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Determinants and Effects of Negative Advertising in Politics

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WORKING PAPER SERIES Nº 2017-25

DEPARTMENT OF ECONOMICS, FEA-USP
WORKING PAPER Nº 2017-25

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This paper assesses the determinants of negative advertising between candidates in electoral races ruled by majority vote, and also the effects of this type of advertising in the voter's behavior. We evaluate, for example, how the number of candidates and how electoral rules (single-ballot versus runoff election) affects the negativity level of campaigns. We use data from Brazil's Judiciary system for 2012 mayors election, which allows us to assess how these determinants affect differently the decision of going negative when attacker-attacked candidates were 1st-2nd or 2nd-3rd, for example, in the final vote share.

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Version: July 2017

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1 Introduction

It is remarkable how, during political races all around the world, candidates devote a significant part of their advertising effort to attack opponents, the so-called negative advertising, instead of engaging in a more policy-oriented debate. The 2016 presidential race in the US was a clearly example, given that in the last days of campaign *"only* 3% *[of television ads] focused on positive messages about Clinton, and* 5% *were built around positive messages about Trump"*.[1]

Despite its controversial effects on voter turnout presented by the literature, little attention has been devoted to evaluate what are the determinants of the candidates decision to *go negative*. If we consider that this type of propaganda generates indeed some kind of disutility for voters (or potential voters), it's a relevant research question to define what makes a candidate going negative, which is essential in designing policies to reduce the negativeness of a campaign as a whole.

As a main inspiration for this project, Ghandi et al. (2016) assess one possible determinant of this negative advertising that it is entirely related to electoral competition: negative advertisements may generate positive externalities for those candidates that are not the target of a specific attack in races with more than two candidates. Despite also evaluating this mechanism, we try to go further and evaluate the strategic behavior of candidates conditional on their ranking on the election outcome. We also search for others channels through which it is optimal for candidates to engage in a more negative advertising, mainly how the presence of an incumbent affect the decision of candidates and also how it is affected by different electoral rules (single ballot *versus* two rounds election). Finally, we also try to contribute to the literature that evaluates the effect of negativity on voter's behavior, just as in Ansolabehere et al. (1994) and Ansolabehere et al. (1999). Therefore, the contribution of this paper is a wider look on determinants and effects

[1] `http://edition.cnn.com/2016/11/08/politics/negative-ads-hillary-clinton-donald-trump/`.

of negative advertising, allowing more focused policy advices.

For this purpose, we use an unique dataset of Brazil's Judiciary system together with data on electorate composition, candidates and cities characteristics. First, it is shown that cities with only two candidates experience more negativity between 1st and 2nd ranked candidates and less negativity between all other candidate pair. This result is in accordance with Ghandi et al. (2016) story of electoral competition externality, in which the attack of candidate X aiming candidate Y could benefit candidate X itself but also another candidate Z indirectly. It is also shown that the presence of an incumbent in the electoral race impacts positively the decision of going negative, given that all candidates have more information about the incumbent, which reduces the cost to *go negative* on him[2].

Next, using an identification strategy based on RDD, we observe more negativity between 2nd and 3rd ranked candidates, which can be explained by the idea that in a two-round election the second place in the first round has a positive payoff for candidates. Given this, there is a greater probability of 2nd and 3rd ranked candidates engaging in a negative advertising in cities where two rounds are possible according to brazilian laws. And finally, it is shown that negativity does not have effect on turnout, but affects in a non-linear way how people vote, mainly the proportion of blank votes.

These empirical findings about negative advertising determinants and effects on voter's behavior shed some light on the mechanisms through which policies on electoral rules affect political campaigns tone and also how voters react to it. This is the main contribution of the paper, which is related to political economy literature, but also dialogues with the political science literature.

The rest of this paper is organized as follows. Section 2 presents the theoretical framework and summarizes the testable hypotheses of all three parts of analysis. Section 3 describes our database. Results and the methodology that we use in each part are presented in section 4.We conclude in section 5.

[2]Results on this are left to the Appendix.

2 Theoretical Framework

Although not developing an entire microfundamented model in this first version of the paper, we try in this section to shed some lights on the incentives that candidates and voters are subject to, and, given that, present the theoretical hypotheses which are tested in the next section.

Diagram presented in figure 1 summarizes the whole analysis and what questions we are trying to answer:

1. How cities and candidates characteristics (e.g., electoral competition) affect the decision of going negative?

2. How electoral rules (single-ballot *vs* runoff election) affect the same decision?

3. How negativity affects voter's behavior?

Despite seeming unrelated questions, they are all part of the same framework and always present in one electoral race. What are the incentives behind candidates and voters decision in these three questions?

Electoral competition. The incentives in this case are the main mechanism that drives Ghandi et al. (2016) results. When there are more than two candidates running for the same seat, an attack made by candidate X aiming candidate Y could benefit candidate X by demobilizing candidate Y voters, but could also reduce the proportion of votes on candidate X by redirecting votes from Y to Z. This possibility of an attack reducing the attacker chances of winning constitutes a negative externality of negative advertising, which is not present in races with only two candidates (duopoly). Therefore, we would expect more overall negativity in duopolies, and less negativity between candidates that are not feasible in these duopolies, e.g. 3rd and 4th ranked candidates.

