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CONTRIBUTION LIMITS AND TRANSPARENCY IN A CAMPAIGN FINANCE EXPERIMENT

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ABSTRACT

We experimentally compare electoral outcomes when donor contribution limits are varied. The effect of contribution limits is studied under three levels of transparency: one where donors' preferences and donations are unobserved by the candidate and public; one where they are observed by the candidate but not the public; and one where they are observed by all. We find that a combination of stricter contribution limits and full transparency is most successful at limiting donors' influence on policy choice. We also find that stricter contribution limits improve social welfare. We further find that the partial and no anonymity settings lead to "centrist bias," whereby implemented policies, on average, are more centrist than the candidate's preferences.

Contribution Limits and Transparency in a Campaign Finance Experiment

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Abstract

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Keywords: Campaign Finance Reform; Transparency; Elections; Political Contributions; Contribution Limits

JEL Classification Codes: D72

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1 Introduction

Recently, campaign finance legislation has focused on campaign contribution limits and increasing the amount of transparency in the system. The rationale behind these legislative changes is that limiting the amount of contributions preserves the "one man, one vote" philosophy that underlies democratic elections, while increasing transparency allows voters to see which individuals or organizations may be capturing the politician. Yet, there is little systematic study of these legislative changes and a lack of evidence that suggests both changes are needed to enhance social welfare. In order to fill that void, Fang, Shapiro, and Zillante (2016) (hereafter FSZ) uses a laboratory experiment to examine how interactions between transparency of donor identities and the number of donors impact voter and candidate behavior as well as social welfare.[1] This paper is an extension of FSZ with the focus on the effect of stricter contribution limits.

Empirical evidence on whether or not contribution limits enhance the competitiveness of elections is mixed. Bardwell (2003) and Abrams and Settle (2004) argue that *spending* limits for candidates should be increased; Gross and Goidel (2001) and Bardwell (2002) show that contribution limits have no effect on candidate spending; and Jacobson (1978), Box-Steffensmeier and Dow (1992), and Lott (2006) provide empirical evidence that incumbents benefit from contribution limits and suggest that limits be relaxed or repealed. However, Eom and Gross (2006), Stratmann (2006), and Stratmann and Aparicio-Castillo (2006, 2007) find that contribution limits decrease the margin by which a candidate wins an election, and therefore infer that limits increase the competitiveness of the election. Hogan (2005) finds that if the goal is to decrease (increase) interest group involvement in a political party then contribution limits should be increased (decreased).

Our experimental design is as follows. There are candidates and donors who have preferences over possible policies. An agent experiences quadratic loss if the implemented policy differs from his most preferred policy (MPP). Donors can contribute to the candidate's election fund, and contributions only increase the candidate's election probability. Following FSZ, three levels of transparency are considered. *Full anonymity*: donors' preferences and the donated amounts are unknown to candidates; *partial anonymity*: donors' preferences and the donated amounts are known to candidates; and *no anonymity*: differs from partial anonymity in that the public observes donors' preferences as well. FSZ model no anonymity by assuming that donations from donors whose views are less popular among voters will have smaller marginal impact on the election probability.

The main result of FSZ is that full anonymity performs best at limiting the donors' influence on policy choices. The no anonymity treatments are better in limiting donors' influence, in general, than partial anonymity treatments, but the former have some limitations. For instance, under no anonymity candidates are more responsive to donations from unpopular donors even though such donations have a lower effect on the candidate's probability of election. Furthermore, donors' preferences have a statistically significant impact on candidate policy choices.

[1] Among very few experimental papers directly on the topic of campaign finance are Houser and Stratmann (2008), and Grosser et al. (2013).

In this paper we find that a combination of stricter contribution limits *and* no anonymity is successful at limiting donors' influence on policy choice. Notably, both factors are required to obtain the effect. Limiting contributions under partial anonymity does not prevent donors from affecting the policy choice. Similarly, no anonymity with generous contribution levels is not as effective at limiting donors' influence either. Further, imposing stricter donation limits increases social welfare as compared to the case of more relaxed limits. These results suggest that the current trends of reducing contribution limits and increasing transparency are welfare improving relative to a partial anonymity setting (which we believe is closest to the status quo), but social welfare may still be higher in a full anonymity setting.

