Reciprocity versus Reelection*

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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 the voters who put her in office, but does not eliminate it entirely.

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I INTRODUCTION

Incumbent politicians care strongly about being reelected and hence about strategies to help their reelection chances. One such tool that incumbency allows them is the allocation of resources to potential voters. This may be especially important when commitment to post-election policies is seen as not fully credible, so that the distribution of resources before an election may be used to indicate post-election intentions. Allocating resources to show congruence with the policy preferences of key voting groups may therefore be an important reelection strategy. Voters would use spending choices observed before an election to try to infer an incumbent's policy priorities and hence her likely policy choices if reelected.[1]

Such a strategy of course implies trade-offs when voting groups have different policy preferences. By giving benefits to one group of voters to indicate that she shares their preferences, a candidate signals to a group with different preferences that the does not share theirs. Hence, a candidate who uses distribution of benefits instrumentally to improve her reelection prospects must weigh the net benefits of a distributional choice in gaining votes from one group of potential voters while losing them from another.

Groups whose turnout is expected to be low will have little weight in this instrumental electoral calculus from a candidate whose goal is reelection, unless of course distribution of benefits can induce higher turnout. This is a key argument in the debate of "who should be targeted?" — swing voters who might change the candidate for whom they vote versus a candidate's "core" constituency, where a candidate's goal is to induce them to turn out to vote.[2]

Ideological considerations of course could also affect an incumbent's choice of policies or distribution of benefits in the run-up to an election. A candidate who is motivated by both reelection concerns and ideology may temper her purely instrumental choice of the distribution of benefits if it conflicts too strongly with her underlying policy preferences. (As we shall argue, "ideological limitations" on the distribution of benefits a candidate is willing to choose is what may give them their signaling value about post-electoral policy.)

[1] The view that commitment to policy platforms is not credible has led to the "citizen-candidate" approach (e.g., Besley and Coate (1997) or Osborne and Slivinski (1996)) where candidates follow their policy preferences once elected, so that platform commitments in themselves carry no information. Key to his approach is that these preferences are known to voters. The argument here is a variant of the citizen-candidate where candidate preferences are not known ex-ante, and pre-electoral choices are use to signal these choices, as in Drazen and Eslava (2013)).

[2] For example, see Cox (2010).

Absent from the literature on instrumental or ideological motivations for choices made by an incumbent facing reelection is another type of motivation entirely. Might a candidate's choices be such as to show gratitude to those who put her in office, independent of any instrumental benefits such a display might have? That is, will incumbent's display non-instrumental reciprocity to the voters who elected her (for example, as in Sobel (2005))?[3] To the extent that resources are then distributed to individuals who are not central to reelection, or to those whose turnout is expected to be exogenously low in the upcoming election, such reciprocity (or even basic altruism) is potentially costly to reelection efforts. How might reciprocity alter reelection-oriented behavior? This is the issue we explore in this paper, both theoretically and experimentally.

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.

A laboratory experiment allows us to isolate reciprocity to past voters from benefits to prospective voters in a way that is difficult, if not impossible, in naturally occurring election data. For example, one identification issue that may arise is that when the set of voters in past and future elections significantly overlap, an incumbent giving benefits to past voters who strongly supported her (or punishing voters who did not) may both reflect her attempting to

[3] "Intrinsic reciprocity is a property of preferences... It is more traditional to view reciprocity as the result of optimizing actions of selfish agents. Responding to kindness with kindness in order to sustain a profitable long-term relationship or to obtain a (profitable) reputation for being a reliable associate are examples of instrumental reciprocity. Economics typically describes instrumental reciprocity using models of reputation and repeated interaction" (Sobel, 2005, pp. 392-392).

influence their votes in the next election, and her reciprocity motives. By having a different set of voters in sequential elections, our experimental design allows us to disentangle reciprocal and reelection motives.

The plan of the paper is as follows. In the next section, a brief review of the literature is presented, and in section III 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 IV sets out the experimental design and section V presents our experimental results and interprets them. The final section presents conclusions. Appendix A presents a more formal treatment of the theory and the equilibria described in the text.

II 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 ofLevine (1998), Bénabou and Tirole (2006), Camerer and Fehr (2006), and Malmendier et al. (2014) 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 (Frey and Oberholzer-Gee, 1997; Gneezy and Rustichini, 2000; Bénabou and Tirole, 2006; Ariely et al., 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 et al., 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 focuses 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 (2019) 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 (1994, chapter 6), Inquirer (November 8, 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 (1988) 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 models 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.[4] 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 Grosskopf and Sarin (2010) and Bolton et al. (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.

III A MODEL OF CANDIDATE BEHAVIOR

III.I 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. Inter-

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

ested readers can find a more formal treatment of the theory in Appendix A, 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 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. 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 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.

III.II Model Set-up

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 voter's 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 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.

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 $\theta \geq 0$. 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 to use a Cobb-Douglas utility function, $u = r^{\theta} s^{1-\theta}$, where the terms r and s depend on the election and τ of the candidate. This utility function is broadly consistent with the reciprocity model of Cox et al. (2007).[5] 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 $\theta \leq 0.5$ 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.[6]

For example, we represent first-period candidate utility as

$$u^1_{(1,\theta)}(x_1, x_2) = x_1^{\theta} x_1^{1-\theta} \tag{1}$$

$$u^1_{(2,\theta)}(x_1, x_2) = x_1^{\theta} x_2^{1-\theta} \tag{2}$$

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

$$u^2_{(1,\theta)}(y_1, y_2) = y_2^{\theta} y_1^{1-\theta} \tag{3}$$

$$u^2_{(2,\theta)}(y_1, y_2) = y_2^{\theta} y_2^{1-\theta} \tag{4}$$

where a type $(1, \theta)$ candidate's first-best is $y_2 = \theta Y < Y$, and a $\tau = 2$ candidate's first-best is $y_2 = Y$.

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.[7] At the end of the section, we explore the implications of incorporating candidate altruism into the model, allowing

[5] Cox et al. (2007) also include an altruism parameter in their preferred parameterization. We show that the model can be extended to include altruism at the end of the section.

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

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

candidates to also care about giving to a policy incongruent and non-voting voter in an election.

Voters' 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 $[0, \theta]$, 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 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 affects 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.

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.

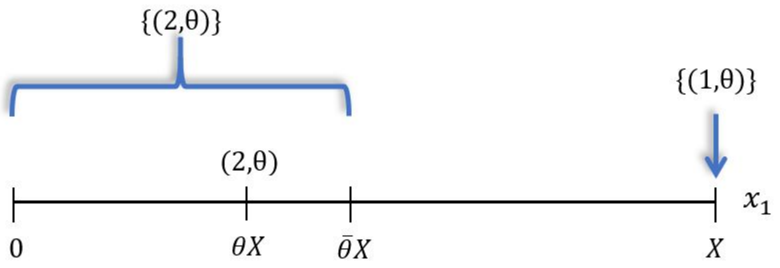
To give more detail on the role of constrained reciprocity when benefits may signal a candidate's policy preferences, we consider the cases where benefits are not observed — the "no-information" case where signalling is not possible — and where they are, the "signalling case." Under the latter, a $\tau = 2$ 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.