Electoral rules. In an election with the possibility of two rounds, the second place in the first round is as much important as the first place, given that both

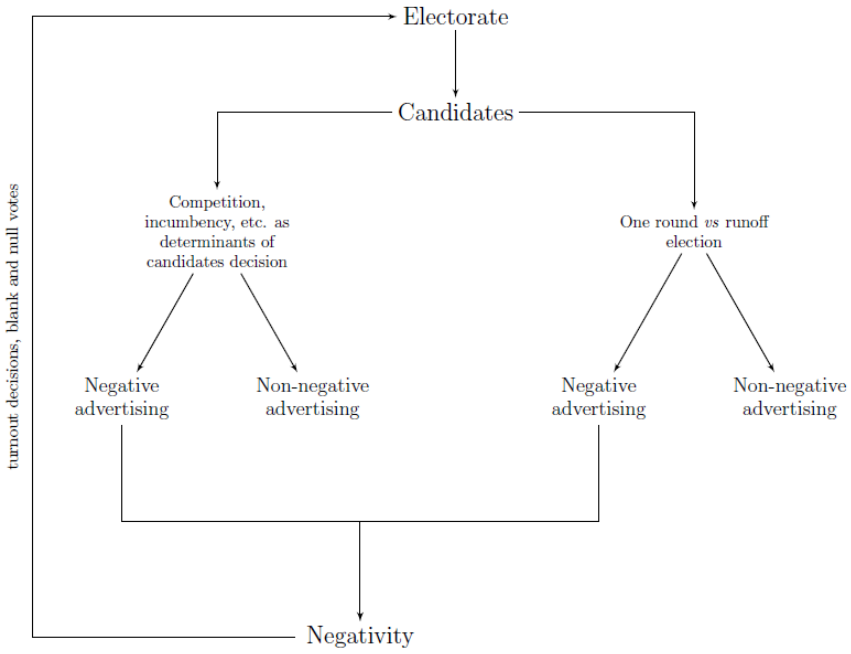

Figure 1: Summary of the analysis steps and the direction of causation.

places would dispute the seat in a second round. In this case, the candidate that is the 3rd most preferred in the first round enters the game. We should expect more negativity between this 3rd place and others candidates, mainly 2nd place, in the first round.

Effect of negativity on voter's behavior. Following Kartik and McAfee (2007) idea, we should expect more turnout in an election with a more negative campaign, since that in their model the candidate's character contains important information for voters and this character can be revealed by negative advertising. On the other hand, Ansolabehere et al. (1999) show that negative advertising demobilizes voters, reducing turnout. Moreover, brazilian laws imposes a monetary and social cost for those that do not show up for voting. Given these mixed evidences and incentives that may be acting in both directions, there isn't a clear testable hypothesis regarding the effect of negativity on voter's behavior.

We try some specifications with negativity and covariates as regressors. As the dependent variable we use turnout, the share of blank votes in the

total, and the share of null votes in the total[3].

3 Data

As an alternative approach to Ghandi et al. (2016), which use US data on primary races, we use data on Brazil's 2012 mayors election, which have *a priori* a considerable variability in the number of candidates given the multi-partidarism environment in Brazil[4]. To quantify advertising negativeness, however, we use an institutional feature that is present (and heavily used) in Brazil political races: the so-called requests of *direito de resposta* (DR henceforth), in which an electoral judge arbitrates litigation among candidates and may give to plaintiff the right to use the offender candidates TV time (or another media) to reply to "offensive ads[5].

We collected this data on *direito de resposta* for more than 75% of country in 2012 mayors election[6] and matched with the TSE data, allowing us to identify the pair of candidates of each litigation and their characteristics. A rich and unique database that may be also a contribution of this paper.

Table 1 presents some descriptive statistics of the cities that are in our database[7]. With a mean of almost 62,000 voters, cities have low variability in the composition of these voters, either in age[8], education or turnout. The

[3]Blank vote and null vote are both invalid votes and can be viewed as protest vote.

[4]This data, which are publicly available in the federal electoral authority, the *Tribunal Superior Eleitoral* (TSE), website (`http://www.tse.jus.br/eleicoes/estatisticas/repositorio-de-dados-eleitorais`), includes a wide range of informations about the city electorate and also characteristics of all candidates.

[5]Silveira and De Mello (2011) does a similar approach to define negativity, despite using only the number of hits of a search for the expression *direito de resposta* as their measure.

[6]Data on 2012 and 2016 mayors election for almost the whole country will be available for the next version of the paper.

[7]We kept only cities that appeared at least one time in the DR database, even if the litigation was between parties and not candidates.

[8]In the brazilian mandatory voting system, only people in the 18-70 years range are required to vote, and, therefore, age is the main driver behind the fraction of population

Table 1: Descriptive statistics

	Composition of voters						Negativity			
	Voters	% Pop	College	Illiterate	Low education	% Turnout	1st x 2nd	1st x 3rd	2nd x 3rd	Index
Mean	61,427	77.6%	3.1%	5.5%	57.2%	84.8%	54.4%	14.9%	10.0%	37.1%
Sd	199,028	7.5%	2.2%	4.1%	7.1%	4.8%	49.8%	35.7%	30.0%	40.8%
p10	5,560	69.4%	1.1%	1.8%	47.9%	79.0%	0%	0%	0%	0%
p50	21,224	77.3%	2.7%	4.4%	57.6%	84.4%	100%	0%	0%	20.0%
p90	129,805	85.5%	5.7%	11.1%	66.0%	91.6%	100%	100%	0%	100%
N	964	964	964	964	964	966	965	562	562	966

table also shows that DR between mayors is indeed an important feature of brazilian political process: 54.4% of the cities in our sample had at least one litigation involving the 1st and 2nd ranked candidates, and, on average, 37.1% of all possible candidates pair had a litigation between them[9].

