Analyzing the gender quota effect in Brazil's political parties

Aishameriane Schmidt*

February 25, 2017

Abstract

We study the effect of a compulsory quota system for Brazilian political parties that establishes, since 2009, a minimum of 30% candidates from each gender for the proportional-elected chairs. Using data of approximately 5.000 cities from the past four city council elections - 2004 to 2016 - along covariates from the 2010 census data, we constructed a panel model using random effects. The coefficient associated with the quota periods were positive related with the share of women elected for city councils, showing that although the women representation is still small, there are evidences of the share of women elected changing after the bill.

1 Introduction

Historically, there is a huge gap in women's share at public offices. Although women represent half the world population, data from 190 countries ("Women in Parliaments" 2017) shows that half of them have a proportion of women equal or below 29% in the lower (or single) house. The number is even smaller when looking the seats occupied by women on upper houses (Senates): half the countries have less or equal than 13.5% women in their composition.

There are evidences that the increase of women participation in legislative and executive offices leads to more equality policies and better representation towards women, children and minorities. Women officeholders (compared to men counterparts) tend to have a better connection and thus a better understanding of women's specific necessities as a group, promoting general welfare (Braga and Scervini 2017; Dodson 2006).

In order to boost women participation in politics, several countries are implementing gender quotas. The most common is the party-level quotas, where each party chooses to adopt a minimum percent of female candidates. Another type that has been increasing in the last decades is the gender quota law, that imposes for the parties the minimum percentage of women, among the candidates presented for legislative offices. More than 100 countries have quotas at party-level or national level, in form of a bill (Franceschet, Krook, and Piscopo 2009). It is estimated that a gender law increases in approximately 8% the number of women elected (Baldez 2004) and they tend to "boost" female participation in politics, breaking the hegemony of the past groups who held power. One study used regression models to evaluate the determinants of female participation in the Brazil and USA Senates (Bohns). They end up concluding that the gender is not the biggest obstacle, the major determinant for Senate elections is the career as professional politician.

In Brazil, more than half the population is composed by women but the country is in the 155th position in the ranking of female representation in parliament("Women in Parliaments" 2017). The first brazilian female mayor, *Alzira Soriano*, was elected in 1928, even before women had permission to vote, which was achieved only in 1932. Since Alzira, things didn't change much: in the last 2016 local elections, only 13.5% of the people elected for city councils were women. The last change in Brazil's law regarding electoral quotas for women imposes a more rigid control over parties - they cannot have male candidates if the female minimum percentage is not met. Since the passing bill, the country had two local elections. Some authors investigated the phenomena (Miguel 2008, Araújo 2001) but they lack an econometric model and their data are before the recent law.

In this study we investigate the gender quota effect in the share of women elected for city councils in Brazil using a panel data approach, to compare two elections before the law and two elections after. We divided this paper as follows: first, the Brazilian election system is briefly presented

*This is the final draft for the Microeconometrics Course (2016/2) from the Master's Degree program in Economics from Universidade Federal de Santa Catarina. Professor: Francis Petterini, PhD. Student's contact: aishameriane at gmail dot com

along some other studies about female representation in the country; the second session explains the proposed model and the obtained results. In the conclusions we discuss if the results are consistent with another studies and the validity of our findings. All data and codes are available in a digital repository[1].

2 Literature Review

The **Federative Republic of Brazil**, or Brazil, is the largest country in South America and in Latin America. It has gone through several government regimes since its independence from Portugal in 1822 and only in 1984 the last totalitarian regime has ended. Brazil is nowadays a federative presidential republic, and the current Constitution is from 1989 and allows both women and men to run for public offices.

The country has a bicameral parliamentary representative system, composed by the Federal Senate (Upper House) and the Chamber of Deputies (Lower Chamber). Deputies are elected based on a system of proportional representation in each one of the 26 states plus the federal district. The number of seats per state in the Lower Chamber varies accordingly the state's population size and can range from the minimum of 8 to the maximum of 70 deputies. The *major elections* occur every four years and the electorate vote simultaneously for president, state governors, federal deputies, senators[2] and state deputies. They last occurred in 2014 and the voting system uses the criteria of open party list.