2 Experimental Design and Hypotheses

2.1 Experimental Design

The experimental design, which is based on the theoretical model and experimental design in FSZ, is briefly described here. Each round of a session has two candidates and either one or two donors, depending upon the treatment. All donors and Candidate 1 ($C1$) are played by human participants, while Candidate 2 ($C2$) is computerized. The policy space is over $[0, 300]$. Each round the MPPs of all donors and $C1$ (c_1) are drawn from $U[0, 150]$ and the MPP of $C2$ is $c_2 = 225$. Thus, both the human candidate and the donors belong to the same half of the policy spectrum while the computer candidate belongs to the other half. The initial election probability for $C1$ is equal to the share of voters who prefer the MPP of $C1$:

$$\rho_1 = \frac{c_1 + 225}{600}. \tag{1}$$

Donors observe c_1 and c_2 and, in some treatments, the preferences of other donors. Each donor has an endowment of $w = 9000$ ECUs and can donate up to $\bar{d} = 1000$ ECUs to $C1$. Donations change election probabilities in the following manner:

$$\widehat{\rho}_1 = \rho_1 + \sum_{j=1}^{J} d_j r_j, \tag{2}$$

where d_j is the donation of donor j, and r_j is the impact of donor j. Candidates always observe updated election probabilities and total donations, and in some treatments they also observe the individual donation amounts and individual donors' preferences. Candidates make their policy choice and a winner is randomly determined based on the updated election probabilities.[2] If $C1$ wins the election and implements policy y_1 his utility (in ECUs) is $U_c = 6000 - (y_1 - c_1)^2$, and 0 otherwise. Utility of donor j is $U_{donor\ j} = \max\{9000 - d_j - (l_j - y)^2, 0\}$. Here l_j is the MPP of donor j, d_j his contribution, and y a policy implemented by the elected candidate.

[2] We choose to have candidates make policy choices prior to the election winner being announced in order to have balanced panel regardless of the election outcome.

As in FSZ, there are no voters in this experiment. The focus of the analysis is on the donor-candidate interaction, and as such we abstract away from voters. In addition, as our goal is to mimic elections with a large electorate, the number of voters needed to create an environment in which the odds of a voter not being pivotal is larger than could feasibly be accommodated in the labs that we used. Despite the lack of human voters, we believe we can address our chosen questions with the current design.

There are three levels of transparency: full anonymity (FA), partial anonymity (PA), and no anonymity (NA). In FA, candidates observe total donations they receive but not donors' MPP. This setting is designed to parallel the full anonymity system proposed in Ackerman and Ayres (2002). In PA, candidates observe MPPs and the donated amount of each donor. NA is similar to PA except that contributions from donors with unpopular preferences are less influential. Donors observe MPPs of other donors in PA and NA but not FA. The NA setting is closest to a perfectly enforced set of campaign finance regulations that call for complete transparency regarding contributions.

In FA and PA donations affect the candidate's probability of winning at the same rate, $r_j = 0.0001$, so that a donation of 100 ECUs leads to a 1% increase in $C1$'s probability of election. In NA, the impact of a donation depends upon the donor's MPP:

$$r_j^{NA} = r_j^{PA} + \frac{1}{600} \cdot \frac{l_j - c_1}{J \cdot \bar{d}}.$$

Thus, if a donor's MPP is more (less) centrist than the candidate's MPP the marginal impact of a donation will be greater (smaller) in NA than in PA or FA. The particular functional form for r_j^{NA} is chosen for its simplicity as r_j^{NA} does not depend on d_j or d_{-j}.

Among the three transparency levels, partial anonymity has no built-in safeguards to limit donors' influence. The full anonymity setting weakens potential favoritism by candidates, while the no anonymity setting reduces the possibility that socially unpopular policies are chosen due to contributions have a lower marginal impact on $\hat{\rho}_1$.

Each experimental session consists of a single transparency level (FA, PA, or NA). All subjects participate in two treatments throughout a session – a single transparency level that progresses from one to two donors. For every given transparency level/number of donors combination, candidates and donors are matched as partners. The number of periods, T, is generated randomly to mimic the infinitely repeated game environment.

To facilitate comparison across sessions two features are added. First, the number of rounds T was drawn prior to running sessions but was unknown to participants. One-donor treatments last for 14 rounds, and two-donor treatments last for 12 rounds respectively. Second, the same candidate-donor locations are used for each transparency level. For a given J, all J-donor treatments, regardless of transparency level, use the same pair of candidate-donor MPPs.[3]

[3] As in FSZ, we also conducted treatments with three donors. We do not present the results here (1) to conserve on space and (2) because by design the 3-donor treatments in FSZ and the current paper are identical, leading to no discernible differences between the treatments. These results are available upon request from the authors.

The focus of our paper is the role of contribution limits, with the main difference between this paper and FSZ being the effect of contribution limits. In this paper, the contribution limit is kept constant at 1000 ECUs for each donor regardless of how many donors are in the treatment. In FSZ the aggregate amount that can be donated is kept constant across treatments, so that $\bar{d} = \frac{3000}{J}$, where J is the number of donors. In Section 3 shorthand notation is used in referring to the treatments. The transparency level is first, followed by the contribution limit (where 1000 refers to treatments in which $\overline{d} = 1000$ and 3000 refers to treatments in FSZ), and then the number of donors. For example, PA1000-1 refers to the partial anonymity treatment when donations are always capped at 1000 with one donor, whereas NA3000-2 refers to the no anonymity treatment in which the aggregate donation cap is 3000 and there are two donors.