Similarly to Ghandi et al. (2016), table 2 shows that electoral races with only two feasible candidates are the majority: more than 70% of the disputes for Brazil mayors' seat in 2012 had only two feasible candidates when feasibility is defined as at least 10% in the final vote share[10]. Even when we consider all candidates, without any restriction on the final vote share, almost half of the races had only two candidates. These evidences show that the importance of starting our analysis by evaluating the duopoly effect goes beyond only replicating Ghandi et al. (2016) exercise: lack of electoral competition is also a feature of brazilian political process.

4 Methodology and results

4.1 Determinants of negativity

Our database allows us to assess how each candidate pair react to different electoral rules and institutional characteristics. Ghandi et al. (2016) use the

that is registered to vote.

[9]This index is defined as the ratio between the number of candidates pairs that have a DR and the total of candidates pairs in the city.

[10]This 10% threshold is the one that we use in all empirical aplications when defining the number of feasible candidates and, therefore, our duopoly variable.

Table 2: Cumulative distribution of number of candidates as a function of the threshold used to define the feasibility of a candidate

N of candidates	All	At least 5%	At least 10%	At least 15%
1	2.5%	3.1%	3.4%	4.4%
2	44.9%	59.2%	70.7%	79.7%
3	75.4%	91.0%	95.6%	99.4%
4	88.6%	98.4%	99.7%	100.0%
5	94.4%	99.9%	100%	100%
6	97.5%	100%	100%	100%
7	99.0%	100%	100%	100%
8	99.5%	100%	100%	100%
9	100.0%	100%	100%	100%

Wisconsin Advertising Project (WiscAds) to assess negativity on primary races, but with the advertising itself as the unit of observation. With this database, the authors are able to assess the determinats of negativity as a whole, which is different from our approach since we are able to assess not only the agreggated negativity but also its distribution between candidates pairs.

With the exception of the analysis of negativity effect on voter's behavior, our unit of observation is the candidate pair: a city with three candidates will give rise to three observations regarding all possible pair of candidates, i.e., 1st-2nd, 1st-3rd, and 2nd-3rd. In this environment, we measure negativity as a dummy variable that equals one if the candidate pair had at least one DR[11] involving this pair as plaintiff and defendant in the period of first round campaign[12]. This approach is somewhat less subjective than evaluating each advertising by its "negativity tone", given that there is a law

[11]Note that having a DR involving the candidate pair do not guarantee that the judge have considered the defendant guilty. To assess the litigation result is way more demanding and susceptible to measurement error, given that the result may be judicially reviewed several times.

[12]All other variables are straightforward and a more detailed explanation about their construction is presented when necessary.

in Brazil which defines what is considered an attack susceptible to DR and what is not. Moreover, we define negativity using "at least one DR" and not the number of DR to avoid double counting of the same litigation in the database construction.

4.1.1 Duopoly effect

To evaluate how electoral competition affects the negativity of campaigns, we employ the specification below:

$$\begin{aligned} LIT_{ijcs} =& \beta_0 + \beta_1.D_{12} + \beta_2.D_{13} + \beta_3.D_{23} \\ &+ duopoly_c.(\beta_4.D_{12} + \beta_5.D_{13} + \beta_6.D_{23}) \\ &+ \phi_c + \phi_s + \Gamma.X_{ijcs} + \epsilon_{ijcs} \end{aligned} \tag{1}$$

where LIT_{ijcs} is our negativity dummy for candidate pair $i - j$ in the city c of the state s, and D_{12} is a dummy that equals one if $i = 1st\ place$ and $j = 2nd\ place$ (and vice-versa). $duopoly_c$ is also a dummy, which indicates that the city is a duopoly, ϕ_c is city fixed effects, ϕ_s is state fixed effects[13], and X_{ijcs} is a vector of control variables.

We are interested in coefficients β_4, β_5 and β_6, which show the heterogeneous effect of duopoly on each candidate pair. According to our theoretical hypotheses, we would expect $\beta_4 > 0$, $\beta_5 \leq 0$ and $\beta_6 \leq 0$.

Column (4) of table 3, our most preferred specification, shows this is exactly what we obtain. Specifically, 1st and 2nd ranked candidates have 35% more chance of having a DR involving both in a duopoly compared to a non-duopoly. At the same time, the probability of other candidate pair having a DR goes to zero. Furthermore, coefficients are very stable, even if we add controls and (city or state) fixed effects, which points to a small bias in the coefficients estimation. These results are in accordance with Ghandi et al. (2016) results for US and with their externality idea as the mechanism

[13]To avoid multicolinearity, ϕ_c and ϕ_s are added separately.

Table 3: Negative advertising and electoral competition

	Dep variable: 1 if there is a litigation involving candidate pair				
	(1)	(2)	(3)	(4)	(5)
1st against 2nd	0.49***	0.38***	0.38***	0.40***	0.38***
	(28.85)	(13.39)	(13.10)	(9.62)	(12.84)
1st against 3rd	0.10***	0.18***	0.18***	0.22***	0.18***
	(6.25)	(7.13)	(6.84)	(5.87)	(6.74)
2nd against 3rd	0.05***	0.10***	0.11***	0.14***	0.11***
	(3.64)	(4.58)	(5.02)	(4.22)	(4.97)
(1st vs 2nd)*duopoly		0.16***	0.18***	0.14**	0.18***
		(4.84)	(5.23)	(2.31)	(5.20)
(1st vs 3rd)*duopoly		−0.17***	−0.20***	−0.22***	−0.20***
		(−5.78)	(−6.68)	(−4.78)	(−6.72)
(2nd vs 3rd)*duopoly		−0.10***	−0.11***	−0.13***	−0.11***
		(−4.03)	(−4.36)	(−3.06)	(−4.41)
Constant	0.05***	0.05***	0.02	0.05	0.02
	(8.37)	(8.37)	(0.69)	(1.23)	(0.51)
City fixed effects	No	No	No	Yes	No
State fixed effects	No	No	No	No	Yes
Additional controls	No	No	Yes	Yes	Yes
Number of cities	967	967	967	967	967
Number of pairs	4059	4046	4045	4045	4045
Adj. R-squared	0.27	0.28	0.29	0.41	0.29

Notes: Standard errors are clustered at the city level. Additional controls are all characteristics of candidate pair: distance in final vote share between candidates, distance squared, dummy indicating if both candidates are men, dummy indicating if one candidate is a man and the other is a woman, and dummy indicating if both candidates have a college degree. t statistics are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

through which electoral competition affects negativity.