Interweaving major elections, the municipalities have their local elections, were city counselors and mayors are elected. The last local elections in Brazil were in 2016 and occurred simultaneously for all 5.570 cities. City councils size varies from location to location and it is up to the local legislation to establishes the number of seats.

Brazilian women acquired the right to vote only in 1932 - a gap of 43 years after the republic proclamation (and thus, institution of male vote). This could be one reason to explain the differences in women contemporaneous representation in public offices, but as pointed out by previous studies (Araújo 2003), Brazil was ahead some European countries in this matter. Another reason cited by the same study was the several changes in the political system that resulted in 38 years under dictatorial government in the last century.

After the dissolution of the Military Government and the re-democratization process in 1986 there were a uprise from 8 to 26 women participating in the Chamber of Deputies. The "lipstick lobby" (elected congresswomen) along members of women movements were part of the group who wrote the Constitution from 1988, which is valid until today. This participation was the beginning of the process to bring the women's movements and groups into the political scenario. Also, the Constitution still today represents major advances towards general population rights and specifically towards minorities groups, women included (Araújo 2003).

The gender quotas for parties in Brazil

The debate for female quotas in political spaces were initiated by the parties in the late 80's and a minority adopted the internal quotas for the 1990 elections. The first law obliging parties to have a minimum proportion of women among their candidates (20%) to the Lower Chamber was passed[3] in 1995, but due to the lack of sanctions, it's effect was minimum.

The second attempt[4] extended the quotas for all proportional elected public offices (city council, federal and state chambers) and raised the minimum female's candidate share to 30%. Again, there were no sanctions to the parties. In fact, the same law increased the number of candidates each party could present, so the numerical increase in the female candidates were not relevant proportionally (Miguel 2008).

Only in 2009, almost fifteen years after the first attempt, there was an effective change in the law[5] and the 30% share of women among the candidates became mandatory for parties and coligations. The original text also intended to increase the time destined to female candidates on TV and use money from the commom parties fund to promote women participation on politics, but these two were never fully implemented. The penalties for parties and coligations to force the adherence in the

1. https://github.com/aishameriane/Microeconometrics—2016-1
2. Senate mandates are the only ones with eight year duration - with alternate renovation of $\frac{1}{3}$ and $\frac{2}{3}$ of its composition at every major election - and the only legislative chair that don't use proportional representation.
3. Federal Law number 9.100 from 29th, September 1995.
4. Federal Law number 9.504 from 30th, September 1997.
5. Federal Law number 12.024 from 29th, September 2009.

affirmative action are pointed out as enhancement to the quota effectiveness (Paxton and Hughes), so its natural to question whether the last legislation change had an impact in the number of women elected.

There are some analysis in the media about the gender gap in the elections that occurred since 2012, including analysis about the "ghost candidates": women candidates with zero votes after the elections, uprising some serious questions about the quota efficacy. Although the obvious increase in the number of women among the candidates, we were not able to locate studies evaluating its impact on the number of women effectively elected. Also, no studies using Brazil's electoral data into econometric models to evaluate the gender quota were found.

3 Methodology and Analysis

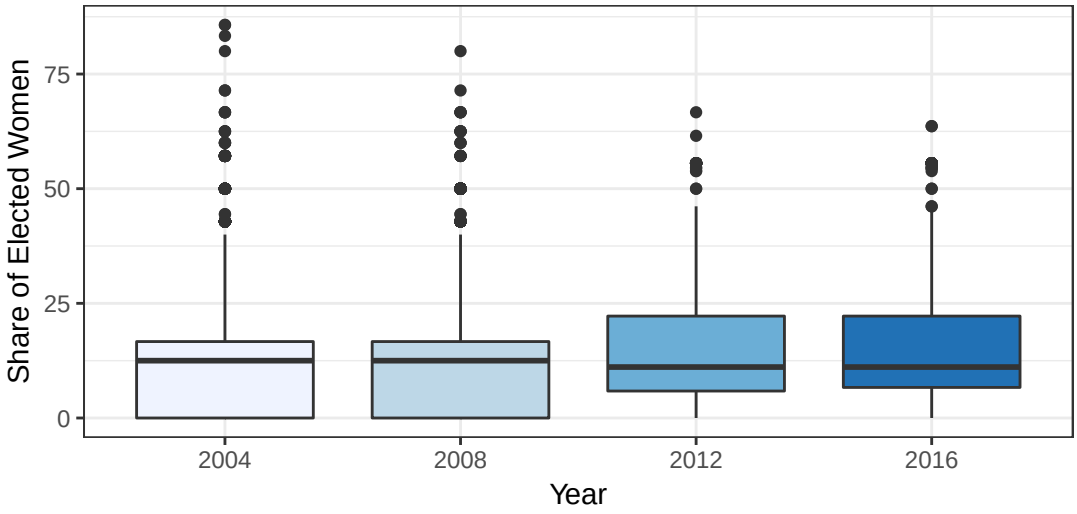
The data from the last four local elections were acquired[6], with the list of all candidates[7] for all cities in Brazil. These data contains the following information (for each candidate):

