

Inequality and the Cost of Electoral Campaigns: Evidence from the Brazilian 2012 municipal elections¹

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“[I]nequality [...] has increased pretty much everywhere in recent decades”

Thomas Piketty, Harvard Kennedy School PolicyCast, April 4, 2018.

“Since the mid-1980s, the amount dumped on elections by campaigns and outside groups, as measured by the Federal Election Commission, has grown 555 percent—faster than even the alarming increases in the costs of health care and private college tuition.”

Michael Scherer, Prateek Rebala and Chris Wilson, The Time Magazine, October 23, 2014.

1. Introduction

In spite of the fact that “Human beings are thoroughly diverse” (Sen, 1992), and that “economic inequality is widespread and to some extent inevitable” (Alvaredo, Chancel, Piketty, Saez, & Zucman, 2018), economics professionals and citizens in general are deeply uncomfortable with the phenomenon of economic and wealth inequality (Jindra, 2014).

Economic inequality is typically studied with a focus on its causes (Fischer, et al., 2018) or, more frequently, with a focus on its consequences. For instance, Wilkinson (1996) shows that “inequality and relative poverty have absolute effects: they increase death rates”; Sen (1997) shows that “the relation between inequality and rebellion is indeed close, and it run both ways”, i.e., inequality engenders rebellions and rebellions cause inequality; Persson and Tabellini (1994) conclude that inequality reduces economic growth; Morenoff et al. (2001) find evidence that “special dynamics, coupled with neighborhood inequalities in social and economic capacity are [...] consequential for explaining urban violence”; Avison and Loring (2006) argue that “that vertical social differentiation,

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as measured by income inequality, and horizontal differentiation, as indexed by ethnic heterogeneity, have significant main effects on cross-national homicide”.

Inequality may also reduce the effectiveness of public policy, as argued by Berliner (2013) in the case of school reform in the US. Furthermore, inequality may be (negatively) associated with happiness, as Graham and Felton (2006) find empirical evidence that “inequality has negative effects on happiness in Latin America”.

One important area of concern for both academic researchers and the general public is corruption, which has been in the spotlight in Brazil for the past years. There too, we can find strong evidence of a correlation with inequality. According to Uslander (2006), there is that same two-way relationship: “Economic inequality provides a fertile breeding ground for corruption and, in turn, leads to further inequalities.” Although, the research stresses the fact that “The path from inequality to corruption may be indirect, through generalized trust, but the connection is key to understanding why some societies are more corrupt than others”. Uslander (2006) focusses on the effect on trust and redistribution: “perceptions of rising inequality and corruption lead to lower levels of trust and demands for redistribution”. Corruption is also often associated with the financing of electoral campaigns (Pinto-Duschinsky, 2002). According to Rose-Ackerman (1997), “bribes are often used to fund political parties and election campaigns”. This is especially of concern for the case of Brazil because of the highly expensive political campaigns. Indeed, according to Samuels (2001), “scholars have suggested that Brazilian campaigns ought to be among the most expensive in the world”. Therefore, it is of fundamental importance for Brazil and other high-cost electoral-campaign countries to understand the determinants of these costs.

A recent literature has been focusing on understanding the relationship between economic inequality and the cost of electoral campaigns. First, Bugarin et al. (2011) present a political economy model showing that there is a theoretic positive correlation between inequality and the cost of electoral campaigns, i.e., the more unequal a society is, the more expensive the electoral campaigns tend to be, in per-capita terms. The authors also present econometric tests for Brazilian local elections for municipal mayors and for municipal assemblies’ representatives for the year 2004. The econometric results strongly support the theoretic predictions. Next, Bugarin (2012) and Bugarin (2015) extend the previous work to include a country that has a completely distinct inequality structure and history: Japan. For the case of Japan, these works test for the relationship between inequality and the cost of the electoral campaigns for the House of Councillors (the upper house) of the National Diet, for the period running from 1977 to 2010. The panel data econometric study also strongly supports the hypothesis that higher local inequalities yield to costlier per capita electoral campaigns.

The present research aims to present yet another empirical test of the theoretic regularity first highlighted in Bugarin et al. (2011). The focus, now, is on the 2012 countrywide municipal elections, both for the Executive (mayors) and for the Legislature (municipal houses of representatives). The main finding is that the theoretic relationship between inequality and the cost of electoral campaigns is also confirmed with the 2012 dataset. Additional findings refer to the role of the size of young and senior population and the role of urbanization of the municipality on the cost of electoral campaigns, as discussed in detail in this essay.