4.1.2 Single-ballot *vs* runoff election

We are also interested in evaluate how different electoral rules affect campaign's tone. According to our hypotheses, we should expect more negativity between 3rd placed candidate and others when in a runoff election compared to a single-ballot one, given that being the 2nd most preferred candidate in first round allows the candidate to dispute the seat in a "new" election with only one another candidate.

Mayors election in Brazil has a particularity which allows us to evaluate the effect of these two electoral systems: cities with more than 200,000 registered voters[14] may have a second round if in the first one no candidate reaches more than 50% of final vote share (in smaller cities this possibility is absent). Using the same specification as before, table 4 shows us that, in all columns, we got what we expected, i.e., more negativity between 3rd placed and others when comparing cities with more than $200k$ voters and smaller cities.

This discontinuity in the assignment of electoral rules also allow us to employ a regression discontinuity design, which brings us closer to a causal identification. The idea to use this $200k$ threshold in a RDD is not new, and have been used by Fujiwara (2011) when searching for evidences of strategic voting in brazilian elections: exploiting this discontinuity, the author shows that single-ballot plurality rule causes voters to desert 3rd placed candidates and vote for the top two placed ones, which do not occur in dual-ballot plurality systems.

Despite the somewhat less restrictive hypotheses behind identification on RDD, in order to advocate in favor of causal relation of different electoral rules on negativity, we need to guarantee that there is no manipulation on the running variable around threshold (McCrary, 2008), and also that the only discontinuity around threshold is observed in negativity, i.e., covariates

[14]There are 59 cities in the regressions' sample with more than 200,000 registered voters.

Table 4: Negative advertising and electoral competition

	Dependent variable: 1 if there is a litigation involving candidate pair				
	(1)	(2)	(3)	(4)	(5)
1st against 2nd	0.49***	0.49***	0.49***	0.41***	0.49***
	(28.85)	(27.96)	(27.84)	(13.24)	(26.48)
1st against 3rd	0.10***	0.08***	0.08***	0.08***	0.07***
	(6.25)	(5.01)	(4.23)	(3.25)	(3.93)
2nd against 3rd	0.05***	0.02*	0.02*	0.02	0.02
	(3.64)	(1.79)	(1.82)	(1.18)	(1.53)
(1st vs 2nd)*(Runoff election)		0.07	0.07	0.14*	0.07
		(1.06)	(1.02)	(1.71)	(1.08)
(1st vs 3rd)*(Runoff election)		0.17***	0.17***	0.17**	0.18***
		(2.81)	(2.79)	(2.17)	(2.86)
(2nd vs 3rd)*(Runoff election)		0.25***	0.25***	0.24***	0.25***
		(4.01)	(3.96)	(3.17)	(4.01)
Constant	0.05***	0.05***	0.04	0.09**	0.04
	(8.37)	(8.37)	(1.51)	(2.31)	(1.40)
City fixed effects	No	No	No	Yes	No
State fixed effects	No	No	No	No	Yes
Additional controls	No	No	Yes	Yes	Yes
Number of cities	967	967	967	967	967
Number of pairs	4059	4059	4058	4058	4058
Adj. R-squared	0.27	0.27	0.27	0.40	0.28

Notes: Standard errors are clustered at the city level. Additional controls are all characteristics of candidate pair: distance in final vote share between candidates, distance squared, dummy indicating if both candidates are men, dummy indicating if one candidate is a man and the other is a woman, and dummy indicating if both candidates have a college degree. t statistics are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

should not "jump" when comparing cities at the left to cities at the right of $200k$ voters mark.