1. Election year and turn[8];
2. City name, TSE unique code, state;
3. A categorical value to inform whether the candidate is running for Mayor or City Councelor;
4. Information about the candidate party, coligation and total spent on campaign;
5. Personal information, such as scholarship, age, gender, race, etc.

I developed[9] a computational routine implemented in R language to extract from the raw information a data frame containing, for each Brazil's city, 1) the number of candidates to city council; 2) the number of women candidates to city council; 3) total number of people elected and 4) total number of women elected, both also in respect to city council seats. From this, it was possible to calculate the share of women among the candidates and share of women among the elected.

Figure (1) has the evolution of women candidates and women elected in these years.

Figure 1: Distribution of the proportion of women elected in city council elections in Brazil - 2004-2016



Font: Author, using data from TSE.

Analyzing the graphs in figure (1), we note that the median share of elected women for the last two elections were slightly higher and their distributions seem to have a lower variance. The data from the first two periods have outliers surpassing the 70% in y axis, showing bigger variability. They

6. Available at the TSE (Tribunal Superior Eleitoral) and downloaded using the -R- package *electionsBR* (https://cran.r-project.org/web/packages/electionsBR/electionsBR.pdf).

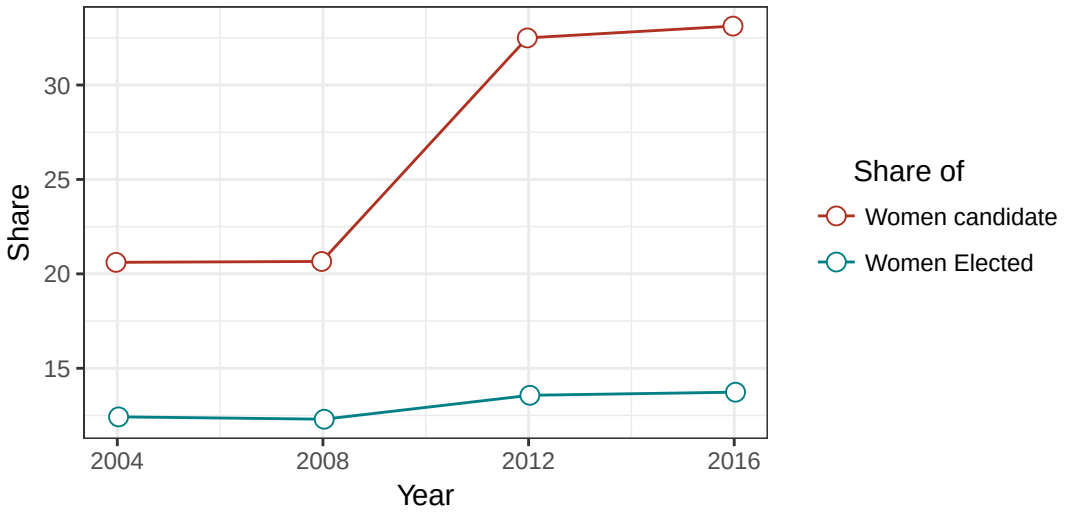
7. From now on, we are talking only about candidates for city councils.

8. City councils elections does not occur in turns.

9. This paragraph is here just to explain the process to the professor, later on we can remove it from the final text. The routine is available at the Github repository provided in the beginning of the text.

also have lower 1st quartile, suggesting a distribution with a large quantity of lower values on its left side.