The remaining of the chapter is organized as follows. Section 2 summarizes the main elements and conclusions of the political economy model first presented in Bugarin et al. (2011). It also explains in intuitive reasoning the driving forces behind the theoretic result. Section 3 presents the data and the empirical strategy that is used to test the relationship between inequality and the cost of electoral campaigns in Brazilian 2012 municipal elections. Section 4 presents and discusses the results of the econometric tests for the local Executive and Legislative electoral campaigns. Finally, section 5 concludes by summarizing the main results, discussing some policy implications and presenting new directions for future research.

2. Summary of the main theoretic result and its intuition

This section briefly introduces the political economy model that was used to generate the testable hypotheses linking inequality to the cost of electoral campaigns, summarizes its main findings and explains the rationale behind the results. It draws heavily on Bugarin et al. (2011).

Society is divided in two classes, the “rich” and the “poor”. The rich have high income whereas the poor have low income. There are two parties, the “left” and the “right” party. The electoral campaign begins when each party announces its political platform, which corresponds to a certain amount of per capita public good to be provided. All citizens pay linear taxes on their incomes to finance the public good provision. The tax rate is the same for everyone, so that a rich citizen pays a higher total amount of taxes than a poor one. Each party has a preferred level of public good provision; the left party prefers high public good provision whereas the right party prefers low public good provision. Moreover, parties value office holding, i.e., they also want to win the electoral competition game. Each income class is organized as a lobby interest group that can provide private financing for the electoral campaign. Once a lobby group is informed of each party’s political platform, it decides how much financing to contribute to each one of the parties. Each party uses the resources obtained from lobby groups to influence voters’ electoral choices.

Each citizen, rich or poor, votes in a one-district national election for one of the two parties, according to his preferences. Voters’ preferences are affected by several factors. First, they are affected by the policy announcement of the parties, the total amount of public good to be provided. As the rich pay relatively more for the public good provision, they prefer lower levels of public output than the poor. Therefore, they tend to prefer a party whose platform requires lower public good provision. Conversely, the poor tend to favor a party whose announced platform requires higher public good provision.

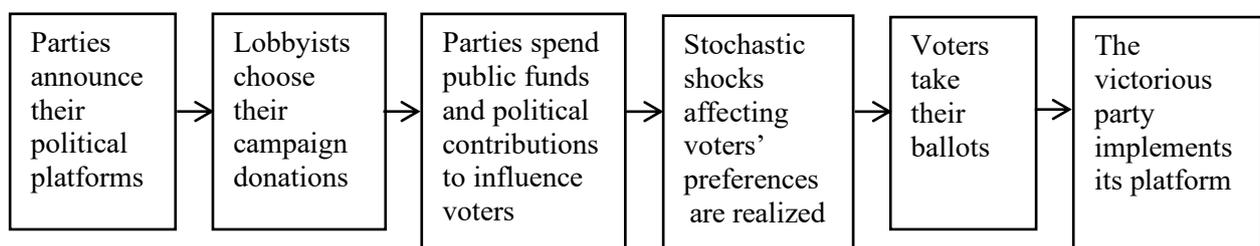
Second, voters’ preferences are affected by the electoral campaign in such a way that they tend to prefer a party that spends more money during the campaign over a party that spends less money. That is the influence effect of the electoral campaign.

Finally, stochastic variables that are realized just before voters take their ballots also affect voters’ preferences. These variables capture the other factors that may affect voters’ preferences that are not related to the parties’ electoral platform neither campaign expenditure. Natural disasters, terrorist attacks, sudden news about politicians’ private lives, corruption scandals, are all examples of such uncontrollable factors that may affect voters’ preferences in favor of one party or the other. These variables introduce a probabilistic voting approach to the model.

Citizens vote sincerely, taking into consideration all deterministic and stochastic factors that affect their preferences. Then, the party that obtains a majority of votes implements its announced platform.

The electoral competition game between parties, lobbyists and voters is presented in Figure 1.

Figure 1 The electoral competition game



A careful analysis of the solution to the model allows to determine how the total amount contributed by the lobbyists to the electoral campaign is affected by a measure of income inequality. The main result is that, under simple regularity assumptions, we can prove a positive relationship between these two variables, i.e., the more unequal a society is, the more contributions the interest groups will be willing to make for the electoral campaign.

The intuition behind this result is rather simple. In more equal societies there is little difference between the two classes' preferred levels of provision of public goods. This commonality of interest, in turn, makes it costlier, in terms of votes, for a party to announce a policy away from the one preferred by the average voter. Therefore, parties announce platforms relatively close to each other. But then, interest groups see little gain in spending money in the electoral campaign, as the differences in public good's provision, depending on which party wins the elections, are small. Hence, the interest groups are less inclined to contribute to the electoral campaigns and, therefore, campaigns are cheaper.