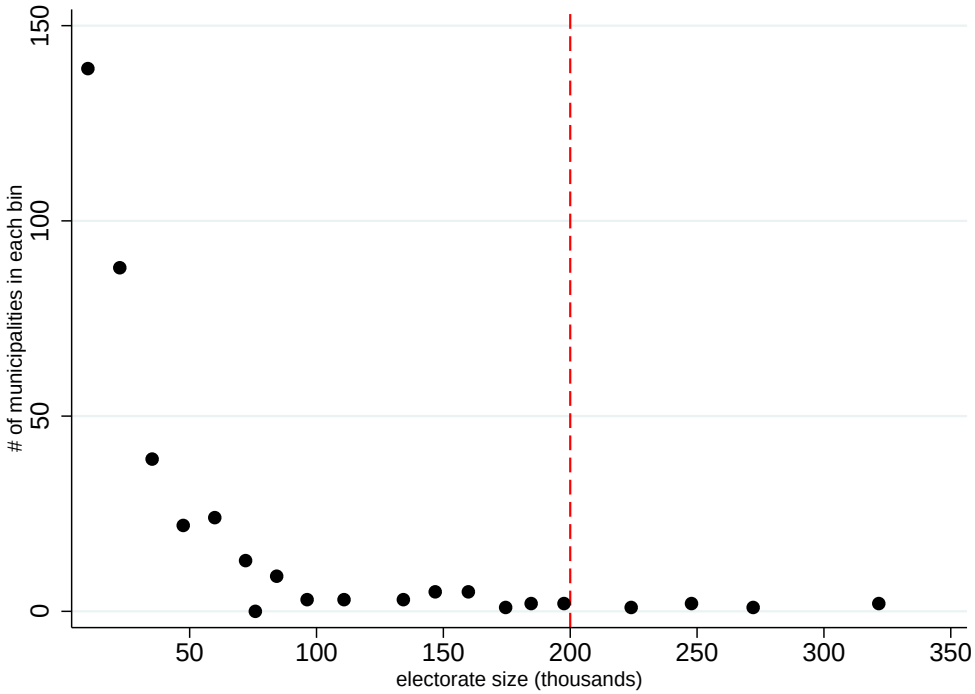

Figure 2: Distribution of electorate size. Bins are defined in a range of 12,500 voters.

Figure 2 suggests that in our database, similar to Fujiwara (2011), there is no sign of strategic manipulation ocurring around the threshold. Moreover, table 5 shows that cities just above and just below the threshold are very similar, with exception of some education variables and, mainly, negativity involving 2nd and 3rd places, which is the discontinuity that we are looking for.

Table 5: Difference on variable mean of cities just below and cities just above the threshold - T-test for different bandwidth.

	25k	50k	75k	100k
Gini in 2010	0.023	-0.004	-0.016	-0.015
	(0.017)	(0.013)	(0.011)	(0.010)
Incumbent	0.302	0.188	0.179	0.032
	(0.236)	(0.173)	(0.134)	(0.123)
Electorate size	-24,472***	-51,926***	-78,636***	-97,567***
	(4,288)	(5,104)	(5,530)	(6,692)
Electorate (% pop.)	-0.019	-0.005	-0.000	-0.004
	(0.032)	(0.018)	(0.013)	(0.012)
College (% electorate)	-0.015	-0.007	-0.017*	-0.018**
	(0.007)	(0.006)	(0.008)	(0.006)
Illiteracy (% electorate)	0.008	0.005	0.006	0.012
	(0.006)	(0.006)	(0.005)	(0.007)
Low education (% electorate)	0.031	0.016	0.036*	0.043**
	(0.020)	(0.018)	(0.016)	(0.014)
Turnout	0.001	-0.005	-0.001	-0.003
	(0.011)	(0.007)	(0.006)	(0.006)
DR involving 1st-2nd	0.127	0.071	0.060	0.055
	(0.267)	(0.175)	(0.136)	(0.123)
DR involving 1st-3rd	0.270	0.169	0.044	0.050
	(0.257)	(0.169)	(0.122)	(0.109)
DR involving 2nd-3rd	-0.460	-0.292	-0.300**	-0.274**
	(0.217)	(0.144)	(0.110)	(0.103)
Negativity Index	0.089	0.063	0.063	0.076
	(0.075)	(0.056)	(0.052)	(0.052)
Observations	16	36	62	82

Notes: Standard errors are in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Given these evidences of no strategic manipulation on running variable and no discontinuity on covariates, RDD is an appropriate identification strategy to assess the causal effect of electoral rules on negativity. However, the reduced number of observations does not allow us to add high order polynomials or even covariates that may be important. Therefore, estimated equation is:

$$LIT_{23cs} = \gamma_0 + \gamma_1.TR_c + \gamma_2.(voters_c - 200,000) + \gamma_3.(voters_c - 200,000).TR_c + \mu_{23cs} \quad (2)$$

where LIT_{23cs} is our negativity dummy regarding the pair 2nd-3rd, which is where we look for the discontinuity given results of table 5, and TR_c is the treatment dummy (= 1 if $voters \geq 200,000$). Again, given the problem with observations we estimate equation 2 in two ways, imposing first $\gamma_2 = \gamma_3 = 0$, and then estimating all four parameters.

Table 6 summarizes the estimations of γ_1 for all specifications (see figure 3 for the graph version of the specification with $1st$ order polynomial) and also subtituting the sample of candidates pairs to evaluate how negativity changes for pairs that are not 2nd-3rd. Note that, despite not being significant at the 10% level for a sufficiently small bandwidth in the linear specification, $\hat{\gamma_1}$ is positive and very stable, which is also clear in figure 4. When dealing with others candidates pairs, however, there is more variability in magnitude and also in significance, which may suggest that the effect of a runoff election on negativity is restricted to the 2nd-3rd pair.

Table 6: Coefficient of interest estimated for different bandwidth.

Polynomial order		25k	50k	75k	100k	125k	150k
0	2nd-3rd	0.460**	0.292**	0.300***	0.274***	0.309***	0.299***
		(0.217)	(0.144)	(0.110)	(0.103)	(0.081)	(0.068)
1	2nd-3rd	0.493	0.399	0.392*	0.402*	0.290*	0.335**
		(0.430)	(0.293)	(0.235)	(0.210)	(0.158)	(0.132)
	N	16	36	60	79	120	188
0	Not 2nd-3rd	-0.090*	-0.046	-0.051*	-0.059**	-0.068***	-0.072***
		(0.049)	(0.036)	(0.029)	(0.027)	(0.025)	(0.023)
1	Not 2nd-3rd	-0.020	-0.123*	-0.069	-0.068	-0.051	-0.057
		(0.084)	(0.067)	(0.058)	(0.053)	(0.046)	(0.044)
	N	175	358	545	685	946	1311