Figure 2: Evolution of the proportion of women candidate and elected for city councils share in the last 4 local eletions

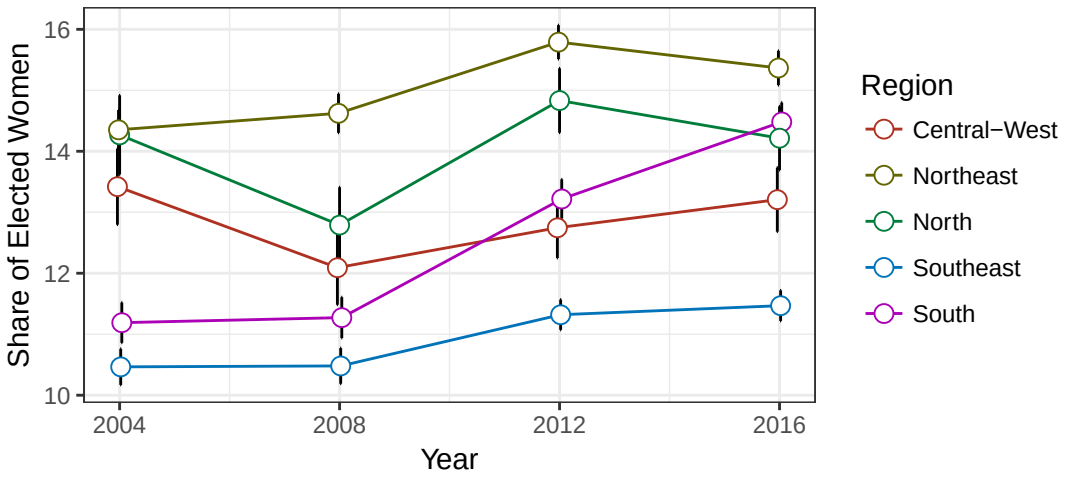


Font: Author, using data from TSE.

We can see in figure (2) the average "raw" effect of the law: from 2008 to 2012 there were a major increase in the female proportion among candidates (from 20.66 to 32.50), which is near the established 30% value. The same visual effect is cannot be observed in elected women: although there is a increase, the change was from 12.30% in 2008 to 13.56% in 2012. This raises the question whether the increase was due only by chance or, if controlling for other variables the quota was really effective in increasing the number of women in Brazilian City Councils.

One could ask about differences in regions: since we are dealing with cities data and they are inserted in a macro context (regions of the country) it is possible that the behavior of the share of women elected varies from region to region. Figure 3 has the same structure that figure 2, but now the region is functioning as grouping variable. It is possible to see in the figure different patterns for the five regions, but none suffered a decrease between 2008 and 2012, indicating that there are share differences across regions, but the increase pattern is stable between 2008-2012.

Figure 3: Share of elected women in city council elections, per region, in Brazil - 2004-2016



Font: Author, using data from TSE and IBGE.

It is relevant to notice that the less developed (in terms of industrialization, literacy and social indicators in general) regions of the country - North and Northeast - have the higher female participation in seat councils when compared with the other regions. This phenomena was studied specifically for the Brazil case by Miguel and Queiroz (2006). In their study, they developed a success rate index to compare the different regions, arguing that the share of elected women alone could not incorporate intrinsic factors like city size - elections in bigger cities tend to be more difficult for individual candidates to stand out in the candidates pool. They were not able to find variables that explained this fact, probably due to lack of econometric models (it's a descriptive study).

Brazil had, in 2010, 5.565 cities, divided between the 26 states. To match[10] the data from TSE with data from 2010 National Census, we had to merge the data frames using the keys provided here: https://github.com/tbrugz/ribge. Because of duplicate keys, missing names and some cities that didn't exist in all years considered, some observations were lost[11]. In total, we were able to get information from 5.561 cities for 2004, 5.536 for 2008, 5.563 for 2012 and 5.563 for 2016.

To act as controls in the model, we selected variables from the 2010 census[12]:

1. Gini index,
2. Human Development Index - HDI[13],
3. % of population living in urban and rural areas,
4. % of female in the population,
5. Life expectancy (in years),
6. % of people living in poverty,
7. Fertility rates,
8. Illiteracy rates,
9. GDP per capita
10. Country Region[14].

