Reciprocity versus Reelection*

Prateik Dalmia[†] Allan Drazen[‡] Erkut Ozbay[§]

This Draft: March 26, 2019

Abstract

We study how reelection concerns affect reciprocity by elected leaders to the voters who elected them. If showing kindness to past voters reduces the chances of reelection, will an elected leader reduce or eliminate such intrinsic reciprocity? We present a signalling model of candidate behavior, where we show that candidates may limit intrinsic reciprocity to past voters to signal congruence with voters important for reelection, and selfish candidates may mimic reciprocal behavior for instrumental purposes. We then present an experiment that tests these ideas in the laboratory and finds support for the model. Both candidates and voters behave as the signalling model predicts. Our key finding is that the desire to be reelected may limit intrinsic reciprocity of an elected leader to reciprocate to the voters who put her in office, but does not eliminate it entirely.

JEL classification: D72, E62, D78

Keywords: Elections, Voting, Reelection, Signalling

*Drazen gratefully thanks the National Science Foundation (grant SES 1534132) and the Gaspard Monge Visiting Professorship for financial support, as well as Ecole Polytechnique for its hospitality. We thank Daniel Friedman, Ian Chadd, seminar participants at Ecole Polytechnique, Raboud University, and Stanford GSB, and conference participants at IOEA 2018, Corsica and the Fourth Taxation Theory Conference, especially Alexey Kushnir, for helpful comments.

[†]University of Maryland, prateikdalmia@gmail.com

[‡]University of Maryland, CEPR, and NBER, drazen@econ.umd.edu

[§]University of Maryland, erkut.ozbay@gmail.com

1 Introduction

It is now widely accepted that the behavior of many people is not described by a model of a purely self-interested individual. People perform kind acts and reciprocate to kind acts. "People ... help other people ... according to how generous these other people are being." (Rabin [1993], p. 1281). Evidence of intrinsic reciprocity – that is, reciprocity not motivated by any material benefit to be gained – is common in everyday life.

However, some argue that in this respect, politicians are different from you and me, at least in their role as politicians. Success in political life requires "hard-headed" calculations rather than sentimentality. Hence, it is argued that behavioral models including intrinsically-motivated other-regarding behavior – such as kindness, reciprocity, etc. as a property of underlying preferences – do not describe political leaders. Reciprocity displayed by politicians is argued to be instrumental, that is, motivated by forward-looking self interest when relationships are ongoing.[1] Examples include vote-trading in legislatures ("logrolling"), adherence to international agreements, interactions between politicians and special interest groups, or voter-favorable policies by incumbents concerned about reelection.

These examples suggest that it is not that politicians are inherently different than the rest of us, but that their intrinsic reciprocity may be constrained by the situations in which they find themselves. Much like anyone else, the behavior of politicians will reflect not only their preferences, but also their situation, in that showing reciprocity may conflict with their political goals. Since an important motivation of many people who enter public life is their desire to improve the welfare of others, the argument that politicians are intrinsically selfish is unconvincing on its face.

To sharpen the argument that intrinsic reciprocity of politicians may be situationally constrained, consider the above example of a politician concerned with reelection. Reciprocity to past supporters may conflict with reelection concerns when voters who will vote in the upcoming election only partially overlap with those who voted in the previous election. For example, consider a politician who faces a different constituency than in a previous election (perhaps because of a significant redistricting), where, for example, the previous constituency was weighted towards retirees – who voted heavily for the candidate and were crucial to her

[1] The distinction between "intrinsic" reciprocity (a property of preferences) and "instrumental" reciprocity (seemingly reciprocal actions taken because they benefit a self—interested individual) is discussed more fully in Sobel (2005).

being elected – whereas the new constituency she will face is much more heavily weighted towards young workers. Helping enact a policy to raise Social Security benefits via higher taxes on workers reciprocates to retirees for their votes, but may be seen by the young as indicating the incumbent doesn't share their concerns and thus endanger her reelection. She may thus need to limit her reciprocity in order to get reelected.

The purpose of this paper is to investigate the intrinsic reciprocity of elected decision makers when this conflicts with other goals, focusing on the desire to be reelected. More specifically, we consider a model in which an elected candidate attracts votes in her reelection bid by trying to convince voters that she will enact policies favorable to them if reelected. She does this by showing that her policy preferences are "congruent" with theirs. When her policy tool is distribution of benefits before an election, she must give them enough benefits to signal her congruent preferences. Doing so successfully will increase her chances of reelection.

We demonstrate, however, that candidates with reciprocal preferences still show reciprocal behavior when facing reelection, but that the conflict between reciprocity and reelection may lead them to limit their reciprocity when voters have a sufficiently high cost of voting. This is a key result, which we find confirmed in a laboratory experiment. We further find that (both in the theory and the experimental results) when congruent candidates use distribution of benefits to signal her policy preferences, a "non-congruent" candidate may mimic a congruent one in order to be reelected. Voters respond to signalling by not voting for a candidate whom they believe does not share their policy interests, a theoretical prediction of a signalling model that is confirmed in the lab.

The plan of the paper is as follows. In the next section, a brief review of the literature is presented, and in section 3 we go over the basic conceptual set-up of our approach and outline a model of candidates giving benefits to different voters to signal their preferences and describe the equilibria of the election games. Section 4 sets out the experimental design and section 5 presents our experimental results and interprets them. The final section presents conclusions. A technical appendix below presents a more formal treatment of the theory and the equilibria described in the text.

2 Literature

Our paper relates to several literatures. One of course is the literature on reciprocity, with the theoretical literature considering a range of questions such as whether there is reciprocity to the actions, the intentions, or the motivations of the original actor. In the experimental literature there is significant evidence of intrinsic reciprocity in gift-exchange, trust, public goods, ultimatum and other games. Fehr and Schmidt (2006) present a fairly comprehensive summary.

We are interested in the specific question of how other goals affect reciprocal behavior. There is a literature on how signalling motives may induce people with selfish preferences to act as if they are kind – "crowding in" of reciprocity – as in the work of Levine (1998), Bénabou and Tirole (2006), and Camerer and Fehr (2006) among others. This may result from self-image concerns, social pressure, or the desire for reciprocity from other agents. Mimicking of reciprocal types by selfish types is, in a sense, the opposite of our main point, namely how the desire to signal that the candidate's selfish preferences are congruent with those of the voter in the upcoming election induces less kind behavior by the candidate.

On "crowding out" of kind behavior, the literature considers how the perception that intrinsic kindness may be seen as motivated by selfish desires may reduce kind actions (for example, Frey and Oberholzer-Gee [1997], Gneezy and Rustichini [2000], Bénabou and Tirole [2006], Ariely, Bracha, and Meier [2009], Promberger and Marteau [2013]). For example, giving monetary incentives for blood donations or for contributing to a charity may reduce the donations (Mellström and Johannesson [2008], Niza, Tung, and Marteau [2013]). The reduction in intrinsically motivated behavior is analogous to our finding, but the mechanism is conceptually rather different. In particular, in these cases reciprocity is reduced because it *aligns* with other selfish motives, whereas in our case reciprocity is reduced because it *conflicts* with other, perhaps selfish, reelection motives. Limiting reciprocity because of "crowding out" would seem to be a not uncommon event, but we are aware of no experimental work showing such "constrained reciprocity" that we study.

In the political economy literature, the role of reciprocity in elections focusses on reciprocity by voters, for example in the work of Finan and Schechter (2012) or Ozbay and Tonguc (2018), which link successful vote buying by politicians to reciprocity by targeted voters, and Hahn (2009). Of course, a trade of votes for politician favors is conceptually different than ex post distribution of benefits by politicians to those who elected them due to intrinsic reciprocity.

To the best of our knowledge, there are almost no papers in the literature examining the intrinsic reciprocity of politicians to the voters who elected them. Drazen and Ozbay (forthcoming) studied a one-shot dictator game where they considered how the way in which the dictator was chosen affected the degree of other-regarding behavior. In a laboratory experiment, they found that leaders who are elected are significantly more likely to share than leaders who are appointed, and that elected leaders tend to favor the voter who elected them rather than the losing candidate, while appointed leaders show no such tendency. They argued that the results provided support for the view that non-selfish behavior of leaders reflects a reciprocity motive. Enemark, et al. (2016) performs a laboratory experiment involving a trust game, where the subjects are former political candidates, and finds that having held office makes individuals *subsequently* more intrinsically reciprocal than politicians who ran for office but were not elected. Empirical discussion of reciprocity of elected leaders to voters tends to be more of an anecdotal nature (Schlesinger (1991, chapter 6), *Philadelphia Inquirer* (2012)).

By contrast, there are several papers that look at *instrumental* reciprocity of elected politicians once in office to other politicians, especially in legislatures (Weingast [1979], Binder [1997], Martorano, [2004], Kirkland and Williams [2014]).

Our paper also relates to literature on the actions of candidates seeking reelection. More precisely, there are a number of models in which an incumbent seeking reelection chooses an expenditure other than her first best in order to improve her reelection chances. The earliest models which considered this in a model of candidate signalling to rational voters were Rogoff and Sibert (1989) and Rogoff (1990). A significant number of models followed, of which Drazen and Eslava (2013), on which our model is based, is but one example. These model all considered candidates who were motivated by a combination of their own utility in getting reelected and social welfare, rather than by reciprocity to voters. However, the conceptual motivation is the same. In the absence of reelection motives (or observability of candidate expenditure behavior), candidates would simply maximize their own utility, however defined. Reelection motives induce them to choose a different pattern of expenditure to signal their type (competence, congruence with voting groups) in order to increase the probability of reelection.

Moreover, our paper relates to the experimental literature on reputation formation, and the behavior of a long run player (the candidate) facing a sequence of short-term players (voters) who are unsure about her preferences and observe her previous choices. The literature tends to focus on testing whether a particular refinement is a good predictor of behavior in industrial organization or financial market games.[2] While we find data consistent with the intuitive criterion, rather than comparing refinements, we manipulate the observability of information about past behavior and focus on the effects of signalling itself, as in Groskopf and Sarin (2010) and Bolton, Kotak and Ockenfels (2004). Furthermore, we distinguish ourselves by focusing on the interaction of signalling motives with other-regarding preferences, two rich areas of research, and also by allowing for a continuum rather than a finite number of types.

3 A Model of Candidate Behavior

3.1 Overview

In this section, we present a game-theoretic model of a candidate running for election to represent the conflict she may face between intrinsic reciprocity to past voters and her reelection prospects. The model also forms the basis of our experiment. After describing the model, we informally summarize the equilibria and the main theoretical result, that is, the constraint a high cost of voting and reelection concerns may impose on a candidate's reciprocity to past voters. These predictions will inform our interpretation of the experimental data. Interested readers can find a more formal treatment of the theory in the Appendix below, establishing the uniqueness of the equilibria described here.

Central to our model is that policies chosen by an incumbent before an election may signal her unobserved policy preferences – more specifically, whether or not they are congruent with those of a voter – and hence the choices she would make if reelected. That is, if an incumbent wants to signal that she places a high priority on, let's say, environmental issues and will continue to do so if reelected, she may devote resources to protecting the environment before an election in a way that she would not do if she did not have that priority. Drazen and Eslava (2013) model this idea formally, and we use this idea to represent how distribution

[2] Camerer and Weigelt (1988), Neral and Ochs (1992) and Brandts and Figueras (2003) study how well sequential equilibrium predicts behavior. Brandts and Holt (1992) and Cadsby et al. (1998) explore whether the intuitive criterion provides a plausible refinement.

of benefits by the incumbent can be an effective reelection strategy.

To consider the possible conflict between rewarding voters who voted in the previous election and using benefits to gain votes in the next election, we assume that there are two groups of non-overlapping voters – those who voted in the last election and those who will vote in the subsequent election – and consider benefits to voters who will vote in only one of these elections.[3]

3.2 Model Set-up

3.2.1 Elections and Distribution of Benefits

There are two sequential elections, two voters V_1 and V_2 and one candidate C who runs in the first election and then, if she is elected in the first election, runs for reelection in the second. Voter V_1 either votes or abstains in the first election, while voter V_2 votes or abstains in the second election. In other words, there is only one voter in each election who is pivotal to C being elected or not (when the relevant voter chooses not to vote). Hence a voters actions are equivalent to his intentions (whether to see the candidate elected or not). The cost of voting in an election is $k > 0$, assumed identical for the two elections.

If elected, C has $X > 0$ to distribute after the first election and, if reelected, Y to distribute after the second election. The amount given to the two voters is x_1 and x_2 respectively (where $x_1 + x_2 = X$) after the first election (if C is elected) and y_1 and y_2 (where $y_1 + y_2 = Y$) after the second election (if C is reelected). One could think of x_1 and y_1 (x_2 and y_2) as choice of policies favorable to V_1 (V_2) in the first election and second election respectively.

It is assumed that $X > Y > \frac{X}{2}$ and $Y > k$. The first assumption is made because i) if Y is too big, then all candidates would pool to be reelected and there would be no signalling of preference congruence with V_2, and ii) if Y is too small, then candidates would not care enough about reelection to try to signal preference congruence with V_2. The value of Y relative to X could be motivated by thinking of election benefits as identical in each

[3]This is similar, but certainly not identical, to a central question in electoral strategy: do candidates win elections from targeting swing or core voters? (Cox, 2010). However, in that literature, core voters are targeted not to thank them for voting for the candidate in previous contests, but to mobilize them to turn out to vote in the current electoral contest. Hence, identifying previous voters as "core" and prospective voters as "swing" in our experiment would be incorrect. These ideas will be clearer once one sees the underlying model.

election, but there being some common discount factor δ with $\frac{1}{2} < \delta < 1$ applied to future benefits. The second assumption is made because if $Y < k$, then V_2 would always abstain in the second election and there would likewise be no signalling motives.

3.2.2 Candidate and Voter Preferences

We say that C has a "policy preference", $\tau = 1, 2$, where her material payoff is equal to the amount of benefits given to the voter of her policy type (V_1 if $\tau = 1$ and V_2 if $\tau = 2$). For a $\tau = 1$ candidate, acting selfishly and giving benefits to V_1 coincide, while for a for a $\tau = 2$ candidate, acting selfishly and giving benefits to V_2 coincide. This is a simple way of representing candidate preferences over policies, and voter preferences over candidates based on policies they would enact. C is also characterized by a "reciprocity parameter" θ between 0 (a "selfish" candidate) and $\overline{\theta} \geq 0$. Hence, a candidate's type is a function of her policy preference and reciprocity parameter (τ, θ), where type is not directly observed by voters. This is central to the model, as discussed in the next subsection.

