Campaign spending and poverty levels in Brazil: an exploratory approach*

Dalson Britto Figueiredo Filho (UFPE)
dalsonbritto@yahoo.com.br

Manoel Santos
mlwds@hotmail.com

José Alexandre Silva Júnior (UFG/UFPE)
jasjunior2007@yahoo.com.br

Enivaldo Rocha (UFPE)
eni-rocha@hotmail.com

Abstract

Is there campaign spending efficiency higher in poorer states? This paper estimates the effects of campaign spending on Brazilian electoral outcomes by testing the hypothesis that candidate spending efficiency is positive correlated with poverty levels. The model uses individual level data of the 2006 House of Representatives national elections. The preliminary results suggest that: (1) campaign spending exerts a positive effect on votes; (2) Not elected candidates show a pattern of higher marginal returns of each extra dollar spent in their political campaigns compared to elected ones; (3) this pattern is consistent across states and poverty levels; (4) there is no evidence that poverty levels are positive correlated with candidate spending efficiency.

Keywords: campaign spending; poverty levels; comparative campaign finance.

Research problem

Is there campaign spending efficiency higher in poorer states?

Brief literature review[1]

Accurately estimate the effect of campaign spending on electoral outcomes is a canonical issue in political science (Palda, 1973, 1975; Welch, 1974, 1980; Glantz, Abromowitz and Burkhart, 1976; Abromowitz, 1988, 1991; Green and Krasno, 1988, 1990; Ansolabehere, 1990; Gerber, 1998, 2004). The typical research design has three main characteristics: (1) it estimates a

* A different version of this paper was presented at Bratislava Workshop on Institutional Analysis, organized by Ronald Coase Institute and held at University of Economics in Bratislava, Slovakia, 10-15 may, 2009. I am thankful for all suggestions received at that time.

[1] Gerber (2004) indicates Jacobson (1985) for a review of empirical literature through the mid-1980s. According to Squire (1995), a deep overview of campaign finance literature can be found in Fowler (1993).

regression of a candidate's vote share on some function of the candidate's spending levels after controlling for additional variables; (2) it uses ordinary least squares functional form; (3) the unit of analysis is the House of Representatives of the USA. According to Gerber (2004), the basic model to analyze the relationship between money and votes is the following:

$$Vote_{inc} = \beta_1 f(Spending_{inc}) + \beta_2 f(Spending_{inc}) + \beta_3 f(X)$$

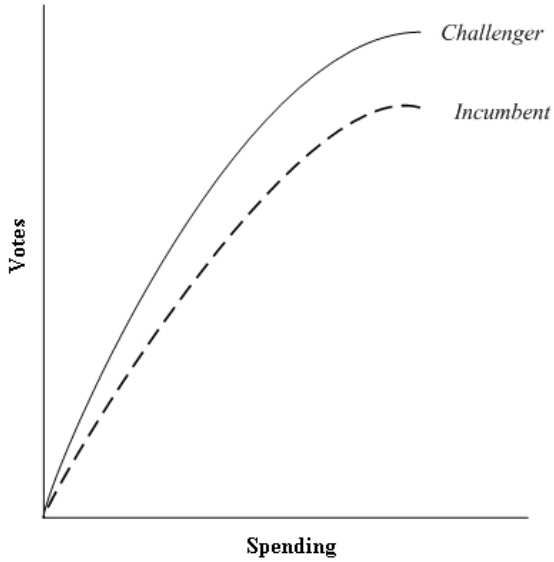
Gerber (2004) argues that

> where $Vote_{Inc}$ is the incumbent's share of the two-party vote, $Spending_{Inc}$ is total incumbent campaign spending, $Spending_{Chal}$ is total challenger campaign spending, f(z) stands for an arbitrary function of z, and X represents a set of variables other than campaign spending that are thought to influence candidate vote totals, such as challenger quality or constituency partisanship. The spending variables are entered additively, and the particular function of campaign spending is usually either the spending level itself (i.e., f(z) = z) or the natural logarithm of spending (Gerber, 2004: 544).

Comparatively, some scholars analyzed subnational legislative and Senate (Grier, 1989; Gerber, 1988). On methodological grounds, some pundits uses two-stage least squares (Green and Krasno, 1988), logarithmic transformations (Jacobson, 1978), computational experiments (Houser and Stratmann, 2008) and field experiments (Gerber, 2004) trying to properly identify the mechanisms that link spending and votes. On theoretical grounds, Gary Jacobson has produced the seminal work on campaign-spending literature (Gerber, 2004). He found that incumbent regression coefficients' were negative, suggesting that as much they spend, less votes they get[2]. The figure below illustrates his argument.