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 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.[8]

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

Figure 1: No Information Game Equilibrium

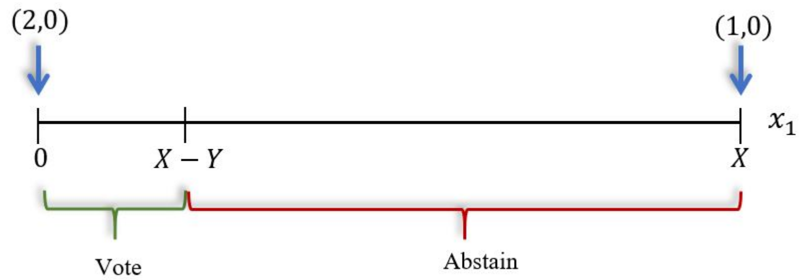


Equilibria When V_2 Observes x_1 and x_2

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 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 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),[9] so that this would include $\tau = 1$ with sufficiently low θ. With a positive mass of such $\tau = 1$ candidates relative to the mass of $(2, \overline{\theta})$, V_2 would abstain if the voting cost is too high.[10] Hence, $x_1 = \overline{\theta}X$ would not be an equilibrium choice for $(2, \overline{\theta})$ as she would not be reelected.

However, suppose $(2, \overline{\theta})$ constrains her reciprocity, that is choosing a lower value of x_1. As $(2, \overline{\theta})$ 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 $(2, \overline{\theta})$ chooses. For a low enough value of x_1, the mass of reciprocal $\tau = 2$ candidates who choose to constrain themselves will imply just 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 date 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 $x_1 = X$.

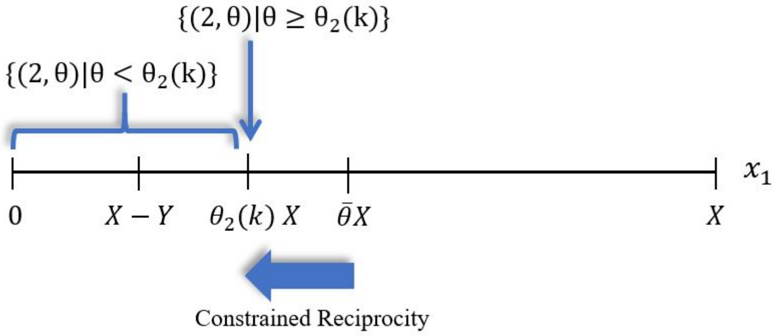
Figure 3a depicts this semi-separating equilibrium with constrained reciprocity by the highly reciprocal $\tau = 2$ candidates and Figure 3b mimicking by the more selfish $\tau = 1$ candidates.

[9]Since $0 \leq \theta \leq \frac{1}{2}$, second period utility of a $(1, \theta)$ candidate is monotonically decreasing in θ from equation (3).

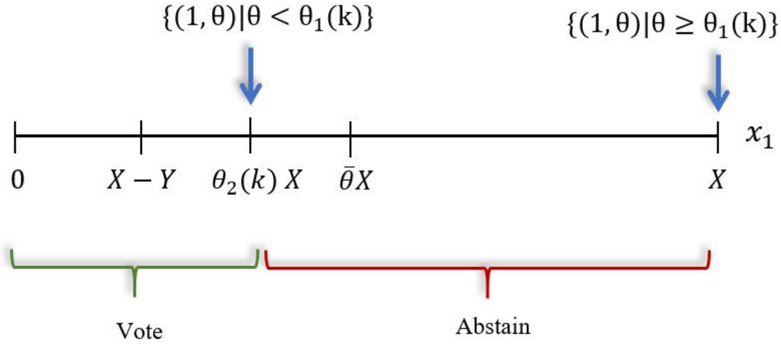
[10]We assume $F(0) > 0$ following the observation of positive mass of selfish players in gift exchange games (Fehr et al., 1993). This assumption is not necessary for this result, but simplifies the proofs in Appendix A.

Figure 3: No Information Game Equilibrium

(a) Constrained Reciprocity by Highly Reciprocal $\tau = 2$ Candidates



(b) 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 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 to vote. 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. However, at the same time, the degree to which $\tau = 2$ candidates constrain their reciprocity may be less because there is a higher ratio of reciprocal $\tau = 2$ candidates to selfish $\tau = 1$ candidates. Which effect dominates depends strongly on the distributional assumptions imposed, and how that distribution is affected by k. We leave a formal analysis out as this significantly increases the complexity of the model. In this light, our model should be taken as a rule of thumb for the underlying strategic issues at play.

Additionally, 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.

Lastly, we focused on a candidate's reciprocal and policy preferences. Out of a desire to be altruistic, candidates may also care about giving benefits to the non-voting citizen in an election, even if this citizen's preferences are not those of the candidate. We summarize the results below and present a more formal treatment in the Appendix A. The main intuition driving constrained reciprocity, type 2 candidates' need to prevent type 1 mimicking to be reelected, still holds when we incorporate altruism.

Constrained Reciprocity Equilibria with Altruism

In addition to a reciprocity parameter θ and a policy preference τ, here we assume that each candidate is endowed with an altruism parameter α. The altruism parameter represents the weight a candidate places on giving to the non-voting voter in an election. We assume α is distributed according to some continuous distribution function $G()$ with support $[0, \overline{\alpha}]$. We assume there is a positive mass of selfish candidates $G(0) > 0$, and candidates self-interest is at least as large as their altruism $\overline{\alpha} < 0.5$. Furthermore, we assume $G()$ and $F()$ are independently distributed, as candidates may have different definitions of what constitutes kindness. Some candidates might believe kindness comes from reciprocating to kind actions, others might believe it comes from distributing benefits to everyone, and others might believe it comes from a combination of both. The utility function of each candidate in the first election is as follows:

$$u^1_{(1,\theta,\alpha)}(x_1, x_2) = x_1^{1-\theta-\alpha} x_1^{\theta} x_2^{\alpha} = x_1^{1-\alpha} x_2^{\alpha} \tag{5}$$

$$u^1_{(2,\theta,\alpha)}(x_1, x_2) = x_2^{1-\theta-\alpha} x_1^{\theta} x_2^{\alpha} = x_1^{\theta} x_2^{1-\theta} \tag{6}$$

A $(1, \theta, \alpha)$ candidate would choose $x_1 = (1-\alpha)X$ if she were simply maximizing first-period utility, while a type $(2, \theta, \alpha)$ candidate would choose $x_1 = \theta X$.