To model reciprocal preferences, we assume that C's utility depends not only on her own payoff, but also the payoff of the voter electing her according to her reciprocity parameter θ. A selfish candidate cares only about her own material payoff, while a reciprocal elected candidate may also care about the payoff of the voter who put her in office. That is, a reciprocal C has a psychological payoff from giving to V_1 if he voted for her in election 1 and to V_2 if he voted for her in election 2.

We characterize C's utility function as follows. If $r \in \{x_1, y_2\}$ for "reciprocity" represents the amount given to the voter who elected C in an election (x_1 in election 1 and y_2 in election 2), and $s \in \{x_1, x_2, y_2, y_2\}$ for "selfishness" is the amount C gives to the voter of her type (x_1 or y_1 if $\tau = 1$ and x_2 or y_2 if $\tau = 2$), then a simple way to represent C's utility in said election is $u = \theta \log(r) + (1 - \theta) \log(s)$, where the terms r and s depend on the election and τ of the candidate. According to this utility function, a C with $\theta = 0$ is selfish, and a C with $\theta > 0$ is reciprocal, with her reciprocity increasing in θ. We assume $\overline{\theta} \leq 0.5$ so that candidates selfish motives are at great as large as their other-regarding motives, as in Fehr and Schmidt (1999). Furthermore, we assume a candidate's θ is identical in both elections.[4]

For example, we represent first-period candidate utility as

[4]Our theoretical results would not be qualitatively affected by modifying this assumption, and might actually be strengthened.

$$u^1_{(1,\theta)}(x_1, x_2) = \theta \log(x_1) + (1-\theta)\log(x_1) \quad (1a)$$
$$u^1_{(2,\theta)}(x_1, x_2) = \theta \log(x_1) + (1-\theta)\log(x_2) \quad (1b)$$

Regardless of her θ, a $\tau = 1$ candidate would clearly choose $x_1 = X$ if she were simply maximizing first-period utility (her "first-best"), while a type $(2, \theta)$ candidate would choose $x_1 = \theta X < X$.

Similarly, second-period candidate utility is represented as

$$u^2_{(1,\theta)}(y_1, y_2) = \theta \log(y_2) + (1-\theta)\log(y_1) \quad (2a)$$
$$u^2_{(2,\theta)}(y_1, y_2) = \theta \log(y_2) + (1-\theta)\log(y_2) \quad (2b)$$

where a type $(1, \theta)$ candidate's first-best is $y_2 = \theta Y < Y$, and a $\tau = 2$ candidate's first-best is $y_2 = Y$. This utility function can be translated into a Cobb-Douglas utility function without changing the underlying preferences, consistent with the reciprocity model of Cox, Friedman and Gjerstad (2007).

Finally, we assume voters are risk neutral and selfish. In other words, we assume voters have $\theta = 0$ so their utility function is linear in their payoffs. Risk-neutrality is assumed for simplicity of exposition. Voter selfishness allows us to focus on *candidate* rather than *voter* reciprocity. We do not model reciprocity by voters to candidates, nor inequity aversion by either candidates or voters.[5]

3.2.3 Voter's Beliefs, Candidate's Dilemma

We assume that $\tau = 1$ and $\tau = 2$ are initially equally likely, and that θ is independently distributed by a continuous distribution function $F(\theta)$ with support $[0, \overline{\theta}]$, where this distribution is assumed to be common knowledge. V_1 has no information about C's type (τ, θ) when she votes other than his priors over these two variables. In contrast, and this is the heart of both the model and the experiment, since V_2 votes after C chooses x_1 and x_2, these may reveal information about the C's type. The problem that a reciprocal $\tau = 2$ candidate faces is that choosing too high a value of x_1 out of her desire to be reciprocal to V_1 may lead V_2 to believe she has policy preference $\tau = 1$. Hence, when voting is costly, V_2 would choose to abstain and C would not be reelected. Put differently, a reciprocal $\tau = 2$ candidate may

[5]See Hahn (2009) for an interesting exploration of the effect of voter reciprocity on elections.

choose to limit her reciprocity to V_1 after the first election in order to not be perceived as a $\tau = 1$ candidate by V_2.

In order to study constrained reciprocity, we compare what a reciprocal $\tau = 2$ candidate – that is, one whose θ is positive – would do if V_2 had no information about x_1 and x_2 before voting to the case where she does. More precisely, we study two different set-ups, following Grosskopf and Sarin (2010). The first is where V_2 observes first election benefits (x_1 and x_2) before deciding whether to vote. In this set-up, candidates are motivated to signal policy preference congruence with V_2 to be reelected. In the second set-up V_2 does not observe first election benefits (x_1 and x_2) before deciding whether to vote, so that C cannot use distribution of benefits to signal type. This no-signalling set-up will serve as a useful benchmark to understand how signalling for electoral purposes affect candidate reciprocity.

We expect a $\tau = 2$ candidate's reciprocity to be unconstrained in the no information game as a high value of x_1 is unobserved by V_2 and thus has no implications for reelection prospects. By contrast, in the signalling game, the desire to get reelected may constrain C in her choice of x_1 in order not to harm her reelection chances.

3.3 Electoral Equilibria

We can now summarize the equilibria in our two set-ups. Our basic result is that when signalling is possible, a reciprocal $\tau = 2$ will in fact constrain her reciprocity when the cost of voting is high, but less so when it is low. The key driver of this result is that since the policy preferences of a candidate are not known ex ante, a candidate with policy preference $\tau = 1$ may choose to mimic the x_1 choice that a reciprocal $\tau = 2$ candidate would make. Pooling by $\tau = 1$ type candidates reduces the benefit V_2 expects from voting to reelect C, and the higher the cost of voting, the more likely V_2 is to abstain. Reducing her reciprocity to V_1 reduces the mass of $\tau = 1$ type candidates who pool while increasing the mass of $\tau = 2$ type candidates who pool, thus increasing the expected benefit of voting, which, as indicated, is more important when voting costs are high.

To give more detail on the role of constrained reciprocity when benefits may signal a candidate's policy preferences, we consider the cases where benefits are not observed – the "no-information" case where signalling is not possible – and where they are, the "signalling case." Under the latter, a $\tau = 2$ type candidate may face a trade-off between reciprocating to V_1 after the first election and signalling her congruence of policy preference with V_2.

3.3.1 Equilibria when V_2 Does Not Observe x_1 and x_2

In this no-information case, C cannot signal her type, so she simply maximizes her single period utility in each election (her first-best). Hence, a type $(2, \theta)$ candidate chooses $x_1 = \theta X$ in the first election, her optimal balance between benefits to V_1 and to herself. Furthermore, she chooses $y_2 = Y$ if reelected since her self-interest and reciprocity motives align in dictating the giving of second selection benefits to V_2. By contrast, a type $(1, \theta)$ candidate chooses $x_1 = X$ in the first election, regardless of her reciprocity preference, and $y_2 = \theta Y$ if reelected, her first-best in each election. The equilibrium in the first election equilibrium is depicted in Figure 1, where we note that there is complete separation of $\tau = 1$ and $\tau = 2$ candidates. V_1 and V_2 vote rather than abstain if the expected benefit from voting exceeds the cost.[6]

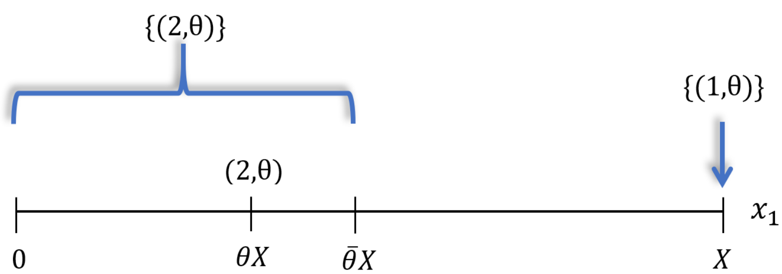


Figure 1: No Information Game Equilibrium

3.3.2 Equilibria when V_2 Observes x_1 and x_2

To better understand C's choices when x_1 and x_2 are observed before the second election, suppose that all candidates are selfish, and it is common knowledge that there are only $(1, 0)$ and $(2, 0)$ type candidates.

Consider the first-best of a $(2, 0)$ candidate, $x_1 = 0$. Clearly $(2, 0)$ will choose this if it implies her reelection. If a type $(2, 0)$ candidate chose $x_1 = 0$, a type $(1, 0)$ candidate would not mimic as she receives a higher utility from choosing her first-best, $x_1 = X$, and foregoing reelection than mimicking when $X < Y$. Thus, in equilibrium, a type $(2, 0)$ chooses $x_1 = 0$

[6] Given the chosen benefits of $\tau = 1$ and $\tau = 2$ candidates, for V_2, this is $\frac{1}{2}Y + \frac{1}{2}Y \int_0^{\bar{\theta}} \theta dF(\theta) > k$, where the first two terms are his expected benefits from electing a $\tau = 2$ and $\tau = 1$ candidate respectively, weighted by their probabilities.

and is reelected, while a type $(1,0)$ chooses $x_1 = X$ and foregoes reelection, so that $\tau = 1$ and $\tau = 2$ candidates locate at the extremes. This equilibrium is depicted in Figure 2.

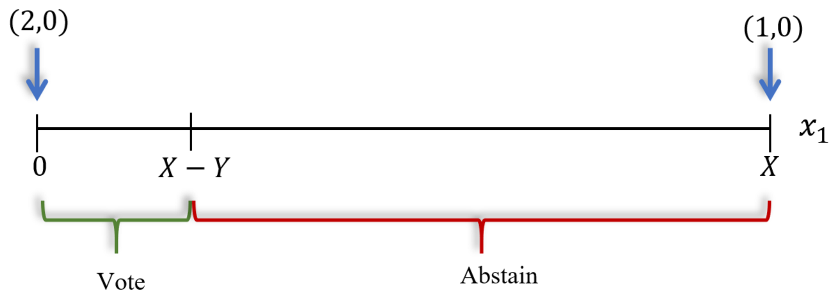


Figure 2: Selfish Candidates Separating Equilibrium

In contrast – and this summarizes key results of the paper – when candidates may be reciprocal, but distribution of benefits is observed, we get a result "between" the cases of reciprocal candidates without observation of x_1 and x_2 as in section **??** and observation of x_1 and x_2 without reciprocal candidates. C's distribution of benefits will be interior but often not as much as compared to reciprocal candidates in the no-information case.

To see why, suppose that all $(2, \theta)$ incumbents played their first-best. In other words, suppose that any given $(2, \theta)$ candidate plays $x_1 = \theta X$, as in the no information case. Furthermore, consider the implications for the most reciprocal incumbent with policy preference $\tau = 2$, that is, type $(2, \overline{\theta})$ choosing $x_1 = \overline{\theta} X$.

If $\overline{\theta}$ is sufficiently large, then some $\tau = 1$ candidates would be willing to mimic choosing $\overline{\theta} X$ to get reelected instead of their first-best X. The lower is the reciprocity θ of a $\tau = 1$ candidate, the greater the benefit of mimicking (as utility after election 2 will be higher[7]), so that this would include $\tau = 1$ with sufficiently low θ. With a positive mass of such $\tau = 1$ candidates[8] relative to the mass of $(2, \overline{\theta})$, V_2 would abstain if the voting cost is too high. Hence, $x_1 = \overline{\theta} X$ would not be an equilibrium choice for $\left(2, \overline{\theta}\right)$ as she would not be reelected.

However, suppose $\left(2, \overline{\theta}\right)$ constrains her reciprocity, that is choosing a lower value of x_1. As $\left(2, \overline{\theta}\right)$ decreases her choice of x_1, so too must all highly reciprocal $\tau = 2$ candidates with first-best greater than that value of x_1 which $\left(2, \overline{\theta}\right)$ chooses. For a low enough value of x_1, the mass of reciprocal $\tau = 2$ candidates who choose to constrain themselves will imply just

[7] Since $0 \leq \theta \leq \frac{1}{2}$, second period utility of a $(1, \theta)$ candidate is monotonically decreasing in θ from (2a).

[8] We assume $F(0) > 0$ following the observation of positive mass of selfish players in gift exchange games (see Fehr et al. [1993]). This assumption is not necessary for this result, but simplifies the proofs in the Appendix.

enough mass of $\tau = 2$ candidates such that V_2 votes even if with mimicking by some (low reciprocity) $\tau = 1$ candidates. Note further the lower is x_1, the fewer $\tau = 1$ candidates who will want to mimic x_1 so that the relative weight of $\tau = 2$ candidates would increase for two reasons (though the expected benefit to V_2 from voting if the candidate is a mimicker also falls as more reciprocal $\tau = 1$ drop out of the pool).

Ultimately, in equilibrium, a $\tau = 2$ candidate face a reciprocity cut-off, based on the cost of voting, $\theta_2(k)$. All $\tau = 2$ candidates with reciprocity greater than or equal to that reciprocity cut-off $\theta \geq \theta_2(k)$ will constrain their reciprocity and choose $x_1 = \theta_2(k)X$, and all $\tau = 2$ candidates with reciprocity less than that cut-off choose their first-best $x_1 = \theta X$. Similarly, there is a reciprocity cut-off for $\tau = 1$ candidates, $\theta_1(k)$. All $\tau = 1$ candidates with reciprocity less than that cut-off $\theta < \theta_1(k)$ mimic the highly reciprocal $\tau = 2$ candidates by choosing $x_1 = \theta_2(k)X$, while all other $\tau = 1$ candidates simply choose their first-best $x_1 = X$.

Figure 3 depicts this semi-separating equilibrium with constrained reciprocity by the highly reciprocal $\tau = 2$ candidates and Figure 4 mimicking by the more selfish $\tau = 1$ candidates.

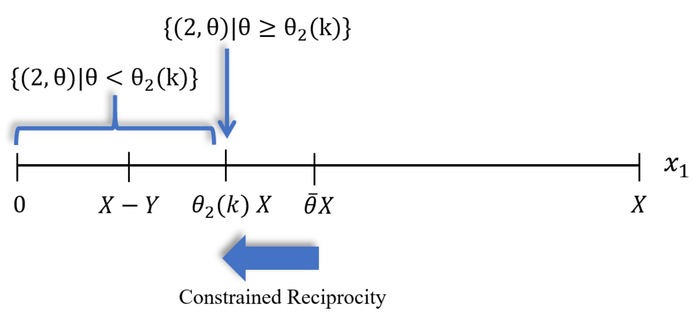


Figure 3: Constrained Reciprocity by Highly Reciprocal $\tau = 2$ Candidates

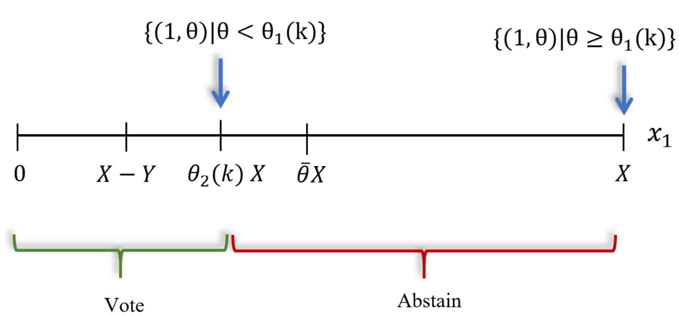


Figure 4: Mimicking by Selfish $\tau = 1$ Candidates

Furthermore, since V_2 is less willing to vote as the cost of voting rises, $\tau = 2$ candidates further constrain themselves at a higher cost of voting to ensure their reelection. In other words, the cut-off at which $\tau = 2$ candidates limit their reciprocity ($x_1 = \theta_2(k)X$) is weakly decreasing in the cost of voting. We view this as our central theoretical finding, and important for interpreting our experimental results.