The argument goes symmetrically as a society becomes more unequal. Indeed, higher inequality means a more polarized society where the poor want a much stronger intervention of government in the economy, in order to provide public goods and services, such as social security, unemployment insurance, public health service, etc. Conversely the rich, which are the main financers of the public goods and services provided by the government through their high tax payments, prefer a much-reduced presence of the state in the economy. This, in turn, allows for more divergent policy announcements by parties that represent respectively the poor and the rich. But then, interest groups understand that there is a lot at stake in the election, as a policy very much distant from their preferred one may be implemented if the party farther away from them wins the election. Therefore, interest groups become more willing to contribute to their preferred party, which, in turn, generates more expensive electoral campaigns.

In summary, more unequal societies are expected to yield costlier (per capita) political campaigns.

The remaining part of the chapter aims at developing an empirical methodology for testing this result using Brazilian 2012 municipal elections' data.

3. The evidence from Brazilian 2012 municipal elections: The empirical strategy

3.1. Brazilian electoral system²

Brazil is presently a presidential federative republic composed of 26 states, one Federal District and 5570 municipalities. In Brazilian constitution, the states and municipalities are awarded the status of members of the federation, which grants them constitutional autonomy and discretion.

There are executive, legislative branches at all levels of government and there are judiciary branches at the federal and state levels of government.

The federal government's executive is directed by the President, who is both the head of state and the head of government, and is elected for four-year terms, with one possible consecutive reelection (non-consecutive elections are not restricted). Similarly, each one of the 26 states, the Federal District and each one of the 5568 municipalities elect their governors (states and the Federal District) and mayors (municipalities) for four-year terms with the same reelection constraints. The

² The present section is based on Hagopian (2010) and draws heavily on Bugarin (2015).

elections for president and for governors and the elections mayors are staggered, so that municipal elections are held two years after the presidential and state governor's elections.

The federal legislative branch is bicameral, with the upper house –the Federal Senate– and a lower house –the Chamber of Deputies– forming a balanced system in which no house dominates the other. The Senate is meant to equally represent the higher members of the federation and is composed by three senators from each state and the Federal District. Senators are elected in a SVNT (single voter non-transferable) single state constituency system for eight-year terms in staggered elections that are held every four years for one-third and two-thirds of the Senate in alternation.

The Chamber of Deputies is meant to represent the entire country population and is composed of 513 deputies from the states and the Federal District. Deputies are elected in state-wise single districts in a single proportional system for four-year terms. The size of each state delegation is roughly proportional to its population, with the caveat that there is a minimum of eight and a maximum of seventy deputies per state, which overrepresents the low population and underrepresents the high population states.

The states and municipalities' legislative branches are unicameral and are elected in one single constituency by a single voter proportional system. There are no term limits for the legislative representatives.

Finally, the judicial branch is an independent body composed of specialized courts, which are the Supreme Court, the Superior Court, Regional Federal Appeal Courts (five regions), labor courts, electoral courts, military courts and state courts. Most important to this article, the electoral courts were introduced in 1932 to investigate fraud in the Old Republic elections. The Tribunal Superior Eleitoral, the higher electoral court, rules over all areas regarding parties, mandates of elected representatives, admissibility of candidacies, counting ballot procedures, notably the all-electronic voting system used in Brazil, and even the constitutionality of electoral legislation.

3.2. The data

The cross section econometric analysis for Brazil focuses on the 2012 elections for the Brazilian municipalities. In each of the 5568 Brazilians municipalities, citizens voted simultaneously for mayors in a plurality system with second round runoff in municipalities with a voting population of 200,000 or more, and for local assembly representatives, the municipal legislature, in a proportional municipality-wide single constituency system. The econometric study tests whether the relationship between private electoral campaign donations and inequality suggested by the theoretic model holds for these elections. We follow the econometric strategy presented in Bugarin (2015).

3.2.1. The dependent variables

The main dependent variables are the aggregate electoral contributions candidates running respectively for mayors and for municipal assembly representatives received during the 2012 municipal elections. Campaign resources used at the municipal level can be classified into three categories: party's transfers from national and state level boards; party's transfers from local units (local political action committees); and private donations (including private resources from the own candidates).