Figure 01 – Jacobson's Effect

[2] According to Gerber (2004), "A common critique of Jacobson's findings was that incumbents raise their spending levels in response to strong threats. If the control variables do not fully account for the threat level, candidate spending effects will tend to be biased downward due to a negative correlation between incumbent spending and the regression error" (Gerber, 2004: 542).



Both challengers' and incumbents' spending exert a positive impact on their sharing of votes and suffer from diminish returns. However, each extra dollar spending by challengers has a higher effect compared to incumbents spending. This empirical finding is widely accepted by campaign finance scholars[3]. Table summarizes this literature.

Table 01 – Literature summary

Author (year)	Argument
Jacobson, 1978; Abromowitz, 1988; Ansolabehere and Gerber, 1994; Gerber 2004	Incumbent spending is ineffective but that challenger spending produces large gains
Erikson and Palfrey, 2000; Green and Krasno, 1988; Gerber, 1998; Levitt, 1994	Neither incumbent nor challenger spending makes any appreciable difference
Thomas, 1989; Kenny and McBurnett, 1994; Goidel and Gross, 1994; Green and Krasno, 2001	After controlling for quality of challenger and reciprocal causation, marginal effect of incumbent spending is substantial
Krasno, Green and Cowden, 1994	Incumbent spending is reactive to challenger spending

Levitt (1994) argues that "Campaign spending has an extremely small impact on election outcomes, regardless of who does the spending" (Levitt, 1994: 777). Gerber (1998) defend that "when the endogeneity of candidate spending levels is properly taken into account, the marginal effects of incumbent and challenger spending are roughly equal" (Gerber, 1998: 401). Jacobson (1990) argues that

> The OLS regression models reported in most studies are inappropriate for estimating reciprocal relationships; a simultaneous equation system is required. OLS estimates of parameters when the true relationship is reciprocal are biased and inconsistent because endogenous variables (those which have a reciprocal effect on one another), when treated as explanatory variables, are correlated with the error term (Jacobson, 1978: 470).

[3] Normatively, campaign spending limits will favor status quo. According to Jacobson (1978), "any reform measure, which decreases spending by the candidates will favor incumbents. This includes limits on campaign contributions from individuals and groups as well as ceilings on total spending by the candidates" (Jacobson, 1978: 489).

Nevertheless, there are controversial findings even among studies that employ TSLS. For example, Green and Krasno (1988) reported that incumbent campaign spending coefficients' were positive and statistically significant. On the other side, Jacobson (1978) argued that "spending by challengers has a much more substantial effect on the outcome of the election even with simultaneity bias purged from the equation" (Jacobson, 1978: 475). Clearly, the essence of campaign finance literature is not a contest over sophisticated statistical models. In fact, these models are only a methodological tool employed by scholars to correctly identify the variables that matter to explain the phenomena. Regarding campaign finance literature, comparative empirical work is limited and very little is known about the effects of money on votes outside of the U.S[4]. Thus, this paper aims to advance our current knowledge over the spending-votes literature by analyzing the effects of campaign spending on Brazilian electoral outcomes.

The aim of the project

This paper estimates the effects of campaign spending on Brazilian electoral outcomes by testing the hypothesis that candidate spending efficiency is positive correlated with poverty levels. In particular, it is expected that higher spending efficiency should be found in poorer states. To explain, assuming that clientelistic politics still is a dimension of Brazilian politics, I expect that candidates with higher spending should do better on elections since they can exchange money for votes in a superior rate. In addition, taking

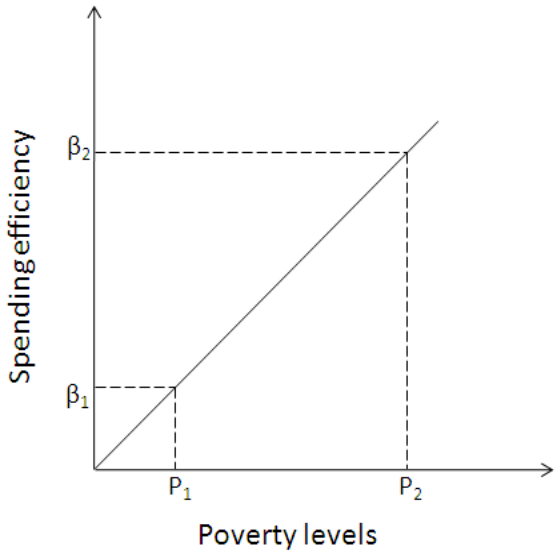
Main hypotheses

$H_{1:}$ candidate spending efficiency is positive correlated with poverty levels.