We predict to see greater constrained reciprocity for a higher cost of voting, and might not even be able to detect constrained reciprocity for a sufficiently low cost of voting. Before continuing to the experimental results, a couple notes and conjectures about how our theoretical results might be affected by relaxing some of the simplifying assumptions.

First, we assumed the distribution of reciprocity $F()$ is independent of k. One might suspect that $F()$ is dependent on k, with candidates feeling greater reciprocity towards voters when they pay a higher cost of voting. In this case, it might be that a greater number of highly reciprocal $\tau = 2$ candidates constrain their reciprocity with a higher cost of voting, apart from the amount they constrain as shown here, but we leave a formal analysis out as this significantly increases the complexity of the model.

Lastly, for simplicity, we assumed voters are risk-neutral and there is no ambiguity about the underlying reciprocity distribution $F()$. If voters are risk-averse and/or there is ambiguity about $F()$, then this should strengthen the robustness of the constrained reciprocity equilibrium as V_2 would be less willing to reelect $\tau = 1$ candidates, and $\tau = 2$ candidates would need to further constrain themselves to ensure reelection.

Informed by this section's theoretical predictions, we turn to the experimental results.

4 Experimental Design

The aim of our experiment is to investigate the interaction between intrinsic reciprocity and reelection concerns on candidate behavior as suggested by the signalling model above. We implemented four treatments in a 2 x 2 experimental design. Treatments differed in the cost of voting, \$1 in treatments 1 and 3 (the "low cost of voting games") and \$6 in treatments 2 and 4 (the "high cost of voting games"). Additionally, as in the two election games in the model, treatments varied in whether V_2 observed the distribution of first election benefits in treatments 1 and 2 (the signalling games) or did not observe the distribution of first election benefits in treatments 3 and 4 (the no information games) before deciding whether to vote.[9]

The experiment was run in the Experimental Economics Lab at the University of Maryland. There were 300 participants, all undergraduate students at the University of Maryland. We conducted five sessions for each treatment (15 participants per session, i.e. 75 participants per treatment). No subject participated in more than one session. Participants were seated in isolated booths. The experiment was programmed in z-Tree (Fischbacher [2007]).

At the beginning of each session, subjects were randomly assigned one of three roles: "Voter 1" (V_1), "Voter 2" (V_2), or "Candidate" (C). The assigned roles stayed fixed for all 5 rounds (until the end of the experiment). At the beginning of each of the 5 rounds in a session, participants were given a \$6.00 endowment (each) and randomly sorted into groups of 3 people, consisting of V_1, V_2, and C. In each round, C was independently and randomly assigned a policy type, "Type 1" ($\tau = 1$) or "Type 2" ($\tau = 2$), with equal probability of being assigned either type. Voters did not learn the candidate's type at any point, but knew the initial probability associated with each type. No participant was ever grouped with any other participant in more than one round. Thus, each round can be thought of as a one-shot game.

Each round consisted of two sequential elections, with V_1 voting in the first election and V_2 voting in the second election. In each election, the respective voter decided whether to vote at a cost or abstain at zero cost. If a candidate was elected in election 1 (election 2), then the candidate was given \$15 (\$10) to distribute between voter 1 and voter 2. The candidate could divide the money in any penny amount. Furthermore, the candidate was given an additional penny to keep for every penny distributed to the voter of her type. Thus, the candidate could earn up to \$15 (\$10) in the first election (second election). If a voter abstained in an election, then the candidate was not elected and the round immediately came to an end. Thus, if the candidate was not elected in the first election, then the second election did not occur. The treatments may be summarized as follows:[10]

[9] Instructions for each treatment can be found in the Supplementary Appendix at: http://econweb.umd.edu/~ozbay/ReciprocityvReelection_Appendix.pdf.

[10] Note that in the \$6 cost of voting case, our theoretical results can be extended to any continuous distribution $F()$ with support $[0, 0.5]$. Also, note that these parameter choices imply $\overline{\theta}_1 = 0.084$.

Treatment	Signalling Game?	Voting Cost	Election 1 Distribution (X)	Election 2 Distribution (Y)
1	Yes	$1	$15	$10
2	Yes	$6	$15	$10
3	No	$1	$15	$10
4	No	$6	$15	$10

Once all 5 rounds were finished, 1 round out of the 5 rounds was randomly picked, and the earnings in that round were the participant's final earnings for the experiment in addition to a $7 participation fee. Including the participation fee, subjects averaged a total of $23.62 in earnings.

5 Results and Interpretation

5.1 Distribution and Voting Patterns

To give a preliminary overview of the data, we summarize the distribution of benefits in Table 1, where the elected candidate has $15 to distribute in the first election and $10 to distribute in the second election.[11]

	$ Benefit to V_1 in First Election				$ Benefit to V_2 in Second Election			
	Treat 1	Treat 2	Treat 3	Treat 4	Treat 1	Treat 2	Treat 3	Treat 4
Type 1	9.07	10.05	13.61	11.88	1.39	2.36	1.61	3.31
	(2.21)	(3.26)	(2.16)	(2.96)	(1.87)	(2.77)	(1.96)	(2.50)
Type 2	3.50	2.82	2.59	4.93	8.38	9.18	8.72	8.02
	(3.29)	(2.97)	(3.53)	(3.60)	(2.06)	(1.39)	(1.77)	(1.82)
Observations	119	109	120	119	96	73	111	78

Mean, standard deviation in parentheses.

Table 1: Distribution of $ Benefits

[11] Additional histograms showing the distribution of second election benefits by type 2 candidates, not provided in the main text, can be found in Figures A.1 and A.2 of the Supplementary Appendix at: http://econweb.umd.edu/~ozbay/ReciprocityvReelection_Appendix.pdf.

Additionally, voting proportions are given in Table 2. (Figures 16 and 26 below show voting patterns by V_2 in the second election broken down by actual candidate types.)

	Treat 1	Treat 2	Treat 3	Treat 4
Voter 1	0.952	0.872	0.960	0.952
	(0.215)	(0.335)	(0.197)	(0.215)
Voter 2	0.807	0.670	0.925	0.655
	(0.397)	(0.472)	(0.264)	(0.477)

Mean vote proportions, standard deviation in parentheses.

Table 2: Vote Proportions

5.2 Existence of Intrinsic Reciprocity

The first question we investigate is whether candidates exhibit intrinsic reciprocity to the voters who elected them when they are free from reelection motives. We focus on the no information games (treatments 3 and 4) where candidates are unable to signal their policy type to V_2, so that observed reciprocity must be intrinsic rather than instrumental. We look at whether a a type 1 candidate gives a non-zero amount of money to V_2 after the second election, and, analogously, whether a type 2 candidate gives a non-zero amount of money to V_1 after the first election. In these cases giving cannot be motivated by the candidate's self-interest and hence is evidence of intrinsic reciprocity.[12]

As seen in the histograms in Figures 5 and 6, while some candidates are selfish, many give a substantial reward to the voter who elected her. Indeed, on average candidates give a positive amount of money to the voter who elected them: type 1 candidates give \$1.61 and \$3.31 to V_2 in the second election in treatments 3 and 4 respectively (Table 1 and Figure 5); type 2 candidates give \$2.59 and \$4.93 to V_1 in the first election in treatments 3 and 4 respectively (Table 1 and Figure 6). Furthermore, since there exists positive mass above $x_2 = \$3.33$ in Figure 5 and $x_1 = \$5$ in Figure 6, it is clear that $\overline{\theta} > \frac{1}{3} = \frac{X-Y}{X}$, an important condition for constrained reciprocity in the signalling games.

[12] One might argue that candidates are free from reelection concerns in the second election of treatments 1 and 2, so that if a type 1 candidate gives a non-zero amount of money to voter 2 in the second election, then this would indicate intrinsic reciprocity. However, when signalling of type is possible after the first election, it may be that observed candidate behavior after the second election behavior may be affected by signalling mechanism in the first election, including selection of more selfish types in the semiseparating equilibrium as discussed in the formal model.

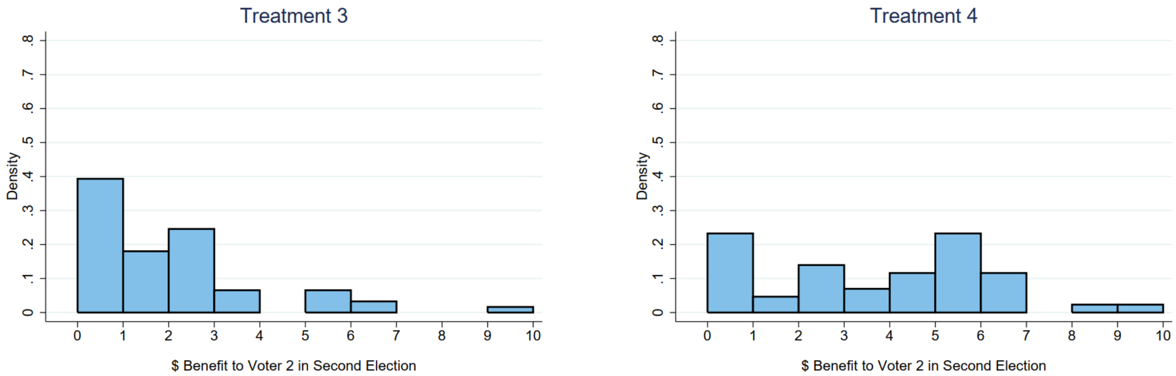


Figure 5: Type 1 Candidate Intrinsic Reciprocity

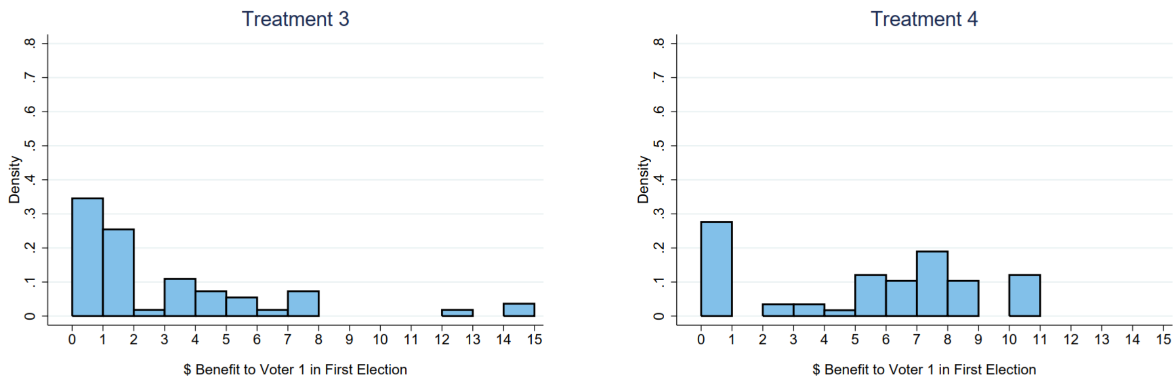


Figure 6: Type 2 Candidate Intrinsic Reciprocity

Next, we estimate the average value of θ and test whether it is statistically different from zero in tables 3 and 4. We use an OLS regression of the percentage benefits given by a type 2 (type 1) candidate to voter 1 in election one (voter 2 in election two) on a constant term, accounting for possible learning effects across periods (which we do not find) and clustered at the candidate level (to account for serial correlation in a given candidate's choices). The coefficient on the constant term can be interpreted as an estimate of the expected value of θ. We find that the constant term is significant and positive in both treatments (3 and 4), indicating that θ is statistically different from zero, and ranges from an average of 17.4% to 41.1%. It is interesting to note that the amount of intrinsic reciprocity is greater in the high voting cost game (treatment 4) than the low voting cost game (treatment 3). This might reflect candidates showing higher reciprocity when voting costs are higher.

	(1)	(2)
	Treat 3	Treat 4
Constant	0.261***	0.411***
	(0.071)	(0.096)
Period	-0.033*	-0.029
	(0.0165)	(0.026)
Observations	61	43
R-squared	0.068	0.027

Clustered at candidate level.

*** p<0.01, ** p<0.05, * p<0.1

Table 3: OLS of Type 1 Candidate % Benefits to V_2 in Election 2

	(1)	(2)
	Treat 3	Treat 4
Constant	0.174**	0.398***
	(0.067)	(0.085)
Period	-0.000	-0.022
	(0.022)	(0.018)
Observations	55	58
R-squared	0.000	0.015

Clustered at candidate level.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: OLS of Type 2 Candidate % Benefits to V_1 in Election 1

5.3 High Cost of Voting Games

Here, we explore the results for the high cost of voting games with (treatment 2) and without (treatment 4) room for signalling. We find results consistent with the theoretical model.

First, there is clear evidence that not all candidates are selfish. Consistent with the existence of non-selfish desires, type 1 and type 2 candidates do not fully separate in the first election at the extremes of $x_1 = \$15$ and $x_1 = \$0$ respectively. Instead, we observe many interior values of x_1 both with (treatment 2) and without (treatment 4) reelection motives.

Furthermore, we find that aggregate behavior closely resembles the constrained reciprocity equilibrium outlined in Proposition 3 in the Appendix. That is, reciprocal type 2 candidates must constrain their reciprocity to ensure their reelection. Furthermore, the less reciprocal type 1 candidates mimic the highly reciprocal type 2 candidates and are reelected, while the remaining type 1 candidates choose $x_1 = \$15$ and forego reelection. Lastly, V_2's actions also reflects play in this equilibrium. His propensity to vote increases with his benefits received in the first election. Indeed, V_2's behavior most closely resembling a cut-off strategy, with his likelihood of voting increasing significantly if he receives x_2 around $\$5-\$6$ or more in the first election.

