AN EXPERIMENTAL STUDY OF ALTERNATIVE CAMPAIGN FINANCE SYSTEMS: TRANSPARENCY, DONATIONS, AND POLICY CHOICES

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We experimentally study the transparency effect of alternative campaign finance systems on donations, election outcomes, policy choices, and welfare. Three alternatives are considered: 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 label them full anonymity (FA), partial anonymity (PA), and no anonymity (NA), respectively. We find that in NA and PA candidates consistently respond to donations by choosing policies favoring the donors. FA, in contrast, is the most successful in limiting the influence of donations on policy choices. Donors benefit greatly from the possibility of donations whereas social welfare may be harmed in some treatments. To our knowledge, this article is the first to investigate the effect of different campaign finance systems distinguished by their transparency level. (JEL D72)

Just as troubling to a functioning democracy as classic quid pro quo corruption is the danger that officeholders will decide issues not on the merits or the desires of their constituents, but according to the wishes of those who have made large financial contributions valued by the officeholder.

— U.S. Supreme Court, McConnell v. FEC [540 U.S. 93 (2003)]

Sunlight is … the best … disinfectant.

— Justice Louis Brandeis, *Other People's Money* (National Home Library Foundation, 1933, p. 62), quoted in Buckley v. Valeo [424 U.S. 1, 67, n. 80 (1976)]

Just as the secret ballot makes it more difficult for candidates to buy votes, a secret donation booth makes it more difficult for candidates to sell access or influence. The voting booth disrupts vote-buying because candidates are uncertain how a citizen actually voted; anonymous donations disrupt influence peddling because candidates are uncertain whether givers actually gave what they say they gave. Just as vote-buying plummeted with the secret ballot, campaign contributions would sink with the secret donation booth.

—Bruce Ackerman and Ian Ayres, *Voting with Dollars: A New Paradigm for Campaign Finance* (Yale University Press, 2002, p. 6)

I. INTRODUCTION

Campaign contributions and spending have many potential effects. On the positive side, campaign resources allow the candidates to fund the dissemination of useful information to voters. This information may lead voters to make more informed electoral choices. On the negative side, voters' interests may be harmed if candidates trade policy favors to special interests, or large donors, in exchange for contributions. While the First Amendment of the U.S. Constitution has

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ABBREVIATIONS

C1: Candidate 1
C2: Candidate 2
ECU: Experimental Currency Unit
FA: Full Anonymity
FECA: Federal Election Campaign Act
MPP: Most Preferred Policy
NA: No Anonymity
NE: Nash Equilibria
PA: Partial Anonymity

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repeatedly been used by the Courts to strike down efforts to restrict overall campaign spending, the first two quotes above suggest that the Supreme Court nonetheless is concerned about the potential corruptive influence of money in politics.

Throughout history, election procedures have been modified in order to stem the degree of influence in elections and policy choices. Secret ballots, for instance, are often thought of as protection for those who vote against the winning candidate. However, once ballots were made secret, candidates needed an alternative observable measure by which they could reward those who supported them during their campaign. Currently, nonanonymous campaign contributions may fill that role. A candidate cannot tell if an individual votes for him but can see how much money an individual contributes to his campaign. Based on that knowledge, the candidate could choose policies to reward that individual for monetary contributions. Indeed, the importance of money in American electoral campaigns has been steadily increasing over time. In 2010, the elected House of Representatives on average spent $1.4 million in their campaigns, a 58% increase in real terms over the average expenditure in 1998. Over the same period, the average real cost of a winning Senate campaign increased by 44% to $8.99 million.[1]

Given the suspicion that politicians, once elected, are likely to reciprocate those who contributed to their election by enacting favorable policies to their contributors, as forcefully expressed in the quoted majority opinion of the U.S. Supreme Court in *McConnell v. FEC* [540 U.S. 93 (2003)], there have been numerous attempts to control and limit the influence of money in politics. The Federal Election Campaign Act (FECA) of 1972 required candidates to disclose sources of campaign contributions and campaign expenditures. Current campaign finance law at the federal level requires candidate committees, party committees, and political action committees to file periodic reports disclosing the money they raise and spend.[2,3]

Additionally, they must disclose expenditures to any individual or vendor.

However, Yale Law School professors Bruce Ackerman and Ian Ayres, in their 2002 book *Voting with Dollars: A New Paradigm for Campaign Finance,* advocate a drastically different approach to reduce the corruptive influence of money in politics. As highlighted in the third quote above, a key part of Ackerman and Ayres' new paradigm advocates *full anonymity (FA)*, in which all contributions will be made secretly and anonymously through the FEC, indicating which campaign they will support.[4] Private donations would still be allowed but they would be anonymous and the FEC would be the clearinghouse for these now anonymous donations. To prevent donors from communicating to the politician by donating a specially chosen amount, the FEC masks the money and distributes it directly to the campaigns in randomized chunks over a number of days.

What paradigm will be more effective in reducing the role of corruptive influence of money in politics, the full transparency system as advocated by FECA (1972), or the FA system as advocated by Ackerman and Ayres? To date, little empirical evidence exists on this topic because FA has rarely been utilized in elections.[5] In this article, we use laboratory experiments to make a first step in addressing this important question.[6] The advantage of the laboratory environment is that it provides for a large degree of control for such factors as individuals' preferences, the impact of donations, transparency, voters' behavior, and so on. These factors may be difficult to measure using data from actual elections, but are important in determining the impact of the different systems. Furthermore, by fixing all

an undue burden that they would be unconstitutional. The Court opined that disclosure could be unconstitutional if disclosure would expose groups or their contributors to threats, harassment, and reprisals; and the Court suggested a "hardship" exemption from disclosure requirements for groups and individuals able to demonstrate a reasonable probability that their compliance would result in such adverse consequences.

4. Ackerman and Ayres' proposal also includes a Patriot dollar component in which each voter is given a $50 voucher in every election cycle to allocate between Presidential, House, and Senate campaigns.

5. Ayres and Bulow (1998) discuss various attempts at anonymous contribution systems for judicial elections in a dozen U.S. states in the 1970s. As they mention, many of these systems did not last long nor does much data exist to determine what effect full anonymity had on campaign contributions.

6. See Morton and Williams (2010) for an excellent introduction of the use of lab experiments in political science.

1. See http://www.cfinst.org and http://www.open secrets.org for the historical data on campaign expenditures.

2. Federal candidate committees must identify, for example, all PACs and party committees that give them contributions, and they must provide the names, occupations, employers, and addresses of all individuals who give them more than $200 in an election cycle. The Federal Election Commission maintains this database and publishes the information about campaigns and donors on its website.

3. The *Buckley* Court did indicate a circumstance in which the FECA's disclosure requirements might pose such

factors but one we can examine the role of the fixed factor. For instance, we examine behavior between a candidate and his/her donors by comparing different campaign finance systems—as characterized by their transparency level—in terms of donors' contributions, candidates' policy choices, and social welfare.

We consider three alternative systems as follows:

• *Full Anonymity (FA)*. Donors are anonymous to the candidate. The candidate observes neither donors' preferences nor the exact amount contributed by each donor. Donors are anonymous to the public: the donation impact on the electoral outcome does not depend on the donor's identity. We interpret the FA system as corresponding to the system advocated by Ackerman and Ayres (2002).

• *Partial Anonymity (PA)*. The candidate observes the donors' identities and their individual contribution amounts. Donors remain anonymous to the public. As in FA, the donation impact does not depend on the donor's identity.[7] Alternative interpretations for this treatment are that voters are indifferent to the identities of contributors to campaign funds, or that they may know who is contributing the funds but do not know the preferred policies of the donors.

• *No Anonymity (NA)*. The candidate observes the donors' identities and their individual contribution amounts. The donation impact depends on the donor's identity. We assume that donations from more (less) extreme donors are less (more) powerful. The NA system will correspond to a perfectly enforced set of campaign finance disclosure laws and can also be referred to as the *Full Transparency* system. The PA and NA treatments represent the bounds of information processing by voters, with PA being no information processing and NA being full information processing.

These three systems are modeled as follows. There is a set of potential policies represented by the interval $[0, 300]$. There are two candidates in the election and J potential donors. The candidate labeled as Candidate 1 is played by one of the participants of the experiment. The candidate labeled as Candidate 2 is nonstrategic and is computerized. The candidates and donors have most preferred policies (MPPs) and experience quadratic loss if the implemented policy differs from their respective MPPs. Candidates' MPPs are common knowledge. Only Candidate 1 can receive donations; thus in our model we abstract away from candidate competition for donations as well as the donor's choice of which candidate to support. In practice, it appears as if large individual donors consistently contribute to the same party across time. Using individual donor data from opensecrets.org, 30 names appear on the top 100 list of individual donors for both the 2010 and 2012 election cycles. Twenty-six people contributed 100% to the same party each cycle, three additional people gave over 90% to the same party each cycle, and only one individual made 100% of his contributions to one party in 2012 but less than 90% (74%) to that party in 2010.

Donations do not directly benefit Candidate 1 but increase the candidate's election probability.[8] Under the FA and PA systems, each contributed dollar has the same impact on the election probability. Under NA, the impact depends on donors' identities. Contributions from donors with more extreme (closer to 0) MPPs have lower impact. The reason that these contributions have a lower impact in the NA system is because voters, who can observe donor identities in this system, would be more likely to believe that the candidate would be captured by the donor and implement policies further from the candidate's MPP.[9] Candidates observe aggregate donations under all three systems, but in PA and NA candidates also observe donors' MPPs and the donation made by each individual donor. After observing this information, Candidate 1 chooses a policy that will be implemented if he is elected.

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7. Under the current federal election contribution laws, it is widely known that the identity of contributions can be hidden from the public via 501(c)(4) organizations and such. In our view PA approximates the current system in the United States because *voters* are uninformed about the identity of the donor, while candidates are likely to learn the identity through other means (e.g., private fund-raising events, etc.).

8. Aranson and Hinich (1979) provide an early theoretical model in which donations affect election probability.

9. As an extreme example to motivate this assumption, consider a sizable campaign contribution from an organization considered contemptible by a large chunk of the voters (even those who have political leanings to the same side). The monetary donation will certainly benefit the candidate, but because the organization is so extreme it may cause a loss in support from other donors/voters who feel that by accepting the donation the candidate may enact policies that are too extreme. It is in this way that donations from extreme donors have "less impact" than anonymous donations. However, a donation of the same size from a nonanonymous very moderate group would have a larger impact than the same donation from an anonymous donor (as well as a much larger impact than the same size donation from a nonanonymous extreme group) on the candidate's election probability because less voters would be turned away.