Figure below illustrates this hypothesis.

Figure 02 – Research hypothesis illustration

[4] David Samuels (2001a; 2001b; 2001c) has done pioneer work on campaign spending in Brazil and he argues that endogeneity is not an important issue in Brazil. As I also employed OLS functional form to estimate the effects of money on votes is worth to quote Samuels (2001c) entire explanation: Simultaneity bias is far less of a problem in Brazilian elections than elsewhere, justifying straightforward OLS. In large-magnitude, open-list elections, with large numbers of candidates and where margins of victory are tiny, the notion of electoral "threat" is effectively constant across *quality* candidates. As a result, candidates should always spend whatever they can. This eliminates any endogeneity problem and justifies using OLS (Samuels, 2001c: XX).



It is expected to observe an increasing positive effect of spending on votes when it goes from a less poor state (P_1) to a poorer state (P_2). Then, on average, when $P_2 > P_1$ then $\beta_2 > \beta_1$.

Methodology

This paper combines different statistical techniques. It begins by employing a principal component analysis (PCA) to estimate a factor measure of poverty. The next step is to estimate an ordinary least squares (OLS) regression of a candidate's vote share on his spending levels per state. Then, it uses cluster analysis to conglomerate states according to their poverty level. We close by running an analysis of variance (ANOVA) to assess in what extent campaign effect regression coefficients vary across different clusters of poverty levels. Next table summarizes our research design.

Table 01 – Research design

Population	Candidates running for the Brazilian House of representatives (2006)
Variables	Spending_log;Votes_log; per_capita_income
Comparison	Aggregate effect of campaign spending across poverty levels
Techniques	Spatial analysis; correlation; OLS regression

Results

Table 02 – Spending effect on votes

Votes_log	B	Std. Error	t	Sig
Constant	2.076	.074	27.936	.000
Spending_log	.670	.008	88.707	.000

R^2 = .691; F = 7869.03; p-value < .000

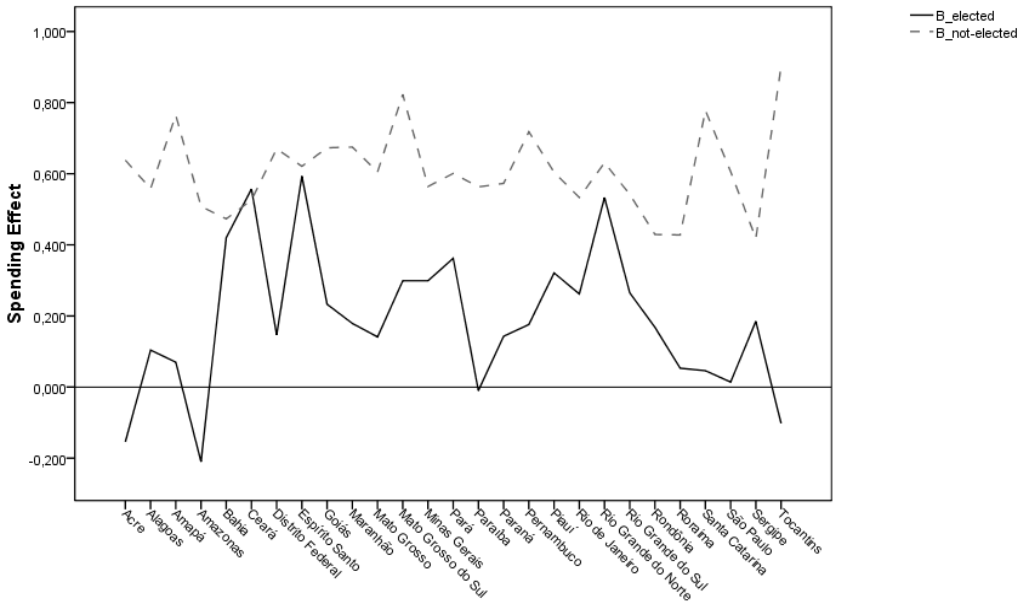
The data suggests that a 1% increasing in campaign spending produces a positive effect of .670% on votes. R^2 using only one independent variable reached 69.10% of total variance, suggesting an acceptable good of fit. Both t-statistic (88.707) and p-value (p<.000) suggest that the null hypothesis of zero effect of spending on votes should be rejected. Table 03 summarizes spending effect on votes per candidate situation.