Sessions were conducted using z-Tree (Fischbacher, 2007) at large public southeastern universities. A total of 72 subjects participated in the 1000 treatments, and 72 participated in the 3000 treatments. Payments averaged about \$18.25 for the 90 minute sessions.

2.2 Hypotheses

This section presents hypotheses that describe the anticipated impact of stricter contribution limits. We use the following mnemonic rule to label hypotheses: C and D correspond to hypotheses with regards to candidates and donors respectively. Letters A and I specify whether the hypothesis is about aggregate or individual level data, while W stands for welfare.

In 1000 treatments it is expected that total donations will be lower than in the 3000 treatments simply because there is less money that can be donated. Furthermore, with stricter contribution limits donors are less influential and, therefore, candidates have less incentive to favor them, thereby reducing donors' incentives to support their candidate.

Hypothesis (AD): *Aggregate donations in 1000 treatments are less than those in 3000 treatments.*

Hypothesis (AC) *On average, in 1000 treatments candidates deviate less from their MPPs.*

With regards to the individual-level candidate's behavior the key question is whether donors' preferences have any impact on the policy implemented by $C1$. A natural conjecture is that this impact should be reduced in treatments with stricter contribution limits.

Hypothesis (IC) *In 1000 treatments donors' preferences will have less impact on the candidate's policy choice.*

The effect of the NA condition should be to limit the socially undesirable influence of extreme donors on chosen policies. However, FSZ does not find strong evidence indicating that extreme donors in NA treatments have no or less (than in PA) influence on the candidate. We conjecture that the combination of full transparency *and* stricter contribution limits can weaken the influence of extreme donors.

Hypothesis (NA): *In NA1000 treatments extreme donors have less impact on the candidate's policy choice.*

Next we examine the donor's contribution decisions at the individual level. Just like in the case with **(AD)** we expect lower donations in 1000 treatments.

Hypothesis (ID): *In the 1000 treatments, donors, at the individual level, will donate less.*

Finally, we examine the effect of stricter contribution limits on social and donors' welfare. Intuitively, we expect the following two effects:

Hypothesis (WD): *In treatments with stricter limits donors are worse off.*

Hypothesis (WS): *In treatments with stricter limits social welfare is higher.*

3 Results

3.1 Aggregated Behavior

Table 1 reports average total contributions and human candidates' response for each of the six treatments. Panel A shows the actual (left columns) and the theoretical (right columns) donation levels. Theoretical donations are calculated under the assumption that donors expect $C1$ to implement c_1 if elected. Panel B shows the deviations (left column) and absolute deviations (right column) of the implemented policy y_1 from the candidate's MPP. The former measures whether donations result in more centrist or more extreme policies, while the latter measures a candidate's willingness to respond to donations.[4] Table C reports the share of zero and maximum allowable donations.

The first result is that total donations in 1000 treatments are significantly lower than in 3000 treatments, which supports **(AD)**. Furthermore, with the exception of NA1000-1 there is no significant difference between donations in the 1000 treatments and the theoretical predictions. Thus, in 1000 treatments donors behave as if they expect the candidate to implement c_1 instead of favoring donors. Panel B shows that, on average, candidates tend to choose policies to the right of their original MPPs. Combined with the fact that candidates' preferences were drawn from the left of the policy spectrum, it suggests a centrist bias in candidates' choices. The notable exception is the PA3000-2 and PA1000-2 treatments, where choices are to the left of candidates' preferences. Finally, the average absolute deviations in 1000 treatments are not significantly different from those in 3000 treatments. Thus the evidence supporting **(AC)** is weak.

Panel C shows that for many donors the contribution limit was a binding constraint. It also shows that stricter contribution limits discourage donations, as the percentage of donors who donated zero is higher in 1000 treatments (with one exception of FA3000-2).

[4]In NA1000-1 subject 143 chose a policy above 150 in eight of fourteen elections. We have excluded the data point from this subject in Table 1.