Since party funds are partially supplied by public contributions and we are more directly concerned with private contributions, our dependent variables will be based on total campaign resources received by all candidates exclusively from private donations (the third category above) in each

Brazilian municipality, as declared to the Tribunal Superior Eleitoral (TSE, <http://www.tse.jus.br/>), in thousands of *real* (the Brazilian currency denomination³), in current 2012 terms.

The detailed, per candidate data, were obtained from the TSE. The per-candidate data were then aggregated per municipality, for the elections for mayors and for local assembly representatives, to form the variables Executive: total private donations for mayor election, and Legislative: total private donations for local assembly election, respectively. For the case of the assembly elections, since different municipalities have different numbers of legislative seats, running from 9 to 55, we also considered the variable: total expenditure of the candidates for a legislative mandate divided by the number of seats under contest in the corresponding municipality.

Next, we applied the (10-base) logarithm transformation to obtain the dependent variables used throughout the econometric study, in order to smooth the dependent variable and to have a simple interpretation of the effect of the estimated parameters.

There are electoral data for all the 5568 Brazilian municipalities. However, as it will become clear next, we use several fiscal variables as explanatory variables in the econometric study. Since these explanatory variables are not available to all municipalities, our database reduced to 4752 municipalities.

The total private donations for the Executive campaigns in the reduced database amounts to 556 million 2012 Brazilian reals. The corresponding amount for the Legislative campaigns is 777 million reals. However, on the per disputed Legislative seat that amount reduced to 54.1 million reals of donations per disputed seat, roughly 10% of the total Executive private donations.

Table 1 presents the summary statistics of the alternative campaign private donations variables used in this study, before taking the log transformation. Note that the econometric studies only used the log versions of the campaign donations figures. In order to facilitate the interpretation of the summary statistics, we also included the per-voter versions of these variables.

On average, an Executive election received a bit over 100 thousand 2012 reals from direct private contributions to the candidates. Overall, the Legislative elections were more expensive, receiving almost 50% more direct private donations. However, when we divide the corresponding donations by the total number of Legislative seats under dispute, then the average Legislative per-seat donations reduced to about 10% of the corresponding executive amount, roughly 10 thousand 2012 reals.

The most privately supported local Executive election received the highest donations above 5.6 million reals, whereas the most supported local Legislative election received highest donation above 27 million reals. On a per disputed seat account, the Legislative campaign with highest donation received over 1.1 million 2012 reals per seat.

In a per voter account, on average an Executive campaign received about 7.5 reals per voter in private donations, whereas a Legislative campaign received about 9.4 reals per voter. On a per Legislative seat account, that amount reduces to about 96 cents of a real per seat per voter.

The most privately supported Executive election in per voter term received about 115 reals per voter, whereas the corresponding Legislative election received over 2 thousand reals per voter. Again, on a per disputed seat basis, the most supported Legislative campaign received over 220 reals per voter.

To summarize, in aggregate terms, the Legislative campaigns tend to receive more private donations than the Executive campaigns, on average, but when we consider the donations per disputed Legislative seat, then the Executive campaigns are about 10 times more expensive than the Legislative counterparts.

³ According to the Brazilian Central Bank, 1 US dollar was worth 2.65 real in December 31, 2004. <http://www4.bcb.gov.br/pec/conversao/Resultado.asp?idpai=convmoeda>

Table 1: Summary statistics of the private campaign donations variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Total donations for the Executive election (in thousand reals)	5216	106.577	259.367	0.000	5685
Total donations for the Legislative election (in thousand reals)	5216	148.915	689.991	0.000	27100
Total donations for the Legislative election per Legislative seat (in thousand reals per seat)	5216	10.381	36.042	0.000	1154
Total donations for the Executive election per voter (in reals per voter)	5216	7.473	8.888	0.000	115.847
Total donations for the Legislative election per voter (in reals per voter)	5216	9.351	37.842	0.000	2023.335
Total donations for the Legislative election per voter per Legislative seat (in reals per voter per seat)	5216	0.959	4.106	0.000	224.817

Source: Authors' calculations

3.2.2. The explanatory variables

The main explanatory variable is the **Gini** coefficient. According to the theoretic model, we expect the Gini coefficient to be positively related to the cost of electoral campaigns, i.e., the more unequal a prefecture is, the more expensive the electoral process should be. The Gini coefficient was obtained from the DATASUS, which produces it from IBGE 2010 Census data⁴.

Several additional explanatory variables were tested. The main significant ones and their motivation are described below.

Socio-economic indicators:

Revenue: The 10-base log of the municipalities' revenue. This variable is meant to check if private campaign donations are higher or lower in richer municipalities. The municipalities' revenues were obtained from *Secretaria do Tesouro Nacional* (STN, the Brazilian Treasury Secretariat).