Notes: Standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

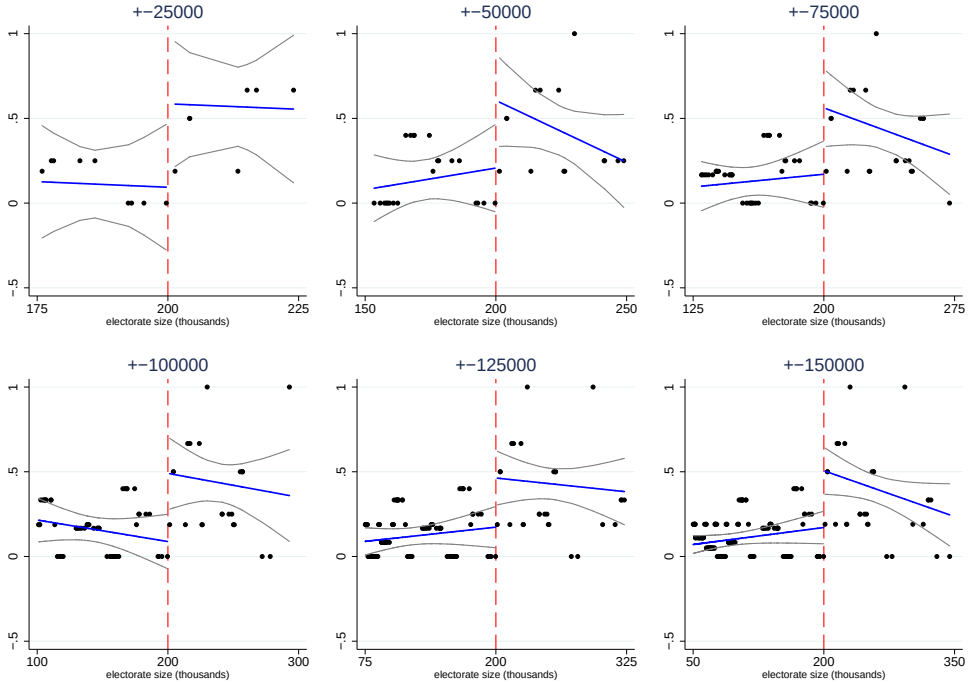

Figure 3: Ilustration of the discontinuity on 2nd-3rd negativity for polynomial of order 1.

Therefore, just as table 4 and table 5 suggested, RDD approach shows that our theoretical hypothesis regarding single ballot *versus* runoff election may be correct: the 2nd place in the first round of the election is of great value, which translates into more negativity between candidates that are disputing this place, mainly 2nd and 3rd placed candidates. Magnitude is also important, given that 2nd-3rd pair has $30-40\%$ more chance to engage in a DR in a city with the possibility of having a second round.

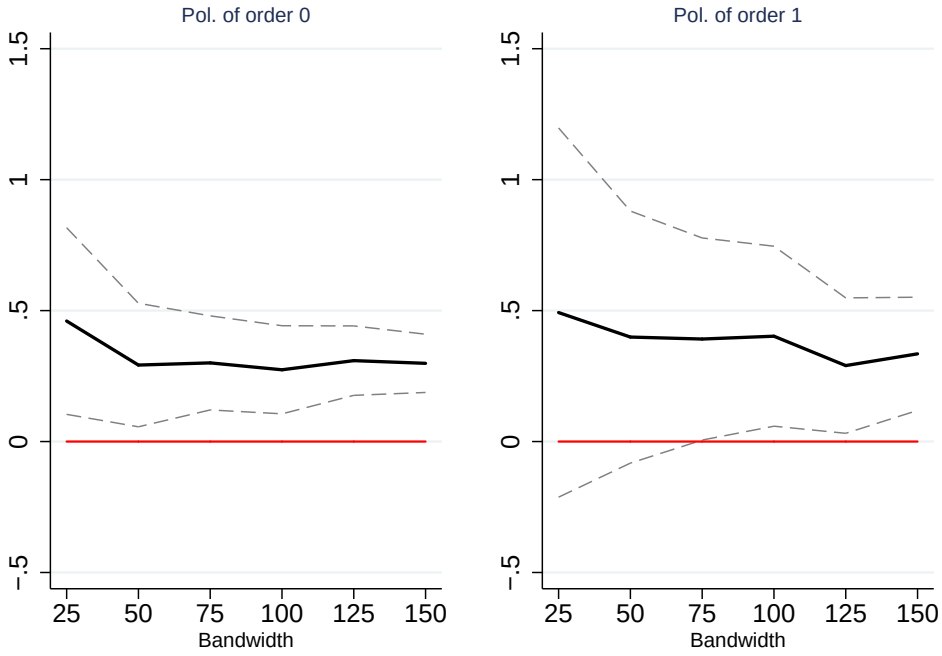

Figure 4: Stability and significance at 10% level of $\hat{\gamma}_1$.

4.2 Negativity effects on voter's behavior

Our final empirical exercise is to assess the effect of negativity on voter's behavior, i.e., how is voter's decision influenced by candidates that attack each other. As shown in section 2, evidences in the literature are ambiguous and, therefore, we evaluate the effect of negativity through various specifications. All estimated equations, however, are a variation of the one below:

$$Y_{cs} = \theta_0 + \theta_1.NegIndex_{cs} + \theta_2.NegIndex_{cs}^2 + \Theta.X_{cs} + \phi_s + \eta_{cs} \qquad (3)$$

where $NegIndex_{cs}$ is defined as the ratio between the number of candidates pairs that have a DR and the total of candidates pairs in the city c of the

state s, which means that $NegIndex_{cs} \in [0,1]$[15]. X_{cs} is a vector of covariates, ϕ_s is state fixed effects, and Y_{cs} is the outcome variable that measures voter's behavior, for which we use turnout, fraction of blank votes, and fraction of null votes[16].