Result 1: *Hypothesis **(AD)** is supported by the data while Hypothesis **(AC)** is not.*

Result 2: *With the exception of PA treatments candidates tend to choose more centrist policy as compared to their MPPs.*

3.2 Policy Choice

3.2.1 Deviations in Candidates' Policy Choice

First, we examine whether there is a statistically significant difference between the 1000 and 3000 policies. Table 2 presents results of t-tests and shows that, by anonymity level, the NA treatment by far had the most instances of significant difference between 1000 and 3000 policy choices (15 out of 37).[5] Furthermore, with two exceptions (1-donor $c_1 = 75$ and $c_1 = 97$), whenever there is a significant difference between the chosen policy in NA1000 and NA3000, its sign consistently indicates that the policy in NA1000 is closer to the candidate's MPP than the policy in NA3000. For example, in treatments with one donor when $c_1 = 146$ and $l_1 = 48$ the implemented policy in NA1000 is significantly higher than in NA3000, which indicates that in 3000 treatments candidates choose policies that are closer to the MPPs of the extreme donor.

Notably, NA1000 candidates tend to be less responsive not only to more extreme donors but also to more centrist donors which supports the stronger hypothesis, **(IC)**. For instance, in the two-donor treatment with $c_1 = 21$, candidates in NA1000 implemented more extreme policies than candidates in NA3000. In contrast, there is no difference between PA1000 and PA3000 choices when $c_1 = 21$. In the one-donor phase with $c_1 = 3$ or $c_1 = 49$ candidates in PA, but not those in NA, implemented less extreme policy thereby favoring less extreme donors. In other words, regardless of whether donors are more or less centrist than the candidate, the donors' impact on policy choice is lower in NA1000 than in NA3000 or PA1000.

Result 3: *The NA data provide stronger support for **(IC)** than the PA data. We also find support for **(NA)** in that NA1000 limits extreme donors' influence.*

3.2.2 Determinants of Policy Deviations

We use pooled data to examine which factors affect a candidate's decision to deviate from the candidate's MPP, and whether different factors have different impacts in the 1000 and 3000 treatments. The latter is measured using interaction terms with the dummy variable $Is1000$ (= 1 for 1000 treatments). The absolute value of the candidate's deviation, $|y_1 - c_1|$, is the dependent variable. We used the same independent variables as in FSZ and interact them with $Is1000$. Most variables are self-explanatory. Variable $(l_{far} - c_1)(l_{close} - c_1)$ measures relative locations of the candidate and donors. The further the candidate is from the donors the larger is its value. Variable $d_{far} - d_{close}$ calculates the difference in donation levels between the farthest and closest donors to determine

[5] As before we exclude subject 143 in 1-donor treatment tests.

if larger donations from farther donors lead to larger policy deviations. The results of panel-tobit regression are presented in Table 3.

1-Donor Treatments The analysis of 1-donor treatments substantiates our finding that NA data support **(IC)**, while PA data do not: $(l_1 - c_1)^2$ is significant and positive in both PA and NA. In 1000 treatments, however, the interaction term, $(l_1 - c_1)^2 \cdot Is1000$, is negative and significant in NA, while positive and insignificant in PA. The total effect of $(l_1 - c_1)^2$ in NA1000-1 is insignificant and positively significant in PA1000-1. Thus, for NA (but not PA) stricter contribution limits do more than reduce the impact of donors' preferences as conjectured in **(IC)**; they eliminate it.

We also find strong support for **(NA)**. In NA, the dummy variable $(c_1 > l_1)_t$ is significant and positive while its interaction with $Is1000$ is significant and negative. The sum of the two is insignificant (p-value 0.83). As argued in FSZ, that NA3000 candidates are more responsive to less influential but extreme donors is a potential weakness of the NA system in its ability to restrict the influence of extreme donors. However, this undesirable effect disappears with stricter contribution limits.

As established in FSZ, larger donations lead to smaller deviations in FA3000 and larger deviations in PA3000 and NA3000. However, the effect of d_1 in FA1000 is insignificant (p-value 0.59) Intuitively, when the contribution limit is 3000 the donors could send a clearer signal regarding their preferences than when it is only 1000. In the PA and NA treatments both d_1 and the interaction term are positive and significant. Candidates are more responsive to the same donated amount in the 1000 treatment than in the 3000 treatment. Finally, $c_1 + c_1 \cdot Is1000$ is negative and significant in all three treatments, while c_1 is significant only at FA. Thus in all 1000 treatments, centrist candidates are less likely to respond to donations and their deviation from c_1 is smaller.

2-Donor Treatments Similarly to the 1-donor case, NA1000-2 removes donors' preferences as a factor in candidates' decisions: the distance to the farthest donor, $(l_{far} - c_1)^2$, closest donor, $(l_{close} - c_1)^2$, or relative location of the candidate and donors, $(c_1 - l_{far})(c_1 - l_{close})$ have insignificant total effects in 1000 treatments. The 2-donor NA data strongly support **(IC)** and **(NA)**. In PA, the distance to the closest donor is significant and positive in both 3000 and 1000 treatments. When the closest donor is farther away from the candidate, it implies that in PA-2 having, for example, two extreme donors and a centrist candidate will lead to a considerably more extreme policy than in NA. Stricter contribution limits do not mitigate this effect. Therefore, PA-2 data do not support **(IC)**. Finally, that in NA treatments c_1 changes its impact from positive to insignificant between NA3000 and NA1000 provides further support to (**H-NA**).