Table 03 – Spending effect on votes per candidate situation

Situation	B	Std. Error	Beta	t	Sig
Elected	.269	.029	.412	9.404	.000
Not elected	.416	.023	.580	18.395	.000

Unstandardized regression coefficients are higher to Not elected candidates (.416) than to elected ones (.269), suggesting that Not elected candidates benefit most of each additional dollar spent in their campaigns. This difference is expected since other variables should explain votes' variation among elected candidates such as pork barreling, credit claim, etc. Next graph illustrates spending effect on votes per candidate situation across Brazilian states.

Graph 01 – Spending effect on votes per candidate situation across states



There is a clearly pattern regarding campaign spending efficiency that is robust across states: Not elected candidates benefit more for each extra dollar spent in their political campaigns. In fact, a negative effect of spending on votes for elected candidates was observed in four states (Amazonas = -.210; Acre = -.154; Tocantins = -.102 and Paraíba = -.010). Table 04 synthesizes spending effect on votes per poverty clusters.

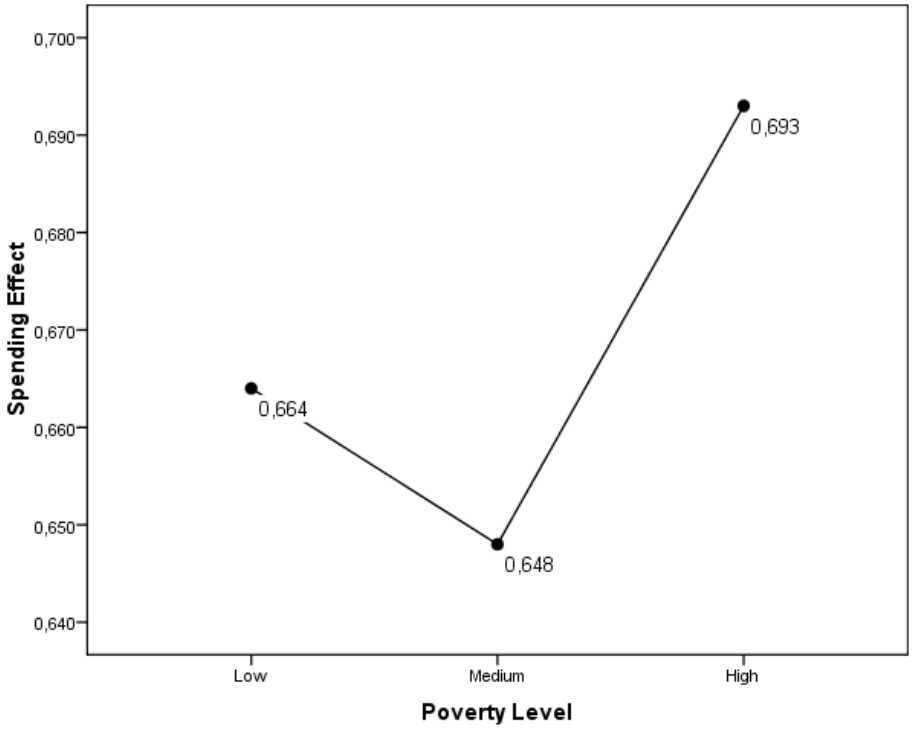
Table 04 – Spending effect on votes per poverty clusters

Poverty Cluster	B	Std. Error	Beta	t	Sig
Low	.664	.009	.838	76.199	.000
Medium	.648	.038	.763	16.880	.000
High	.693	.015	.851	47.549	.000

Regarding the main hypothesis of this paper – candidate spending efficiency is positive correlated with poverty levels – the data suggest that we cannot reject the null hypothesis of no difference across clusters. The correlation between campaign spending effect and poverty levels is negative and not statistically significant (r = -.078; p-value = .698). The analysis of variance (ANOVA) suggests the same results (F = .912; p-value = .415). In other words, the variance within each cluster is higher than the variance among clusters. On less technical terms, there is more variation regarding campaign spending efficiency in each cluster than across state poverty clusters[5]. Next graph illustrates spending effect on votes across different poverty clusters.