⁴ <http://tabnet.datasus.gov.br/cgi/ibge/censo/cnv/ginibr.def>

Educational fragmentation: The voting population's educational fragmentation index. This variable is a proxy for how heterogeneous is the electorate in terms of educational attainment. The index of educational fragmentation is calculated as $1 - \sum_{j=1}^7 \varepsilon_j^2$, where ε_j is the proportion of voters in class j , one of the 7 instruction levels. That index was multiplied by 100 here in order to use a variable ranging from 0 to 100. The instruction level information was obtained from the TSE. Therefore, this variable reflects the instruction level of voters at the moment they register for the first time or when they update their registration. In an educationally homogeneous society all citizens have the same number of years of education at the same age. If that is the case, the variable value takes very small values. On the other hand, in very educationally heterogeneous societies all educational classes are well represented, and the variable takes very high values. Therefore, the more homogeneous is the educational level of society, the lower the educational fragmentation index. The objective of this variable is to test whether educational homogeneity in a society affects, and if so, in which direction, the costs of electoral campaigns.

Demographic indicators:

Percentage of Young Citizens: The percentage of young population, citizens below 16 years old, in the municipality.

Percentage of Senior Citizens: The percentage of senior citizens, 65 years old and above, in the municipality.

Citizens below 16 years old do not vote in Brazil. Senior citizens are not required to vote. Therefore, these two variables aim at testing if higher proportions of young and/or old citizens reduce the cost of campaigns.

Age fragmentation: The age fragmentation index of the voting population, as a proxy for how heterogeneous the electorate is in terms of age span. The index of age fragmentation is calculated as $1 - \sum_{j=1}^{13} v_j^2$, where v_j is the proportion of voters in age class j , one of the 13 age classes. This index has also been multiplied by 100 in order to use a variable which value range from 0 to 100. As for the educational fragmentation index, the higher the index, the more fragmented the population in different age groups.

Percentage of Urban Population: The percentage of urban population. This variable was included in order to check if elections tend to be more expensive in the more urban municipalities.

The demographic data were based on the 2010 population census, IBGE.

Electoral indicators:

ExecCandidates, LegCandidates: The number of candidates running in for mayor and for the local assembly representatives, respectively, and their squares. These variables were included in order to test if higher competition implies higher electoral costs in per capita terms.

Voters: The number of voters in the Municipality and its square. This variable was included in order to check if there are gains of scale that could reduce the per capita cost of campaigns as the number of voters increase.

Runoff: A dummy variable, which takes value 1 where there are run-off elections for mayors. This happens in Brazil in cities with a voting population above 200,000 people, when the candidate with a plurality of votes does not have at least 50% of valid votes. In that case only the candidates who obtained the two highest numbers of votes compete in the second round. It is expected that a second round would increase the cost of elections. Note that a second round only applies to the mayors' elections. Therefore, this variable will only be included in the elections for mayors.

Incumbent: A dummy variable that takes value 1 if there is an incumbent among the candidates for mayor. One would expect that the presence of an incumbent would reduce the competition, given to the incumbency advantage and, thereby, reduce the cost of electoral campaigns. Although this variable should affect the cost of the Executive campaigns, we also include it in the Legislative regression in order to check if the fact that there is a possibility of a second round Executive election may affect the donations to the Legislative candidates as well.

Seats: Number of legislative seats under dispute in the electoral race, and its square. This variable applies only for the legislative elections.

All electoral variables were obtained from the TSE.

Administrative regions variables:

Brazil is divided in five administrative regions, each of which encloses several states. The different regions display different patterns of migration, history, development and GDP, among others. We include the region variables to test whether there is a regional component to the cost of electoral campaigns.

NO: North region includes the states of Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins.

NE: Northeast region includes the states of Alagoas, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, Rio Grande do Norte and Sergipe.

CO: Center-west region with the states of Mato Grosso, Mato Grosso do Sul, Goiás and the Federal District.

SE: Southeast region includes the states of São Paulo, Rio de Janeiro, Espírito Santo and Minas Gerais.

SU: South region, includes the states of Paraná, Rio Grande do Sul and Santa Catarina.

In order to avoid perfect collinearity, the NE region dummy is removed from the regressions.

The summary statistics of the explanatory variables are presented in Table 2. Table 3 presents expected signs of these variables for each one of the three dependent variables' regressions, for each type of election.