Result 4: *In NA1000 treatments donors' preferences have no effect on implemented policy. This is not the case in PA treatments and NA3000. This provides strong support for* ***(NA)****.*

Result 5: *Under PA and NA, stricter donation limits make centrist (extreme) candidates less (more) likely to deviate.*

3.3 Donations

To study what factors affect donors' decisions as well as the role of contribution limits, a panel-tobit model, with the dependent variable the percentage of contribution limit donated, is estimated. Given that donors could be willing to donate more than the maximum amount, especially in 1000 treatments, two censoring limits are used: 0 and 100. To focus on the difference between 1000 and 3000 treatments we again use the previously mentioned binary variable $Is1000$, as well as interactions between $Is1000$ and other variables. Other factors considered are the distance between the candidate and the donor, $|l_j - c_1|$, the candidate and the other donor, $|l_{-j} - c_1|$, whether the candidate is between donors, *Between*, and the marginal impact r_j in NA treatments. Estimation results are presented in Table 4.

We test hypothesis **(ID)** using the variables $|l_j - c_1|$ and $|l_j - c_1| \cdot Is1000$. If the latter is negative (insignificant), then donors with the same distance in the 3000 and 1000 treatments donate a smaller (same) percentage of the contribution limit in 1000 treatments. Thus, only positive values of the interaction term are inconsistent with **(ID)**.

Result 6: *For every transparency level donors donate less in 1000 treatments. Hypothesis **(ID)** is confirmed.*

Another effect of stricter contribution limits is that they remove strategic effects present between the donors in multiple donor PA-treatments. For example, in PA3000-2 variables related to locations of the other donor(s) such as $|l_{-j} - c_1|$ or *Between*, are significant. In PA1000-2, however, these effects disappear. Both $Dist_{-j} + Dist_{-j} \cdot Is1000$ and $Dist_{-j} \cdot Between + Dist_{-j} \cdot Between \cdot Is1000$ are insignificant in PA1000-2. This result suggests that the location of the other donor and the relative locations of candidates and donors is no longer a factor in donation decisions in 1000 treatments.

Result 7: *Having stricter contribution limits removed all strategic effects that were present in the PA3000-2 treatment.*

3.4 Welfare

In this section we calculate and compare social welfare and donor welfare under two scenarios. The first scenario is a hypothetical benchmark where donations are not allowed and the elected candidate always chooses his MPP. The second scenario is based on the experimental outcomes. When calculating social welfare we assume that voters' most preferred policies are uniformly distributed on the interval $[0, 300]$ and that voters' utilities are the same as donors' utilities, as specified in Section 2. In particular, voters' payoffs are bounded by zero and are calculated *ex-ante*. That is, if the election probability of $C1$ is $\hat{\rho}_1$ and a voter's MPP is μ_i then that voter's expected utility is

$$\hat{\rho}_1 \cdot \max\left\{9000 - (y_1 - \mu_i)^2, 0\right\} + (1 - \hat{\rho}_1) \cdot \max\left\{9000 - (225 - \mu_i)^2, 0\right\}. \quad (3)$$

In the benchmark when donations are prohibited, $\hat{\rho}_1$ is the same as the initial election probability, and $y_1 = c_1$. Table 5 shows observed and benchmark average welfare by anonymity and number of donors.

Results 8 through 10 summarize Table 5:

Result 8: *Welfare in treatments with stricter donation limits tend to be higher, thereby supporting* ***(WS)****. The effect is statistically significant between the PA1000-1 and PA3000-1 treatments.*

Result 9: *Donors' welfare is lower in 2-donor treatments but not 1-donor treatments. The effect is significant for NA-2. The support for* ***(WD)*** *is weak.*

Result 10: *Compared to the benchmark, stricter contribution limits are significantly welfare improving in FA1000 treatments, but not FA3000 treatments, highlighting the role of stricter contribution limits. In all other treatments but PA1000-1 the effects is either negative or insignificant.*

4 Conclusion

With expenditures on political campaigns increasing each election cycle, campaign finance reform is a topic under consideration by many scholars. Current legislation favors stricter contribution limits and increased transparency of donor identities. While there are a number of studies that examine the effect of contribution limits, examining the interaction of contribution limits and transparency levels is more difficult due to the difficulty in controlling for transparency levels. To study this issue we use a laboratory experiment in which the transparency levels and contribution limits are varied. The results of this and a companion paper, Fang, Shapiro, and Zillante (2016), suggest that full anonymity and full transparency combined with strict donation limits are successful in weakening donors' influence.