[5] To be sure, we run both a Hierarchical Cluster Analysis (HAC) and a K-means Cluster Analysis (KCA). HAC dendogram graph suggested a seven cluster path. Then, we used seven poverty clusters and found no statistical significant differences regarding campaign spending efficiency among clusters. The next methodological step was aggregate similar states into more homogenous clusters, producing a three clusters path. We run our analyses again and we reach no statistical significance difference among poverty clusters. Finally, we run a principal component

Graph 02 – Spending effect on votes across poverty clusters



Campaign spending effect is slightly higher in states with low levels of poverty (.664) compared to medium poverty levels states (.648). The highest effect of spending on votes is found at poorer states (.693). However, the magnitude of the difference is too small to support any statistical significant results. To make the claim more robust, we disaggregate candidates per electoral situation across poverty clusters to avoid aggregation bias.

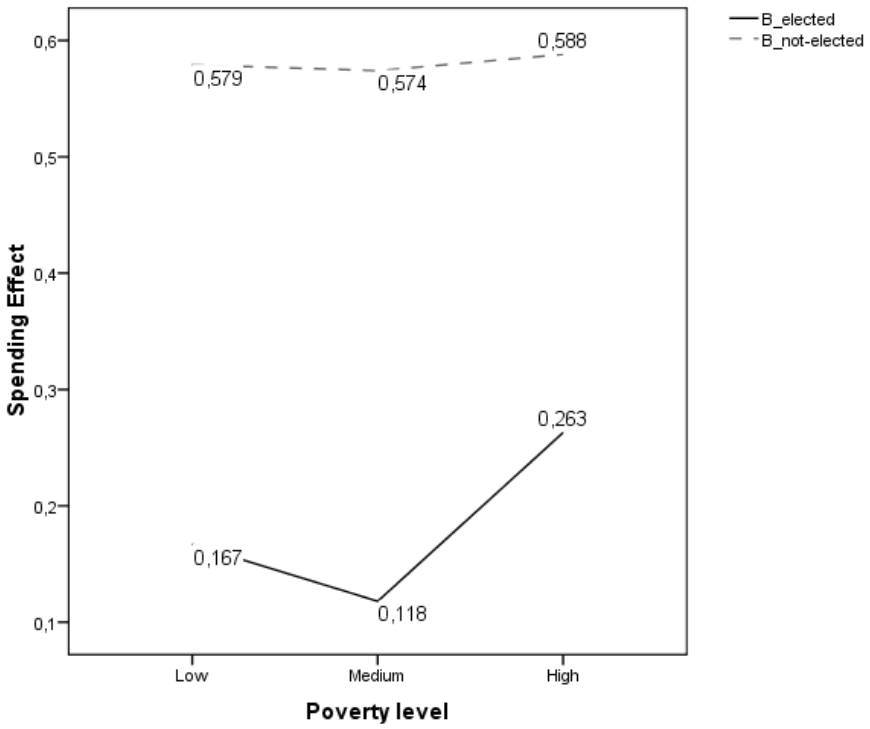
Table 05 – Spending effect on votes per candidate situation across poverty clusters

Poverty Cluster	Situation	B	Std. Error	Beta	t	Sig
Low	Elected	.167	.029	.320	5.805	.000
	Not Elected	.579	.010	.773	56.648	.000
Medium	Elected	.118	.136	.156	.865	.394
	Not Elected	.574	.046	.689	12.503	.000
High	Elected	.263	0.40	.436	6.537	.000
	Not Elected	.588	.020	.753	29.714	.000

The results are very similar. The next graph summaries this data.

analysis (PCA) to create another measure of poverty trying to better discriminate each case based on their new value. Again, we found no statistical significant differences among any poverty clusters. Thus, we are very confident in not rejecting the null hypothesis.

Graph 03 – Spending effect on votes per candidate situation across poverty clusters



To conclude, the preliminary results suggest that (1) campaign spending exerts a positive effect on votes; (2) not elected candidates benefit more of each extra dollar spent in their political campaigns compared to elected ones; (3) this pattern is consistent not only across states, but also among poverty levels; (4) there is no evidence that candidate spending efficiency is positive correlated with poverty levels.