Similarly, second-period candidate utility is represented as

$$u^2_{(1,\theta,\alpha)}(y_1, y_2) = y_1^{1-\theta-\alpha} y_2^{\theta} y_1^{\alpha} = y_1^{1-\theta} y_2^{\theta} \tag{7}$$

$$u^2_{(2,\theta,\alpha)}(y_1, y_2) = y_2^{1-\theta-\alpha} y_2^{\theta} y_1^{\alpha} = y_1^{\alpha} y_2^{1-\alpha} \tag{8}$$

where a type $(1, \theta, \alpha)$ candidate's first-best is $y_2 = \theta Y$, and a $(2, \theta, \alpha)$ candidate's first-best is $y_2 = (1-\alpha)Y$.

Consider the first election of the signaling game. As can be seen in equation (6), type 2 candidate first election motives are unchanged by the incorporation of altruism. Besides their self-interest, the only other relevant first election motive of type 2 candidates is reciprocity. However, as seen in equation (5), altruistic type 1 candidates may also care about giving to V_2 in the first election.

Suppose all candidates played their first-bests in the first election. Type 1 candidates' benefits to V_1 would then be continuously distributed along the continuum $[(1-\overline{\alpha})X, X]$ with a positive mass at $x_1 = X$. As before, type 2 candidates' benefits to V_1 would be continuously distributed along the continuum $[0, \overline{\theta}X]$ where $\overline{\theta}X < (1-\overline{\alpha})X$. If the expected θ of type 1 candidates is not too high, then V_2 would not reelect them (see equation (7)). Thus, type 1 candidates would have an incentive to mimic the most reciprocal type 2 candidate at $x_1 = \overline{\theta}X$ to be reelected. Furthermore, altruistic type 1 candidates would have to deviate less to mimic, giving them greater incentive to mimic. Additionally, type 1 candidates with low reciprocity would have greater incentive to mimic because they would have more utility to gain from reelection. There would then be a positive mass of mimicking type 1 candidates according to their reciprocity and altruism parameters. The remaining non-mimicking type 1 candidates would play their first-bests.

However, V_2 would not reelect where there is low mass of type 2 candidates and high mass of mimicking and low reciprocity type 1 candidates. Type 2 candidates would then have to constrain their x_1 until they accrue just enough mass relative to the mimicking type 1 candidates that V_2 still reelects. Incorporating altruism implies that type 2 candidates may have to constrain their reciprocity below $x_1 = \frac{X-Y}{X}$ because altruistic type 1 candidates are even more willing to mimic. In this light, incorporating altruism strengthens the robustness of the theoretical results. Furthermore, the amount type 2 candidates have to constrain their reciprocity is increasing in the cost of voting.

The only differences between the equilibrium with altruism and without are that i) some non-mimicking and altruistic type 1 candidates select $x_2 > 0$ and ii) altruistic type 2 candidates choose $y_1 > 0$. Informed by these theoretical predictions, we turn to the experimental results.

IV EXPERIMENTAL DESIGN

The aim of our experiment is to investigate the interactive effect of 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 the "low cost of voting games" and \$6 in 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 the signalling games or did not observe the distribution of first election benefits in the no information games before deciding whether to vote. We label treatments as "SLC" (signalling low cost), "SHC" (signalling high cost), "NILC" (no information low cost) or "NIHC" (no information high cost).

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. In each session, subjects were asked to sign a consent form first and given written experimental instructions (provided in the Online Appendix), read to them by the experimenter. 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" ($\tau = 2$) 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. A \$6 cost of voting was chosen because it implies that constrained reciprocity should hold for a very general set of distributions of reciprocity, as V_2 would not even want to reelect the most reciprocal type 1 candidate if $\theta < 0.6$ (given the \$10 second election pie).[11] The treatments may be summarized as follows:

Table 1: Treatments

Treatment	**Signalling Game?**	**Voting Cost**	**Election 1 Distribution (X)**	**Election 2 Distribution (Y)**
SLC	Yes	\$1	\$15	\$10
SHC	Yes	\$6	\$15	\$10
NILC	No	\$1	\$15	\$10
NIHC	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.

V RESULTS AND INTERPRETATION

[11] Also, note that these parameter choices imply $\theta_1 = 0.084$.

V.I Existence of Intrinsic Reciprocity

We begin by investigating whether candidates exhibit intrinsic reciprocity to the voters who elected them when free from reelection motives? We focus on the no information games 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 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 (and perhaps some altruism).[12]

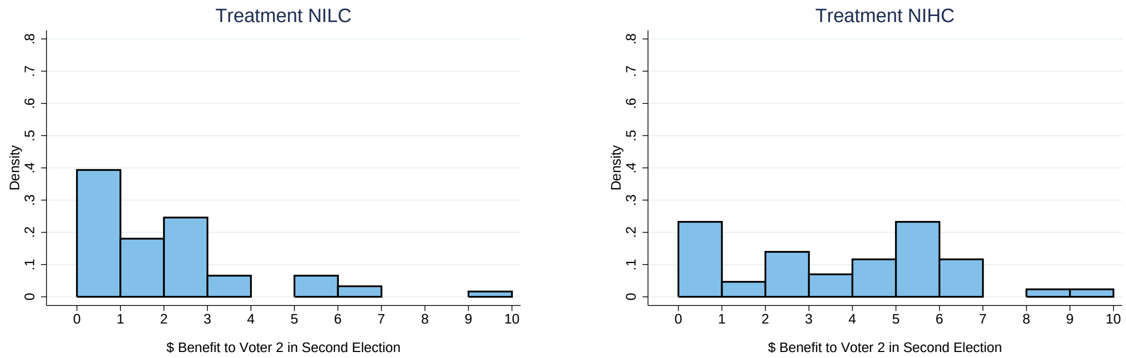
As seen in the histograms in Figure 4, while some candidates are selfish, many give a substantial reward to the voter who elected her. Indeed, on average candidates give a positive amount of money to the voter who elected them: type 1 candidates (type 2 candidates) give \$1.61 and \$3.31 to V_2 in the second election (\$2.59 and \$4.93 to V_1 in the first election) of treatments NILC and NIHC respectively.[13]

[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 semi-separating equilibrium as discussed in the formal model.