5.3.1 Type 2 Candidates: Constrained Reciprocity

Our main finding is that type 2 candidates who display reciprocity limit the amount they give to V_1 in the first election, deviating from their first-best in order to help their reelection chances. We regard this as a key result, as it indicates that reelection concerns may limit reciprocity. Let's consider the results as a whole.

When the cost of voting is high, we find that some type 2 candidates are selfish, but the majority display reciprocity towards V_1 in the first election. In treatment 2 (treatment 4), 31.88% (21.67%) of candidates give $x_1 = \$0$ to V_1 in the first election, and the remaining 68.12% (78.33%) select interior values of x_1. We focus on the motives of the reciprocal type 2 candidates.

We show evidence of the constraints signalling concerns place on a type 2's intrinsic reciprocity. As shown in Table 5, type 2 candidates give on average \$2.11 more to V_1 in the no information game than in the signalling game (\$4.93 in treatment 4 and \$2.82 in treatment 2). The same trend is found if restricting the data to type 2 candidates who select $x_1 > \$0$ and thus might be labeled reciprocal (\$6.35 in treatment 4 and \$4.50 in treatment 2).

	First Election	Second Election
Treat 2	2.82	0.82
	(2.97)	(1.39)
Treat 4	4.93	1.98
	(3.60)	(1.82)
Observations	117	86

Mean, standard deviation in parentheses.

Table 5: Type 2 Candidate \$ Benefit to V_1 with High Cost of Voting

This can be seen visually in the histograms in Figure 7. There is much less density towards the right of the treatment 2 graph than the right of the treatment 4 graph, and the rightmost (maximum) choice of x_1 is also lower (\$7.5 in treatment 2 and \$11 in treatment 4), reflecting a constraint at some x_1^*.

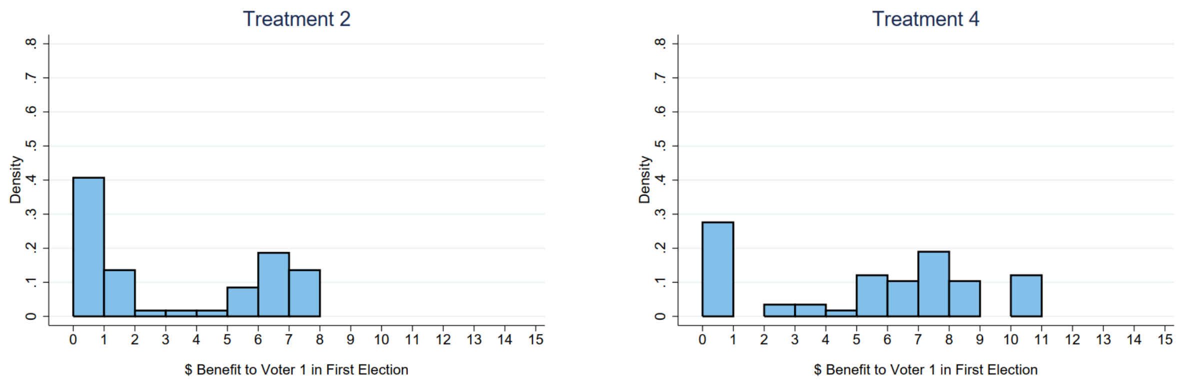


Figure 7: Type 2 Candidate First Election Benefits with High Cost of Voting

Furthermore, Figure 8 shows that the CDF of type 2 candidate giving to V_1 in the first election of treatment 4 first-order stochastically dominates that in treatment 2. We find this to be significant using the first order stochastic dominance test in Barrett and Donald (2003).[13]

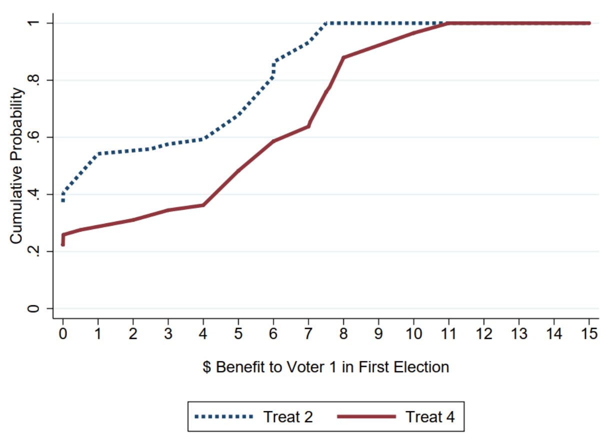


Figure 8: Type 2 Candidate First Election Benefits with High Cost of Voting

Moreover, consider only type 2 candidates who are reelected (which is 60.3% of them, as shown in Figure 16 below). The scatter plots in Figure 9 display the benefit given to V_1 in each election. As one can see, there is a lot more mass to the left side of the treatment 2

[13] We use a bootstrap of size 1,000 to calculate p-values. The test consists of two steps. We first test the null hypothesis that the treatment 4 distribution either first order stochastically dominates or is equal to the treatment 2 distribution in the \$0 to \$15 range. We cannot reject the null, with a corresponding p-value of 0.719. We then test the null hypothesis that the treatment 2 distribution first order stochastically dominates or is equal to the treatment 4 distribution (in the \$0 to \$15 range). We reject this null hypothesis in this case, with a corresponding p-value of 0.077.

scatter plot than the treatment 4 scatter plot, indicating that in the former type 2 candidates constrain their reciprocity to V_1.

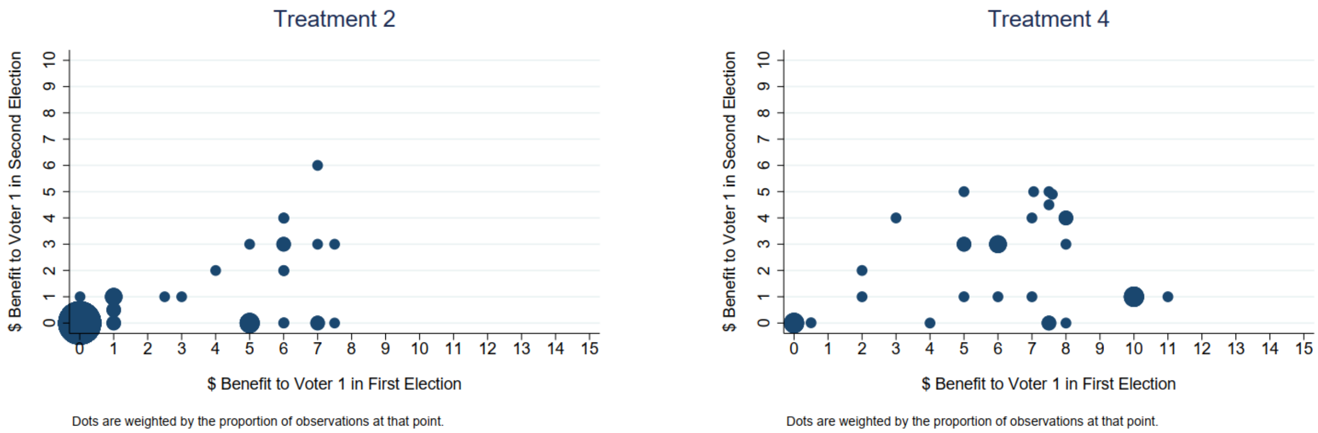


Figure 9: Type 2 Candidate Benefits to V_1 in the Two Elections with High Cost of Voting

Finally, in Table 6 we test whether the apparent constraints that reelection places on reciprocity are statistically significant. We use a two-limit Tobit regression to account for censoring from below ($0) and above ($15 in the first election), clustered at the candidate level (to account for serial correlation in a given candidate's choices). The coefficient on the treatment 4 dummy shows that the amount type 2 candidates give to V_1 in the first election is significantly higher in treatment 4 than in treatment 2.

Treat 4	2.944**
	(1.196)
Period	-0.629**
	(0.241)
Constant	3.507***
	(0.925)
Observations	117

*** p<0.01, ** p<0.05, * p<0.1

SE clustered at candidate level.

Table 6: Two-Limit Tobit, Type 2 Candidate $ Benefit to V_1 in Election 1 (Treatments 2 vs 4)

5.3.2 Type 1 Candidates

We find that some type 1 candidates play their first-best in distributing first election benefits, thus foregoing reelection, while at the same time, many type 1 candidates pool with type 2 candidates in order to be reelected. Furthermore, we show evidence that the type 1 candidates who pool with type 2 candidates to be reelected tend to be less reciprocal.

First, we show that signalling motives lead type 1 candidates to mimic type 2 candidates in order to help their reelection chances. As shown in table 7, type 1 candidates give on average \$1.83 more to V_2 in the first election of the signalling game than the no information game (\$4.95 in treatment 2 and \$3.12 in treatment 4).

	First Election	Second Election
Treat 2	4.95	2.36
	(3.26)	(2.77)
Treat 4	3.12	3.31
	(2.96)	(2.50)
Observations	111	65

Mean, standard deviation in parentheses.

Table 7: Type 1 Candidate \$ Benefit to V_2 with High Cost of Voting

This can be seen visually in the histograms in Figure 10 showing type 1 candidate choices of x_2. There is much higher density towards the the middle in the treatment 2 histogram (higher benefit to V_2) and left in the treatment 4 histogram (lower benefit to V_2).

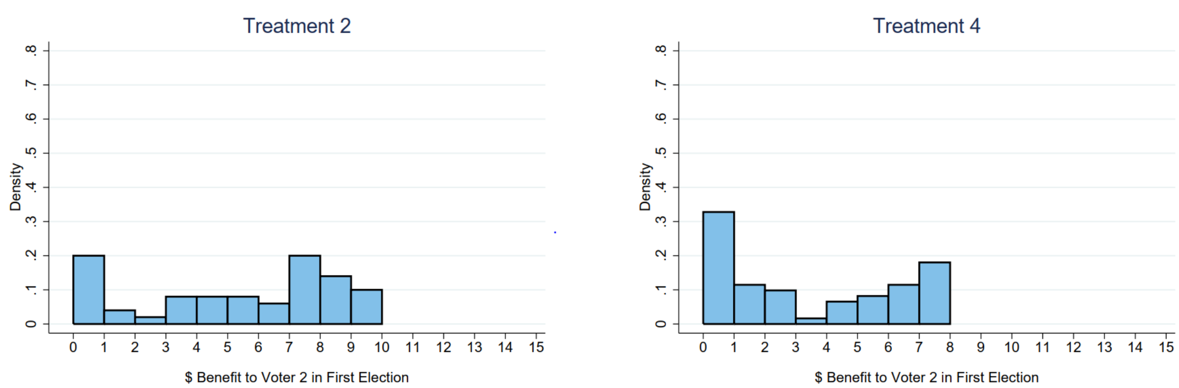


Figure 10: Type 1 Candidate First Election Benefits Distribution with High Cost of Voting

This may also be seen in Figure 11, which shows that the CDF of what type 1 candidate benefits to V_2 in the first election of treatment 2 first-order stochastically dominates that in treatment 4. We find this to be significant using the first order stochastic dominance test in Barrett and Donald (2003).[14]

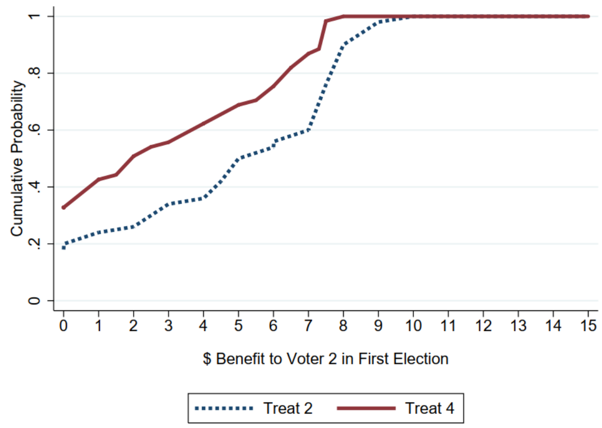


Figure 11: Type 1 Candidate First Election Benefits with High Cost of Voting

Table 8 presents a two-limit (from below at \$0 and above at \$15) Tobit regression clustered at the candidate level (to account for serial correlation in a given candidate's choices). The coefficient on the treatment 4 dummy shows that the amount type 1 candidates give to V_2 in the first election is significantly lower in treatment 4 than in treatment 2, that is, without versus with the possibility of signalling.

[14] We use a bootstrap of size 1,000 to calculate p-values. We first test the null hypothesis that the treatment 2 distribution either first order stochastically dominates or is equal to the treatment 4 distribution in the \$0 to \$15 range. We fail to reject this null hypothesis, the corresponding p-value is 0.664. We then test the null hypothesis that the treatment 4 distribution first order stochastically dominates or is equal to the treatment 2 distribution (in the \$0 to \$10 range). We reject the null hypothesis in this case, with a corresponding p-value of 0.079.

Treat 4	-2.374**
	(1.116)
Period	-0.535**
	(0.265)
Constant	6.178***
	(0.893)
Observations	111

*** p<0.01, ** p<0.05, * p<0.1

SE clustered at candidate level.

Table 8: Two-Limit Tobit, Type 1 Candidate $ Benefit to V_2 in First Election (Treatments 2 vs. 4)

While it is clear that mimicking is going on, an important next question is what kind of type 1 candidates are mimicking? While both types are concerned about reelection, we saw in the theoretical model that the least reciprocal type 1 candidates earn the highest utility gain from reelection, and are thus most likely to mimic. The scatter plots of distribution of benefits to V_2 in the first and second election in Figure 12 suggest that this is likely the case. The large mass at the bottom left of the treatment 4 graph disappears in the treatment 2 graph, and a new mass appears in the bottom middle. This suggests that many of the mimickers are selfish, with a signalling motive leading her to give near half of total dollar benefits to V_2 in the first election but little in the second election.