We design nine treatments that vary along two dimensions: the campaign finance system (FA, PA, or NA) and the number of donors (one, two, or three). We find the following results. First, except under FA, candidates are responsive to donations and they consistently choose policies that favor donors. Under both PA and NA systems, larger contributions prompt more favorable policies and candidates *are* willing to deviate more when the donors are further away. FA, however, is successful in limiting the impact of political contributions on policy choice. Regression results show that donations in FA had either no effect or a negative one on a candidate's willingness to deviate from his MPP. Thus, we find that FA, and not Full Transparency (NA), is most successful in reducing large donors' influence on policy choice. We also show that having more donors weakens an individual donor's influence in the NA and PA treatments. Given that most campaign finance systems are a combination of PA and NA, this result suggests that it might be desirable to foster competition between donors. It also provides some justification for limiting contribution amounts. We further explore this topic in the study by Fang, Shapiro, and Zillante (2015).

Next, donor behavior is examined. Contributions are lowest under FA, regardless of the number of donors, and are largest under PA with one and two donors and under NA with three donors. The major and most robust determinant of the contribution amount is the distance between the MPPs of the donors and the candidate. As expected, donors who are closer to the candidate donate more. In treatments with multiple donors, there is evidence of free-riding and competition among donors. Free-riding has a negative impact on individual donations and is statistically significant in PA treatments. Competition has a positive impact on individual donations and is statistically significant in all two and three donor treatments except NA with three donors. The competition effects in this article are similar to the effects of counteractive lobbying by rich and poor donors in the experiments in Grosser and Reuben (2013).

Finally, we compare donors' and social welfare with a benchmark in which donations are not allowed. The institution of political contributions considerably improves donors' welfare. The ability to increase the election chances of a preferred candidate and possibly induce an implementation of a more favorable policy by far outweighs donation costs. As for social welfare, in treatments with one and two donors, FA performs the best. Furthermore, it is the only system that improves welfare when compared with the no-donation benchmark. In three-donor treatments, however, the result is reversed. It is NA that has the highest welfare while FA is the only treatment with welfare below the no-donation benchmark.

Overall, this study is the first to examine Ackerman and Ayres (2002) campaign finance reform proposal and our findings indicate that implementing anonymity of donations is a successful method of limiting the impact of money in politics. The remainder of the article is structured as follows. Section II reviews related literature. Section III presents a theoretical model of the donor–candidate relationship in which donations increase the probability a candidate is elected. Section IV describes our experimental design and Section V presents the results. Section VI concludes the study.

II.   RELATED LITERATURE

The theoretical literature on campaign finance has mostly focused on the effect of contribution limits on election outcomes and welfare in models that feature binding contracts between donors and politicians, which are enforceable only if politicians are aware of donors' identities. In the terminology of this study, the existing theoretical research assumes that the campaign finance system is either NA or PA, thus it does not allow for a comparison with the fully anonymous system in which donors' identities are not known to the politicians.[10] It is typically assumed that campaign contributions are used in electoral races to provide information to voters, and candidates secure contributions by promising favors.

The literature emphasizes two different ways that campaign expenditures may provide information to voters. One strand of the literature assumes that campaign advertising is directly informative (e.g., Ashworth 2006; Coate 2004a, 2004b). For example, Coate (2004a) presents a model in which limiting campaign contributions may lead to a Pareto improvement. His main insight is that the effectiveness of campaign contributions in increasing votes may be affected by the presence of contribution limits. A second strand of the literature instead assumes that political advertising is only indirectly informative

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10. See Morton and Cameron (1992) for a comprehensive review of the earlier literature.

(e.g., Potters, Sloof, and van Winden 1997; Prat 2002a, 2002b; Sloof 1999). The core idea in these articles is that candidates have qualities that interest groups can observe more precisely than voters and the amount of campaign contributions a candidate collects signals these qualities to voters, which is the informational benefit of campaign contributions.

While there is a large experimental literature on voting, and a growing literature using field experiments to study political science issues, we are unaware of any existing study that investigates the effect of different campaign finance systems distinguished by information structures, though there are a few that discuss issues related to campaign finance.[11] Houser and Stratmann (2008) conduct experiments where candidates can send advertisements to voters in order to influence elections. Advertisements may or may not be costly (to voters) to send but they contain information about the candidate's quality (high or low). Based on a model in which candidates are motivated to trade favors for campaign contributions, they find that high-quality candidates are elected more frequently and the margins of victory for high-quality candidates are larger in publicly financed campaigns than in privately financed ones.

Grosser, Reuben, and Tymula (2013) examine the effect of money on political influence among small groups of voters. In their design, there is one wealthy voter/(potential) donor and three poorer voters who cannot make donations. Differently from our experimental design, donations in this setting are direct transfers to the candidate, and the donor can donate to both candidates. Candidates propose a binding redistribution policy (ranging from no redistribution to full redistribution) and voters then vote with the election winner determined by majority rule. The only setting in which they find that candidates will not propose full redistribution is the partner–donation setting.[12] This finding is consistent with our finding that candidates reciprocate donors by implementing policies that are more favorable to

the donor. In their design, however, candidates gain at the expense of poor voters, while the wealthy donor on average breaks even.

III. A THEORETICAL MODEL

In this section, we provide a simple analytical framework to understand the incentives for donors to contribute to the candidates' campaign. The model is also used as the basis of our experimental design described in Section IV. In this and the following sections, we will be using terms *MPP* and *location* when referring to agents' preferences interchangeably.

A. Candidate and Donor Characteristics

Consider a game between a politician who is a candidate in an election and J potential donors who can contribute to the candidate's campaign fund. The candidate receives benefit B if elected and 0 otherwise. The candidate's strategy is to determine a policy $y_1 \in [0, b]$ that will be implemented should he be elected. The candidate's preferences are characterized by his MPP $c_1 \in [0, b]$. Specifically, if policy y_1 is implemented then the candidate will experience quadratic loss, $-(c_1 - y_1)^2$.

Assume that there are two candidates who participate in elections. To focus on the candidate's response to donations and to abstract away from the competition for donations between candidates, we assume that the second candidate is *not* a strategic player. His preferences are characterized by policy $c_2 \in [0, b]$ and if elected he simply implements policy c_2. Furthermore, donations can be made only to the first, that is, to the strategic, candidate.

Candidates' preferences, c_1 and c_2, are common knowledge[13] and without loss of generality we can assume that $c_1 < c_2$. Voters' ideal policies are uniformly distributed on $[0, b]$, so that the expected vote share of the candidates is given by $(c_2 + c_1)/2b$ and $(2b - c_2 - c_1)/2b$, respectively, under the assumption that a voter will vote for the candidate whose ideal policy is closer to his own. We assume, as is common in probabilistic

voting models (see, e.g., Banks and Duggan 2005; Calvert 1985) that candidate i's probability of being elected, denoted by ρ_i, corresponds to the theoretical vote share, that is,

$$(1) \qquad \rho_1 = (c_2 + c_1) / (2b),$$

$$\rho_2 = 1 - \rho_1 = (2b - c_2 - c_1) / (2b).$$

We refer to these as *baseline winning probabilities*, and we describe below how campaign contributions affect these probabilities.

Donors can contribute to the first (strategic) candidate's campaign fund. Contributions do not directly benefit the candidate but increase his winning probability:[14] if donor j donates $d_j \geq 0$ to the candidate then it increases the winning probability at a rate r_j. Thus, if $\mathbf{d} = (d_1, \ldots, d_J)$ is the vector of donors' contributions then the winning probability of Candidate 1 becomes

$$\rho_1 + \sum_{k=1}^{J} r_k d_k.$$

Donors' preferences are characterized by their MPPs, and we use l_j to denote the MPP of donor j. Donor j always knows l_j. We consider two cases for l_{-j}, when preferences are public and l_{-j} is observed by donor j, and another when preferences are private. The expected payoff of donor j with preferences l_j when Candidate 1 implements policy y_1 and Candidate 2 implements policy $y_2 = c_2$ is

$$(2) \qquad w - d_j - \left(\rho_1 + \sum_{k=1}^{J} r_k d_k \right) (y_1 - l_j)^2$$

$$- \left(1 - \rho_1 - \sum_{k=1}^{J} r_k d_k \right) (c_2 - l_j)^2.$$

Here, $w > 0$ is the initial endowment and it is introduced to allow positive payoffs for donors; d_j is the donation of donor j and it is directly subtracted from the donor's wealth regardless of which candidate wins; $-(y_1 - l_j)^2$ and $-(c_2 - l_j)^2$ are disutilities caused by policies implemented by the winning candidates; the disutility from policy y_i is multiplied by the winning probability for candidate i.

Recall that the candidate's payoff in the case of losing elections has been normalized to zero.

Then the expected payoff of the strategic candidate given a donation vector $\mathbf{d}$ is

$$\left(\rho_1 + \sum_{j=1}^{J} r_j d_j \right) \cdot \left[B - (y_1 - c_1)^2 \right].$$

The timing of the game is as follows. In the beginning of the game, donors observe their own preference, l_j, as well as the preferences of both candidates, c_i. If donors' preferences are public then each donor can also observe the preferences of other donors, l_{-j}. Donors know ρ_i and the marginal impacts of their donations, r_j. Upon observing the available information, each donor decides how much to contribute to Candidate 1. Elections occur next. If Candidate 2 is elected, he implements policy $y_2 = c_2$ and the game ends. If Candidate 1 is elected, then he decides which policy to implement. Candidate 1 observes c_1 and the total sum of donations. When donors' preferences are public then the candidate can observe them *as well as* donations made by each donor. Upon learning this information, Candidate 1 chooses policy y_1 and the game ends.

B. Nash Equilibrium

Unbounded Payoffs. We solve the game using backward induction assuming the game is played once. The politician, if elected, has no incentive to choose anything other than the MPP,[15] $y_1 = c_1$. Because y_1 does not depend on the donor's behavior, it follows from Equation (2) that the payoff of donor j is a linear function of d_j and therefore optimal donations are either 0 or w. It is optimal to donate w (assuming the winning probability of the preferred candidate remains less than one) when the coefficient at d_j in Equation (2) is positive, that is when

$$(3) \qquad -1 + r_j \left[(c_2 - l_j)^2 - (c_1 - l_j)^2 \right] > 0;$$

and to donate 0 otherwise. From Equation (3), $d_j = w$ is optimal when either the impact of donations, r_j, is large or when there is a substantial difference between candidates' platforms from the donor's point of view.

As long as the election probability is less than one, the optimal donation level does not depend on donations of others. Therefore, the set of Nash

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14. For studies on the effects of campaign spending to vote shares and probability of winning, see, for example, Jacobson (1985), Abramowitz (1988), Green and Krasno (1988), Levitt (1994), and Gerber (1998).

15. Admittedly there are other reasons, such as reciprocity, that would cause the candidate to deviate from implementing the most preferred policy in the one-shot setting. However, we abstract away from these reasons in order to establish a benchmark theoretical case.

equilibria (NE) is as follows. Let J_w be the set of donors for whom Equation (3) holds. If $\rho_1 + \sum_{j \in J_w} r_j w < 1$ then the only NE is where donors from J_w donate everything and other donors donate nothing. Otherwise, we have a multiplicity of equilibria where donors from J_w will donate such an amount that $\rho_1 + \sum_{j \in J_w} r_j d_j = 1$.