References

1. Abramowitz, A. (1988). Explaining Senate election outcomes. American Political Science Review, 82(June), 385-403.

2. Abramowitz, A. (1989). "Campaign Spending in U.S. Senate Elections "Legislative Studies

3. Abramowitz, A. (1991). "Incumbency Campaign Spending, and the Decline of Competition in U.S. Elections" Journal of Politics 53: 34-56.

4. Ansolabehere, Stephen, and Alan Gerber. 1994. "The Mismeasure of Campaign Spending: Evidence from the 1990 U.S. House Elections. Journal of Politics 56: 1106-18.

5. Ansolabehere, Stephen, and Shanto Iyengar. 1994. "Effects of Advertising and News in Campaigns. Public Opinion Quarterly 58: 335-57.

6. Coates, Dennis (1998). "Additional Incumbent Spending Really Can Harm (at Least Some) Incumbents: An Analysis of Vote Share Maximization." Public Choice, 95:63-87.

7. Erikson, R. S., & Palfrey, T. R. (2000). Equilibria in campaign spending games: Theory and evidence. American Political Science Review, 94, 595-609.

8. Fowler, Linda L. (1993). Candidates, Congress and the American Democracy Ann Arbor: University of Michigan Press.

9. Gerber, A. (1998). Estimating the effect of campaign spending on Senate election outcomes using instrumental variables. American Political Science Review, 92, 401-411.

10. Gerber (2004). "Does Campaign Spending Work? Field Experiments Provide Evidence and Suggest New Theory," *American Behavioral Scientist*, January, 47(5), 541-574.

11. Gerber, A. S., & Green, D. P. (2000). The effects of canvassing, telephone calls, and direct mail on voter turnout: A field experiment. American Political Science Review, 94, 653-663.

12. Glantz, Stanton, Abramowitz, Alan, and Michael Burkhart. 1976. "Election Outcomes: Whose Money Matters?" Journal of Politics 38, (November):1033-8.

13. Goidel, Robert K., and Donald A. Gross. (1994). "A Systems Approach to Campaign Finance in U.S. House Elections" American Politics Quarterly 22: 125-53.

14. Green, D. P., & Krasno, J. S. (1988). Salvation for the spendthrift incumbent. American Journal of Political Science, 32, 884-907.

15. Green, D. P., & Krasno, J. S. (1990). "Rebuttal to Jacobson's New Evidence for Old arguments'". American Journal of Political Science 34: 363-72.
16. Grier, Kevin (1989). Campaign Spending and Senate Elections, 1978-1984," *Public Choice*, 63: 201-219.

17. Houser, D. and Stratmann, T. "Selling Favors in the Lab: Experiments on Campaign Finance Reform," Public Choice, Vol. 136 (2008), pp 215-239

18. Jacobson, G. C. (1978). The effect of campaign spending in congressional elections. American Political Science Review, 72, 469-491.

19. Jacobson, G. C. (1985). Money and votes reconsidered: Congressional elections, 1972-1982. Public Choice, 47(1), 7-62.

20. Jacobson, G. C. (1990). The effects of campaign spending in House elections: New evidence for old arguments. American Journal of Political Science, 34(May), 334-362.
21. Jacobson, G. C. (2001). The politics of congressional elections (5th ed.). New York: Longman.

22. Krasno, Jonathan S., Donald Philip Green, and Jonathan A. Cowden. (1994). "The Dynamics of Campaign Fundraising in House Elections" Journal of Politics 56: 459-74.

23. Levitt, S. (1994). Using repeat challengers to estimate the effect of campaign spending on election outcomes in the House. Journal of Political Economy, 102, 77-98.

24. Palda, K. (1973). “Does Advertising Influence Votes?' an Analysis of the 1966 and 1970 Quebec Elections." *Canadian Journal of Political Science,* 6: 638-55.

25. Palda, K. (1975). “The Effect of Expenditure on Political Success." *Journal of Law and Economics,* 18: 745-71.

26. Samuels, David. (2001a). “Money, Elections and Democracy in Brazil.” *Latin American Politics and Society* 43(2): 27-48.

27. Samuels, David. (2001b). “Does Money Matter? Campaign Finance in Newly Democratic Countries: Theory and Evidence from Brazil.” *Comparative Politics* 34: 23-42.