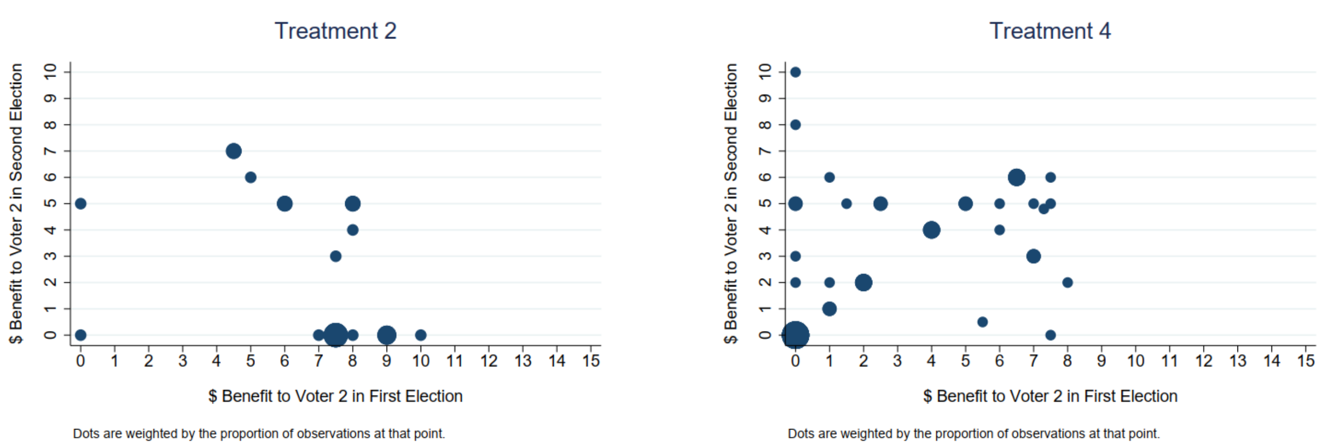


Figure 12: Benefits to V_2 by Type 1 Candidate in the Two Elections with High Cost of Voting

Similarly, Figure 13 shows the distribution of type 1 candidates benefits to V_2 in the second election. There is much higher density to the left of the treatment 2 histogram, indicating that the reelected type 1 candidates tend to be less reciprocal and more selfish in the signalling game than in the no information game.

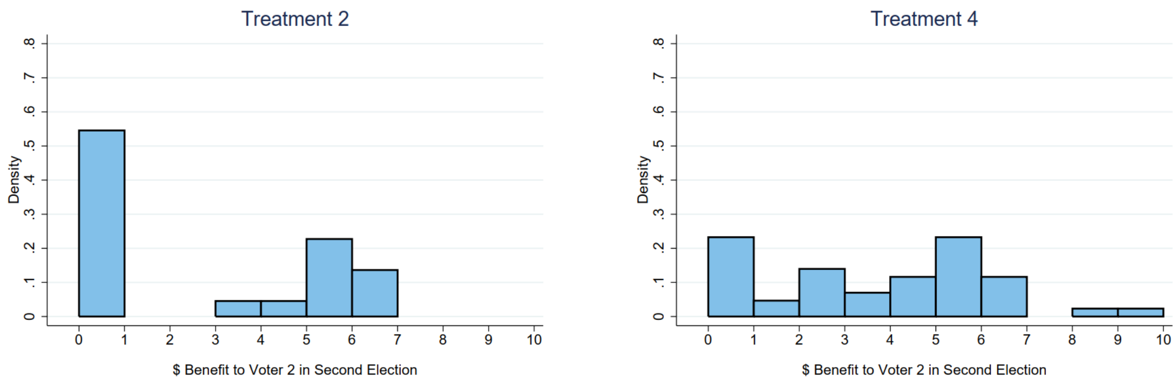


Figure 13: Type 1 Candidate Second Election Benefits Distribution with High Cost of Voting

Indeed, of the type 1 candidates who give between \$6 and \$10 to V_2 in the first election of treatment 2 (which constitutes 48.00%, or 24 out of 50 type 1 candidate observations), 66.67% are reelected (16 of 24 type 1 candidate observations); and, of those that are reelected, 62.50% (10 of 16 give type 1 candidate observations) give nothing to V_2 and the entire \$10 to V_1 in the second election. Mimicking increases their total payoff above the \$15 they would receive if the simply maximized their first period payoff by giving everything to V_1 in the first election as short-sighted selfishness would dictate.

5.3.3 V_2's Propensity to Vote

Is restricting x_1 an effective reelection strategy for type 1 and type 2 candidates? To answer that question, we consider the voting behavior of V_2 in the signalling game with high voting costs. Consistent with, we show that V_2 is substantially more likely to vote not simply when C is indeed type 2 (remember that C's type is never directly revealed to V_2), but also the higher is the amount of money he received in the first election (the higher is x_2).

First, we look at V_2's propensity to vote given his benefits received in the first election (x_2). The scatter plot in Figure 14 shows that the likelihood of V_2 voting increases in x_2, and strongly suggests that he uses a cut-off strategy, only considering voting when he receives at least \$5 to \$8 in the first election.

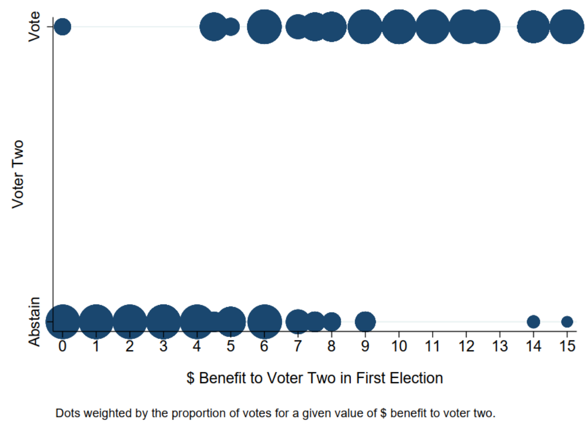
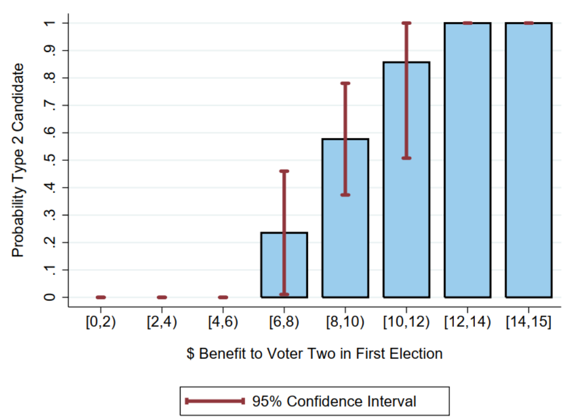


Figure 14: V_2 Decision by Benefit Received in First Election of Treatment 2

Furthermore, Figure 15 shows that both the probability of V_2's voting and a type 2 candidate decline sharply near this range. This lends greater credibility to the premise of the data representing equilibrium play.



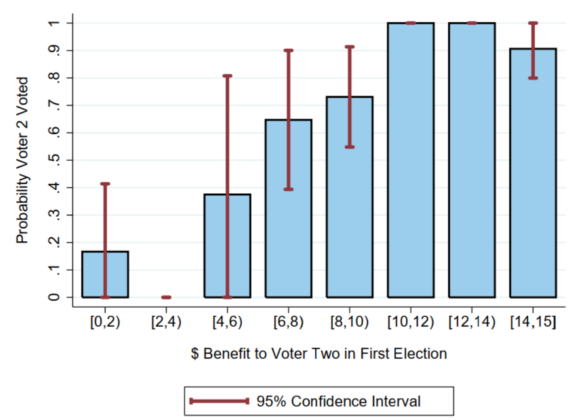


Figure 15: Probabilities of Candidate Type and V_2 Voting by x_2 in Treatment 2

We more closely examine V_2's abstention rate given a candidate's type in Figure 16. When the candidate is in fact type 2, V_2 abstains only 13.6% of the time, about the same as the 12.8% overall abstention by V_1 in the first election (of treatment 2) and much lower than the 34.5% overall abstention by V_2 in treatment 4 where he had no information about either x_1 or the candidate's type. (We might expect some subjects to always abstain due to high risk aversion.) In contrast, when the candidate is in fact type 1, V_2 abstains 56% of the time, much higher than the 13.6% abstention rate with a type 2 candidate and the 34.5% abstention rate with no information. Note that the significant non-zero abstention rate when the candidate is actually type 2 can be explained by some subjects having high risk aversion, combined with uncertainty about candidate type.

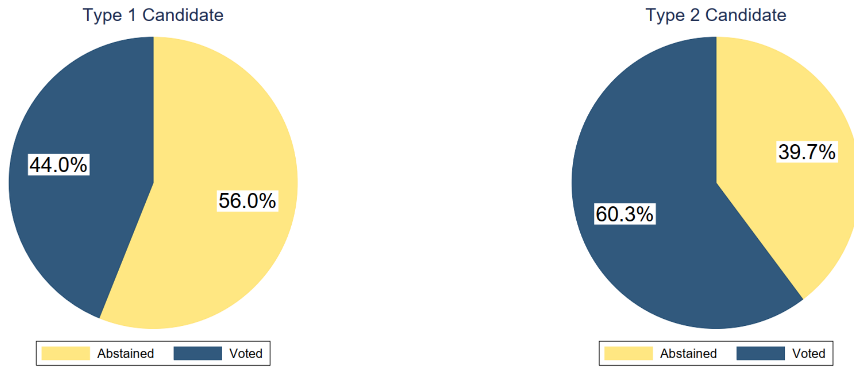


Figure 16: V_2 Voting Decision by Candidate Type in Treatment 2

This is confirmed in the logit regression results in Table 9 which shows V_2's likelihood of voting is significantly higher when facing a type 2 candidate in the signalling treatment with high voting costs.

Type 2	0.520***
	(4.47)
Period	-0.0709*
	(-2.21)
Observations	109
Baseline Predicted Probability	0.579

t statistics in parentheses

Baseline predicted probability calculated for treatment 2, period 1 and a type 1 candidate.

SE clustered at voter two level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 9: Logit Results on Marginal Effect of Candidate's Type on V_2's Probability of Voting in Treatment 2

5.4 Low Cost of Voting Games

We now turn to the results with a low cost of voting, with (treatment 1) and without (treatment 3) reelection motives. As in the high cost of voting games, we find that type 1 and type 2 candidates do not fully separate in the first election at the extremes of $x_1 = \$15$ and $x_1 = \$0$ respectively, as evidence for the existence of non-selfish candidate motives. In fact, we find more interior than non-interior choices of x_1 in the first election.

Consider first the choice of a type 2 candidates. Our main finding, consistent with the result in Section 5, is that with low voting cost, there is no discernible conflict between showing intrinsic reciprocity to V_1 and getting reelected, even when such benefits are observable by V_2. That is, type 2 candidates can largely show their desired reciprocity to V_1 without hurting their reelection chances. This is a key finding of the paper.

As in the high cost of voting games, the results suggest that some type 1 candidates pool with reciprocal type 2 candidates in order to get reelected, and the type 1 candidates who do so tend to be less reciprocal. Meanwhile, other type 1 candidates play their first election first-best and forego reelection.

Lastly, we show that V_2 is more likely to vote in more money received after the first election, employing a strategy that most closely resembles a cut-off strategy.

5.4.1 Type 2 Candidates: Unconstrained Reciprocity

When the cost of voting is low we find that some type 2 candidates are selfish, but the majority display reciprocity towards V_1 in the first election (as was the case with a high cost of voting). In treatment 1 (treatment 3), 24.00% (32.76%) of candidates give $x_1 = \$0$ to V_1 in the first election, and the remaining 76.00% (67.24%) select interior values of x_1. Again, we focus on the motives of the non-selfish type 2 candidates.[15]

As Corollary 1 in the Appendix suggested might be the case, the results show no clear sign that type 2 candidates meaningfully limit their reciprocity in order to get reelected in the signalling game with a low cost of voting. That is, we see no discernible differences in choices made by type 2 candidates when signalling of type is possible (treatment 1) and when it is not (treatment 3): in both cases they play their first best or close enough to their first best to be indistinguishable.

This can be seen in Table 10 showing the mean type 2 candidate first election benefits to V_1 in the two treatments. Type 2 candidates display intrinsic reciprocity to V_1 in the

[15] The fact that more type 2 candidates select $x_1 > \$0$ in treatment 1 (76.00%) than in treatment 2 (68.12%) is consistent with a higher cost of voting constraining a type 2's reciprocity. The fact that less type 2 candidates select $x_1 > \$0$ in treatment 3 (67.24%) than in treatment 4 (78.33%) is consistent with a candidate's reciprocal motives increasing with the cost of voting.

first election of both treatments. If anything, they give a little more (\$0.91) to V_1 when type may be signaled by distribution of benefits than when it cannot. This is the opposite direction from what one would expect if the need to signal created a conflict between intrinsic reciprocity and the desire to be reelected, as is the case with a high cost of voting.

	First Election	Second Election
Treat 1	3.50	1.62
	(3.29)	(2.06)
Treat 3	2.59	1.28
	(3.53)	(1.77)
Observations	104	98

Mean, standard deviation in parentheses.

Table 10: Type 2 Candidate \$ Benefit to V_1 with Low Cost of Voting

The histograms in Figure 17 and CDFs in Figure 18 also shows no apparent impact of restricting reciprocity when V_2 uses first election choices to update his voting decision. We find the CDFs to be equal using the first order stochastic dominance test in Barrett and Donald (2003).[16] Furthermore, considering only those type 2 candidates who are reelected (which is 90.9% of them, as shown in Figure 26 below), the scatter plots in Figure 19 show they give similar amounts to V_1 in the first election of treatments 1 and 3, indicating unconstrained reciprocity.

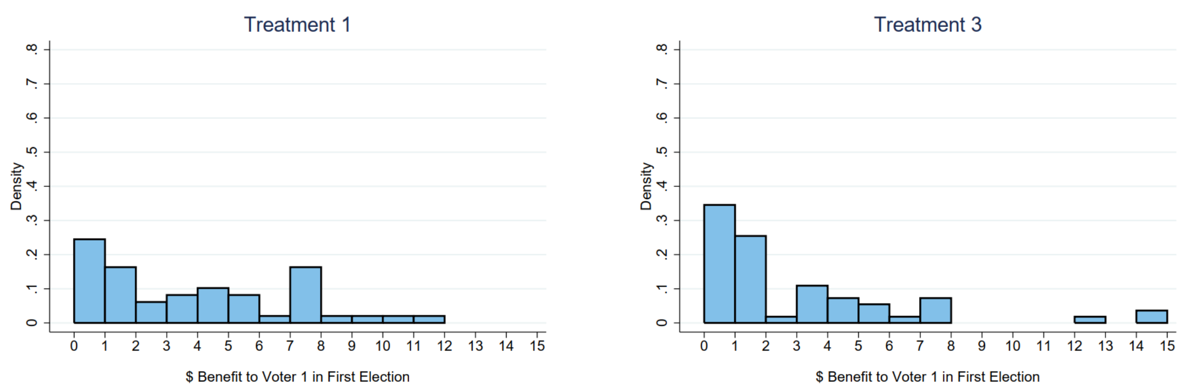


Figure 17: Type 2 Candidate First Election Benefits with Low Cost of Voting

[16] We use a bootstrap of size 1,000 to calculate p-values. We first test the null hypothesis that the treatment 3 distribution either first order stochastically dominates or is equal to the treatment 1 distribution in the \$0 to \$15 range. We cannot reject the null, with a corresponding p-value of 0.637. We then test the null hypothesis that the treatment 1 distribution first order stochastically dominates or is equal to the treatment 3 distribution (in the \$0 to \$15 range). We again cannot reject the null hypothesis in this case, with a corresponding p-value of 0.629.