Table 2: Summary statistics of the main control variables

Variable	Obs	Mean	Std. Dev.	Min	Max
Gini	5216	0.554	0.068	0.297	0.880
Revenue (million reais)	5216	75.4	632	0	37300
Revenue (log)	4858	17.14	1.04	15.28	24.34
Educational Fragmentation	5216	88.8	5.14	56.5	93.8
Percentage of Young Population	5216	27.3	5.16	7.92	53.73
Percentage of Senior Population	5216	8.43	2.34	1.47	19.82
Age Fragmentation	5216	87.32	2.41	68.88	90.82
Percentage of Urban Population	5216	64.22	21.96	4.17	100
Voters	5216	25609	154283	1017	8619170
Number of candidates for the Executive	5216	2.94	1.34	1	14
Number of candidates for the Legislature	5216	81.78	88.13	11	1717
Seats in the Legislature	5216	10.80	3.36	9	55

Source: Authors' calculations

Table 3: Expected signs of the control variables

Variable	Expected signs				
	Executive		Legislative		
	Total private donations	Log of total private donations	Total private donations	Log of total private donations	Log of total private donations per seat
Gini	+	+	+	+	+
Revenue	+	+	+	+	+
Education frag	+	+	+	+	+
Young	-	-	-	-	-
Senior	-	-	-	-	-
Age frag	+	+	+	+	+
Urban	-	-	-	-	-
Voters	+	+	+	+	+
Number of Executive candidates	+	+			
Number of Legislative candidates			+	+	+
Seats			+	+	-
Incumbent	-	-	?	?	?

Source: Authors' calculations

4. The Cross-Section Regressions

The econometric evidence for the Brazilian 2012 municipal elections is separated in the two different elections, for mayors and for local house of representatives. For the Executive (mayors) election, we used the total private donations and the log of total private donations as dependent variables and for the Legislative (local house of representatives), we used total private donations, the log of total private donations and the log of total private donations per Legislative seat. The results using the total donations dependent variable and the log of the total donations variables are very similar. Therefore, for the sake of space and easy of interpretation, we expose here only the results with the log variables.

4.1. The 2012 elections for mayors

First, we regress the total private donations for the mayor's elections on the explanatory variables.

We used robust standard error estimates. Table 4 presents the regression results.

Except for the percentage of senior population, the percentage of urban population and the square of the number of voters, all other variables are significant. The overall R^2 is 35.6%

The main variable, the Gini coefficient is significant at 1% level and points to a positive relationship between inequality and the cost of electoral campaigns. Indeed, an increase in 1 in a scale of 100, i.e., one percentage point increase in the Gini, yields almost 1% increase in the cost of the election for mayors.

The municipality revenue also affects the positively the cost of electoral campaigns: a municipality that increase one percent its income, increases but roughly 0.6% the cost of electoral campaigns.

More fragmented municipalities, either in terms of education or age of its citizens, tend to have more expensive campaigns.

Having more youngsters also increases campaign contributions, as having more voters also do, but the economic effect of the number of voters is actually very small.

The number of candidates raises very significantly (1%) in a concave way the log of donations. Every additional candidate increases, on average, 0.2% the contributions.

Having a runoff election and having an incumbent running for reelection tend to increase the cost of elections as well, although these variables are significant only at the 5% level.

Finally, in terms of the regional distribution of donations, the Northeast region being the reference, the Centerwest region has equivalent donations, and the North region has higher contributions, whereas the South and Southeast regions have relatively less contributions, on average.

It is noteworthy that the effect of the Gini coefficient is the strongest one among all explanatory variables, both in terms of significance (1%) and in terms of magnitude (0.94). Next, municipality revenue plays the biggest impact on private contributions, as expected.

Table 4: Private electoral campaign donations and inequality
The elections for mayors' cross-section regression in Brazil

Dependent variable:

Log of total donations for the Executive election campaigns in 2012 Brazilian reais