28. Samuels, David. (2001c). “Incumbents and Challengers on a Level Playing Field: Assessing the Impact of Campaign Finance in Brazil.” *The Journal of Politics* 63(2): 569-584 (May 2001).

29. Squire, P. (1995). Candidates, money, and voters: Assessing the state of congressional elections research. Political Research Quarterly, 48(4), 891-917.

30. Welch, William P. (1974). “The Economics of Campaign Funds.” *Public Choice* 20: 83-97.

31. Welch, William P. (1980). “The Allocation of Political Monies: Economic Interest Groups.” *Public Choice* 35: 97-120.

Appendix

Raw variable – situation – is originally string and has four categories: Elected, Elected by means, Substitute and Non-elected. Elected and Elected by means were grouped and assume value 1. Substitute and Non-elected candidates were grouped and assume value zero.

The factor measure of poverty (FMP) was created based on five different observed variables:

1. Proportion of indigent children
2. Proportion of poverty children
3. Proportion of indigent people

4. Proportion of poverty people
5. Poverty intensity

Using a principal component analysis these variables were reduced to one single component of poverty. This component has a eigenvalue of 4.85 and explains 96,90% of the variance of original variables. KMO statistics reach .629 and BTS of 437, df = 10 and p-value <.000).

Prior using FMP as clustering variable I run a model using per capita income as grouping variable. States were divided in three groups (low per capita income, medium per capita income and higher per capita income). After that I run an ANOVA model to compare the distribution of campaign effect per income group. The results suggest that there is no statistically difference between campaign spending effect across different groups of income.

Figure XX – Spending effect per state

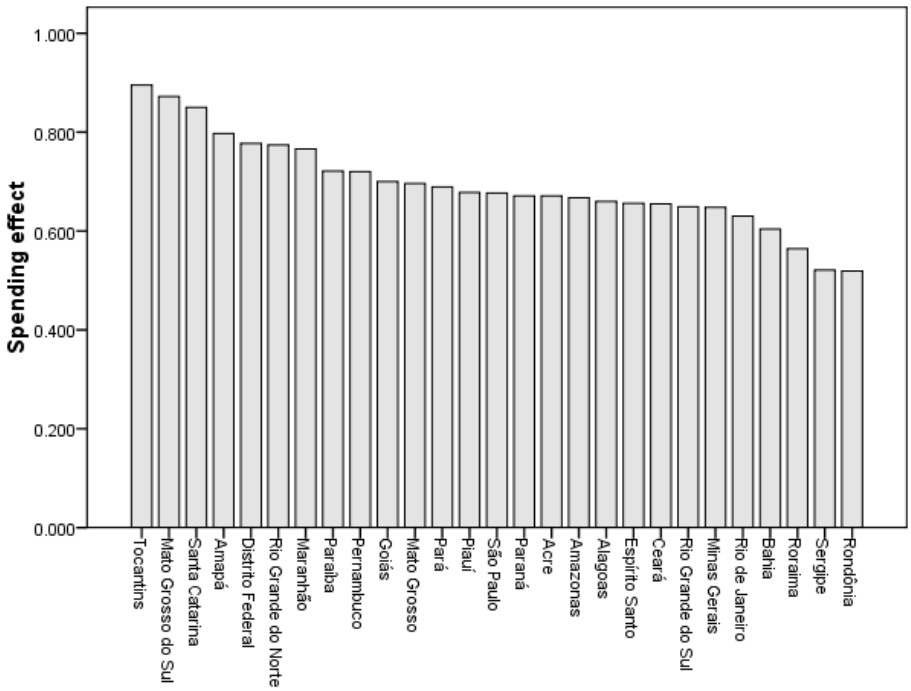


Table XX – Average per capita income per poverty cluster

Poverty Cluster	(R$)	US$	RUBLOS$
Low	345.95	221.76	6168.21
Medium	189.39	121.40	3376.83
High	147.92	94.82	2637.43

Table XX – States per poverty cluster

Poverty Cluster	N	states
Low	8	
Medium	13	
High	6	

Table XX – Institutional design

USA	BRAZIL
Single member district (Majority system)	Multimember district (8-70) (Proportional system)
Two party system	Multiparty system
Candidates can direct buy advertisements (issue advocacy and express advocacy)	Candidates CANNOT direct buy any type of media advertisements
Corporations CANNOT donate money direct to candidates (PACs)	Corporations can donate money direct candidates (maximum of 2% of their annual revenues)