Bounded Payoffs, Public Preferences. To make the theoretical framework compatible with the experimental setting, we consider the case where ex-post payoffs are bounded from below by 0. That is, if winning candidate i implements policy y_i such that $w - d_j - (y_i - l_j)^2 < 0$ then j's payoff is zero. When $w \leq (c_2 - l_j)^2$ the donor's objective function then becomes

$$(4) \quad \max_{\{d_j\}} \left[\rho_1 + \sum_{k=1}^{J} r_k d_k \right] \left[w - d_j - (c_1 - l_j)^2 \right].$$

Assuming an interior solution, the first-order condition implies that the optimal amount of donations is

$$(5) \quad d_j = w/2 - \left[(c_1 - l_j)^2 \right] / 2$$

$$- \rho_1 / (2r_j) - \left(\sum_{k \neq j} r_k d_k \right) / (2r_j).$$

Parameters affect the optimal donation level in an intuitive way. Richer donors will donate more and donations are larger if the candidate's ideal policy is closer to the donor's; also donors with larger impacts on elections, that is, those with higher r_j, donate more. Furthermore, we observe a free-riding effect: if other donors donate more, then donor j donates less. These properties carry through to the equilibrium donation levels given by Equation (6) below:[16]

$$(6) \quad d_j^{\text{pub}} = \left(1 - \left[\sum_{k=1}^{J} (r_k/r_j) \right] / (J+1) \right)$$

$$w - \rho_1 / \left[(J+1) r_j \right] - \left[J / (J+1) \right] (c_1 - l_j)^2$$

$$+ \left[\sum_{k \neq j} (r_k/r_j) (c_1 - \ell_k)^2 \right] / (J+1)$$

16. When $w > (c_2 - l_j)^2$ a donor's utility coincides with the unbounded payoff case if $d_j < w - (c_2 - l_j)^2$ and it becomes (4) otherwise. Depending on parameter values three cases are possible: the optimal donation can be either 0, $w - (c_2 - l_j)^2$, or the level determined by (5). Having three cases makes the exact analytical expression for the NE too cumbersome and so for parameter values from our experiment we calculate NE numerically.

Private Preferences. We now solve for the equilibrium in which donors' locations are private information, which corresponds to the Ackerman and Ayres proposal. Donor j does not observe preferences of other donors and believes that they are distributed with cdf $F(\cdot)$. We assume that the impact of donations that we denote as r is the same because donors are indistinguishable.

The unbounded payoffs case remains unchanged because optimal donations do not depend on preferences of other donors. In the case of bounded payoffs, the FOC becomes

$$(7) \quad d_j = \left[w - (c_1 - l_j)^2 \right] / 2 - \rho_1 / (2r_j)$$

$$- \left(E \sum_{k \neq j} d_k \right) / 2$$

Taking expectations of both sides and assuming symmetry, we obtain:

$$(8) \quad Ed_j = w / (J+1) - \rho_1 / [r(J+1)]$$

$$- \left[E (c_1 - l_j)^2 \right] / (J+1)$$

and therefore the equilibrium donations are

$$(9)$$
$$d_j^{priv} = w/(J+1) - \rho_1 / [r(J+1)] - \left[(c_1 - l_j)^2 \right] / 2$$

$$+ \left[(J-1) \left(E (c_1 - l_j)^2 \right) \right] / [2(J+1)]$$

Using Equations (6) and (9) to compare donations in public and private cases, we obtain:

$$(10)$$

$$d_j^{priv} = d_j^{pub} + \left[(J-1) (c_1 - l_j)^2 \right] / [2(J+1)]$$

$$+ \left[(J-1) \left(E (c_1 - l_j)^2 \right) \right] / [2(J+1)]$$

$$- \left(\sum_{k \neq j} (l_k - c_j)^2 \right) / (J+1)$$

From Equations (8) and (10), we have the following proposition:

PROPOSITION 1. *The average individual contributions in models with public and private information are the same. On average, larger J leads to lower individual contributions. Donor j will donate less than under private information if his preferences are closer to c_1 or preferences of other donors are further from c_1.*

The intuition for the last statement is as follows. In the case of public information, there is a

free-riding effect: when other donors contribute larger amounts, donor j has less incentive to contribute. For example, if l_j is close to c_1 and this is common knowledge, other donors contribute less thereby making donor j contribute more. This effect is absent in the case of private information and therefore d_j^{priv} is lower. Similar intuition is applied to the case when c_1 is further away from other donors.[17]

C. Candidate's Responsiveness and Its Impact on Donations

In the previous section, we used backward induction to establish that the candidate will always choose $y_1 = c_1$. The same argument would apply if the stage game is repeated $T < \infty$ times, where T is common knowledge. However, when T is unknown or is infinite then backward induction is no longer applicable and it might be rational for the candidate to choose $y_1 \neq c_1$ in anticipation of higher future donations, or to avoid potential punishment of zero donations, adding another dimension to political contributions. Donors would now contribute not only to *support* the candidate but also to *influence* his policy choice upon winning the election.

Assume that the policy choice $y_1(\mathbf{d}, c_1)$ is a function of donations, $\mathbf{d}$, and the candidate's location, c_1. A donor's maximization problem under the bounded payoff becomes

(11)
$$\max_{d_j} \left[\rho_1 + \sum_{k=1}^{J} r_k d_k \right] \left(w - d_j - \left[y_1 \left(\mathbf{d}; c_1 \right) - l_j \right]^2 \right),$$

and under the unbounded payoffs

(12)
$$\max_{d_j} w - d_j - \left[\rho_1 + \sum_{k=1}^{J} r_k d_k \right] \left[y_1 \left(\mathbf{d}; c_1 \right) - l_j \right]^2$$
$$- \left[1 - \rho_1 - \sum_{k=1}^{J} r_k d_k \right] \left(c_2 - l_j \right)^2.$$

Let $\varepsilon = -\partial(y_1(\mathbf{d}; c_1) - l_j)^2]/\partial d_j$ be a measure of a candidate's responsiveness to donations. It

is defined so that if larger donations lead to more favorable policies then $\varepsilon > 0$. From the first-order condition with respect to d_j, we obtain:

(13) $d_j r_j (2 - \varepsilon) = r_j w - r_j \left[y_1 \left(\mathbf{d}; c_1 \right) - l_j \right]^2$
$$- \left(\rho_1 + \sum_{k \neq j} r_k d_k \right) (1 - \varepsilon),$$

in the case of bounded payoffs and in the case of unbounded payoffs we have:

(14) $-1 + r_j \left[\left(c_2 - l_j \right)^2 - \left(y_1 \left(\mathbf{d}; c_1 \right) - l_j \right)^2 \right]$
$$+ r_j d_j \varepsilon = 0.$$

For brevity we omit the arguments of $\mathbf{d}$ and c_1.

While full characterization of the equilibrium structure in this model would go beyond the scope of the article, we use the equations above to study how donors' behavior is affected by behavior of the candidate and contributions of other donors.[18]

First, consider the unbounded payoff case. As before, corner solutions are possible. When $\varepsilon > 0$ and (3) is satisfied it is optimal to donate as much as possible. If Equation (3) is not satisfied and ε is small it is optimal to donate 0. Finally, when Equation (14) determines optimal donations (in this case, ε' would have to be negative at the optimum) then higher ε and lower $(y_1(\mathbf{d}; c_1) - l_j)^2$ mean higher d_j. Intuitively, marginal cost remains equal to one and marginal benefits increase.

Now consider the bounded payoff setting. When $\varepsilon > 2$ it is optimal to donate as much possible, or at least until ε remains above 2. Intuitively, the combined benefits of supporting and influencing the candidate outweigh the cost of donations. When $\varepsilon < 2$ then the best response is affected as follows. Higher ε, other things being equal, implies larger donations because benefits from donations are larger. Similarly, other things being equal, an expectation of a more favorable policy, that is, lower $[y_1(\mathbf{d}; c_1) - l_j]^2$, implies a larger donation. Finally, the response to d_{-j} depends on whether $\varepsilon < 1$ or not. In the former case, an increase in d_k for some $k \neq j$ should decrease d_j, which is similar to the free-riding effect observed earlier. However, when $\varepsilon > 1$ then donations become *strategic complements* in that higher d_k leads to higher d_j. Intuitively, the benefits of influencing the policy (as measured by ε)

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17. Our focus is on a setting in which one candidate receives donations while the second candidate does not. A natural question is what would happen to the amount of donations if both candidates could receive them. While we have not included the model here, the end result is that donations would increase because now it would be the amount of donations beyond what the other candidate raises that shift the probability of election. In essence, more donations would be needed to offset the opposing candidate's donations.

18. Naturally, without deriving the equilibrium the applicability of the analysis below is somewhat limited. Nonetheless, it will be a useful benchmark for interpreting empirical results in Section V.

and the cost of supporting the candidate matter only as much as the influenced candidate is likely to be elected. Higher d_k amplifies both effects, however, when $\varepsilon > 1$ ($\varepsilon < 1$) the impact on benefits is higher (lower) and thus it is optimal for donor j to increase (decrease) donations.

Note that a candidate's response to donations crucially depends on the information structure. When donors' preferences are private, for example, one would expect the candidate to be less responsive to donations than in the case of public preferences and therefore the donated amount would be smaller than in the public case. That, in turn, would further limit the candidate's incentives to respond.[19] In the experimental part of the study, we will test how different information structures impact donors' and candidate's behavior.

IV. EXPERIMENTAL DESIGN AND PROCEDURES

The experimental design is closely related to the model described in the previous section. In this section, the details of the experimental design, as well as the justifications for some of the design choices, are presented.
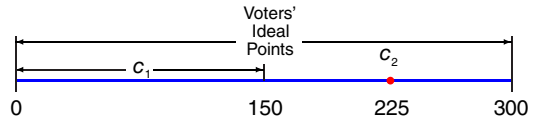
A. Players and Basic Environment

There are two types of players: candidates running for office and donors who finance candidates' campaigns. There are two candidates and, depending on the treatment, one to three donors. The set of potential policies that can be implemented by an elected candidate is represented by a [0, 300] interval. All candidates and donors have preferences over the set of policies. Each player has an MPP and incurs quadratic loss when implemented policies differ from the MPP.

One candidate, labeled as Candidate 1 (hereafter $C1$), and all donors are played by human participants. A uniform distribution on the

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FIGURE 1
The Ideal Policies of Voters, Donors, and Candidates

interval [0, 150] is used to draw their MPPs. Candidate 2 ($C2$) is a nonstrategic computer player with an MPP at $c_2 = 225$ (see Figure 1). The difference between the two candidates is that $C1$, if elected, can implement any policy from the interval [0, 300], whereas the computerized $C2$ always implements its MPP (225). Furthermore, only $C1$ can receive donations. In this design, we intentionally abstract away from questions concerning competition between candidates for political donations and focus on the interactions between one candidate and his potential donors.