References

[1] Abrams, Burton A. and Russell F. Settle (2004). Campaign-Finance Reform: A Public Choice Perspective. *Public Choice*, 120, 379-400.

[2] Ackerman, Bruce and Ian Ayres (2002). Voting with Dollars: A New Paradigm for Campaign Finance. New Haven: Yale University Press.

[3] Bardwell, Kedron (2002). Money and Challenger Emergence in Gubernatorial Primaries. *Political Research Quarterly*, 55(3) 653-668.

[4] Bardwell, Kedron (2003). Not All Money is Equal: The Differential Effect of Spending by Incumbents and Challengers in Gubernatorial Primaries. *State Politics & Policy Quarterly*, 3(3), 294-308.

[5] Box-Steffensmeier, Janet M. and Jay K. Dow (1992). Campaign Contributions in an Unregulated Setting: An Analysis of the 1984 and 1986 California Assembly Elections. *Western Political Quarterly*, 45(3), 609-628.

[6] Eom, Kihong and Donald A. Gross (2006). Contribution Limits and Disparity in Contributions between Gubernatorial Candidates. *Political Research Quarterly* 59(1), 99-110.

[7] Fang, Hanming, Dmitry Shapiro and Arthur Zillante (2016). An Experimental Study of Alternative Campaign Finance Systems: Transparency, Donations and Policy Choices. *Economic Inquiry* 54(1), 485-507.

[8] Fischbacher, Urs (2007). z-Tree: Zurich Toolbox for Ready-Made Economic Experiments. *Experimental Economics*, 10(2), 171-178.

[9] Gross, Donald A. and Robert K. Goidel (2001). The Impact of State Campaign Finance Laws. *State Politics & Policy Quarterly*, 1(2), 180-195.

[10] Grosser, Jens, Ernesto Reuben, and Agnieska Tymula (2013). Political Quid Pro Quo Agreements: An Experimental Study. *American Journal of Political Science*, forthcoming.

[11] Hogan, Robert E. (2005). State Campaign Finance Laws and Interest Group Electioneering Activities. *Journal of Politics*, 67(3), 887-906.

[12] Houser, Dan and Thomas Stratmann (2008). Selling Favors in the Lab: Experiments on Campaign Finance Reform. Public Choice 136, 215-239.

[13] Jacobson, Gary C. (1978). The Effects of Campaign Spending in Congressional Elections. *American Political Science Review*, 72(2), 469-491.

[14] Lott, John R. Jr. (2006). Campaign Finance Reform and Electoral Competition. *Public Choice*, 129, 263-300.

[15] Stratmann, Thomas (2006). Contribution Limits and the Effectiveness of Campaign Spending. *Public Choice*, 129, 461-474.

[16] Stratmann, Thomas and Francisco J. Aparicio-Castillo (2006). Competition Policy for Elections: Do Campaign Contribution Limits Matter? *Public Choice* 127, 177-206.

[17] Stratmann, Thomas and Francisco J. Aparicio-Castillo (2007). Campaign Finance Reform and Electoral Competition: Comment *Public Choice* 133, 107-110.

5 Tables and Figures

Average Donations and Candidate Response

Panel A: Total Donations						
	1 donor			**2 donors**		
	Observed	Theory	Diff-ce	Observed	Theory	Diff-ce
FA1000	545	627	-82	959	952	7
FA3000	1397	962	435*	1599	1358	241
Diff-ce	-852***	-		-640**	-	
PA1000	610	627	-17	1133	984	149
PA3000	1735	962	773***	2209	1268	941**
Diff-ce	-1125***	-		-1076***	-	
NA1000	540	500	40*	1048	1032	16
NA3000	1522	944	578***	1939	1250	689**
Diff-ce	-982***	-		-891***	-	
Panel B: Effect on Policy Choices						
	1 donor			**2 donors**		
	$y_1 - c_1$	$\|y_1 - c_1\|$	$y_1 - c_1 = 0$	$y_1 - c_1$	$\|y_1 - c_1\|$	$y_1 - c_1 = 0$
FA1000	6.37	14.51	*	19.36	23.66	**
FA3000	4.74	9.65	**	13.90	21.73	-
Diff-ce	1.63	4.86		5.46	1.93	
PA1000	8.57	16.30	*	-0.75	6.15	-
PA3000	1.25	10.39	-	-1.13	12.06	-
Diff-ce	7.32	5.90		0.38	-5.92	
NA1000	9.55	14.95	***	0.60	8.60	-
NA3000	2.86	23.95	-	2.59	13.78	-
Diff-ce	6.69	-9.00		-1.99	-5.18	
Panel C: Frequency of Zero and Maximum Allowed Donations						
	1 donor			**2 donors**		
	0	Max		0	Max	
FA1000	0.08	0.16		0.08	0.16	
FA3000	0.04	0.10		0.13	0.21	
PA1000	0.09	0.16		0.11	0.22	
PA3000	0.02	0.07		0.02	0.26	
NA1000	0.08	0.20		0.09	0.27	
NA3000	0.04	0.13		0.08	0.35	