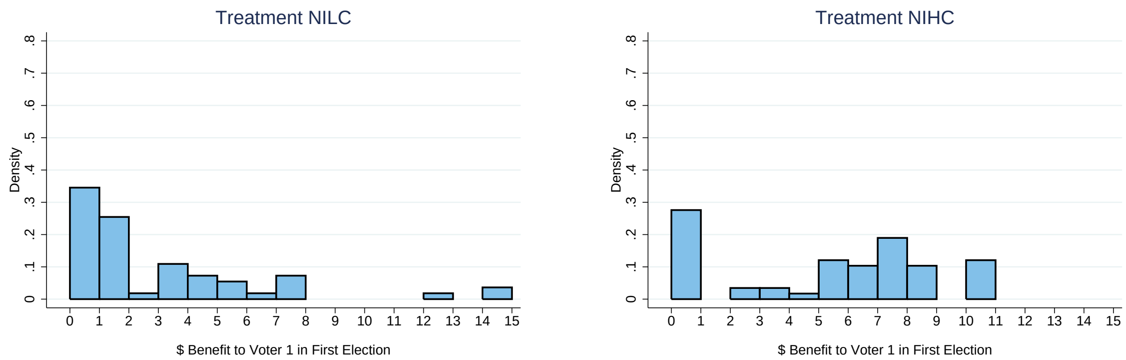
[13]Furthermore, since there exists positive mass above x_2=\$3.33 in Figure 4a and x_1=\$5 in Figure 4b, it is clear that $\theta > \frac{1}{3} = \frac{X-Y}{X}$, an important condition for constrained reciprocity in the signalling games without altruism.

Figure 4: Intrinsic Reciprocity

(a) Type 1 Candidate Reciprocity



(b) Type 2 Candidate Reciprocity



We use a regression to estimate the average value of θ and test whether it is statistically different from zero. Table 2 shows 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, dummies for each period (to account for possible learning effects) 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 the expected value of θ. We find that the constant term is significant and positive in both treatments (NILC and NIHC), indicating that θ is statistically different from zero, and ranges from 12.3% to 31.8%. It is interesting to note that the amount of intrinsic reciprocity is greater in the high voting cost game (NIHC) than the low voting cost game (NILC). This might reflect candidates showing higher reciprocity when voting costs are higher.

Table 2: OLS of Intrinsic Reciprocity

	Type 1 Candidate % Benefit to V_2 in Election 2		Type 2 Candidate % Benefit to V_1 in Election 1	
	(1)	(2)	(3)	(4)
	Treat NILC	Treat NIHC	Treat NILC	Treat NIHC
Constant	0.293***	0.341***	0.121***	0.388***
	(0.0818)	(0.0967)	(0.0350)	(0.0733)
Period Dummies	Yes	Yes	Yes	Yes
Observations	61	43	55	58
R-squared	0.068	0.027	0.000	0.015

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

Robust standard errors in parentheses. Clustered at candidate level.

Additionally, we observe evidence of altruism. Note that type 1 candidates give on average \$1.39 and \$3.12 to V_2 in the first election of treatments NILC and NIHC respectively. Similarly, type 2 candidates give a positive amount to V_1 in the second election, averaging \$1.28 and \$1.98 in treatments NILC and NIHC respectively. This is consistent with the model incorporating altruism and a positive α for some candidates.

V.II Type 2 Candidate (Un)Constrained Reciprocity

We turn to the main question of the experiment, how signaling motives influence candidate reciprocity? We begin with type 2 candidates, as they face the main conflict between intrinsic and instrumental motives.

Let us first briefly restate the theoretical predictions borne out by the equilibria of the signaling games. We expect type 2 candidates to constrain their reciprocity to V_1 when the cost of voting is high, but we do not necessarily expect to empirically detect constrained reciprocity when it is low. Given either cost of voting, selfish type 1 candidates may mimic type 2 candidates to be reelected, and V_2 should use a cut-off rule — voting when they receive a sufficient quantity in the first election and abstaining otherwise.

While some type 2 candidates are selfish, the majority display reciprocity towards V_1 in the first election, even with reelection motives.[14] We focus on the motives of the reciprocal type 2 candidates. Our primary experimental finding is that type 2 candidates who display reciprocity limit the amount they give to V_1 in the first election with a high cost of voting,

[14] In treatment SHC (treatment SLC), 31.88% (24.00%) of candidates give $x_1 = \$0$ to V_1 in the first election, and the remaining 68.12% (76.00%) select interior values of x_1.

deviating from their first-best in order to help their reelection chances. However, with a low cost of voting, their behavior is unchanged by the presences of signaling motives. We regard this as a key result, as it indicates that reelection concerns may limit reciprocity when voting costs are sufficiently high.

As shown in Table 3, when the cost of voting is high, type 2 candidates give on average \$2.11 more to V_1 in the first election of the no information game than the signalling game (\$4.93 in treatment NIHC and \$2.82 in treatment SHC).[15] However, when the cost of voting is low, type 2 candidates give similar amounts to V_1 with and without signaling motives. If anything, they give a little more (\$0.91) to V_1 when distribution of benefits may signal type. 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.

Table 3: Type 2 Candidate \$ Benefit to V_1

	High Cost of Voting		Low Cost of Voting	
	First Election	Second Election	First Election	Second Election
Signaling Game	2.82	0.82	3.50	1.62
	(2.97)	(1.39)	(3.29)	(2.06)
No Information	4.93	1.98	2.59	1.28
Game	(3.60)	(1.82)	(3.53)	(1.77)
Observations	117	86	104	98
P-values	0.001	0.001	0.180	0.381

Mean, standard deviation in parentheses. P-values based on two-tailed t-test.

This pattern can also be seen visually in the CDFs in Figure 5. When the cost of voting is high (Figure 5a), the CDF of type 2 candidate giving to V_1 in the first election of treatment NIHC first-order stochastically dominates that in treatment SHC. We find the difference to be statistically significant using the first order stochastic dominance test in Barrett and Donald (2003).[16] At the same time, there is no obvious difference between the CDFs in the low cost of voting games (Figure 5b). Indeed, we find the CDFs to be equal in a first order stochastic

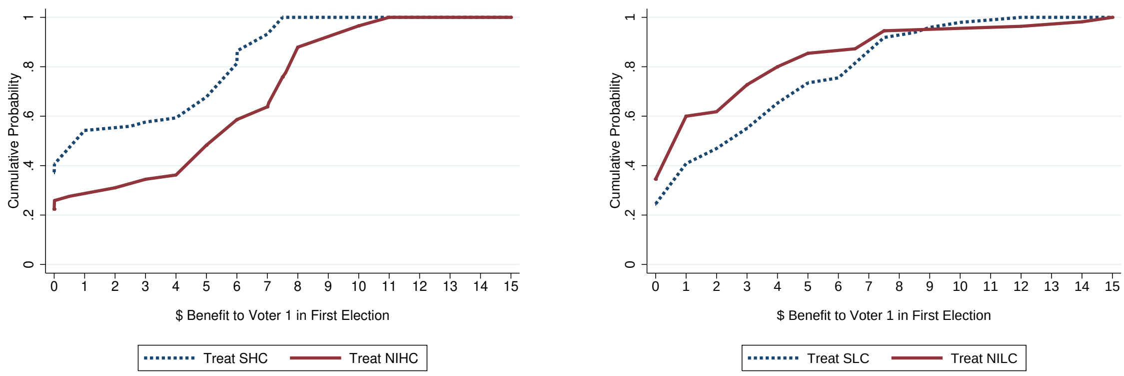
[15] The same trend is found if restricting the data to type 2 candidates who select x_1>\$0 and thus might be labeled reciprocal (\$6.35 in treatment NIHC and \$4.50 in treatment SHC). Note in Table 3 that type 2 candidates give on average \$1.12 more to V_1 in the second election of treatment NIHC than SHC. While our theory does not account for this difference in type 2 second election behavior, we note that it is not very large.