The key treatment condition in this study is the level of donor anonymity. Three conditions are considered: *FA*, in which candidates observe neither donors' preferences nor the amount of individual contributions; *PA*, in which donors' preferences and individual contributions are observed *and* each contributed dollar has exactly the same impact regardless of the donor's preferences; and *NA*, in which donors' preferences and individual contributions are observed *and* donations from more (less) extreme donors have lower (higher) impact. NA explicitly incorporates transparency proponents' argument that voters observing large donors' identities will anticipate the candidate favoring those donors. Therefore, large donations from an extreme donor would mean a higher likelihood of more extreme policies if the candidate is elected, which voters in our setup would find undesirable.[20]

The timing and information structure is as follows. The game begins with a donor stage in which each donor learns his MPP, l_j, as well as the MPPs, c_1 and c_2, of both candidates. Donors observe the *initial* probability of $C1$ winning the election. In PA and NA, donor j is also

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shown the MPPs of other donors, l_{-j}. Given the available information each donor decides how much to donate to $C1$. Donations do not directly benefit the candidate, but do increase the election probability for $C1$. Once donors decide on contribution amounts, $\{d_j\}$, the game moves to a candidate stage. Candidates observe candidates' MPPs, the sum of donations, and the *new* election probability given the donations. In PA and NA, the candidate also observes $\{l_j\}$ and $\{d_j\}$, the preferences and donated amount for each donor j. The candidate chooses a policy $y_1 \in 0, 300]$ and the candidate stage ends.[21] The election outcome is determined randomly given the updated election probability. Finally, given the implemented policy, payoffs are calculated and displayed.

Note that each election outcome is determined by a probabilistic draw rather than having an election with actual participants as voters. This decision is made for several reasons. Most importantly, it allows us to have full control over how donations impact the election outcome, both within and between different anonymity levels. Furthermore, excluding the voting stage keeps the experimental setup manageable and allows us to focus on our main goal which is studying candidate–donors interactions. Finally, our research is primarily motivated by elections with large electorate, such as Presidential or Congressional elections or primaries. These elections are difficult to implement using participants as voters while retaining a negligible probability that any voter is pivotal.

The exact parameter values and payoff functions used in the experimental design are as follows. Given $C1$'s MPP the initial probability of winning the election, ρ_1, is

$$(15) \qquad \rho_1 = (c_1 + 225)/600.$$

Thus, more extreme candidates have lower probabilities of winning than those candidates closer to the center.

Donors are given an initial endowment of $w = 9000$ experimental currency units (ECUs) of which they can donate up to a maximum donation amount of $\overline{d} < 9000$ to $C1$'s fund. Under PA and FA, the impact of a donation is set at the rate $r = 0.0001$, so that every 100 ECUs donated

increase $C1$'s election probability by 1%. The final election probability for $C1$ is then

$$(16) \qquad \rho_{FA} = \rho_{PA} = \rho_1 + 0.0001 \sum_{j=1}^{J} d_j.$$

The impact of donations under NA depends on donors' MPPs and is given by

$$(17)$$
$$\rho_{NA} = \rho_{FA} + (1/600)\left[\sum_{j=1}^{J} \left(d_j/\overline{d} \right) \left(l_j - c_1 \right) \right] /J$$

where $\rho_{FA}(\mathbf{d})$ is defined in Equation (16) and J is the number of donors.[22]

This particular rule is used for two reasons. First, Equation (17) is a linear function of $\{d_j\}$ and, therefore, the marginal impact of each donated ECU, r_j^{NA}, depends neither on the donated amount, d_j, nor on donations from other donors, d_{-j}. This assumption makes it particularly convenient for experimental purposes. Second, it captures the desired effect that donations from more extreme donors have a lower marginal impact on the election probability. To compare the impact of donations in NA with that in FA and PA, note that $r_j^{NA} = 0.0001 + (1/600)[(l_j - c_1)/(J \cdot \overline{d})]$, so that $r_j^{NA} > r_j^{FA} = r_j^{PA}$ whenever $l_j > c_1$, meaning that the same size donation from a nonanonymous more centrist donor donor will have a larger impact than from an anonymous donor, but the donation from a nonanonymous extreme donor will have a lesser impact than that of an anonymous donor. Intuitively, if $l_j = c_1$, the voters do not expect donations from donor j to distort the candidate's policy choice and the donation's impact is the same as in PA. If $l_j > c_1$ ($l_j < c_1$), the public expects, other things being equal, that the implemented policy will be more (less) centrist which provides extra benefit (cost) to the candidate as compared with PA.

Finally, payoffs are determined in the following manner. If a donor with MPP l_j donates d_j to the human candidate, and the policy implemented by the elected candidate (either human or computer) is y, then the donor's payoff is given by

$$(18)$$
$$\Pi_D \left(y; d_j, l_j\right) = \max \left\{ 9000 - d_j - \left(l_j - y\right)^2, 0 \right\},$$

where 9,000 is the donor's initial endowment.

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21. We chose to have candidates make their policy decision prior to the announcement of the election winner so as to have a complete set of human candidate policy choices.

22. As it is implausible that donations from a few large donors can guarantee a candidate wins the election with certainty, a maximum final election probability for $C1$ of 0.8 is imposed for all three anonymity conditions.

The value to the human candidate of winning the election is set at 6,000.[23] If the human candidate wins the election and implements y_1 then his payoff is $\Pi_C = 6000 - (c_1 - y_1)^2$, and 0 otherwise. As mentioned earlier, in the one-stage game the candidate has no incentive to choose $y_1 \neq c_1$, which is why the experiment is designed as a repeated-game.

B. Sessions and Treatments

Overall, we conducted $3 \times 3 = 9$ treatments: three anonymity levels times for each of three values for the number of donors, $J = 1, 2,$ or 3. For all nine treatments, the *aggregate* amount that could be donated was set equal to 3,000. Therefore, the maximum donation by one donor, $\bar{d}$, is 3000/J. The treatments are labeled according to the values of treatment parameters. For example, PA-2 is the treatment with the PA anonymity level and two donors.

Each session consisted of three treatments. The anonymity level was fixed within the session while the number of donors varied from one to three. Sessions begin with a single donor phase in which each donor was paired with the same human candidate each round, followed by a two-donor phase in which two donors were paired with the same human candidate each round, and then concluded with a three-donor phase in which three donors were paired with the same human candidate each round. Participants knew all three treatments would be conducted prior to making any decisions. While a participant's role is fixed within a phase, participants are randomly rematched across phases and some participants will play both roles throughout the session.

While candidates for political office likely have more than three donors, our results suggest that additional donors would be unlikely to add insight into the processes in which we are interested. For instance, if there were any X number of donors, then either the candidate has an equal number on each side (which can be represented in our two-donor treatments with one donor on each side) or an unequal number on each

side (which can be represented in our three-donor treatments with two or three donors on one side and one or zero on the other). The phases lasted for 14, 12, and 11 rounds, respectively. The number of rounds was predetermined using a random number generator and was *unknown* to participants in order to replicate the infinitely repeated-game environment.

In order to facilitate the comparison of different treatments, the same pregenerated values for candidates' and donors' ideal policy locations were used. In all one-donor treatments, the same 14 pairs of candidate–donor locations are used (one pair for each period), in all two-donor treatments the same 12 triplets of candidate–two-donor locations are used, and so forth. Given that the same subjects participate in treatments with one, two, and three donors, the ideal locations for one-donor treatments differed from the ideal locations for two- and three-donor treatments. Across sessions and candidate–donor groups, however, the draws of the ideal policies were kept identical.[24] One concern is how best to motivate our design choice as donors interact with the same candidate repeatedly but all have (potentially) different locations each round. Our view is that while the candidate and donors come from the same side of the political spectrum on many issues, different issues are of importance in each election. Thus, while the candidate and donors interact repeatedly, their locations vary on different issues. For some issues, a candidate may be to the left of a donor, and for other issues a candidate may be to the right of the donor.

The sessions were conducted using the z-Tree software (Fischbacher 2007). A total of 72 subjects participated with 24 subjects per given information structure. Sessions were conducted at Florida State University's xs/fs laboratory in September 2010. Payments averaged about $18.25 for the 90-minute sessions.

V. RESULTS

In this section, we present results on behavior and welfare. The terms *MPPs*, *locations*, and *preferences* are used interchangeably. We refer to MPPs in $[0, 49]$ as *extreme*, those in $[50, 100]$ as *moderate*, and those in $[101, 150]$ as *centrist*.

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23. The donor endowment of 9,000 and the candidate benefit of 6,000 are chosen in an attempt to equalize expected payoffs between donor and candidate participants. The reason that donors have a larger endowment than the candidate is because when $C1$ loses then all participants are essentially receiving 0, and when $C1$ wins donors are likely to suffer larger losses than candidates because (1) donors contribute some of their endowment as donations and (2) candidates choose policies closer to their own MPPs.

24. Table 2 records the actual draws of the human candidate's ideal policy location c_1 and the donor(s)' ideal policy locations for each period.

TABLE 1
Donations and Candidates' Response

(A) Total Donations (out of 3,000)					
Actual			Theoretical		
1	2	3	1	2	3
FA	1,397	1,599	1,645	962	1,358	1,326
PA	1,735	2,209	1,666	962	1,268	1,225
NA	1,522	1,939	2,392	944	1,250	1,345

(B) Policy Choices					
Deviation			|Deviation|		
1	2	3	1	2	3
FA	4.74	13.90	2.33	9.65	21.73	7.21
PA	1.25	−1.13	14.55	10.39	12.06	19.18
NA	2.86	2.59	24.30	23.95	13.78	27.70

Notes: Theoretical predictions are calculated using the theoretical framework in Section III and under the assumption that donors expect the candidate to implement his MPP.

A. Descriptive Statistics

Panel A of Table 1 reports the actual (left columns) and the theoretical (right columns) average donation levels. The theoretical donations are calculated using the model developed in Section III under the assumption that the candidate will implement his MPP as the chosen policy as donors do not expect to influence the candidate. It follows from Table 1 that for any number of donors average donations in the FA treatments are lower than in the PA and NA treatments. This result provides initial support for Ackerman and Ayres's (2002) proposal for campaign finance reform, at least in reducing the level of money in politics. Intuitively, in our setup there are two reasons to donate: to support one's preferred candidate and to affect that candidate's policy choice. By design, the latter reason is weakest in the FA treatment, leading to lower average contributions in FA.