Table 1: Panel A shows observed and theoretical *total* donations. Panel B shows candidate's average deviation, $y_1 - c_1$, and average absolute deviations, $|y_1 - c_1|$. Columns $y_1 - c_1 = 0$ test the null of average deviation being zero. Panel C shows the share of instances when the contributed amount was either zero or at the maximum allowed amount. */**/*** means significance at 10%/5%/1% of the Wilcoxon test, where one observation is the group average within a treatment. There were 12 groups in one-donor treatments, 8 groups in two-donor treatments.

Difference between Policies Implemented in 3000 and 1000 Treatments

1 Donor					2 Donors					
c_1	FA	PA	NA	l_1	c_1	FA	PA	NA	l_1	l_2
3	0	1	0	42	**7**	0	0	0	138	56
33	0	0	0	125	**21**	0	0	-1	63	11
46	0	0	0	29	**32**	0	0	0	100	4
49	0	1	0	17	**32**	0	0	-1	32	128
63	0	0	0	12	**56**	0	-1	0	128	111
66	0	0	0	76	**68**	0	0	0	70	42
75	1	0	1	143	**87**	0	0	1	52	81
97	0	0	1	138	**92**	0	1	0	6	28
116	0	0	0	116	**95**	0	0	0	41	18
119	0	0	0	148	**95**	0	0	1	13	5
132	0	0	1	57	**103**	0	-1	0	114	21
145	0	0	0	122	**126**	0	0	1	133	40
146	0	0	1	48						
149	0	0	1	96						

Table 2: Comparing the chosen policies in 1000 and 3000 treatments.

NOTES: The results of t-tests comparing implemented policies between 1000 and 3000 treatments for each particular candidate's location. An entry of '1' denotes the case where the hypothesis $y_1^{1000} = y_1^{3000}$ is rejected in favor of $y_1^{1000} > y_1^{3000}$ at 10% level; an entry of '-1' denotes the case where the hypothesis $y_1^{1000} = y_1^{3000}$ is rejected in favor of $y_1^{1000} < y_1^{3000}$ at the 10% level, and entry of '0' denotes the case where $y_1^{1000} = y_1^{3000}$ cannot be rejected.

Factors Determining Candidate's Policy Choice

	FA		PA		NA	
	Coef	**p-value**	**Coef**	**p-value**	**Coef**	**p-value**
Panel A: 1 Donor						
d_1	-0.0075	0.014	0.0031	0.014	0.0065	0.006
$d_1 \cdot Is1000$	0.0042	0.539	0.0096	0.088	0.0129	0.033
$(l_1 - c_1)^2$	0.0015	0.096	0.0017	0.015	0.0029	0.000
$(l_1 - c_1)^2 \cdot Is1000$	-0.0008	0.495	0.0003	0.756	-0.0013	0.234
c_1	-0.2994	0.000	-0.0520	0.275	-0.0893	0.086
$c_1 \cdot Is1000$	0.2006	0.008	-0.1042	0.124	-0.0979	0.176
$(c_1 > l_1)_t$	6.2367	0.306	-1.3466	0.787	13.4086	0.012
$(c_1 > l_1)_t \cdot Is1000$	-1.6031	0.83	4.532377	0.523	-12.2360	0.11
DidCMove$_{t-1}$	0.2197	0.003	0.1156	0.097	0.1548	0.011
DidCWin$_{t-1}$	-3.43911	0.322	-7.04	0.023	-5.2623	0.132
Panel B: 2 Donors						
$d_1 + d_2$	-0.0091	0.270	*	*	*	*
$(d_1 + d_2) \cdot Is1000$	-0.0021	0.888	*	*	*	*
$d_{far} - d_{close}$	*	*	0.0058	0.080	0.0072	0.089
$(d_{far} - d_{close}) \cdot Is1000$	*	*	0.0000	0.998	-0.0038	0.653
$(l_{far} - c_1)^2$	-0.0007	0.648	0.0003	0.701	0.0021	0.005
$(l_{far} - c_1)^2 \cdot Is1000$	0.0013	0.514	-0.0013	0.254	-0.0019	0.091
$(l_{close} - c_1)^2$	-0.0004	0.894	0.0028	0.086	-0.0030	0.089
$(l_{close} - c_1)^2 \cdot Is1000$	-0.0015	0.746	0.0018	0.496	0.0064	0.018
$(c_1 - l_{far})(c_1 - l_{close})$	0.0011	0.686	-0.0006	0.651	-0.0044	0.004
$(c_1 - l_{far})(c_1 - l_{close}) \cdot Is1000$	-0.0011	0.759	0.0038	0.081	0.0048	0.037
c_1	-0.1801	0.303	0.0429	0.602	0.1824	0.035
$c_1 \cdot Is1000$	-0.4658	0.051	-0.1988	0.100	-0.2259	0.060
DidCMove$_{t-1}$	-0.11574	0.330	0.1934	0.102	-0.1891	0.180
DidCWin$_{t-1}$	-1.3696	0.862	-2.5091	0.535	-12.4703	0.006