[16] 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 NIHC distribution either first order stochastically dominates or is equal to the treatment SHC 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 SHC distribution first order stochastically dominates or is equal to the treatment NIHC distribution (in the \$0 to \$15 range). We reject this null hypothesis in this case, with a corresponding p-value of 0.077.

sense (Barrett and Donald, 2003).[17]

Figure 5: CDFs of Type 2 Candidate First Election Benefits

(a) High Cost of Voting **(b)** Low Cost of Voting



Finally, in Table 4 we check whether these results are robust to a regression analysis. We use a two-limit Tobit regression to account for censoring from below ($0) and above ($15). The coefficient on the Signaling Game dummy indicates whether the amount type 2 candidates give to V_1 in the first election is different in the signaling treatment than the no information treatment. This dummy is negative and significant in the high cost of voting treatments, and positive but insignificant in the low cost of voting treatments. This adds further evidence to the finding that reelection motives constrain type 2 candidate reciprocity when the cost of voting is, but not when it is low.

[17] We again use a bootstrap of size 1,000 to calculate p-values. We first test the null hypothesis that the treatment NILC distribution either first order stochastically dominates or is equal to the treatment SLC 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 SLC distribution first order stochastically dominates or is equal to the treatment NILC 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.

Table 4: Two-Limit Tobit, Type 2 Candidate First Election \$ Benefits to V_1

	(1) High Cost of Voting	(2) Low Cost of Voting
Signaling Game	-2.944**	1.241
	(1.194)	(1.224)
Constant	5.655***	0.550
	(1.142)	(1.148)
Period Dummies	Yes	Yes
Observations	117	104

*** p<0.01, ** p<0.05, * p<0.1
Robust standard errors in parentheses. Clustered at candidate level.
Column (1) only includes treatments NIHC and SHC. Column (2) only includes treatments NILC and SLC. Signaling Game is a dummy equal to one in treatments SHC and SLC.

V.III Type 1 Candidate Mimicking

Turning to type 1 candidates, we find that some play their first-best by giving everything or almost everything (as in the model with altruism) to V_1 in the first election, thus foregoing reelection. However, many type 1 candidates pool with type 2 candidates in order to be reelected. Moreover, the type 1 candidates who pool with type 2 candidates to be reelected tend to be less reciprocal. These patterns hold for both a high and a low cost of voting.

Table 5 shows that signalling motives lead type 1 candidates to mimic type 2 candidates to help their reelection chances. With a high cost of voting (low cost of voting), Type 1 candidates give on average \$1.83 (\$4.54) more to V_2 in the first election if signalling of type is possible: \$4.95 in treatment SHC and \$3.12 in treatment NIHC (\$5.93 in treatment SLC and \$1.39 in treatment NILC).

Table 5: Type 1 Candidate \$ Benefit to V_2

	High Cost of Voting		Low Cost of Voting	
	First Election	Second Election	First Election	Second Election
Signaling Game	4.95	2.36	5.93	1.39
	(3.26)	(2.77)	(2.21)	(1.87)
No Information	3.12	3.31	1.39	1.61
Game	(2.96)	(2.50)	(2.16)	(1.96)
Observations	111	65	135	109
P-values	0.003	0.170	0.000	0.554

Mean, standard deviation in parentheses. P-values based on two-tailed t-test.

This mimicking behavior may also be seen visually in the CDFs in Figure 6. With either cost of voting, the CDF of type 1 candidate first election benefits to V_2 in the signaling game first-order stochastically dominates that in the no information game, and the dominance is statistically significant (Barrett and Donald, 2003).[18] Table 5 shows that these results are robust to a regression analysis. Given either cost of voting, the Signaling Game dummy is significant and positive, indicating that type 1 candidates give more first election benefits to V_2 with signaling motives than without.

Figure 6: CDFs of Type 1 Candidate First Election Benefits

(a) High Cost of Voting **(b)** Low Cost of Voting

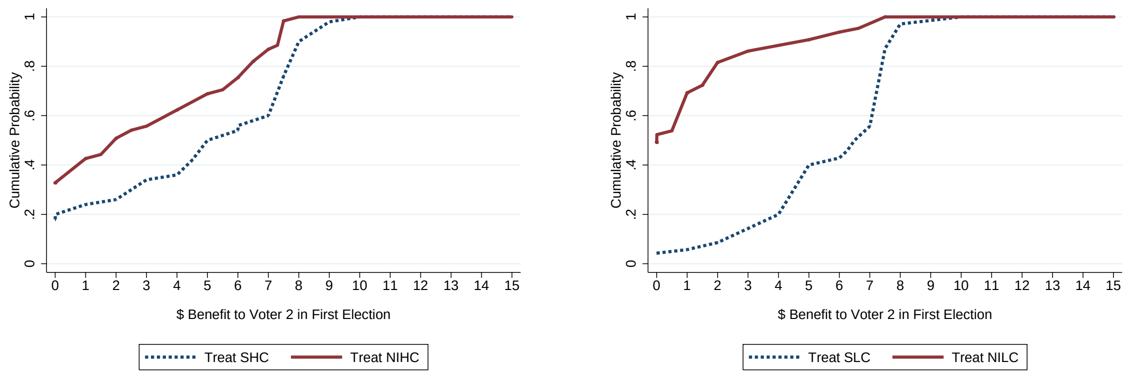


Table 6: Two-Limit Tobit, Type 1 Candidate First Election $ Benefits to V_2

	(1) High Cost of Voting	(2) Low Cost of Voting
Signaling Game	2.407**	5.453***
	(1.115)	(0.709)
Constant	3.134***	0.670
	(1.010)	(0.843)
Period Dummies	Yes	Yes
Observations	111	135

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

Robust standard errors in parentheses. Clustered at candidate level.

Column (1) only includes treatments NIHC and SHC. Column (2) only includes treatments NILC and SLC. Signaling Game is a dummy equal to one in treatments SHC and SLC.

While it is clear that mimicking is going on, an important next question is what kind of

[18] We use a bootstrap of size 1,000 to calculate p-values. We first test the null hypothesis that the treatment SHC (treatment SLC) distribution either first order stochastically dominates or is equal to the treatment NIHC (treatment NILC) distribution in the $0 to $15 range. We fail to reject this null hypothesis, the corresponding p-value is 0.664 (0.589). We then test the null hypothesis that the treatment NIHC (treatment NILC) distribution first order stochastically dominates or is equal to the treatment SHC (SLC) distribution (in the $0 to $10 range). We reject the null hypothesis in this case, with a corresponding p-value of 0.079 (0.000).