Panel B of Table 1 shows the average deviation (left columns), $y_1 − c_1$, and the average absolute deviation (right columns), $|y_1 − c_1|$, between the candidate's MPP and the chosen policy. The average deviation captures whether donations influence a candidate's choice toward more centrist or more extreme policies and the average absolute deviation captures a candidate's responsiveness to donations. With the exception of PA-2, the candidate's average deviation is positive. Recall that the location of the human candidate, c_1, was drawn from the range $[0, 150]$, while the range of policies is $[0, 300]$. Thus, c_1 is always to the *left* of the median voter and so a positive deviation by

the human candidate is socially desirable in our model. Interestingly, contributions lead to more centrist policies, *even though the donors are from the same side of the political spectrum*. In the PA-2 treatment, however, the candidate's average deviation was slightly (less than two units) negative indicating that under PA extreme donors exert the most influence.

Finally, the average absolute deviation ranged from 7.21 to 27.70, with the former corresponding to a candidate payoff loss of 52 ECUs (out of the 6,000 ECUs obtained from winning the election) and the latter to a loss of 767 ECUs. The average absolute deviation across all treatments was 15.69, meaning the candidates, on average, would sacrifice 4.1% of their election benefits. One peculiar finding is that candidates in FA-2 have a larger absolute deviation than those in PA-2 or NA-2 despite the exact same experimental parameters. We discuss what appears to be an odd result, and certainly one that upon first glance does not support our hypothesis, in Section V.B.

B. Policy Choices

Deviations in Candidates' Policy Choice. Figure 2 shows the locations of donors and the human candidates for each period, as well as the average policies implemented by the human candidates. Panel A shows the data for one-donor treatments, panel B for two-donor treatments, and panel C for three-donor treatments.

Deviations appear very common in Figure 2. The average chosen policy differs from c_1 in almost every round of every treatment. Interestingly, deviations also occur in the FA setting even though donors' locations are unknown to candidates. In NA and PA treatments, in which donors' locations are observed, candidates, with few exceptions, choose a policy that is more favorable to donors. For instance, in multiple-donor treatments having all donors to the left of c_1 leads to a policy choice to the left of c_1.

Figure 2 also sheds light on why Table 1 shows such large absolute deviations in FA-2 relative to PA-2 and NA-2. In particular, we focus on periods 2, 5, and 12 in the two-donor treatments. In all of these periods, the candidates in FA deviate more than the candidates in PA or NA. This result likely occurs because the candidate draws are fairly extreme (locations of 32, 21, and 7, respectively) and the candidates attempted to reciprocate donations by moving toward the center, but unlike their PA and NA counterparts, they did not know that (at least in periods 2 and 5) one of the

FIGURE 2

Locations of Donors and Candidates, and the Average Policies Chosen by the Candidate for Each Period
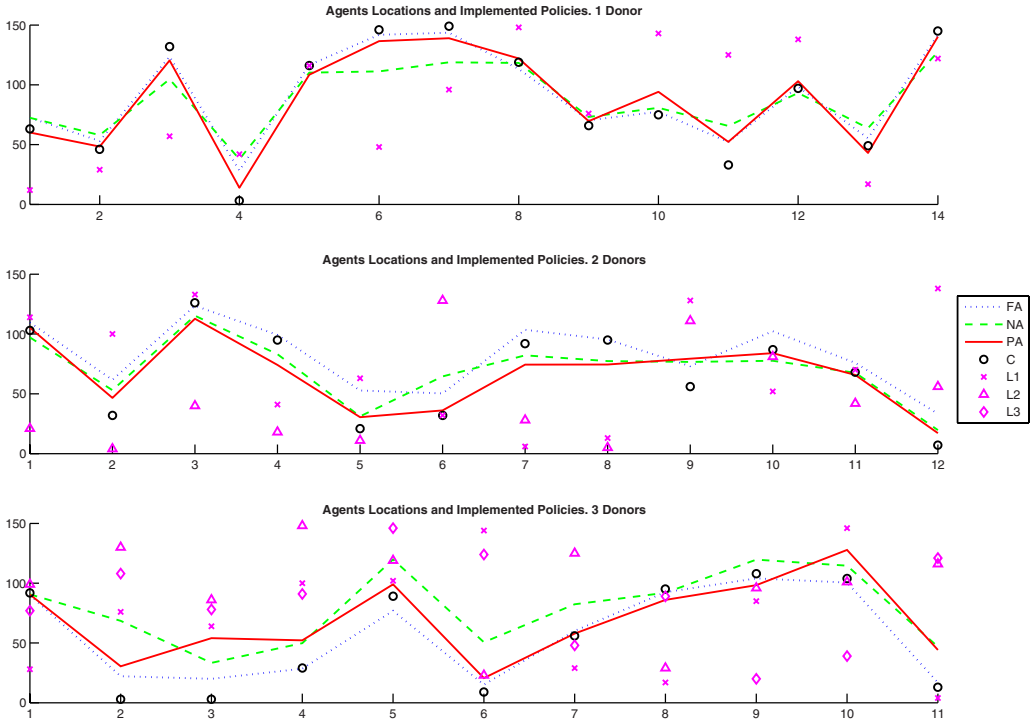
donors was even more extreme than the candidate. From this result, we infer that even candidates in FA will attempt to reciprocate if there is a good chance that they know they are reciprocating "correctly," and in each of those three periods the odds of both donors being to the right of the candidate were at least 61%. Similar patterns of deviation by FA candidates at extreme locations can be found in the three-donor treatments (see Periods 2, 3, 4, 6, and 11), although in the three-donor treatment the FA candidates typically deviate less than the PA or NA candidates because the donors are generally all located to the right of the candidate and far from the candidate's preferred policy (particularly in Periods 2, 3, 4, and 11). For more moderate candidate locations, FA candidates are deviating less than PA or NA candidates, and an alternative experimental design that eliminates extreme preferred policies for candidates may show a more pronounced difference between the FA treatment and the PA and NA treatments.

To test whether and when these deviations are statistically significant we conduct Wilcoxon signed-rank tests comparing the candidate's MPP, c_1, with the chosen policy, y_1. As described in Section IV.B, for a given number of donors, J, and in a given period, t, the locations of the candidate and donors were the same in all three anonymity levels. For example, in Period 1 of all one-donor treatments the candidate's location was 63 and the donor's location was 12. In each treatment, there were 24 subjects with $J + 1$ subjects per group and therefore we have $24/(J + 1)$ observations for a given period in a given treatment. Table 2 reports the results, ordered with respect to c_1, of the signed rank tests for each candidate's location and each treatment.

The informal observations from Figure 2 are largely confirmed by Table 2. First and foremost, there are many instances of statistically significant deviation from c_1. Second, in the NA and PA treatments candidates consistently choose policies that favor donors, especially in clearcut cases when all donor MPPs are on the same side of the candidate MPP. Third, while significant deviations in NA and PA are more prevalent

TABLE 2

Comparing the Chosen Policy, y_1 with the Candidate's Most Preferred Policy, c_1

One Donor					Two Donors						Three Donors						
c_1	FA	PA	NA	l_1	c_1	FA	PA	NA	l_1	l_2	c_1	FA	PA	NA	l_1	l_2	l_3
3	1	1	1	42	7	1	1	1	138	56	3	1	1	1	76	130	108
33	1	1	1	125	21	0	1	1	63	11	3	1	1	1	64	86	78
46	1	0	1	29	32	0	1	1	100	124	9	1	1	1	144	23	124
49	0	−1	0	17	32	0	0	1	32	128	13	0	0	1	4	116	121
63	1	0	0	12	56	0	1	1	128	111	29	0	1	1	100	148	91
66	0	0	1	76	68	0	0	0	70	42	56	0	0	0	29	125	48
75	0	1	0	143	87	0	−1	−1	52	81	89	0	1	1	102	119	146
97	0	1	0	138	92	0	−1	−1	6	28	92	0	0	0	28	99	77
116	0	0	0	116	95	0	0	−1	41	18	95	0	−1	0	17	29	89
119	0	1	0	148	95	0	−1	−1	13	5	104	0	1	0	146	101	39
132	−1	−1	−1	57	103	0	0	0	114	21	108	0	−1	0	85	96	20
145	−1	−1	−1	122	126	0	0	−1	133	40							
146	0	0	−1	48													
149	−1	0	−1	96													

Notes: Wilcoxon's signed rank test of the null $y_1 = c_1$ for each candidate's MPP. Label "1" (label "−1") means the null is rejected in favor of $y_1 > c_1$ ($y_1 < c_1$) at the 10% level; label "0" means the null cannot be rejected.

than in FA, significant deviations also occur in FA. Most of these occur in FA-1 when the candidate's location is at the left or the right extreme of the $[0, 150]$ spectrum, making it possible to guess whether the donor's location is right or left of c_1. Finally and most importantly, we do not find evidence that NA is better than PA at filtering out the effect of extreme donors. There are three instances when $y_1 < c_1$ in NA but not in PA and the same number of instances (three) when $y_1 < c_1$ in PA but not in NA. Additionally, there are five instances in which both NA and PA lead to a choice of significantly more extreme policy.

Given statistically significant deviations in FA, it is worth emphasizing that the pattern whereby extreme candidates move to the right and centrist candidates move to the left is not due to mechanical restrictions imposed on the candidate's policy space and donors' locations. The key determinant for a candidate's choice, especially in PA and NA treatments, is donors' locations. For example, in PA-1 we observe candidates at $c_1 = 119$ choosing an even more centrist policy. At the same time, in the NA-2 and PA-2 treatments, moderate candidates located at 87, 92, and 95 move left toward more extreme donors.

RESULT 1. *Candidates are less likely to deviate from their MPPs under FA than under PA or NA.*

RESULT 2. *In NA and PA, candidates consistently choose policies that favor donors, be they more extreme or more centrist. We observe little*

evidence that NA filters out the impact of extreme donors.

Determinants of Policy Deviations. Having established the general presence and direction of candidates' deviations, we now explore the factors that affect candidate behavior. Table 3 reports panel-tobit regression results with the absolute value of the candidate's deviation, $|y_1 − c_1|$, as the dependent variable. The explanatory variables include donated amounts, candidates' MPPs, and the difference in preferences between candidates and donors. Furthermore, for multiple-donor treatments, we expect the candidate to respond differently to donations depending on the relative proximity and contribution of one donor compared with other donors. To take this into account, we separate variables related to the donor closest to (labeled *close*) and furthest from (labeled *far*) c_1.