Some variables, due high correlation (measured by Spearman's correlation coefficient), were dropped out to avoid multicolinearity. Table (3) has the corresponding correlations. None of the covariates has a high correlation with the share of women elected, in fact, all correlations are between the interval $[-.1, .1]$, which is interesting, since voting preferences are influenced by several factors, including scholarity and fertility rates and others ((Braga and Scervini 2017; Araújo 2003; Bohns 2007)).

For the continuous pre-selected covariables (Gini Index, HDI, Expected Years of Study, Fertility Rate and Percentage of Urban Population), we have the following descriptives:

Table 1: Descriptives of the census data pre-selected as covariates

	Gini	HDI	Study	Fertility	Urban
Minimum	0.28	0.42	4.34	1.21	4.18
Mean	0.50	0.66	9.46	2.19	63.83
Maximum	0.81	0.86	12.83	4.89	100.00
S.D.[1]	0.07	0.07	1.10	0.50	22.03
Variance	0.00	0.01	1.21	0.25	485.24

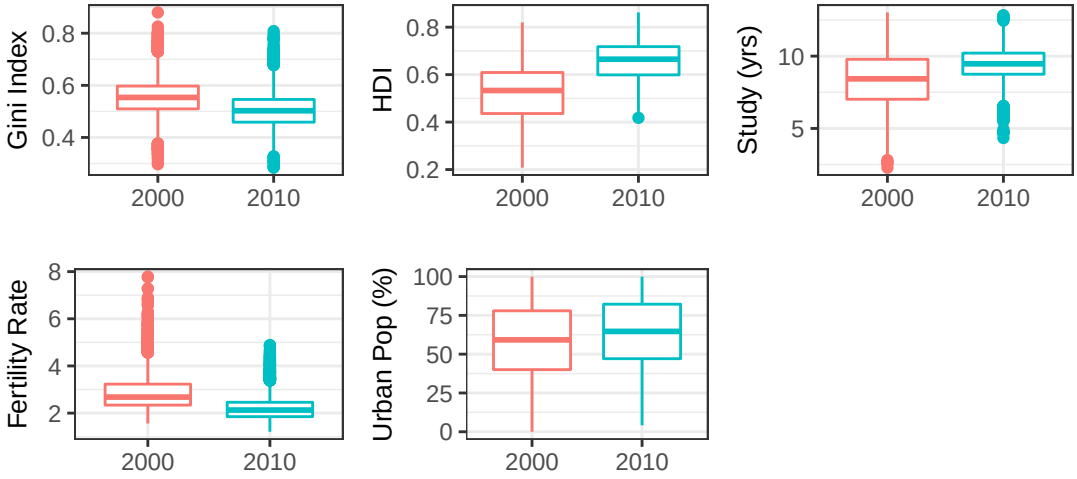
Font: Author, with data from 2010 census (IBGE).
[1.] Standard Deviation.

These characteristics alone doesn't tell much about about the variables. We can see that there is little changes between the municipalities for the 2010 data. But we need to verify for temporal stability of these measures, since our analysis comprehends a timespan of 12 years. The graphs shown

10. Another paragraph that will be dropped.
11. Obs: I really don't know how much data were lost and didn't checked everything to assure data integrity. I made some tests and it seems ok, but, for example, I know that not every city in the database has 4 observations. To verify which ones and drop them out, it would take a lot of time, so I added this to my future self's to-do list.
12. From the IBGE - Instituto Brasileiro de Geografia e Estatística. The microdata is free to download at the institution's website: http://www.ibge.gov.br/home/estatistica/populacao/censo2010/resultados_gerais_amostra/resultados_gerais_amostra_tab_uf_microdados.shtm
13. Adapted for municipalities.
14. There are five major geographic regions in Brazil: Central-West, Northeast, North, Southeast and South.

in figure (4) exibits the covariates behavior in the last two National Census (2000 and 2010). We can see that the country has experienced an enhancement in its indicators: Gini Index distribution for the cities was slightly smaller in 2010 than 2000 and HDI was higher. At the same time, the expected years of study also suffered an increase and the fertility rate suffered the major changes. Urban population tended to be equal. The changes observed could be a challenge for the model, since we should include these time-varying variables in the model (they do not appear to be a fixed effect in respect of time).

Figure 4: Temporal comparison between 2000 and 2010 values for the selected covariates



Font: Author, using census data from IBGE.