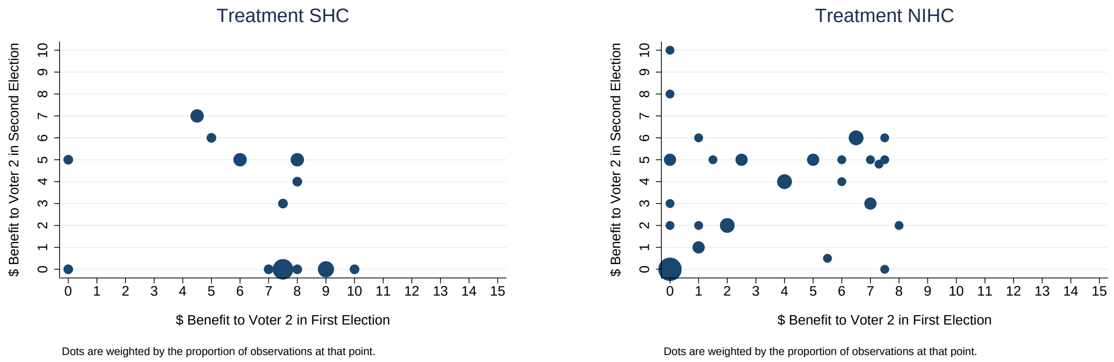
type 1 candidates are mimicking? While both types are concerned about reelection, the model predicts that the least reciprocal type 1 candidates earn the highest utility gain from reelection, and are thus most likely to mimic. The scatter plots in Figure 7 provide suggestive evidence that this is the case. For the type 1 candidates that are reelected, they show the distribution of benefits to V_2 in the first election (horizontal axis) and second election (vertical axis). The large mass at the bottom left of the no information treatment graphs (rightmost graphs) disappear in the signaling treatment graphs (leftmost graphs), 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.[19]

Indeed, while 82% (98%) of reelected type 1 candidates in treatment SHC (treatment SLC) give at least a third of the first election pie to V_2, 55% (55%) give \$0 to V_2 in the second election. By contrast, only 21% (34%) of reelected type 1 candidates give \$0 to V_2 in the second election of treatment NIHC (treatment NILC). Mimicking increases these candidates total payoff above the \$15 they would receive if they gave everything to V_1 in the first election, as short-sighted selfishness and single-period optimization would dictate.

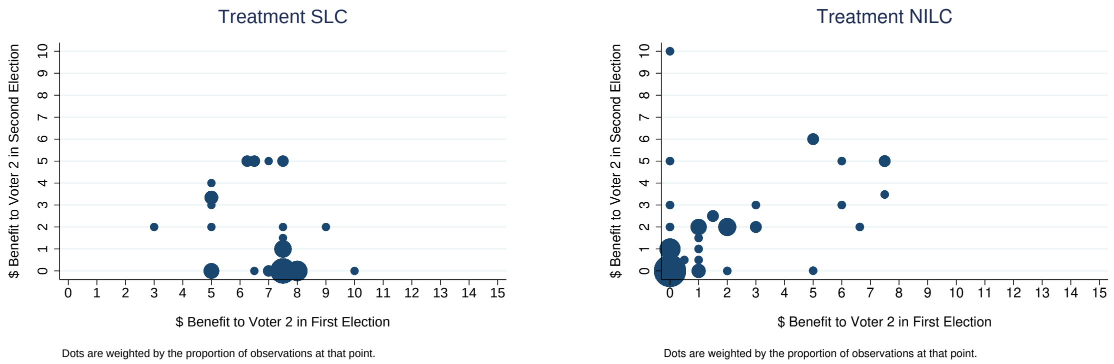
[19] In both treatments SHC and SLC, Exactly half the first election pie (\$7.5) is the modal benefits given to V_2 by reelected type 1 candidates.

Figure 7: Type 1 Candidate \$ Benefit to V_2 in the Two Elections

(a) High Cost of Voting



(b) Low Cost of Voting

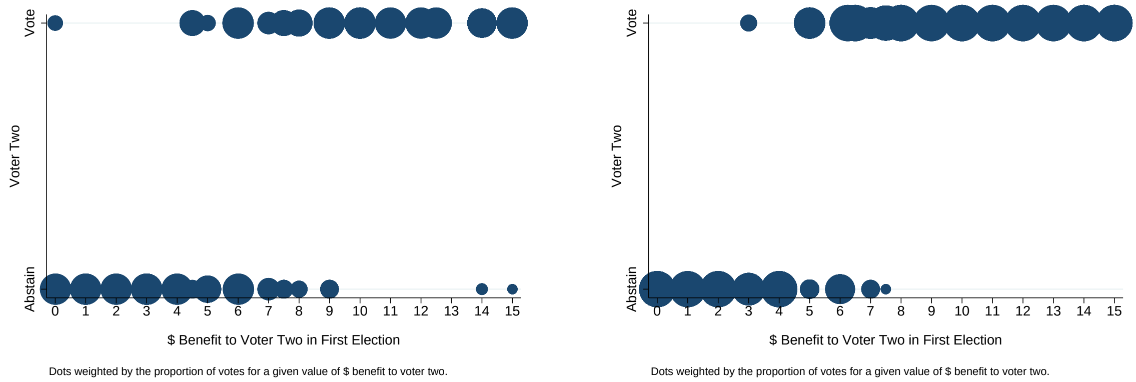


V.IV Voter 2's Propensity to Vote

Is restricting x_1 an effective reelection strategy for type 1 and type 2 candidates? To answer this question, we consider the voting behavior of V_2 in the signalling treatments. We show that V_2 is substantially more likely to vote the more money V_2 receives in the first election (the higher is x_2) in the scatter plots in Figure 8. Note that data limitations prevent us from analyzing the strategy of anyone single voter 2 for every possible amount received in the first election. However, the aggregate data shown strongly suggests that V_2 uses a cut-off strategy, only voting when given at least \$5-\$8 in the first election.