One-Donor Treatments. The donated amount, d_1, has a significant effect on the deviation size in all three treatments, but the sign of the effect differs depending on whether the donor's MPP is observed by the candidate, as in PA and NA, or not, as in FA. In the PA and NA treatments, larger donations lead to larger deviations, which is consistent with the intuition that candidates are more willing to reciprocate in response to larger donations. However, in the FA treatment larger donations lead to *smaller* deviations. When candidates do not observe the donor's preferences, they may interpret larger donations

TABLE 3
The Panel Tobit Regression Analysis of the Candidate Behavior

	FA		PA		NA	
	Coef	**p value**	**Coef**	**p value**	**Coef**	**p value**
(A) One Donor						
d_1	−0.0105	0.008	0.0042	0.053	0.0083	0.006
$(l_1 - c_1)^2$	0.0011	0.345	0.0018	0.003	0.0032	0.000
c_1	−0.3685	0.000	−0.0291	0.500	−0.0609	0.306
$DidCMove_{t-1}$	0.3308	0.018	0.2684	0.042	0.1357	0.067
$(c_1 > l_1)_t$	8.8681	0.241	−0.8718	0.827	13.4470	0.017
$DidCWin_{t-1}$	−12.8371	0.082	−6.8602	0.098	−11.6556	0.032
Const	15.0598	0.333	−5.7233	0.495	−5.9320	0.585
Pseudo-R^2	0.19		0.12		0.18	
(B) Two Donors						
$d_1 + d_2$	−0.0091	0.141	—	—	—	—
$d_{far} - d_{close}$	—	—	0.0073	0.056	0.0073	0.100
$(l_{far} - c_1)^2$	−0.0011	0.299	0.0006	0.559	0.0017	0.077
$(l_{close} - c_1)^2$	−0.0002	0.981	0.0043	0.060	−0.0020	0.385
$(l_{far} - c_1)(l_{close} - c_1)$	0.0019	0.362	−0.0008	0.604	−0.0041	0.013
$c_1 > \max l_j$	0.5705	0.966	−14.4236	0.118	−6.5492	0.501
c_1	−0.2647	0.079	0.1807	0.112	0.1649	0.166
$DidCMove_{t-1}$	0.0136	0.866	0.2564	0.102	−0.0885	0.650
$DidCWin_{t-1}$	−5.9948	0.582	−2.5762	0.702	−14.3803	0.032
Const	38.2178	0.125	−20.0482	0.152	6.9814	0.519
Pseudo-R^2	0.08		0.16		0.16	
(C) Three Donors						
$d_1 + d_2 + d_3$	−0.00454	0.703	−0.02277	0.089	0.00636	0.454
$(l_{far} - c_1)^2$	−0.00157	0.107	−0.00227	0.194	0.00077	0.534
$(l_{close} - c_1)^2$	−0.00448	0.419	−0.00143	0.864	−0.00577	0.279
$(l_{far} - c_1)(l_{close} - c_1)$	0.00552	0.101	0.00419	0.424	0.00495	0.123
c_1	−0.36602	0.033	−0.32116	0.238	−0.33498	0.076
$DidCMove_{t-1}$	−0.11660	0.568	−0.25801	0.245	0.01469	0.926
$DidCWin_{t-1}$	−3.83488	0.719	−19.64494	0.122	−3.08585	0.771
Const	3.70581	0.917	92.06109	0.015	18.60955	0.575
Pseudo-R^2	0.17		0.16		0.18	

Notes: The dependent variable is $|y_1 - c_1|$. Subscript "far" ("close") refers to the furthest (closest) donor from the candidate. Dummy "$DidCMove_{t-1}$" equals 1 if the candidate deviated in the last round; dummy $(c_1 > l_1)_t$ equals 1 if the candidate is more centrist than a donor; $DidCWin_{t-1}$ is 1 if the candidate won in the last period.

as an indication that the donor's MPP is close and reciprocate by not deviating.

The impact of our distance measure, $(l_1 - c_1)^2$, is as expected. Distance is insignificant in the FA treatment, in which it is unobserved, while it is positive and significant in the NA and PA treatments. Thus, in the NA and PA regimes, the further away the donor is from the candidate, the more likely the candidate is to deviate from his MPP and the larger the size of the deviation is.

The candidate location c_1 is negative and significant in FA and insignificant in NA and PA. The former means that the centrist candidates are less likely to deviate under FA, which is socially desirable in our model. In NA and PA treatments, however, this effect disappears as the candidate's response is determined to a larger extent by observed donors' preferences. Finally, in the NA treatment, candidates' responses to

donations differ depending on whether donors were more or less extreme than the candidate. Surprisingly, the response is stronger to donations from extreme donors. This response is surprising because in NA donations from extreme donors have a lower impact. The willingness of the candidates to respond more aggressively to more extreme donors under the NA regime, despite the lower impact of contributions, points toward a potential weakness of the NA system.

Two-Donor Treatments. In FA-2, the only significant variable is c_1 and, as in FA-1, it is negative. The sum of donations is used as an explanatory variable because the candidate in FA-2 could not distinguish contributions from individual donors. However, this variable is insignificant because in FA-2 the total contribution is less informative about donors' preferences than in FA-1.

In NA and PA treatments, as expected, the candidate responds differently to donations from closer and more distant donors. The variable $d_{\text{far}} - d_{\text{close}}$ is positive in both treatments and is significant in PA and marginally significant in NA. Thus, larger donations from a donor further away cause a larger deviation by the candidate, whereas larger donations from a closer donor cause smaller deviations.

The distance between the candidate and donors is another determinant of the candidate's decisions. In PA, the distance to the closest donor has a positive and significant impact on the size of deviation. As the distance of the closest donor increases, both donors are further away from the candidate and reciprocating candidates are willing to deviate more. In NA, it is the distance to the furthest donor that has a positive and significant effect. Despite this difference between the PA and NA systems, the main message is similar to what we observed in one-donor treatments: *in NA and PA treatments candidates are favoring donors. In particular, when donors' ideal policies are further away candidates are willing to deviate more to favor their contributors.*

Three-Donor Treatments. The three-donor case is different from the one- and two-donor cases in that variables related to individual donors' locations and donated amounts are mostly insignificant. The insignificance is robust and holds for all three anonymity levels and different regression specification. We interpret this as evidence that having three donors creates enough competition to limit the individual impact of any given donor.[25]

One robust finding is that the variable c_1 is negative and significant in FA-3, just as it is in FA-1 and FA-2. Thus, that more centrist candidates are less likely to deviate in FA does not depend on the number of donors and appears to be a feature of the FA design.

RESULT 3. *We find strong evidence that candidates respond favorably to donors' contributions in both PA and NA treatments: larger contributions prompt more reciprocation and candidates are willing to deviate more when donors are further away.*

25. Caution should be used when interpreting this result as our experiment consists of three donors in a setting with a single policy dimension. In settings with multiple policy dimensions a candidate could alter policies in many different ways, which could reduce competition among donors.

RESULT 4. *FA treatments are successful in limiting the impact of political contributions. Contributions either have negative or no impact on candidate's willingness to deviate.*

RESULT 5. *In three-donor treatments, an individual donor's influence is limited.*

C. Donations

Donation decisions are studied in this section. We estimate a fixed-effect panel model to determine the impact different variables have on donations. Estimation results are presented in Table 4. The only variable that is significant in all nine treatments is the distance between the candidates' and donors' MPPs. Its sign is expectedly negative—donors contribute more to candidates who are closer. Also, an important determinant of the donation amount in NA-1 is whether the donor was more or less extreme than the candidate, although this is unimportant in FA and PA. In NA, donors who were more extreme and thus less powerful donate less. Notably, this effect disappears in NA-2 and NA-3, which is why the dummy variable, $(c_1 > l_j)_t$, is excluded in regressions for multiple donor treatments.

We are also interested in the nature of strategic interactions between donors in treatments with more than one donor. There are two strategic effects at play. The first is free-riding, as election of $C1$ is a public good for donors. If this effect is present then greater distances between other donors and the candidate will positively impact donation size. The second is competition, which occurs when the candidate is located between the donors, as donors wish to influence the policy choice by their contributions but have opposite views on which policy is desirable. To identify the competition effect we introduce the dummy variable *Between*, equal to one if the candidate is between the donors. The expected sign of *Between* is positive.

The evidence of a free-riding effect is present in the PA-2 and PA-3 treatments as the variables $Dist_{-j}$ and $DistFar_{-j}$ are significantly positive. The variable *Between* is also significant in both PA treatments, suggesting the presence of a competition effect. As the two effects have the opposite sign we might expect them to cancel each other when both are present. We test this conjecture via interaction terms. In PA-2, the coefficient of the interaction term $Dist_{-j} \cdot Between$ is significantly negative and, furthermore, when $Between = 1$, the effect of

TABLE 4
Fixed-Effect Panel Estimation of Donors' Behavior

	FA		PA		NA	
	Coef	**p value**	**Coef**	**p value**	**Coef**	**p value**
(A) One Donor						
$Dist_j$	−0.2365	0.007	−0.1997	0.011	−0.1321	0.094
ρ_1	−17.3125	0.627	−50.8287	0.122	−51.8785	0.174
$c_1 > l_j$	10.4892	0.063	0.3994	0.937	−18.2987	0.037
$Winner_{t-1}$	−0.3626	0.949	−17.6179	0.001	−6.8306	0.176
r_j	*	*	*	*	−284,320	0.088
Const	61.3734	0.001	103.5374	0.000	125.1650	0.000
R^2		0.07		0.12		0.08
(B) Two Donors						
$Dist_j$	−0.2039	0.000	−0.1721	0.000	−0.0801	0.030
$Dist_{-j}$	0.0153	0.774	0.1112	0.016	0.0283	0.573
$Dist_{-j} \cdot Between$	−0.0444	0.594	−0.1638	0.023	−0.1231	0.115
$Between$	−3.2730	0.487	6.9265	0.089	6.0070	0.172
ρ_1	−35.5745	0.050	−8.0679	0.605	−10.8731	0.660
r_j	*	*	*	*	31,459	0.469
Const	56.3912	0.000	43.6188	0.000	36.6782	0.027
R^2		0.18		0.17		0.06
(C) Three Donors						
$Dist_j$	−0.0997	0.000	−0.1585	0.000	−0.0631	0.021
$DistFar_{-j}$	0.0151	0.652	0.1303	0.003	0.0183	0.579
$DistClose_{-j}$	0.0573	0.142	−0.0013	0.979	−0.0409	0.287
$DistFar_{-j} \cdot Between$	−0.0596	0.259	−0.1821	0.007	0.0259	0.616
$DistClose_{-j} \cdot Between$	−0.0149	0.784	0.0840	0.226	0.0304	0.574
$Between$	5.8475	0.110	10.3648	0.026	−4.6547	0.192
ρ_1	6.0823	0.776	0.1208	0.996	−6.7470	0.776
r_j	*	*	*	*	5,465	0.859
Const	17.3861	0.205	17.3162	0.321	33.6528	0.036
R^2		0.23		0.29		0.07

Notes: The dependent variable is donation of donor j as a percentage of total donatable endowment. Independent variables include $Dist_j = |l_j − c_1|$; $Dist_{-j} = |l_{-j} − c_1|$ in two-donor treatments; $DistFar_{-j} = \max_{k \neq j}|l_k − c_1|$ and $DistClose_{-j} = \min_{k \neq j}|l_k − c_1|$ in three-donor treatments. Variable ρ_1 is the initial election probability. Variable $Between$ is equal to 1 if the candidate is located between donors; $c_1 > l_j$ is equal to 1 when donor j is to the left of the candidate; $Winner_{t-1}$ is equal to 1 if the candidate won the election last period. Finally, r_j is the marginal impact of donor j's contributions.