Our main question is: "what's the quota impact in the changes of gender composition in city councils?". To properly answer that, we need to accommodate the data in a structure that considerate a dummy variable marking the periods before/after the law and then proceed to estimate its coefficient and also deal with the time and city effects.

The theoretical model proposed is:

$$ln(s_{it}) = \alpha D_t + X_i\beta + EF_i + EF_t + \mu_{it} \tag{1}$$

Where:

- i indicates the City and goes from 1 to $5.5k$ Brazilian cities;
- t indicates the period of the election (there are 4 periods available);
- s_{it} is the share (proportion) of women in the City i that were elected in election t (so each County has 4 s, one for each period);
- D_t is a dummy variable indicating the period before ($D_t = 0$) and after the law ($D_t = 1$) - we are interested in estimating its coefficient, α;
- X_i is a matrix with census data from City i;
- EF_i is the fixed effect for the City i;
- EF_t is the fixed effect for period t.

Our proposal is to use panel model methodology to accommodate the data structure: since there are 4 observations for each city, estimating equation (1) using ordinary least squares can produce biased results. In other words, it is possible that the increase observed in women participation is due to sociocultural aspects and other omitted variables inherent from each city and not due to the change in law. We are calling this omitted terms as unobserved effects.

The following subsection explains a little further the modeling strategy and it is based on chapter 10 from (Wooldridge 2011).

The nature of unobservable the effects

Two situations arise: 1) the nature of the unobserved effects is time-constant; 2) the nature of the unobserved effects can be treated as random.

The basic model can be written as:

$$y_{it} = x_{it}\beta + c_i + \mu_{it}, \quad t = 1, \ldots, T \tag{2}$$

Where:

- x_{it} is a vector with observable information that can change during time but not for the same i, variables changing between the individuals i and not during time and variables that varies in i and t - in our problem the variables varies in i but not in t, because all the information from census refers to a single year for each city;
- c_i is the unobservable effect for each individual i - in our study, c_i accounts to variables that can influence in the proportion of elected women for each municipality but we cannot directly observe - observe that they are not time varying;
- μ_{it} it's an aleatory variability and we assume that it is not correlated with X.

Our discussion about the nature of the c_i term is whether will be treated as a fixed effect or random effect. Wooldridge argues that the main focus should be about the relationship between c_i and x_{it}. If their relationship is such as $Cov(x_{it}, c_i) = 0,\ t = 1, \ldots, T$, then it should be considered as random effect. Otherwise (if the correlation is not equal 0), there is evidence that the c_i is somehow another characteristic of the i individual, but it doesn't change over time. In order to choose between the two types of effects, it is recommended to use the Hausman specification test.

Adjusting the model and results

All estimatives in this session were obtained using the *plm* R package[15]. The first model tried was the Fixed Model with two-way effects: in this model we assume that there are variability on both time and subjects. For this model, none of the coefficients were statistically different from 0 (for a significance level of 5%), so we are not reporting the obtained values here[16].

Table 2: Model estimatives

	Dependent variable: $ln(share_{ew})$[1]	
	Fixed Effects	Random Effects
Quota dummy[2]	**0.353*****	**0.353*****
	(0.016)	(0.016)
Northeast	-	**0.101****
	-	(0.046)
Southeast	-	**-0.338*****
	-	(0.046)
South	-	**-0.135*****
	-	(0.048)
Central-West	-	**-0.144*****
	-	(0.058)
Constant	-	**1.862*****
	-	(0.042)
Observations	22.205	22.205
R^2	0.028	0.031
Adjusted R^2	-0.297	0.031
F Statistic	480.195*** (df=1;16641)	141.978*** (df = 5; 22199)

$^{*}p < .1$; $^{**}p < .05$; $^{***}p < .01$

[1.] Logarithm of elected women share.

[2.] Dummy is 0 in the period before the quota law; 1 otherwise.

15. https://cran.r-project.org/web/packages/plm/vignettes/plm.pdf
16. I left this paragraph just for the sake of the grading but it should not stay in the final version for submission.

Second and third models were fixed-effect and random effects, respectively. For the random effects model we first used all covariates from table 3 and then estimated a new model using only the ones with statistically significant coefficients (considering $\alpha = .05$). Results are reported in table 2.