Explanatory Variable	Coef.	Robust	<i>t</i>	<i>P</i> > <i>t</i>	[95% Conf. Interval]	
		Standard Error				
Gini***	0.938	0.267	3.52	0.000	0.416	1.461
Log of revenue***	0.633	0.026	24.48	0.000	0.582	0.683
Education Fragmentation**	0.009	0.004	2.09	0.037	0.001	0.017
Young population***	0.081	0.017	4.72	0.000	0.047	0.115
Senior population	-0.003	0.012	-0.23	0.817	-0.026	0.020
Age Fragmentation***	0.153	0.035	4.43	0.000	0.085	0.221
Urban population	0.000	0.001	0.26	0.798	-0.002	0.002
Number of candidates***	0.206	0.044	4.66	0.000	0.119	0.292
Number of candidates squared***	-0.019	0.005	-3.93	0.000	-0.029	-0.010
Number of voters*	0.000	0.000	1.70	0.090	0.000	0.000
Number of voters squared	0.000	0.000	-1.53	0.127	0.000	0.000
Runoff**	0.352	0.138	2.56	0.011	0.082	0.622
Incumbent**	0.124	0.058	2.13	0.033	0.010	0.238
NO*	0.131	0.075	1.74	0.082	-0.016	0.279
CO	0.014	0.078	0.17	0.861	-0.139	0.166
SE***	-0.330	0.054	-6.15	0.000	-0.436	-0.225
SU***	-0.491	0.062	-7.92	0.000	-0.612	-0.369
Constant***	17.192	3.515	-4.89	0.000	-24.084	-10.301

4764 observations, R²: 0.3560

*** Significant at the 1% significance level

** Significant at the 5% significance level

* Significant at the 10% significance level

Source: Authors' calculations

4.2. The 2012 elections for the municipal assemblies

We analyze three regressions for the Legislature elections: Total donations, the log of total donations, and the log of total donations per available seat. For the sake of concision, we present and discuss here the latter.

Table 5: Private electoral campaign donations and inequality

The elections for local house of representatives' cross-section regression in Brazil

Dependent variable:

Log of total donations for the Legislative election campaigns in 2012 Brazilian reais per seat under dispute

Explanatory variable	Coef.	Robust Standard Error	<i>t</i>	<i>P</i> > <i>t</i>	[95% Conf.	Interval]
Gini***	0.8271	0.3205	2.58	0.010	0.1988	1.4554
Log of revenue***	0.6646	0.0499	13.31	0.000	0.5668	0.7625
Education Fragmentation***	0.0142	0.0045	3.15	0.002	0.0054	0.0230
Young population***	0.1313	0.0219	6.00	0.000	0.0884	0.1742
Senior population	-0.0009	0.0143	-0.06	0.948	-0.0289	0.0271
Age Fragmentation***	0.3442	0.0449	7.66	0.000	0.2561	0.4323
Urban population***	-0.0078	0.0011	-7.07	0.000	-0.0099	-0.0056
Number of candidates	-0.0002	0.0007	-0.25	0.799	-0.0015	0.0012
Number of candidates squared	0.0000	0.0000	0.53	0.593	0.0000	0.0000
Number of voters	0.0000	0.0000	0.36	0.723	0.0000	0.0000
Number of voters squared	0.0000	0.0000	-0.25	0.799	0.0000	0.0000
Runoff	0.1491	0.0964	1.55	0.122	-0.0399	0.3381
Incumbent*	0.0679	0.0373	1.82	0.069	-0.0053	0.1411
NO	-0.0016	0.0012	-1.33	0.184	-0.0040	0.0008
CO	0.0660	0.0657	1.00	0.315	-0.0628	0.1949
SE***	0.5501	0.0889	6.18	0.000	0.3757	0.7245
SU	-0.0726	0.0886	-0.82	0.412	-0.2462	0.1010
Constant***	-0.2577	0.0630	-4.09	0.000	-0.3811	-0.1342

4724 observations, R^2 : 0.2801

*** Significant at the 1% significance level

** Significant at the 5% significance level

Source: Authors' calculations

Note that for this study the number of seats under dispute variable and its square have been introduced, in order to test for a nonlinear effect of that variable. We used robust standard error estimates. The regression results are presented in Table 5.

This regression confirms the main results of the previous one. The most important one is that it reinforces, also at the 1% level now, that higher inequality induces higher volumes of private campaign contributions. On average, a 1 point (in a 0-100 scale) increase in the Gini coefficient implies a 0.82% increase in the donations for the Legislative campaigns.

Most of the estimated coefficient follow a similar pattern to what was found in the Executive elections' regression. The main qualitative differences are discussed next.

Education Fragmentation increases the cost of electoral campaigns now at the 1% significance level. The percentage of urban population is now highly significant (at the 1% level) and negative. Although its effect is economically reduced, urban concentration tends to foster cheaper electoral campaigns.

Possibly because of the fact that the cost has been divided by the number of seats, there is no more role played by the number of candidates nor the number of voters.

Furthermore, as expected, the fact that there is possibly a runoff election for the legislature does not affect the cost of the Legislative campaigns. However, the fact that there is an incumbent running for mayor does contribute to increasing the donations to the Legislative campaigns.