$Dist_{-j}$ becomes insignificant (p value 0.27).[26] The same holds in PA-3 for the variable $DistFar_{-j}$ and interaction term $DistFar_{-j} \cdot Between$ (p value is 0.39). Thus stronger competition ($Between = 1$) removes the free-riding effect ($Dist_{-j}$ and $DistFar_{-j}$ become insignificant).

In NA treatments, neither distance variables nor the variable $Between$ is significant. However, in NA-2 the sum of the coefficients for $Dist_{-j}$ and $Dist_{-j} \cdot Between$ is negative and significantly different from zero (with p value 0.067). Thus, while we do not observe free-riding in NA-2, there is evidence of a competition effect. When

competition is weak ($Between = 0$) the MPP of the other donor is insignificant, but with strong competition ($Between = 1$) the effect is negative as donations increase the closer other donors are to the candidate, which is the exact opposite of the free-riding effect.

Finally, in FA treatments, there is neither a competition nor a free-riding effect, which is as expected given that donors' locations are private information.

RESULT 6. *The key determinant of the contribution amount is the distance between the donor and the candidate. Donors who are closer to the candidate donate more.*

RESULT 7. *We observe the free-riding and competition effects in PA-2 and PA-3. We also observe the competition effect in NA-2.*

26. To be more specific, let β_1 be the coefficient at $Dist_{-j}$ and β_2 at $Dist_{-j} \cdot Between$. When $Between = 1$ the effect of $Dist_{-j}$ is $\beta_1 + \beta_2$. The t-test could not reject the hypothesis $\beta_1 + \beta_2 = 0$, with p value 0.27.

TABLE 5
Average Voter Welfare and the No Donation Benchmark by Treatment

	One Donor		Two Donors		Three Donors	
	Observed	**Benchmark**	**Observed**	**Benchmark**	**Observed**	**Benchmark**
FA	**3607**	3594	**3547**	3536	3373	**3432**
PA	3578	**3594**	3464	**3536**	**3457**	3432
NA	3590	**3594**	3514	**3536**	**3506**	3432

D. Welfare

While mitigating the influence of money in politics is the goal of many campaign finance reform proposals, much of the theoretical research mentioned in Section II emphasizes that campaign contributions can play potentially important roles in improving electoral outcomes and increasing social welfare.

In our framework, donations can impact social welfare via two effects: by altering the probability of elections and by affecting the implemented policy. The first effect damages social welfare if $c_1 < 75$. The second effect is detrimental for welfare if $y_1 < c_1$. Note that the two effects can work in opposite directions, such as when an extreme candidate receives large donations but chooses a more moderate policy.

We compare the expected social welfare generated by our experimental data against a benchmark in which donations are prohibited. In calculating social welfare, we assume that voters' preferences are similar to those assumed for the donors, as specified by Equation (18), particularly that voters' payoffs are bounded by zero. If the election probability is $\widehat{\rho}_1$ and the implemented policy is y_1, then the expected utility of a voter with an MPP of μ_i is:

(19)

$$\widehat{\rho}_1 \cdot \max \left\{ 9000 - \left(y_1 - \mu_i \right)^2, 0 \right\}$$

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

In the benchmark when donations are prohibited, $\widehat{\rho}_1 = \rho_1$ as determined by Equation (15), and $y_1 = c_1$. For calculations, benchmark values for candidates' and donors' MPPs were equal to those used in actual treatments. Finally, we assume that voters' preferences are uniformly distributed on [0, 300].

Table 5 shows average voter welfare by treatment and number of donors. We boldface the number that is larger than its counterpart in each treatment. In treatments with one and two donors

FA performs the best and PA performs the worst. With three donors the effect of anonymity is reversed as FA now performs the worst. One reason for this difference is that in the treatments with fewer donors (one and two) it is more likely that all donors are more extreme than the candidate, leading to a more extreme policy under NA and PA. Adding the third donor, however, makes such realization of preferences less probable thereby reducing the chance of welfare decreasing outcomes in NA-3 and PA-3. As for FA-3, the positive aspect of political contributions, which is a choice of more moderate policies by extreme candidates, is absent. Therefore, extreme candidates still obtain a greater chance of election which is not offset by an implementation of more moderate policies.[27]

Table 6 shows donors' expected welfare in different treatments and, in almost all treatments, donors benefit greatly from the institution of political contributions. The ability to increase election chances of a preferred candidate, combined with the ability to influence an implementation of more favorable policies, far outweighs the cost of donations.

RESULT 8. *With a small number of donors (1 and 2) more anonymity improves voters' welfare whereas partial and NA systems lead to small reductions in welfare. With three donors the result is reversed. The worst setting for voters' welfare is the PA treatment with two donors.*

RESULT 9. *The institution of political contributions considerably increases donors' welfare.*

VI. CONCLUSION

Campaign finance reform is one of the biggest domestic policy issues, yet important reform

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27. Another reason may be due to the randomly chosen candidate locations, as extreme locations are overrepresented in the three-donor treatments. As candidates in the FA treatment deviate less than those in other treatments, this random draw could be driving the result.

TABLE 6
Average Donor Welfare and the No Donation Benchmark by Treatment

	One Donor		Two Donors		Three Donors	
	Observed	**Benchmark**	**Observed**	**Benchmark**	**Observed**	**Benchmark**
FA	3339	**3439**	**2889**	2648	**3153**	2626
PA	**3526**	3439	**3550**	2648	**3412**	2626
NA	**3442**	3439	**3529**	2648	**3779**	2626

proposals are difficult to study empirically. In this study, we compare alternative campaign finance systems in a laboratory setting and focus on their effects on donations, policy choices, and welfare. Three systems are considered. The first is an FA system in which neither the politicians nor the voters are informed about the donors' ideal policies or levels of donations, which we believe corresponds in spirit to the reform advocated by Ackerman and Ayres (2002). The second is a PA system in which only the politicians, but not the voters, are informed about the donors' ideal policies and donations, which we believe corresponds closer to the current campaign finance system in the United States. The third is an NA system in which both the politicians and the voters are informed about the donors' ideal policies and donations, which corresponds to a set of perfectly enforced campaign finance disclosure laws.

Our results provide supportive evidence for Ackerman and Ayres's (2002) campaign finance reform proposal. A fully anonymous campaign finance system seems to have the potential to reduce the influence of money in politics more effectively than the current PA system or the NA system. Indeed, under FA donations were lower and contributions had either zero or negative impact on a politician's willingness to deviate from the ideal policy. Furthermore, in FA donations are more likely to make extreme candidates move to the center than to make centrist candidates move to the extreme. The NA, or full transparency, system was less successful in that regard. Candidates *were* responsive to donations and consistently chose policies favoring donors, including more extreme ones. Nonetheless, the NA system resulted in higher welfare as compared with the PA, so if FA cannot be guaranteed a system of full transparency may provide a second-best solution.

We should, of course, bear in mind that many important issues related to campaign finance and political competition are abstracted away in this study. For example, we assumed that candidate's ideal policies are common knowledge

to all donors and voters. This suppresses one of the roles of campaign expenditures, namely to inform voters about the candidate's policy platform. We also abstracted away from the critical voter turnout issue as we do not consider at all how voter turnout may be affected by whether or not donations are anonymous. Moreover, we fixed the policy position of the computer candidate and only included one human candidate in our experiment. Thus we cannot comment on how political competition might affect the performance of different campaign finance systems. It is important to study how alternative campaign finance systems will perform when more of these issues are incorporated and when these systems are possibly implemented in the field rather in the laboratory.

APPENDIX

INSTRUCTIONS

The instructions for the FA sessions are included here. There are comments in italics and boldface when the instructions for the PA and NA treatments differ. Figures A1 and A2 include screenshots of a donor's screen and a candidate's screen from a PA treatment.

WELCOME TO A DECISION-MAKING STUDY!

Introduction

Thank you for participating in today's study in economic decision-making. These instructions describe the procedures of the study, so please read them carefully. If you have any questions while reading these instructions or at any time during the study, please raise your hand. *At this time I ask that you refrain from talking to any of the other participants.*
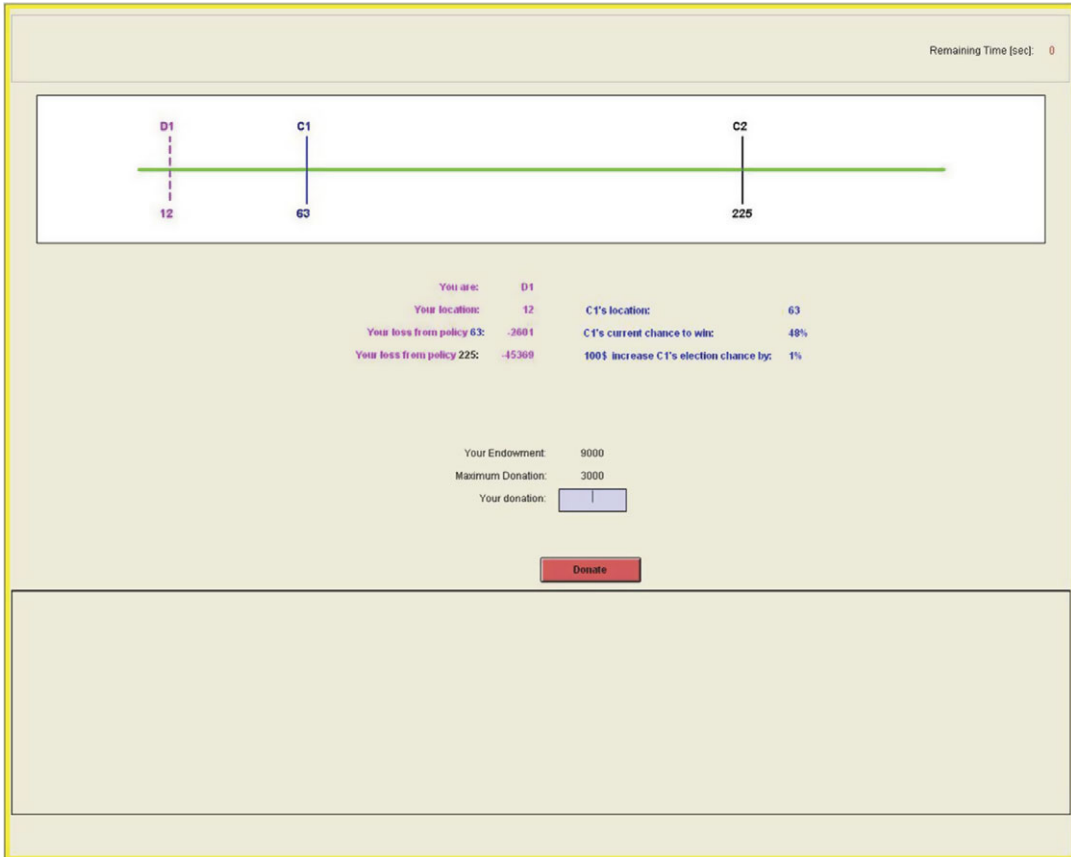
General Description

In this study, all participants are assigned to one of two roles:

- a *candidate* who would like to be elected and
- a *donor* who may or may not provide financial support for the candidate's campaign.