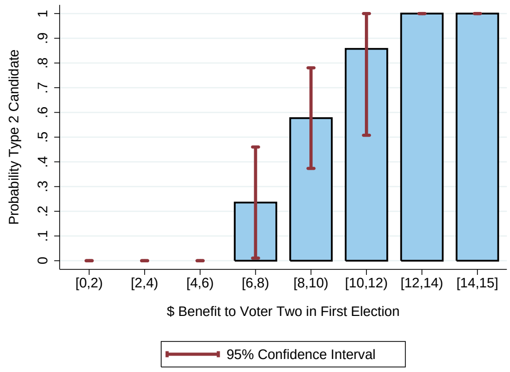
Figure 8: Voter 2 Cut-off Rule

(a) High Cost of Voting **(b)** Low Cost of Voting

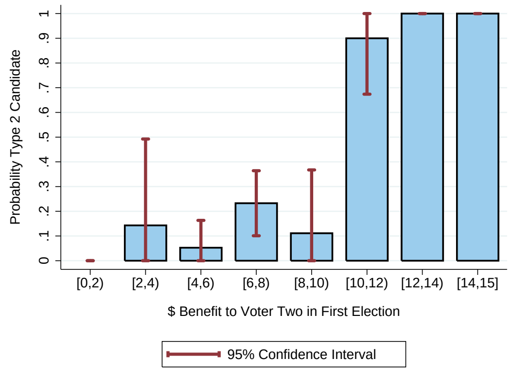


Even-though candidate type is not directly revealed in the signaling treatments, V_2's cut-off rule turns out to be fairly effective in selecting candidates of their type. Figure 9 shows that the probability of V_2 encountering a type 2 candidate increases in the amount of money V_2 received in the first election. In treatment SHC (treatment SLC), V_2 abstains only 13.6% (2.0%) of the time when the candidate is in fact type 2. We might expect some subjects to abstain due to high risk aversion and uncertainty about candidate type. This abstention rate is similar and even sometimes lower than that of voters with no additional information about candidate type: 12.8% (4.8%) abstention by V_1 in treatment SHC (treatment SLC), and 34.5% (7.5%) abstention by V_2 in treatment NIHC (treatment NILC). In contrast, when the candidate is in fact type 1, V_2 abstains 56% of the time in treatment SHC (31.4% of the time in treatment SLC), much higher than the 13.6% abstention rate (2.0%) with a type 2 candidate and the 34.5% (7.5%) abstention rate with no information. In Table 7, we show that this result is robust to a probit regression, and V_2 is significantly more likely to vote in the signaling treatments if the candidate is type 2.

Figure 9: Probability Type 2 Candidate by Amount V_2 Received in First Election



(a) High Cost of Voting



(b) Low Cost of Voting

Table 7: Probit, Likelihood Voter 2 Reelects

	(1) Treat SHC	(2) Treat SLC
Type 2 Candidate	0.445***	0.302***
	(0.087)	(0.082)
Period Dummies	Yes	Yes
Observations	109	119
Baseline Probability	0.669	0.807
Pseudo R Squared	0.201	0.219

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

Probit marginal effects reported (calculated at means of independent variables). Dependent variable is a dummy equal to 1 if voter 2 voted. Robust standard errors in parentheses. Clustered at voter 2 level.

V.V Interpreting Constrained Reciprocity

Put simply, our results indicate that the degree of reciprocity depends on the perceived consequences for reelection. When gratitude is seen as posing little threat to reelection, we see reciprocity to past voters. When gratitude is seen as potentially costly, that is, in sending "the wrong message" to voters so that they do not vote to reelect, the candidate constrains her reciprocity. Hence, reciprocity is not an absolute depending on simply underlying preferences, but reflects the circumstances in which a candidate finds herself.

This argument applies more generally. While reciprocity is a common human trait (see Brown (1991, pp. 107-108)), the amount of reciprocity actually shown will depend on the situation in which people find themselves. As discussed in the literature review, it has been argued that external factors such as social pressure, social image, or norms may lead to an increase apparently reciprocal behavior that do not really represent intrinsic reciprocity. That is, self-interested agents may be induced to show "kindness" because of external constraints. Our results indicate that the argument goes both ways, where (very different) sorts of constraints may lead other-regarding agents to not show reciprocity even though they are inherently reciprocal.

The argument that external circumstances help determine how one acts has another implication central to the design of our experiment. Our basic premise is a clear implication of a principal-agent model. The desire of an agent to be retained in a position will lead her to act to satisfy the principal who has the power over this decision, and may limit inherent gratitude to other agents who put her in the position to begin with. That is, the situation of wanting to be "reelected" to a position influences behavior in addition to any inherent other-regarding preferences (or lack of them, in the case of selfish candidates who mimic in order to be reelected). For incumbent politicians, the desire to be reelected is a key "constraint" on their behavior when it comes to courting potential voters, as argued in the introduction. Hence, an experiment putting individuals in the situation where retention in office is key to their material payoffs seems a good laboratory to test how such concerns affect their inherent reciprocity, even though the subjects themselves are not professional politicians.

VI CONCLUSION

Reelection or retention is a key desire of officeholders. Reciprocity to kind actions is a key characteristic of human behavior. How will this desire affect gratitude to voters who were responsible for the leader to be in office in the first place, when such reciprocity conflicts with the likelihood of reelection? We study this conflict in a theoretical model of a setting where 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 does not 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 do not 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.

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A FORMAL MODEL OF CANDIDATE RECIPROCITY

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:

$$\max \; {x_1}^{\theta} {x_1}^{1-\theta} \; + \; \pi(x_1) \; {y_2}^{\theta} {y_1}^{1-\theta} \tag{9a}$$

$$\max \; {x_1}^{\theta} {x_2}^{1-\theta} \; + \; \pi(x_1) \; {y_2}^{\theta} {y_2}^{1-\theta} \tag{9b}$$

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 since V_2 cannot base her voting decision on the distribution of benefits in the first election. 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 (Equilibrium with Selfish Candidates)**.** *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 $X - Y$.[20] 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 (Constrained Reciprocity Equilibrium)**.** *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 $u^2_{(1, \overline{\theta}_1)}(Y - \overline{\theta}_1 Y, \overline{\theta}_1 Y) = \frac{X}{2}$.[21]

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.

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

[21] 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.

Proposition 2 (Constrained Reciprocity Equilibria)**.** *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 supplies a weakly higher two-period utility to all candidate-types, and a strictly higher two-period utility to some candidate-types.[22] 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 (Constrained Reciprocity Equilibrium)**.** *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 (Constrained Reciprocity and Cost of Voting)**.** *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.*

A.I Reciprocity and Altruism Theory

Here we study equilibria under a modified version of the utility function where candidates may be also be altruistic and care about giving to the non-voting voter in an election. In addition to holding reciprocity and policy parameters θ and τ respectively, each candidate is endowed with an altruism parameter α. We assume α is distributed according to some continuous distribution function $G()$ with support $[0, \overline{\alpha}]$, where $G(0) > 0$ and $\overline{\alpha} < 0.5$ so that candidates care more about their self-interest than being altruistic. Furthermore, we assume that $G()$ is independent of $F()$. The utility function of each candidate in the first election is as follows:

$$u^1_{(1,\theta,\alpha)}(x_1, x_2) = x_1^{1-\theta-\alpha} x_1^{\theta} x_2^{\alpha} = x_1^{1-\alpha} x_2^{\alpha} \quad (10a)$$

$$u^1_{(2,\theta,\alpha)}(x_1, x_2) = x_2^{1-\theta-\alpha} x_1^{\theta} x_2^{\alpha} = x_1^{\theta} x_2^{1-\theta} \quad (10b)$$

A $(1, \theta, \alpha)$ candidate would choose $x_1 = (1 - \alpha)X$ if she were simply maximizing first-period utility, while a type $(2, \theta, \alpha)$ candidate would choose $x_1 = \theta X$.