In terms of the regional distribution of donations, the results for the Legislature differ strongly from the Executive elections. All regions are essentially equivalent, except for the Southeastern region, the richest Brazilian region, in which the Legislative campaigns tend to be more expensive. On average, Legislative electoral campaigns are 0.55% more expensive in per seat terms in that region.

5. Conclusion

The present research follows a line of research that is motivated by the increasing concerns about campaign financing manifested all over the world. In order to better understand what explains the high cost of elections, that research focuses on one possible explanation: income inequality among citizens.

The role of income inequality on the cost of electoral campaigns has been the subject of several studies since the original research in Bugarin et al. (2011). That research's model shows that the higher the level of income inequality, the more private contributions to the electoral campaigns there will be.

The empirical approach presented here is meant to contribute to that literature by testing the hypothesis of positive correlation between inequality and the cost of elections using the 2012 Brazilian municipal elections both for the Executive and the Legislature. The original data consist of cross section information on the year 2012 municipal elections for Brazilian 5568 mayors and local legislatures. The number of observations reduced to about 4700 when we excluded missing data from the explanatory variables.

The present research strongly supports the theoretic findings. On average, an increase in one percentage point, from 50 to 51 percent, for example, in the Gini coefficient, increases private contributions to the executive campaigns by 0.9% and the per-seat contributions to the Legislative campaigns by 0.8%.

The model's findings contribute to the recent debate on the resilience of inequality both in developed countries, such as the USA, and in newly re-democratized societies, such as in Latin America. Indeed, the higher costs of electoral campaigns in high-inequality countries create a money-bias in the political process; that bias favors richer constituencies that have higher means to contribute, but also wish to pay less taxes; therefore, public policy tend to be less redistributive, in spite of a lower median income voter in these societies.

The main policy implication of this research regards the regulation of campaign financing. It is no coincidence that Japan has become more concerned about this issue exactly as inequality has grown in the country, for example (Horiuchi and Saito, 2008; Reeds, 2002; Ferdinand, 2003). Indeed, as the research suggests, higher inequality means more expensive campaigns, controlling for other explanatory variables, which, in turn makes politicians more vulnerable to corruption. A legislation that associates minimal public funding with rigid control of private funding may reduce such vulnerability. As for a country like Brazil that has had incredibly high historical levels of inequality, the implication is very clear: in order to maintain institutional stability and the trust of citizens in the electoral process, it is paramount to reduce inequality. The country has achieved significant and continual reductions in inequality over the last 15 to 20 years; however, inequality levels are still very high and are on the rise again after the financial world crisis of 2008. Therefore, a strong effort still needs to be made to reduce income heterogeneity in Brazilian society.

In addition, the econometric investigation highlighted several significant variables that also explain the cost of elections. For the case of Brazil, the second most important contributor to the cost of campaigns is the municipality revenue. The richer the municipality, the more private contributions its electoral campaigns receive, both for the Executive and for the Legislative elections.

For the case of the Executive campaigns, the existence of a runoff elections (cities with a population over 200,000 inhabitants) increases by 0.3% the volume of contributions.

The educational fragmentation of the population, the age fragmentation of the population and the percentage of young population (citizens below 16 years old) consistently increase the contributions both to the Executive and the Legislative elections. Therefore, the country has an additional incentive to strongly invest in public education, as it will reduce the vulnerability of politicians.

A somewhat unexpected result is that the presence of an incumbent running for mayor also increased private contributions to the Legislative campaigns.

A result that is specific to the Legislative campaigns refers to the fact that more urbanized municipalities tend to have less expensive campaigns, possibly due to the lower displacement costs for the candidates.

There is no clear regional trend that is common to both electoral campaigns. On one hand, the Southeast and the South regions tend to have cheaper electoral campaigns for mayors. On the other hand, the Southeast region tend to have more expensive Legislative campaigns.

The econometric studies highlight several variables that impact the cost of elections as measured by total private donation. Others still need to be analyzed in additional empirical studies. In particular, the role of incumbency has not been explored for the Legislative candidates and could present policy implications, including a contribution about term limits in the Legislature. Additional explanatory variables could also be included, such as the geographic size of the municipality. A panel data analysis using several successive campaigns could bring additional light on the time and individual effects of elections in the country. These additional explorations are left here as suggestions for further research.

Finally, the political economy model in Bugarin et al. (2011) and in Bugarin (2015) focuses on the role of inequality on the cost of elections and does not include any of the additional significant explanatory variables used in the econometric studies. Enriching the theoretic model to better understand these additional effects is also left here as a suggestion for further research.

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