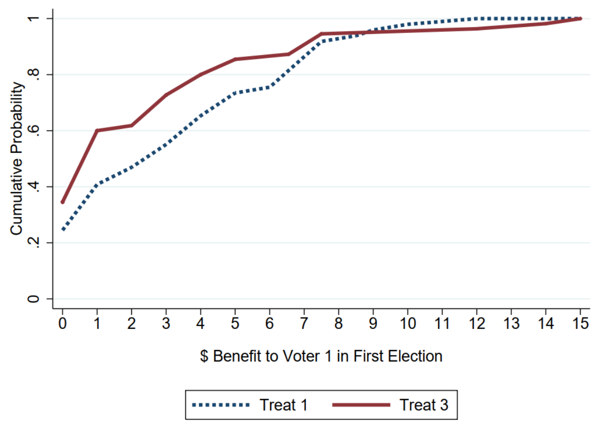


Figure 18: Type 2 Candidate First Election Benefits with Low Cost of Voting

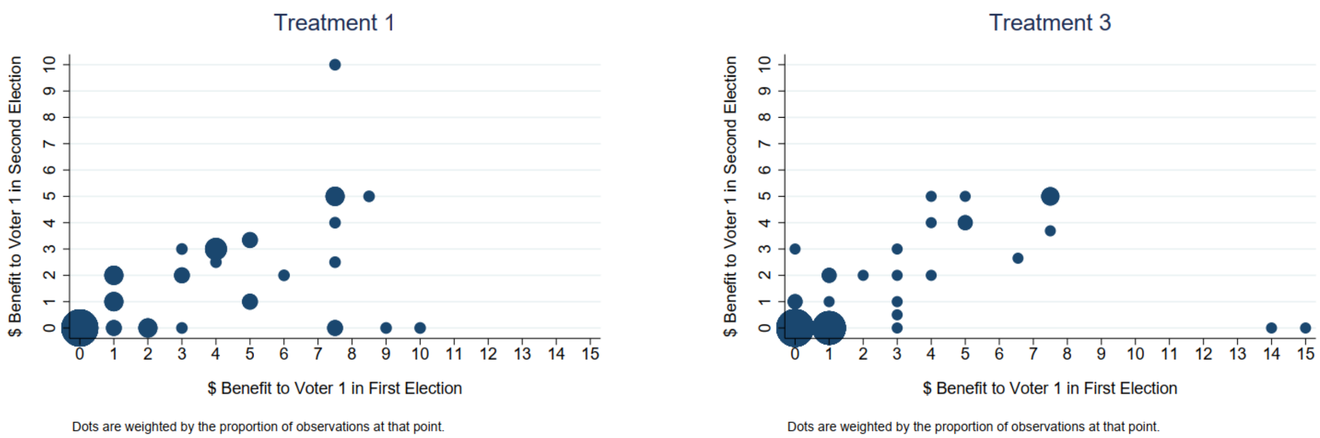


Figure 19: Benefits to V_1 by Type 2 Candidate in the Two Elections with Low Cost of Voting

In the Tobit regression shown in Table 11, the coefficient on the treatment 3 dummy confirms that there is no statistically significant difference in type 2 candidate choice of first election benefits when these benefits may affect V_2's choice of whether to vote or abstain and when they cannot.

Treat 3	-1.250
	(1.237)
Period	0.0714
	(0.313)
Constant	2.585*
	(1.452)
Observations	104

*** p<0.01, ** p<0.05, * p<0.1

SE clustered at candidate level.

Table 11: Two-Limit Tobit, Type 2 Candidate $ Benefit to V_1 in Election 1 (Treatments 1 vs 3)

5.4.2 Type 1 Candidates

Next, we show evidence that type 1 candidates pool with type 2 candidates in order to help their reelection chances. As shown in Table 12, type 1 candidates give on average $4.54 more to V_2 in the first election when signalling of type is possible than when it is not. ($5.93 in treatment 1 and $1.39 in treatment 3).

	First Election	Second Election
Treat 1	5.93	1.39
	(2.21)	(1.87)
Treat 3	1.39	1.61
	(2.16)	(1.96)
Observations	135	109

Mean, standard deviation in parentheses.

Table 12: Type 1 Candidate $ Benefit to V_2 with Low Cost of Voting

This can be seen visually in the histograms in Figure 20 showing type 1 candidate first election benefits to V_2, with much higher density towards the left in the treatment 3 histogram (lower benefit to V_2) and the middle in the treatment 1 histogram (higher benefit to V_2).

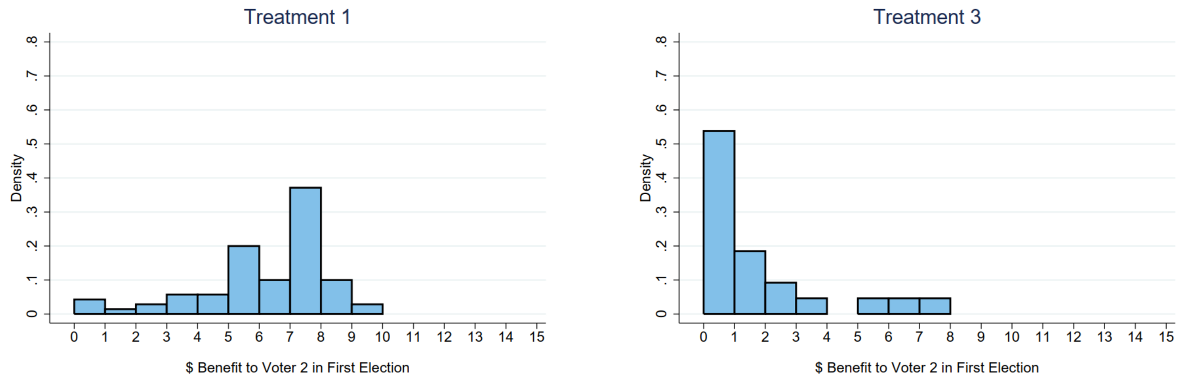


Figure 20: Type 1 Candidate First Election Benefits with Low Cost of Voting

Figure 21 shows that the CDF of type 1 candidate giving to V_2 in the first election of treatment 1 first order stochastically dominates that in treatment 3. We find this to be significant using the first order stochastic dominance test in Barrett and Donald (2003).[17]

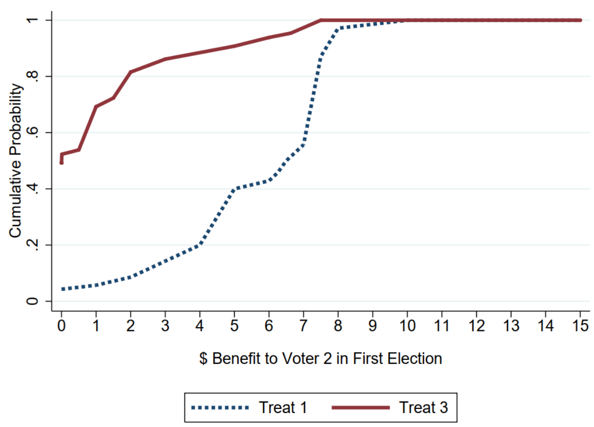


Figure 21: Type 1 Candidate First Election Benefits with Low Cost of Voting

This pattern is confirmed by the Tobit regression in Table 13, which shows that this difference in a type 1 candidate's first election behavior with and without the possibility of signalling type is statistically significant.

[17] We use a bootstrap of size 1,000 to calculate p-values. We first test the null hypothesis that the treatment 1 distribution either first order stochastically dominates or is equal to the treatment 3 distribution in the \$0 to \$15 range. We fail to reject this null hypothesis, the corresponding p-value is 0.589. We then test the null hypothesis that the treatment 3 distribution first order stochastically dominates or is equal to the treatment 1 distribution (in the \$0 to \$15 range). We reject the null hypothesis in this case, with a corresponding p-value of 0.00.

Treat 3	-5.461***
	(0.713)
Period	-0.137
	(0.134)
Constant	6.264***
	(0.542)
Observations	135

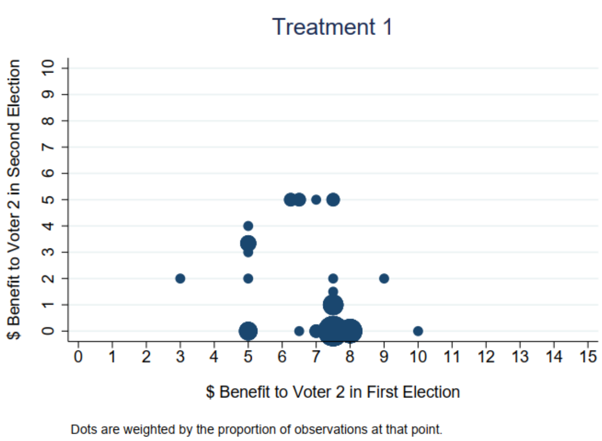
*** p<0.01, ** p<0.05, * p<0.1

SE clustered at candidate level.

Table 13: Two-Limit Tobit, Type 1 Candidate $

Benefit to V_2 in Election 1 (Treatment 1 vs 3)

As in the case with a high voting cost, we argue pooling with type 2 candidates is often driven by more selfish rather than more reciprocal type 1 candidates. The scatter plots in Figure 22 show type 1 candidate giving in both elections of each treatment. It seems that the large mass to the bottom left of the treatment 3 graph disappears in the treatment 1 graph, and a new mass appears in the bottom middle. This supports the claim that many of the mimickers are more selfish, as the signalling motive induces her to give near half of the pie to V_2 in the first election but little to V_2 in the second election.



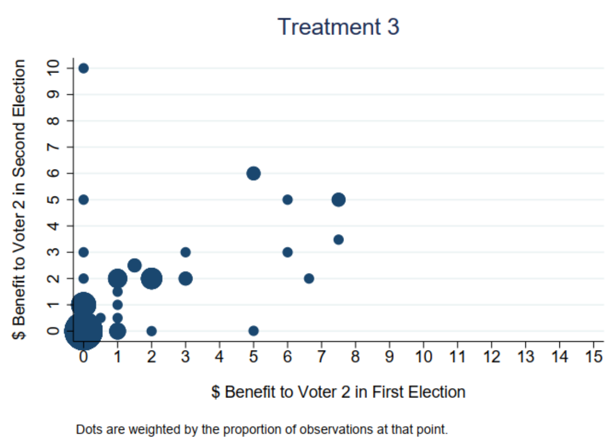


Figure 22: Type 1 Candidate Second and First Election Benefits with Low Cost of Voting

Similarly, Figure 23 shows the average benefits by type 1 candidates to V_2 in the second election. There is higher density to the left of the treatment 1 histogram, indicating that the reelected type 1 candidates tend to be less reciprocal and more selfish in the signalling game than in the no information game.

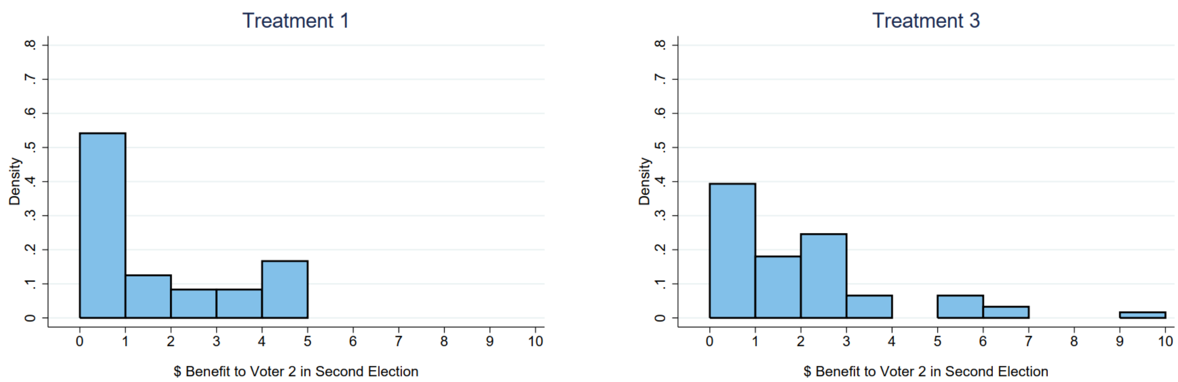


Figure 23: Type 1 Candidate Second Election Benefits with Low Cost of Voting

Indeed, as shown in Figure 20 above, the modal amount of benefits type 1 candidates give to V_2 in the first election of treatment 1 is \$7.5 (31%, or 22 out of 70 candidate observations), exactly half the pie. Of the type 1 candidates who give between \$4 and \$10 to V_2 in the first election of treatment 1 (which constitutes 84.29%, or 59 out of 70 type 1 candidate observations), 77.97% are reelected (46 out of 59 candidate observations). Of those that are reelected, 54.35% (25 out of 46 type 1 candidate observations) give \$0 to V_2 in the second election and 65.22% (30 out of 46 type 1 candidate observations) give \$1 or less. As argued above in the case of high voting costs, by not giving \$15 to V_1 after election 1, as one period optimization would imply, they get reelected and enjoy a higher overall utility.

5.4.3 V_2's Propensity to Vote

Lastly, we consider the voting behavior of V_2 in the signalling game with a low voting cost. While V_2 voted in fairly high proportions due to the low voting cost, we find – analogous to the high voting cost case, that he is substantially more likely to vote the more money he received in the first election and when C is indeed type 2 (where C's type is never directly revealed to V_2).

The scatter plot in Figure 24 shows clear evidence that V_2 uses a cut-off strategy, only considering voting when he receives at least \$5 to \$8 in the first election.

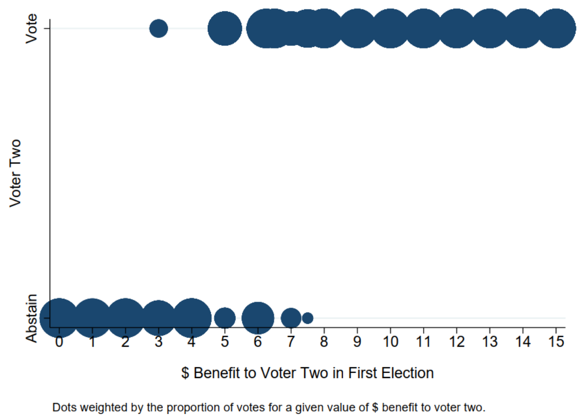


Figure 24: V_2 Decision by Benefit Received in First Election of Treatment 1

This can also be seen in the histogram in Figure 25 which shows that both the probability of V_2's voting and of a type 2 candidate declines sharply near this range.