Table 3: The Panel Tobit Regression Analysis of the Candidate Behavior. Dependent variable is $|y_1 - c_1|$.

Factors Determining Donated Amounts

	FA		**PA**		**NA**	
	Coef	**p-value**	**Coef**	**p-value**	**Coef**	**p-value**
Panel A: 1 Donor						
$\lvert l_j - c_1 \rvert$	-0.343	0.009	-0.275	0.063	-0.241	0.069
$\lvert l_j - c_1 \rvert \cdot Is1000$	-0.278	0.143	-0.490	0.023	-0.418	0.030
ρ_1	-41.200	0.445	-82.296	0.179	-29.963	0.594
$\rho_1 \cdot Is1000$	-5.163	0.947	-104.443	0.241	-239.556	0.004
$c_1 > l_j$	16.421	0.052	-1.280	0.892	-10.519	0.269
$c_1 > l_j \cdot Is1000$	-5.795	0.636	-4.150	0.764	3.849	0.795
r_j	*	*	*	*	-50855	0.588
WinnerL	-4.184	0.496	-20.907	0.002	-2.669	0.653
Is1000	26.149	0.537	88.186	0.059	147.809	0.001
Panel B: 2 Donors						
$\lvert l_j - c_1 \rvert$	-0.381	0.000	-0.360	0.000	-0.235	0.012
$\lvert l_j - c_1 \rvert \cdot Is1000$	0.036	0.738	0.087	0.522	0.033	0.773
$\lvert l_{-j} - c_1 \rvert$	0.037	0.676	0.196	0.080	-0.112	0.317
$\lvert l_{-j} - c_1 \rvert \cdot Is1000$	0.001	0.991	-0.148	0.222	0.111	0.343
$\lvert l_{-j} - c_1 \rvert \cdot Between$	-0.171	0.214	-0.443	0.011	-0.077	0.657
$\lvert l_{-j} - c_1 \rvert \cdot Between \cdot Is1000$	0.101	0.471	0.315	0.081	0.344	0.042
$Between$	1.387	0.836	17.273	0.044	-4.002	0.640
r_j	*	*	*	*	42007	0.391
DidCWin$_{t-1}$	-3.532	0.297	-10.129	0.025	-2.071	0.637

Table 4: Fixed-effect panel estimation of donors' behavior.

Panel A: Social Welfare						
	1 donor			**2 donors**		
	Observed	Benchmark	Diff-ce	Observed	Benchmark	Diff-ce
FA1000	3633	3594	*39*** *	3605	3536	*69**
FA3000	3607	3594	*14*	3547	3536	*10*
Diff-ce	*26*	-		*58*	-	
PA1000	3622	3594	*29***	3508	3536	*-28**
PA3000	3578	3594	*-15***	3464	3536	*-72***
Diff-ce	*44****	-		*44*	-	
NA1000	3611	3594	*17*	3494	3536	*-42*
NA3000	3589	3594	*-4*	3514	3536	*-22*
Diff-ce	*22*	-		*-20*	-	

Panel B: Donors' Welfare						
	1 donor			**2 donors**		
	Observed	Benchmark	Diff-ce	Observed	Benchmark	Diff-ce
FA1000	3472	3439	*33*	2878	2648	*230*
FA3000	3339	3439	*-100*	2889	2648	*241*
Diff-ce	*133*	-		*-11*	-	
PA1000	3592	3439	*153*	3205	2648	*557***
PA3000	3526	3439	*87*	3550	2648	*902***
Diff-ce	*66*	-		*-345*	-	
NA1000	3492	3439	*53**	3075	2648	*427***
NA3000	3442	3439	*2*	3529	2648	*881***
Diff-ce	*50*	-		*-454***	-	

Table 5: Observed and Benchmark Welfare; */**/*** means significance at 10%/5%/1% of the Wilcoxon test. One observation is the group average within a treatment. There were 12 groups in 1 donor treatments, 8 groups in 2 donor treatments.