Using the Hausman test we opted for the random effects model ($\chi^2 = 1.10$, p-value= 0.29). Then, we proceeded to a Breusch-Pagan test to verify if the panel effects are not significant (variance across cities is zero). Since we obtained $\chi^2 = 1602$ (p-value $< .001$) we sustain the option for the random effects model.

The coefficient of the dummy for the quota presence/absence is equal to 0.353. Since this is a log-linear model, we apply the formula $100 * (exp(quota - dummy - coef) - 1)$ and obtain 42.31%. The signals of the regions coefficients are consistent with figure 3. Since the reference region is North and only Northeast is above the north line, we would expect that the women elected share in the other regions to be smaller.

Using the data from TSE we were able to get a list from all the cities in Brazil and their correspondent number of candidates for city councyl (total and female) and the number of elected people (again the total and female, in order to calculate the share of women elected). Using data from the 2010 census as covariates, we estimated the model with fixed and random effects and the Hausman and Breusch-Pagan tests leaded us towards a random effects model.

The final model incorporated information about the quota law, encapsulated into a dummy variable and information from regions. The regions significance are not a surprise here, we had investigated in the descriptive analysis the relationship of the region and the women elected share in city council. Miguel and Queiroz have a study where they discuss the regions differences in more detail, although they don't execute any econometric model.

We found out that the gender quota represented an effect of approximately 42% in proportion of women elected for city councils. Comparing with the descriptive analysis this could seems a little off, but in terms of average effect could make sense. Ideally, more models should be estimated in order to have benchmarks for the random effect model.

4 Conclusions

In this study we showed the gender quota effect in the proportion of women elected for city councils in Brazil. The effect is positive in the sense that the quota increases the percentage of councilwomen elected. We also found a relation between the share of women elected and the country region: the north and northeast regions have cities with most female representatives.

We were not able to find relation within subjects and proportion of women elected by their other characteristics (like fertility rate, life expectancy, etc). This could be due to lack of information to give more variability in these measures. One future study could incorporate data from 2000 census to observations before quota and use 2010 data for the periods after the law. Either way, it would be expected that changes across time change the voters preferences and thus changes the composition of the people elected.

Dodson (2006) points out that there is a difference between *descriptive* and *substantive* representation of women. In the first one we have representatives that look like the ones they represent and in the second one the representatives advocate and act like one of the group they represent would. One example is the 103rd (American) Congress who had the same number of women occupying seats in comparison to the 104rd Congress and the first accomplished much more results in terms of projects and laws towards feminine representation. The author suggests this could be result of the liberal alignment of the representatives. Bringing this concept to Brazil's reality, although the quota system seems to help increase the participation of female politicians in public offices, the is the necessity to evaluate the quality of this participation. Paxton and Hughes points out that quotas reserving a number of seats tends to be more effective than candidate quotas because the last inflates the number of candidates and does not guarantee that the representation will rise in the offices ((Paxton and Hughes 2015)).

The gender quotas brought another problem: the increasing number in phantom candidates. They are candidates who had their candidacy accepted but didn't had votes (their vote count was equal 0). This could be one way the parties found to cheat the law and demonstrate that the quota alone is not sufficient, there should be another complementary actions and programs to increase the electorate and candidates awareness about female participation in public offices.

References

Araújo, Clara. 2001. "As cotas por sexo para a competição legislativa: o caso brasileiro em comparação com experiências internacionais" [in pt]. *Dados* 44 (): –. ISSN: 0011-5258. http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0011-52582001000100006&nrm=iso.

———. 2003. "Quotas for Women in the Brazilian Legislative System."

Baldez, Lisa. 2004. "Elected Bodies: The Gender Quota Law for Legislative Candidates in Mexico." *Legislative Studies Quarterly* 29 (2): 231–258. doi:10.3162/036298004x201168.

Bohns, Simone R. 2007. "Women and candidate quality in the elections for the Senate: Brazil and the United States in comparative perspective." *Brazilian Political Science Review (Online)* 2 (se). doi:10.1590/s1981-38212007000200003.

Braga, Michela, and Francesco Scervini. 2017. "The performance of politicians: The effect of gender quotas." *European Journal of Political Economy* 46:1–14. doi:10.1016/j.ejpoleco.2016.10.007.

Dodson, Debra L. 2006. *The impact of women in congress.* Oxford University Press.