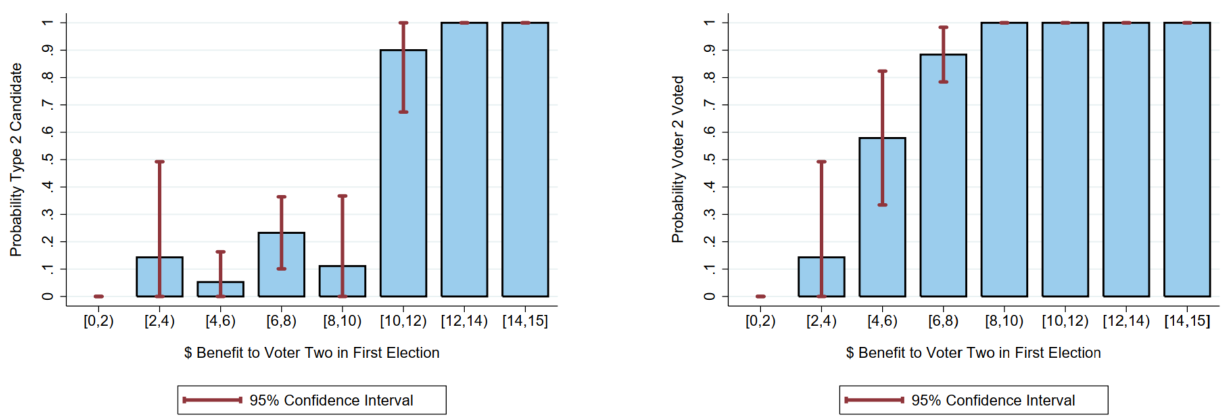


Figure 25: Probability of Candidate Type and V_2 Voting by x_2 in Treatment 1

The pie graphs in Figure 26 show V_2's abstention rate for each type of candidate. When the candidate is in fact type 2, V_2 abstains only 2.0% of the time (1 out of 49 observations), slightly lower than the 4.8% overall abstention by V_1 (in treatment 1) and the 7.5% overall abstention by V_2 in treatment 3 when there is no possibility of the candidate signalling her type with no information. In contrast, when C is in fact type 1, V_2 abstains 31.4% of the time, significantly lower than V_2's 56.0% abstention rate found when voting costs were high. Additionally, this is much higher than the 2.0% abstention rate with a type 2 candidate and the 7.5% abstention when no information about candidate type is conveyed.

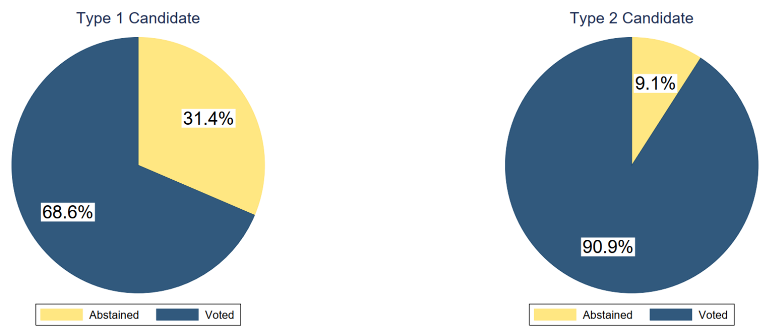


Figure 26: V_2 Decision by Candidate Type in Treatment 1

The type 2 candidate dummy in the logit regression results in Table 14 shows that V_2's voting likelihood is significantly higher when facing a type 2 candidate (when candidates' first election choices are observable to him).

Type 2	0.688**
	(3.16)
Period	0.0184
	(0.48)
Observations	119
Baseline Predicted Probability	0.655

t statistics in parentheses

Baseline predicted probability calculated

for treatment 1, period 1 and a type 1 candidate.

SE clustered at voter two level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14: Logit Results on Marginal Effect of Candidate's Type on V_2's Probability of Voting in Treatment 1

6 Conclusion

Reciprocity to kind actions characterizes human behavior. Those chosen to make decisions for others often show gratitude to those who chose them, a finding confirmed in the lab whereby elected leaders show reciprocity to voters who elected them. But, will elected leaders be similarly reciprocal to past voters when this may conflict with the desire to get reelected? We study this question in this paper by setting out a theoretical model of this conflict when reelection requires a candidate signalling to the relevant voters that she shares their policy preferences. We then test the model in a laboratory experiment and find its predictions are upheld. We think the model is interesting in itself in presenting a reelection strategy not common in the literature (and hence may provide a useful approach to modeling electoral strategies), but the more novel part of the paper is the experiment and its results.

We may divide our results into two parts. First, we find that in a setting where attracting voters means signalling unobserved candidate type, subjects in the lab act in accordance with a basic signalling model. Candidates play their first-best choices where signalling is not possible but restrict those choices when signalling of type may help their reelection chances. Voters appear to read the signals correctly.

Second, we find that in the laboratory that the desire to be reelected may limit intrinsic reciprocity of an elected leader to reciprocate to the voters who put her in office, but doesn't eliminate it entirely. In other words, reciprocity still is present in elected leaders (in the lab) even when put in a situation where "political" concerns, such as the desire to be reelected, are also present.

This would certainly seem to be descriptive of other-regarding individuals. Instrumental concerns may reduce their kindness and reciprocity to kindness, but don't generally eliminate them. We would argue the same is true for politicians and elected leaders in the real world. Elected officials are grateful to the voters who elected them. If self-interest fully (T)rumps gratitude, it is probably because those officials weren't very other-regarding to begin with.

REFERENCES

Ariely, D., A. Bracha, and S. Meier (2009), "Doing Good or Doing Well? Image Motivation and Monetary Incentives in Behaving Prosocially," *American Economic Review* 99(1), 544-555.

Barrett, G. and S. Donald (2003), "Consistent Tests for Stochastic Dominance," *Econometrica* 71(1), 71-104.

Bénabou, R. and J. Tirole (2006), "Incentives and Prosocial Behavior," *American Economic Review* 96 (5), 1652-78.

Binder, S. (1997), *Minority Rights, Majority Rule: Partisanship and the Development of Congress*, Cambridge: Cambridge University Press.

Bolton, G., E. Katok, and A. Ockenfels (2004), "How Effective Are Electronic Reputation Mechanisms? An Experimental Investigation," *Management Science* 50(11), 1587-1602.

Brandts, J. and C. Holt (1992), "An Experimental Test of Equilibrium Dominance in Signaling Games," *American Economic Review* 82(5), 1350-1365.

Brandts, J. and N. Figueras (2003), "An Exploration of Reputation Formation in Experimental Games," *Journal of Economic Behavior and Organization* 50(1), 89-115.

Cadsby, C.B., M. Frank, and V. Maksimovic (1998), "Equilibrium Dominance in Experimental Financial Markets," *The Review of Financial Studies* 11(1), pp.189-232.

Camerer C. and E. Fehr (2006), "When Does "Economic Man" Dominate Social Behavior?," *Science* 311 (5757),47-52.

Camerer, C. and K. Weigelt, (1988), "Experimental Tests of a Sequential Equilibrium Reputation Model," *Econometrica* 56(1), 1-36.

Cho, I. and D. Kreps (1987), "Signaling Games and Stable Equilibria," *The Quarterly Journal of Economics* 102(2), 179-221.

Cox, G. (2010), "Swing Voters, Core Voters, and Distributive Politics," in I. Shapiro, S. Stokes, E. Wood, and A. Kirshner (eds.), *Political Representation* pp. 342-357, Cambridge: Cambridge University Press.

Cox, J., D. Friedman and S. Gjerstad (2007), "A Tractable Model of Reciprocity and Fairness" *Games and Economic Behavior* 59, 17–45.

Drazen, A. and M. Eslava (2013), "Programmatic Targeting," working paper.

Drazen, A. and E. Ozbay (forthcoming), "Does 'Being Chosen to Lead' Induce Non-Selfish Behavior? Experimental Evidence on Reciprocity," *Journal of Public Economics*

Enemark, D., C. Gibson, M. McCubbins, and B. Seim (2016), "Effect of Holding Office on the Behavior of Politicians," Proceedings of the National Academy of Sciences 113 (48) 13690-13695.

Fehr, E., G. Kirchsteiger and A. Riedl (1993), “Does Fairness Prevent Market Clearing? An Experimental Investigation” *The Quarterly Journal of Economics* 108(2), 437-459.

Fehr, E., and K. Schmidt (1999). “A Theory of Fairness, Competition, and Cooperation.” *The Quarterly Journal of Economics*, 114(3), 817-868.

Fehr, E., and K. Schmidt (2006), “The Economics of Fairness, Reciprocity and Altruism–Experimental Evidence and New Theories,” in *Handbook of the Economics of Giving, Altruism and Reciprocity*, 1, 615-691.

Ferejohn, J. (1986), “Incumbent Performance and Electoral Control,” *Public Choice* 50, 5-26.

Finan, F. and L. A. Schechter (2012), “Vote-Buying and Reciprocity,” *Econometrica*, 80(2), 863-881.

Fischbacher, U. (2007), “z-Tree: Zurich Toolbox for Ready-made Economic Experiments,” *Experimental Economics*, 10(2), 171-178.

Frey B. S. and F. Oberholzer-Gee, (1997), “The Cost of Price Incentives: An Empirical Analysis of Motivation Crowding-Out,” *American Economic Review* 87(4), 746-755

Gneezy, U. and A. Rustichini (2000), “Pay Enough or Don’t Pay at All,” *Quarterly Journal of Economics*, 115(3), 791–810

Grosskopf, B. and R. Sarin (2010), “Is Reputation Good or Bad? An Experiment,” *American Economic Review* 100, 2187-2204.

Hahn, V. (2009), “Reciprocity and Voting,” *Games and Economic Behavior* 67 (2), 467-480.

Kirkland, J. and R. L. Williams (2014), “Partisanship and Reciprocity in Cross-Chamber Legislative Interactions,” *Journal of Politics* 76(3), 754-769.

Levine, D. (1998), “Modeling Altruism and Spitefulness in Experiments,” *Review of Economic Dynamics* 1, 593–622.

Martorano, M. (2004), “Cohesion or Reciprocity? Majority Party Strength and Minority Party Procedural Rights in the Legislative Process,” *State Politics & Policy Quarterly* 4(1), 55-73

Mellström, C. and M. Johannesson (2008), “Crowding Out in Blood Donation: Was Titmuss Right?,” *Journal of the European Economic Association* 6(4), 845–863.

Neral, J. and J. Ochs (1992), “The Sequential Equilibrium Theory of Reputation Building: A Further Test,” *Econometrica* 60(6), 1151-1169.

Niza C., B. Tung, and T.M. Marteau (2013), “Incentivizing Blood Donation: Systematic Review and Meta-Analysis to Test Titmuss’ Hypotheses,” *Health Psychology* 32(9), 941-949.

Ozbay, E. Y. and O. Tonguc (2018), “Vote Buying with and without Binding Promises,” working paper.

Philadelphia Inquirer, November 8, 2012, “Will Philly reap rewards for big Obama turnout?”

Promberger, M., and Marteau, T. M. (2013), “When Do Financial Incentives Reduce Intrinsic Motivation? Comparing Behaviors Studied in Psychological and Economic Literatures,” *Health Psychology* 32(9), 950-957.

Rabin, M. (1993), "Incorporating Fairness into Game Theory and Economics," *American Economic Review* 83, 1281-1302.

Rogoff, K. (1990), “Equilibrium Political Budget Cycles,” *American Economic Review* 80(1) 21-36.

Rogoff, K. and A. Sibert (1988), “Elections and Macroeconomic Policy Cycles,” *Review of Economic Studies* 55(1), 1-16.

Schlesinger, J. (1991), *Political Parties and the Winning of Office*, Ann Arbor: University of Michigan Press.

Sobel, J. (2005), “Interdependent Preferences and Reciprocity,” *Journal of Economic Literature* 43(2): 392-436.

Toussaert, S. (2017), “Intention-Based Reciprocity and Signaling of Intentions,” *Journal of Economic Behavior and Organization* 137, 132-144.

Weingast, B. (1979), “A Rational Choice Perspective on Congressional Norms,” *American Journal of Political Science* 23(2), 245-62.

Appendix

Theory

Let us define what we mean by an equilibrium. Candidates choose strategies contingent on their type (τ, θ) to maximize their two-period utility. Thus, a candidate of type $(1, \theta)$ and $(2, \theta)$ solves the below programs respectively:

$$\max\ {x_1}^{\theta}{x_1}^{1-\theta}\ +\ \pi(x_1)\ {y_2}^{\theta}{y_1}^{1-\theta} \tag{3a}$$

$$\max\ {x_1}^{\theta}{x_2}^{1-\theta}\ +\ \pi(x_1)\ {y_2}^{\theta}{y_2}^{1-\theta} \tag{3b}$$

such that $x_1 + x_2 = X$ and $y_1 + y_2 = Y$, where $\pi(x_1)$ denotes C's probability of reelection. $\pi()$ is a function of observed benefits x_1 in the signalling game, while $\pi()$ is necessarily independent of x_1 in the no information game. We denote V_2's posterior beliefs of a type (τ, θ) contingent on observing benefits x_1 by $p(\tau, \theta|x_1)$, where $p(\tau, \theta|x_1)$ must satisfy Bayes Rule on the equilibrium path (in the signalling game). V_2 maximizes her expected utility given her posterior beliefs.

As in many signalling games, a multiplicity of equilibria arises. From now on, we restrict attention to *pure strategy* Perfect Bayesian equilibria satisfying the following off equilibrium beliefs (henceforth, referred to simply as "equilibria"): $p(1, \theta|x_1) = 0$ for all $x_1 < X - Y$ and all θ. These off-equilibrium beliefs are reasonable since a policy preference 1 candidate always prefers $x_1 = X$ and foregoing reelection to $x_1 < X - Y$ (even if doing so implies reelection). They are implied, for example, by the intuitive criterion of Cho and Kreps (1987).

V_1's behavior is trivial. V_1 votes if and only if the expected benefits of voting are weakly higher than the cost of voting. Since V_1's behavior is the same in any equilibrium for which this holds, we do not mention V_1 in our characterization of equilibria, focusing instead on behavior after the first election. All proofs are in the next section.

As background, suppose all candidates are selfish, that is, there are only $(1, 0)$ and $(2, 0)$ type candidates.