Tables 7, 8 and 9 summarizes these estimations. Note that when we add controls and state fixed effects, negativity has effect only on % of blank votes, which can be justified by mandatory voting and turnout decision being contaminated by this. But what about % of null votes?

Table 7: Effect of negativity on voter's behavior - Turnout (% of electorate)

	(1)	(2)	(3)	(4)	(5)	(6)
Negativity Index	0.01*	−0.00	−0.00	−0.08***	−0.02	−0.01
	(1.92)	(−1.09)	(−1.26)	(−5.35)	(−1.22)	(−0.79)
Negativity Index squared				0.09***	0.01	0.01
				(6.05)	(0.99)	(0.51)
Duopoly		0.01***	0.01***		0.01***	0.01***
		(3.78)	(2.96)		(3.54)	(2.80)
Log of voters		−0.03***	−0.03***		−0.02***	−0.03***
		(−18.12)	(−20.21)		(−17.10)	(−19.24)
Number of candidates pairs		0.00***	0.00**		0.00***	0.00**
		(2.81)	(2.56)		(2.74)	(2.53)
Illiterate city population (% total)		−0.52***	−0.63***		−0.52***	−0.63***
		(−11.18)	(−12.60)		(−11.25)	(−12.61)
City pop. with college degree (% total)		−0.21*	0.04		−0.21*	0.04
		(−1.71)	(0.36)		(−1.71)	(0.36)
Runoff election		0.05***	0.04***		0.05***	0.04***
		(9.56)	(8.50)		(9.45)	(8.45)
City Gini Index		−0.07***	−0.08***		−0.07***	−0.08***
		(−2.89)	(−3.71)		(−2.91)	(−3.73)
Constant	0.85***	1.16***	1.18***	0.85***	1.16***	1.18***
	(399.02)	(78.00)	(77.97)	(334.18)	(77.08)	(76.65)
State fixed effects	No	No	Yes	No	No	Yes
Observations	967	964	964	967	964	964
Adj. R-squared	0.00	0.46	0.59	0.03	0.46	0.59

Notes: t statistics are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Our explanation for this heterogenous effect is related to the nature of null vote, which represents not only a vote option but also an error during

[15]This is the same index as in table 1.

[16]All voters have always the option of voting for nobody through a blank vote, and through null vote. The latter is also representative of a voter's error, i.e., a voter that votes for an inexistent candidate.

vote process. Therefore, we should expect that cities with a less educated population would have a greater % of null votes and a lower % of blank votes. We find some support to this idea in coefficients of population education: coefficient of illiteracy rate is positive on table 8 and negative on 9. Moreover, % of electorate with a college degree seems to have impact only on % of blank votes.

Table 8: Effect of negativity on voter's behavior - % of null votes

	(1)	(2)	(3)	(4)	(5)	(6)
Negativity Index	0.00	0.01*	0.02*	0.04	−0.04	−0.04
	(0.24)	(1.71)	(1.89)	(1.49)	(−1.22)	(−1.13)
Negativity Index squared				−0.04	0.06	0.05
				(−1.40)	(1.57)	(1.54)
Duopoly		−0.04***	−0.04***		−0.05***	−0.04***
		(−4.20)	(−4.05)		(−4.15)	(−4.00)
Log of voters		0.02***	0.01***		0.02***	0.01***
		(4.20)	(2.95)		(4.60)	(3.40)
Number of candidates pairs		−0.00**	−0.00**		−0.00**	−0.00**
		(−2.25)	(−2.33)		(−2.35)	(−2.42)
Illiterate city population (% total)		0.22**	0.12		0.21**	0.12
		(2.38)	(1.11)		(2.33)	(1.09)
City pop. with college degree (% total)		0.13	−0.02		0.13	−0.02
		(0.91)	(−0.12)		(0.92)	(−0.12)
Runoff election		−0.03*	−0.02		−0.03*	−0.02
		(−1.73)	(−1.23)		(−1.86)	(−1.36)
City Gini Index		−0.05	0.00		−0.06	0.00
		(−1.05)	(0.05)		(−1.10)	(0.02)
Constant	0.06***	−0.05	−0.04	0.06***	−0.06*	−0.05
	(15.82)	(−1.49)	(−0.90)	(13.92)	(−1.78)	(−1.16)
State fixed effects	No	No	Yes	No	No	Yes
Observations	967	964	964	967	964	964
Adj. R-squared	-0.00	0.07	0.08	-0.00	0.07	0.08

Notes: t statistics are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Finally, note that negativity has a quadratic impact on % of blank votes, being negative for an index of less than 50% but positive for cities with at least half of candidates pairs having a DR. This result put together both evidences presented in literature, i.e., that negativity may be good for voters (Kartik and McAfee, 2007) but may demobilize them if is to great (Ansolabehere et al., 1999).