Franceschet, Susan, Mona Lena Krook, and Jennifer M. Piscopo. 2009. "The Impact of Gender Quotas: A Research Agenda." *Annual Meeting of the American Political Science Association.*

"Women in Parliaments: World Classification." 2017. Inter-Parliamentary Union. Accessed February 24. http://www.ipu.org/wmn-e/classif.htm.

Miguel, Luis F. 2008. "Political Representation and Gender in Brazil: Quotas for Women and their Impact." *Bulletin of Latin American Research* 27 (2): 197–214.

Miguel, Luis F., and Cristina Monteiro de Queiroz. 2006. "Diferenças regionais e o êxito relativo de mulheres em eleições municipais no Brasil." *Revista Estudos Feministas* 14 (2): 363–385.

Paxton, Pamela, and Melanie M. Hughes. 2015. "The Increasing Effectiveness of National Gender Quotas, 1990-2010." *Legislative Studies Quarterly* 40 (3): 331–362. doi:10.1111/lsq.12079.

Wooldridge, Jeffrey M. 2011. *Econometric analysis of cross section and panel data.* MIT.

Table 3: Correlation matrix for all variables candidates to covariates in the model

	Share[1]	**Gini**	**HDI**	HDIe[2]	HDIr[3]	**Study**[4]	Life[5]	Poverty[6]	PChildren[7]	GDPpc	**Fertility**	Iliteracy	**Urban**[8]	Women[9]
Share	1.00	0.06	-0.08	-0.07	-0.08	-0.04	-0.10	0.08	0.08	-0.05	0.08	0.10	-0.01	-0.02
Gini	0.06	1.00	-0.42	-0.42	-0.36	-0.37	-0.39	0.60	0.58	-0.35	0.43	0.39	-0.20	0.00
HDI	-0.08	-0.42	1.00	0.95	0.95	0.65	0.87	-0.93	-0.92	0.80	-0.61	-0.90	0.58	0.22
HDIe	-0.07	-0.42	0.95	1.00	0.83	0.70	0.73	-0.83	-0.83	0.70	-0.56	-0.81	0.59	0.26
HDIr	-0.08	-0.36	0.95	0.83	1.00	0.55	0.85	-0.94	-0.94	0.84	-0.60	-0.90	0.54	0.18
Study	-0.04	-0.37	0.65	0.70	0.55	1.00	0.47	-0.58	-0.57	0.47	-0.40	-0.51	0.27	0.16
Life	-0.10	-0.39	0.87	0.73	0.85	0.47	1.00	-0.84	-0.83	0.74	-0.55	-0.83	0.43	0.08
Poverty	0.08	0.60	-0.93	-0.83	-0.94	-0.58	-0.84	1.00	0.99	-0.81	0.62	0.87	-0.55	-0.14
PChildren	0.08	0.58	-0.92	-0.83	-0.94	-0.57	-0.83	0.99	1.00	-0.82	0.58	0.87	-0.55	-0.11
PIBpc	-0.05	-0.35	0.80	0.70	0.84	0.47	0.74	-0.81	-0.82	1.00	-0.41	-0.79	0.43	0.01
Fertility	0.08	0.43	-0.61	-0.56	-0.60	-0.40	-0.55	0.62	0.58	-0.41	1.00	0.55	-0.25	-0.39
Iliteracy	0.10	0.39	-0.90	-0.81	-0.90	-0.51	-0.83	0.87	0.87	-0.79	0.55	1.00	-0.48	-0.11
Urban	-0.01	-0.20	0.58	0.59	0.54	0.27	0.43	-0.55	-0.55	0.43	-0.25	-0.48	1.00	0.43
Women	-0.02	0.00	0.22	0.26	0.18	0.16	0.08	-0.14	-0.11	0.01	-0.39	-0.11	0.43	1.00

Font: Author, using data from 2010 census (IBGE).

The variables with bold font were maintained in the model estimated.

[1.] Share of elected women (dependent variable);

[2.] Education component from HDI;

[3.] Rent component from HDI;

[4.] Expected years of study;

[5.] Life expectancy (in years);

[6.] Proportion of people living in poverty;

[7.] Proportion of children living in poverty;

[8.] Proportion of urban population;

[9.] Proportion of women in population.