Proposition 1. In the signalling game with only selfish candidates (i.e. $\theta = 0$) there exists a unique equilibrium where:
$(1, 0)$: $x_1 = X$ and $y_2 = 0$ if reelected.
$(2, 0)$: $x_1 = 0$ and $y_2 = Y$ if reelected.
V_2: Vote if $x_1 < X - Y$. Otherwise, abstain.

Next, let's turn to the main motivation of the paper, the case where candidates may be reciprocal and are motivated to signal type. We show that under reasonable conditions we get an equilibrium where the more selfish (low θ) $\tau = 1$ candidates mimic the highly reciprocal (high θ) $\tau = 2$ candidates, and the latter constrain their reciprocity to ensure their reelection.

If reciprocity motives are too low, $\overline{\theta} < \frac{X-Y}{X}$, then $\tau = 1$ candidates have no incentive to mimic a $\tau = 2$ candidate since the latter's first-best $x_1 = \theta X$ is always less than $X - Y$.[18]

[18] In other words, like in the selfish case, there is a unique equilibrium in which all candidate-types play their first-best.

To allow for mimicking motives, let's assume $\overline{\theta} > \frac{X-Y}{X}$ so that some are willing to mimic highly reciprocal $\tau = 2$ candidates for reelection at the latter's first-best.

Let's call x_1^* ($\geq X - Y$) the value at which some $\tau = 1$ candidates possibly mimic $\tau = 2$ candidates for reelection. Notice that any $\tau = 1$ candidates who do not pool (who separate) with $\tau = 2$ candidates will choose their first-best $x_1 = X$ and cannot be reelected. Given this, let's define more precisely what we mean by an equilibrium characterized by "constrained reciprocity."

Definition 1. An equilibrium is characterized by *constrained reciprocity at* $x_1^* \in [0, X]$ if players' strategies satisfy the following conditions:

$(1, \theta)$: $x_1 = x_1^*$ if $\theta < \theta_1$ for some $\theta_1 \in [0, \overline{\theta}]$ and $x_1 = X$ otherwise. $y_2 = \theta Y$ if reelected.

$(2, \theta)$: $x_1 = x_1^*$ if $\theta \geq \frac{x_1^*}{X}$ and $x_1 = \theta X$ otherwise. $y_2 = Y$ if reelected.

V_2: Vote if $x_1 \leq x_1^*$. Otherwise, abstain.

Thus far, we have made few assumptions about the distribution $F()$, besides continuity in its support $[0, \overline{\theta}]$ and the existence of selfish candidates $F(0) > 0$. Before proceeding, we make one additional assumption to allow for well-behaved equilibria. We assume that even if mimicking occurs by all $\tau = 1$ candidates who are willing to mimic *some* $\tau = 2$ candidate for reelection, those leftover at $x_1 = X$ are not reelected. Mathematically, we assume $\frac{Y \int_{\overline{\theta}_1}^{\overline{\theta}} \theta dF(\theta)}{1 - F(\overline{\theta}_1)} \leq k$ where $\overline{\theta}_1$ is implicitly defined by $u^2_{(1, \overline{\theta}_1)}(Y - \overline{\theta}_1 Y, \overline{\theta}_1 Y) = \frac{X}{2}$.[19]

As typical in signalling games, there exists a multiplicity of equilibria. We focus on equilibria satisfying the following intuitive off-equilibrium beliefs: $p(1, \theta | x_1) = 0$ if $x_1 < x_1^*$ for all θ. Since no $\tau = 1$ candidates choose $x_1 < x_1^*$ in a given equilibrium, this is a modest level of sophistication of V_2's off-equilibrium beliefs and is implied by the intuitive criterion of Cho and Kreps (1987). Still, there is a continuum of semi-separating equilibria since there is a continuum of types. Nevertheless, all equilibria are characterized by constrained reciprocity.

Proposition 2. For any k, there exists a $\theta_2(k) \in [\frac{X-Y}{X}, \overline{\theta}]$ such that the set of equilibria satisfying the intuitive off-equilibrium beliefs is non-empty and characterized by constrained reciprocity at $x_1^* \in [X - Y, \theta_2(k) X]$.

In Proposition 2, for a given k, we get a continuum of semi-separating equilibria with $\tau = 2$ candidates facing a reciprocity cut-off at any $x_1^* \in [X - Y, \theta_2(k) X]$. Such a multiplicity of equilibria also arises in Rogoff (1990), and a unique equilibrium is achieved by further requiring dominance by the candidate sending the signal. Similarly, we find the range of equilibria can be drastically reduced (to a unique equilibrium) by focusing on candidate dominant equilibria. We say an equilibrium candidate dominates another equilibrium if it

[19] If this condition is not met, but $Y \int_0^{\overline{\theta}} \theta dF(\theta) < k$ so that *all* type 1 candidates are not reelected at their first-best, then Propositions 2 and 3 still hold. However, Corollary 1 may not hold in this case. If instead $Y \int_0^{\overline{\theta}} \theta dF(\theta) > k$, then there is a unique equilibrium satisfying the intuitive criterion in which all candidate-types play their first-best.

supplies a weakly higher two-period utility to all candidate-types, and a strictly higher two-period utility to some candidate-types.[20] In the candidate dominant equilibrium, the cut-off occurs at its upper bound $x_1^* = \theta_2(k)X$, as described in the proposition below.

Proposition 3. For any k, there exists a *unique* candidate dominant equilibrium satisfying the intuitive off-equilibrium beliefs characterized by constrained reciprocity at $x_1^* = \theta_2(k)X$.

Furthermore, since V_2 is less willing to vote as the cost of voting rises, $\tau = 2$ candidates further constrain themselves at a higher cost of voting to ensure their reelection.

Corollary 1. The amount highly reciprocal policy preference 2 candidates constrain themselves in the equilibrium described in Proposition 3 is weakly increasing in the cost of voting.

Proofs

Proof of Proposition 1. Suppose $(2,0)$ chooses $x_1 > 0$. Since $p\,(2,0|x_1 = 0) = 1$, $(2,0)$ could profitably deviate to $x_1 = 0$. Thus, $(2,0)$ must choose $x_1 = 0$. Suppose $(1,0)$ is reelected by pooling with $(2,0)$ at $x_1 = 0$. This cannot be an optimal strategy since $(1,0)$ could deviate to $x_1 = X$ and forego reelection, while improving her two-period utility. Since $(1,0)$ is not reelected in any equilibrium, she must choose her first-best $x_1 = X$. $\square$

Proof of Proposition 2. In order to characterize the set of equilibria, we need to make a couple definitions.

First, for a given $x_1 < X$, we define the set of $\tau = 1$ candidates who gain from deviating to x_1 to be reelected over playing their first-best (and foregoing reelection). For any $x_1 \in [X - Y, X - \frac{Y}{2}]$, let $\widetilde{\theta}(x_1)$ be implicitly defined by: $x_1 + Y(\widetilde{\theta})^{\widetilde{\theta}}(1-\widetilde{\theta})^{1-\widetilde{\theta}} = X$. It can be shown that $\Psi(x_1) = \{(1,\theta)|\ \theta < \widetilde{\theta}(x_1)\}$ is the set of $\tau = 1$ candidates who gain from choosing x_1 and being reelected over their first-best without reelection. Furthermore, $\Psi(x_1)$ is monotonically increasing in x_1 ($\Psi(x_1') \subseteq \Psi(x_1'')$ iff $x_1' \leq x_1''$), with bounds $\Psi(X - Y) = \{(1,0)\}$ and $\Psi(X - \frac{Y}{2}) = \{(1,\theta)|\theta \leq \overline{\theta}\}$.

We do not construct a similar deviation set for $\tau = 2$ candidates, because any given $(2,\theta)$ is willing to choose $x_1 < \theta X$ over her first-best ($x_1 = \theta X$) to be reelected (this follows from the assumptions $Y > \frac{X}{2}$ and $\overline{\theta} \leq 0.5$).

Next, note that a $\tau = 1$ candidate would not deviate from her first-best unless it implied her reelection. Thus, we consider V_2 and define the set of x_1 over which type 1 candidates in $\Psi()$ pool with highly reciprocal $\tau = 2$ candidates and are reelected. We define $\theta_2(k)$ as the highest θ such that if type 2 candidates with $\theta \geq \theta_2(k)$ pool with all $\tau = 1$ candidates who gain from mimicking ($\Psi(\theta_2(k)X)$), then V_2 still votes.

Define $\theta_2(k)$ implicitly by $\frac{1-F(\theta_2(k)) + \int_0^{\widetilde{\theta}(\theta_2(k)X)} \theta F(\theta)}{1-F(\theta_2(k)) + F(\widetilde{\theta}(\theta_2(k)X))} = \frac{k}{Y}$ if it exists, and $\theta_2(k) = \frac{X-Y}{X}$ otherwise.

[20] This is a more conservative version of the dominance criterion in Rogoff (1990), given that it requires the dominance of all candidate-types and not just some.

Note that $\overline{\theta} > \theta_2(k) \geq \frac{X-Y}{X}$ (the first inequality follows from $F(0) > 0$ and the continuity of $F()$, while the second inequality follows from the assumption $k < Y$). With definitions 1 and 2 we can characterize the set of equilibria.

Claim 1. For a given k, the set of equilibria satisfying the intuitive off-equilibrium beliefs $\Gamma(k)$ is non-empty and strictly includes equilibria where:

$(1, \theta)$: $x_1 = \widehat{\theta}X$ if $\theta < \widetilde{\theta}(\widehat{\theta}X)$ and $x_1 = X$ otherwise. $y_2 = \theta Y$ if re-elected.

$(2, \theta)$: $x_1 = \widehat{\theta}X$ if $\theta \geq \widehat{\theta}$ and $x_1 = \theta X$ otherwise. $y_2 = Y$ if re-elected.

V_2 strategy: Vote if $x_1 \leq \widehat{\theta}X$. Otherwise, abstain.

for any arbitrary $\widehat{\theta} \in [\frac{X-Y}{X}, \theta_2(k)]$.

First, we check that the elements of $\Gamma(k)$ constitute equilibria. Each type of C's strategy is optimal by construction. V_2's beliefs satisfy the equilibria conditions and could be supported by letting $p\,(1, 0) = 1$ off the equilibrium path.

While V_2's strategy is clearly optimal for $x_1 < X$, it remains to be seen that it is optimal at $x_1 = X$. V_2's strategy must be optimal at $x_1 = X$ for all equilibria given that $\frac{Y \int_{\overline{\theta_1}}^{\overline{\theta}} \theta F(\theta)}{1-F(\overline{\theta_1})} < k$, and $\widetilde{\theta}(\widehat{\theta}X) < \overline{\theta_1}$ for all $\widehat{\theta}$ in $\Gamma(k)$.

Next, we show that $\Gamma(k)$ constitutes the entire set of equilibria. One can show that any pooling between $\tau = 1$ and $\tau = 2$ candidates must occur at a single x_1. Furthermore, it cannot be an equilibrium for $\tau = 1$ and $\tau = 2$ candidates to pool at $x_1 > \theta_2(k)$ because they would not be reelected and some could profitably deviate to their first-bests. It also cannot be an equilibrium for $\tau = 1$ and $\tau = 2$ candidates to pool at $x_1 < \frac{X-Y}{X}$, as $\tau = 1$ candidates could profitably deviate to $x_1 = X$.

Moreover, given that pooling between $\tau = 1$ and $\tau = 2$ must occur at some $\widehat{\theta} \in [\frac{X-Y}{X}, \theta_2(k)]$, it cannot be an equilibrium for players to assort themselves in any other way: $\tau = 2$ candidates with $\theta < \widehat{\theta}$ must play their first-bests as the intuitive off-equilibrium beliefs imply it gives them reelection. $\tau = 2$ candidates with $\theta > \widehat{\theta}$ must play $x_1 = \widehat{\theta}X$ as anything greater implies foregoing reelection, while anything less is suboptimal. Lastly, $\tau = 1$ candidates cannot arrange in any other way by construction.

Finally, note that $\Gamma(k)$ also includes an equilibrium where no $\tau = 1$ candidates pool with $\tau = 2$ candidates in the case of $\widehat{\theta} = \frac{X-Y}{X}$. It turns out this is the unique such equilibrium with strict separation between $\tau = 1$ and $\tau = 2$ candidates. $\tau = 2$ candidates cannot separate from $\tau = 1$ candidates and play $x_1 > X - Y$ as some $\tau = 1$ candidates would mimic. Also, $\tau = 2$ candidates cannot constrain to some $x_1 < X - Y$, as intuitive off-equilibrium beliefs imply V_2 reelects at any $x_1 < X - Y$ and $(2, \overline{\theta})$ could profitably deviate. Finally, conditional on $\tau = 2$ candidates choosing $x_1 = X - Y$ and separating from $\tau = 1$ candidates, $\tau = 1$ candidates must choose their first-best $x_1 = X$. Thus, $\Gamma(k)$ constitutes the entire set of equilibria.□

Proof of Proposition 3. The proof of Proposition 2 shows that $\Gamma(k)$ constitutes the entire set of equilibria. Here, we show there is a unique equilibrium with $\widehat{\theta} = \theta_2(k)$ and $\theta_1(k) = \widetilde{\theta}(\theta_2(k)X)$ that candidate dominates all others in $\Gamma(k)$: each $\tau = 2$ candidate receives a weakly higher two period utility; each $\tau = 1$ candidate receives a weakly higher two period utility; some $\tau = 2$ who deviate from their first-best at other equilibria in $\Gamma(k)$

but not at $\widehat{\theta} = \theta_2(k)$ receive a strictly higher two period utility; and some $\tau = 1$ candidates who mimic at $\widehat{\theta} = \theta_2(k)$ but not at other other equilibria in $\Gamma(k)$ also receive a strictly higher two period utility. $\square$

Proof of Corollary 1. We want to show that $\frac{d\theta_2(k)}{dk} \leq 0$. Suppose $\theta_2(k) \neq \frac{X-Y}{X}$ (if $\theta_2(k) = \frac{X-Y}{X}$, then $\frac{d\theta_2(k)}{dk} = 0$ and the statement holds arbitrarily). If k increases, then the right hand side of the equation defining $\theta_2(k)$ (see proof of Proposition 2) increases. Thus, the left hand side must increase too. For the left hand side to increase, the ratio of $\tau = 2$ to $\tau = 1$ candidates $(\frac{1-F(\theta_2(k))}{F(\theta_1(k)))})$ must increase since the former give more second election benefits to V_2. It can be seen that $1 - F(\theta_2(k))$ increases and $F(\theta_1(k))$ decreases when $\theta_2(k)$ decreases. Thus, $\theta_2(k)$ must decrease for the equation to hold. $\square$