Table 9: Effect of negativity on voter's behavior - % of blank votes

	(1)	(2)	(3)	(4)	(5)	(6)
Negativity Index	−0.01***	−0.00***	−0.00***	0.02***	−0.01**	−0.01***
	(−5.59)	(−3.94)	(−3.00)	(4.59)	(−2.28)	(−2.66)
Negativity Index squared				−0.03***	0.01*	0.01**
				(−5.91)	(1.65)	(2.21)
Duopoly		−0.00**	−0.00		−0.00**	−0.00**
		(−2.11)	(−1.62)		(−2.36)	(−1.97)
Log of voters		0.01***	0.01***		0.01***	0.01***
		(17.05)	(16.31)		(17.22)	(16.60)
Number of candidates pairs		−0.00	−0.00		−0.00	−0.00
		(−1.09)	(−1.03)		(−1.20)	(−1.17)
Illiterate city population (% total)		−0.06***	−0.03***		−0.06***	−0.03***
		(−7.42)	(−2.68)		(−7.46)	(−2.75)
City pop. with college degree (% total)		−0.02	−0.07***		−0.02	−0.07***
		(−1.04)	(−3.03)		(−1.04)	(−3.08)
Runoff election		−0.00	−0.00		−0.00	−0.00
		(−1.50)	(−1.29)		(−1.59)	(−1.40)
City Gini Index		−0.02***	−0.02***		−0.02***	−0.02***
		(−4.59)	(−2.99)		(−4.63)	(−3.03)
Constant	0.02***	−0.04***	−0.04***	0.02***	−0.04***	−0.05***
	(40.14)	(−8.60)	(−9.83)	(33.20)	(−8.89)	(−10.14)
State fixed effects	No	No	Yes	No	No	Yes
Observations	967	964	964	967	964	964
Adj. R-squared	0.03	0.51	0.59	0.06	0.51	0.59

Notes: t statistics are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5 Concluding remarks

This papers assesses how electoral competition, candidates characteristics, and electoral rules affect campaign's tone, but also assesses how negativity from campaign impacts voter's behavior. We build some theoretical hypotheses by discussing incentives that candidates and voters may be subject to and then, using an unique database from Brazil's Judiciary system for 2012 mayors election, empirically test each hypothesis through different methodologies.

To summarize results:

- Cities with only two feasible candidates (duopolies) have 35% more chance than cities with more than two candidates to have 1st and 2nd placed candidates having a litigation about negative advertising involving them, which may be explained by the externality idea of Ghandi

et al. (2016).

- In a two-round election, 2nd and 3rd placed candidates engage much more in negative advertising in the first round, given that the candidate who finishes first round in the 2nd place may have a second chance to win the mayor seat in the election's second round.

- Negativity has no effect on turnout decisions, but influences how voters vote through % of blank votes.

By evaluating determinants and effects of negativity, this paper sheds some light on mechanisms through which negativity operates. Evidences presented here may be helpful to policymakers who aim to promote a more policy-oriented political campaign, reducing situations like the one we witnessed in the last US presidential race.

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Appendix

We use the same especification as in equation 1 to assess how the presence of an incumbent in the electoral race affects the campaign's tone. The only difference is the exchange of $duopoly_c$ by $incumbent_{ij}$, which indicates if one of the candidates in the pair is running for the mayor's seat as an incumbent. Therefore, the estimated equation is given by

$$\begin{aligned} LIT_{ijcs} =& \beta_0 + \beta_1.D_{12} + \beta_2.D_{13} + \beta_3.D_{23} \\ &+ incumbent_{ij}.(\beta_4.D_{12} + \beta_5.D_{13} + \beta_6.D_{23}) \\ &+ \phi_c + \phi_s + \gamma.X_{ijcs} + \epsilon_{ijcs} \end{aligned} \tag{4}$$

Results are summarized in Table 10. Estimation suggests that, given the time an incumbent spent in office, candidates have more to attack, which translate in more negative advertising : $\hat{\beta}_4$, $\hat{\beta}_5$ and $\hat{\beta}_6$ are always positive, and significant when we consider our most preferred specification. Moreover, $\hat{\beta}_4$ is significant and equal to 0.10 in all specifications.

The magnitude of $\hat{\beta}_5$ and $\hat{\beta}_6$ in column (4) is also an important result, given that the probability of a pair constituted by 1st and 3rd or 2nd and 3rd placed candidates having a DR approximately doubles if these pairs have an incumbent in it.

Table 10: Negative advertising and electoral competition

	Dependent variable: 1 if there is a litigation involving candidate pair				
	(1)	(2)	(3)	(4)	(5)
1st against 2nd	0.49***	0.46***	0.46***	0.43***	0.45***
	(28.85)	(21.04)	(20.92)	(12.02)	(20.36)
1st against 3rd	0.10***	0.09***	0.09***	0.11***	0.08***
	(6.25)	(4.98)	(4.53)	(3.97)	(4.33)
2nd against 3rd	0.05***	0.04***	0.04***	0.07***	0.04***
	(3.64)	(2.77)	(2.78)	(2.75)	(2.71)
(1st vs 2nd)*(Incumbent pair)		0.10***	0.10***	0.10*	0.10***
		(3.00)	(3.04)	(1.75)	(3.00)
(1st vs 3rd)*(Incumbent pair)		0.05	0.05	0.10**	0.05
		(1.32)	(1.33)	(1.97)	(1.38)
(2nd vs 3rd)*(Incumbent pair)		0.05	0.05	0.09*	0.05
		(1.39)	(1.43)	(1.87)	(1.33)
Constant	0.05***	0.05***	0.04	0.07	0.04
	(8.37)	(8.37)	(1.29)	(1.62)	(1.13)
City fixed effects	No	No	No	Yes	No
State fixed effects	No	No	No	No	Yes
Additional controls	No	No	Yes	Yes	Yes
Number of cities	967	967	967	967	967
Number of pairs	4059	4059	4058	4058	4058
Adj. R-squared	0.27	0.27	0.27	0.40	0.27

Notes: Standard errors are clustered at the city level. Additional controls are all characteristics of candidate pair: distance in final vote share between candidates, distance squared, dummy indicating if both candidates are men, dummy indicating if one candidate is a man and the other is a woman, and dummy indicating if both candidates have a college degree. t statistics are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.