FIGURE A1

Donor's Screen

A candidate, if elected, determines the policy. The policy is described by a number between 0 and 300. A policy of 0 corresponds to one side of the political spectrum and a policy of 300 corresponds to the other extreme of the spectrum. Candidates and donors have an MPP that characterizes your preferences with regards to the implemented policy. The closer the implemented policy is to your MPP the better off you are.

Donor Stage. At this moment, I ask you to turn your attention to the monitor. During the study, all of you will be assigned the role of either a candidate or a donor. If you are assigned a donor role you will see the screen similar to what you see now. You can see that there are two candidates—C1 and C2—and that their MPPs are located at 75 and 225, respectively. You are a donor and your MPP is located at 100. The candidate at 225, C2, will be played by a computer. This candidate always chooses policy 225 if elected. The other candidate, C1, will be played by a human.

Donors have funds, denominated in ECUs, available for contribution. On the computer screen, you see that you have 9,000 ECUs, 3,000 of which you can donate. Donations can be made only to the human candidate, C1. Donors need to decide

how much money they want to contribute to C1's campaign fund. Contributions to the candidate change the probability a candidate is elected as will be explained below.

Without any contributions, the initial chance of election is determined by the human candidate's MPP. Having a more extreme policy means a lower chance whereas having a more centrist policy means a higher chance. The initial chance of election will be calculated and displayed on the screen for you every period. You see on the screen that when C1 is at 75 his chance of being elected is exactly 50%. When C1's more preferred policy is to the left of 75, his chance of being elected will be less than 50% and when it is to right of 75 it will be larger than 50%.

If the human candidate receives contributions from donors then her chance of being elected changes from the initial chance of election [**NA:** *The remainder of the paragraph reads as follows:* **In general, donors' contributions increase the chance of election. The rate of increase, however, depends on the donor's location. Donations from donors with extreme preferred policies are less effective than donations from those with more centrist preferences. The effectiveness of your donations will be shown on the screen. In this example, the donor's location is more centristic and so 100 ECUs of donations increase the**

FIGURE A2

Candidate's Screen
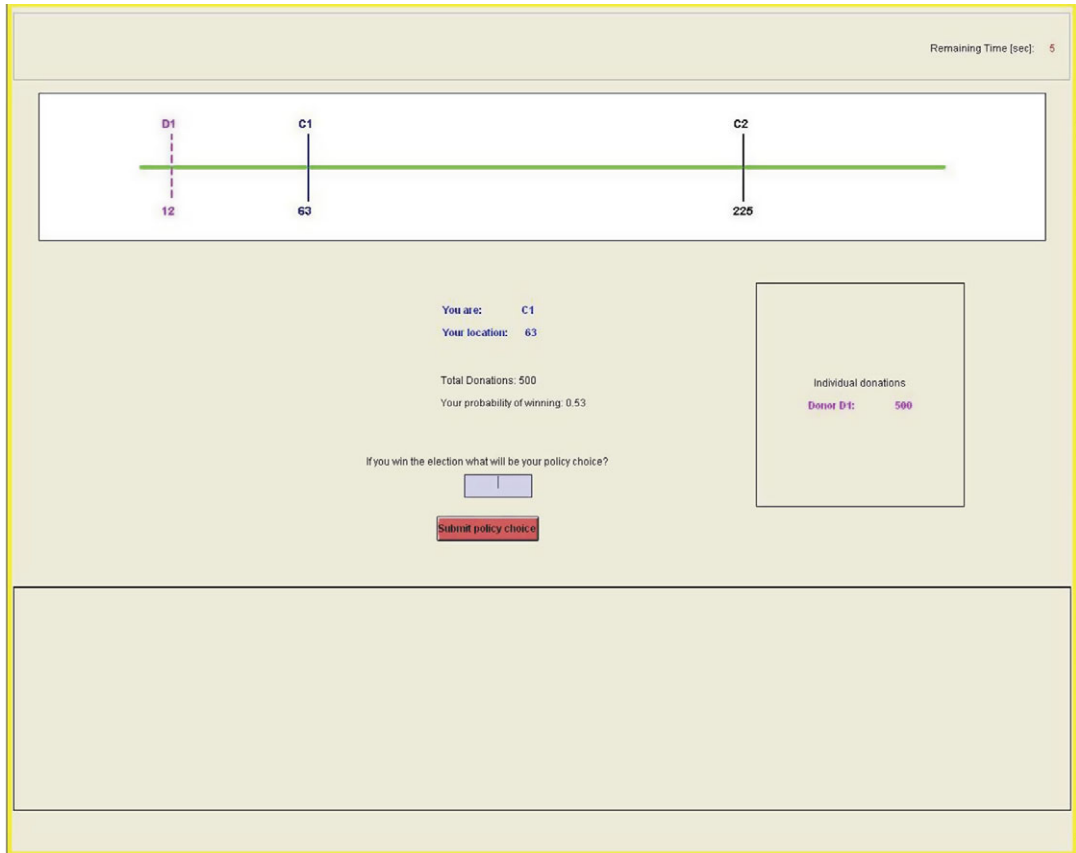
probability of election by 1.14%. The chance of election cannot be made higher than 80%. At this time I ask you to enter a donation of 2,000 and press the " Donate" button. You now see a new screen that shows the size of your donation and the new probability for C1. Because of your donations the new probability is higher and is equal to 73%. Press the " Continue" button]. Contributions increase the chance of election at the rate of 100 to 1. That is, a contribution of 100 ECUs increases the chance of election by 1%, a contribution of 200 ECUs by 2%, and so on. The chance of election cannot be made higher than 80%. At this time I ask you to enter a donation of 3,000 and press the "*Donate*" button. You now see a new screen that shows the size of your donation and the new probability for *C*1. Because of your donations the new probability is higher and is equal to 80%. Press the "*Continue*" button.

Candidate Stage. After donors make their donations it is the candidate's turn to implement a decision. For technical reasons, we ask candidates to decide on the policy before the actual outcome of elections. If you are assigned the role of candidate you will see the following screen. The screen shows you the location of your MPP, the total amount of donations and your probability of winning [**PA/NA: *The prior***

***sentence is replaced by*: The screen shows your chance of election as well as the locations of donors and their contributions**]. You can enter any number between 0 and 300 as your implemented policy. Please submit number 75. This policy will determine your own payoff and the payoff of your potential donors. Notice that the policy you implement has no impact on your chance of election. Your chance of election is only determined by the donations and the initial chance of election. In our example, the chance of election is 80% regardless of the implemented policy.

Profit Stage. The next four screens will show you the profit for *D*1 and *C*1 when *C*1 wins and when *C*1 does not win. In the actual study, you will only see one screen that corresponds to your role and the election outcome. This screen shows the donor's profit if *C*1 is elected. The profit is determined as follows. We take your initial endowment which is 9,000, subtract the size of your donation, 3,000 in our example, and subtract the loss from the chosen policy. The loss is just the square of the difference between the implemented policy and donor's MPP. In our example, it is equal to $(100-75)^2 = 625$. Clearly, the further the implemented policy is from a donor's MPP the larger is the loss.

Formally, a donor's profit is calculated as

$$9000 - \text{Donation} - (\text{Implemented Policy}$$
$$-\text{Donor Preferred Policy})^2 .$$

Please press the "*Continue*" button. This screen shows the donor's profit if $C2$ is elected. The profit is calculated according to the same formula. As the implemented policy of 225 is too far from 100 the profit is negative. Whenever profit is negative it will be counted as 0 for your cash payout. Please press the "*Continue*" button.

The next screen shows $C1$'s profit if $C1$ is elected. Whenever $C1$ is elected he receives 6,000. If the implemented policy differs from $C1$'s MPP then $C1$ incurs a loss which is also a square of the difference. In our example, $C1$ chose 75 and so the loss is 0. So the total profit is 6,000. On the next screen, we show $C1$'s payoff if he loses the election. $C1$'s profit is 0 in that case. Thus, the candidate's profit is 0 when not elected and

$$6000 - (\text{Implemented Policy}$$
$$-\text{Candidate Preferred Policy})^2 ,$$

if elected. Press "*Continue*."

Two Donors. Within the study, the number of donors will be varied depending upon the phase. The second example depicts the case of two donors: $D1$ and $D2$. In this example, you are $D1$. You see the locations of the MPPs for $C1$ and $C2$ which are 60 and 225 [**PA/NA:** ***The following sentence is added*: You also see the MPPs of both donors**]. You see that the initial election chance is less than 50% because $C1$ is to the left of 75. You also see that when there are two donors you can donate only 1,500 of your endowment. Finally, notice that you do not know the location of the other donor(s), only your own location [**PA/NA:** ***The prior sentence is deleted***]. Please enter 1,500 and the computer is programmed so that $D2$'s donation is 0. At the candidate's screen notice that the candidate does not know the location of either of the two donors. Please enter a policy of 75. When $C1$ wins $D1$'s payoff is 6,875. If $C1$ loses then $D1$'s payoff is negative and will be counted as zero. When $C1$ wins now $C1$'s payoff is not 6,000 but $6000 - (75 - 60)^2 = 5775$ because his implemented policy differs from his preferred policy. Again, when $C1$ loses his payoff is zero. This completes our example. Notice that during the study you will either see the donor's screens (if you are a donor) or the candidate's screens but not both.

Phase Description

The study consists of three phases, time permitting. In each phase, participants will be divided into groups. In the first phase of the study, there will be two people in each group: one candidate and one donor. In the second phase of the study, there will be three participants in each group: two donors and one candidate. In the third phase of the study, there will be four participants in each group: three donors and one candidate. *Within a phase your group assignment will not change. Groups are re-assigned in the beginning of every phase.* This means that you will have the same groupmate(s) during each phase of the study but your groupmates in different phases may be different.

Example: In the first phase, person A is a candidate and is matched with person B who is a donor. During the entire first phase for person A, there will be only one potential donor which is person B and person B can only contribute to candidate A. Furthermore, it is the policy implemented by candidate A, if elected, that will determine B's payoff. In the second phase the group assignment will be randomly re-done. For example, person A can become a donor and will be matched with person C who is the second donor and person D who is a candidate. The assignment will be re-done for the third phase as well.

Cash Payoffs

Your cash payoff will be determined as follows. At the end of the experiment we will randomly draw one of the three phases. Your cash earnings will be equal to the total profit that you earned during that phase with 6,000 points being equal to 1 dollar. This is in addition to the $5 that you receive as a show-up fee. For example, if the phase with two donors is chosen and you earned 60,000 points at that phase then your cash payoff will be: $60000/6000 + 5 = \$15$.

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