Similarly, second-period candidate utility is represented as

$$u^2_{(1,\theta,\alpha)}(y_1, y_2) = y_1^{1-\theta-\alpha} y_2^{\theta} y_1^{\alpha} = y_1^{1-\theta} y_2^{\theta} \quad (11a)$$

$$u^2_{(2,\theta,\alpha)}(y_1, y_2) = y_2^{1-\theta-\alpha} y_2^{\theta} y_1^{\alpha} = y_1^{\alpha} y_2^{1-\alpha} \quad (11b)$$

[22] 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.

where a type $(1,\theta,\alpha)$ candidate's first-best is $y_2 = \theta Y$, and a $(2,\theta,\alpha)$ candidate's first-best is $y_2 = (1-\alpha)Y$. We extend the definition of a constrained reciprocity equilibrium to include altruism as follows.

Definition 2 (Constrained Reciprocity with Altruism)**.** *An equilibrium is characterized by constrained reciprocity with altruism at $x_1^* \in [0, X]$ if players' strategies satisfy the following conditions:*

$(1,\theta,\alpha)$: $x_1 = x_1^*$ if $(\theta,\alpha) \in \nabla$ for some compact set $\nabla \in [0,\overline{\theta}] \times [0,\overline{\alpha}]$
and $x_1 = (1-\alpha)X > x_1^*$ otherwise. $y_2 = \theta Y$ if reelected.

$(2,\theta,\alpha)$: $x_1 = x_1^*$ if $\theta \geq \frac{x_1^*}{X}$ and $x_1 = \theta X$ otherwise. $y_2 = (1-\alpha)Y$ if reelected.

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

The difference between the equilibrium described above and that in Definition 1 without altruism is that non-mimicking and altruistic $\tau = 1$ candidates give $x_1 < X$, and altruistic $\tau = 2$ candidates select $y_2 < Y$. Thus, there always exists candidates in each election giving to the non-voting voter. The set ∇ defines the mimicking $\tau = 1$ candidates who deviate to x_1^* to be reelected rather than playing their first-best $x_1 = (1-\alpha)X > x_1^*$ and foregoing reelection.

As in the pure reciprocity model, we need to verify that V_2 prefers not to reelect the $\tau = 1$ candidates who do not mimic (i.e. $\tau = 1$ candidates with $(\theta,\alpha) \notin \nabla$) for the equilibrium to hold. From equation (11a), we see that V_2 need only consider a $\tau = 1$ candidate's reciprocity parameter θ when deciding whether to reelect her. All else equal, a $\tau = 1$ candidate has a greater incentive to mimic if she has a higher α because she has to deviate less from her first-best to be reelected. Furthermore, as before, all else equal a $\tau = 1$ candidate has a greater incentive to mimic if she has a lower θ because she has greater utility to gain from reelection. Thus, if V_2 does not reelect a non-mimicking $\tau = 1$ candidate who has the highest possible altruism parameter $\overline{\alpha}$, then she does not mimic any other non-mimicking $\tau = 1$ candidates (because they have even lower θ). This holds if $E(\theta|\ \theta \geq \widehat{\theta}_1) \leq \frac{k}{Y}$ where $\widehat{\theta}_1$ is defines as the reciprocity parameter of the most altruistic $\tau = 1$ candidate $(1,\widehat{\theta}_1,\overline{\alpha})$ that is indifferent between her first-best and mimicking the most reciprocal $\tau = 2$ candidate $(2,\overline{\theta},\overline{\alpha})$ for reelection. Mathematically, $\widehat{\theta}_1$ is defined implicitly by: $u^1_{(1,\widehat{\theta}_1,\overline{\alpha})}(\overline{\theta}X, X - \overline{\theta}X) + u^2_{(1,\widehat{\theta}_1,\overline{\alpha})}(Y - \widehat{\theta}_1 Y, \widehat{\theta}_1 Y) = u^1_{(1,\widehat{\theta}_1,\overline{\alpha})}(X - \overline{\alpha}X, \overline{\alpha}X)$. We assume the distributions of θ and α follow the above condition in what follows. Additionally, we assume the distribution is such that if all $\tau = 2$ candidates are mimicked by all $\tau = 1$ candidates who are willing to mimick at $x_1 = 0$, then V_2 reelects at $x_1 = 0$.

As before, we focus on equilibria satisfying the intuitive off-equilibrium beliefs of Cho and Kreps (1987): $p\,(1,\theta,\alpha|x_1) = 0$ if $x_1 < x_1^*$ for all θ and α. Under such off-equilibrium beliefs, there exists a continuum of semi-separating equilibria characterized by constrained reciprocity with altruism.

Proposition 4 (Constrained Reciprocity Equilibria with Altruism)**.** *For any k, there exists a $\theta_2(k) \in [0,\overline{\theta}]$ such that the set of equilibria satisfying the intuitive off-equilibrium beliefs is non-empty and characterized by constrained reciprocity with altruism at $x_1^* \in [0, \theta_2(k)X]$.*

Note that allowing for altruism allows us to extend our theoretical results, in the sense that the cut-off x_1^* may be less than $\frac{X-Y}{X}$. This is because altruistic $\tau = 1$ candidates have to deviate less to be reelected, and are thus willing to mimic at lower values of x_1^*.

Furthermore, as before, a unique equilibrium can be found by applying candidate dominance. 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 5 (Constrained Reciprocity Equilibrium with Altruism)**.** *For any k, there exists a unique candidate dominant equilibrium satisfying the intuitive off-equilibrium beliefs characterized by constrained reciprocity with altruism at $x_1^* = \theta_2(k)X$.*

Moreover, $\tau = 2$ candidates need to constrain their reciprocity more as the cost of voting increases.

Corollary 2. *The amount highly reciprocal policy preference* 2 *candidates constrain themselves in the equilibrium described in Proposition 5 is weakly increasing in the cost of voting.*

A.II 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 $x_1 = X$. ■

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.

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 $\frac{Y\int_{\theta_1}^{\overline{\theta}}\theta F(\theta)}{1-F(\overline{\theta_1})} < k$, 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. ■

Proof of Corrollary 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. ■

Proof of Proposition 4. 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 $x_1 \in [0, X - \frac{Y}{2}]$, let $\nabla(x_1) \in [0, \overline{\theta}] \times [0, \overline{\alpha}]$ be implicitly defined by (θ, α) such that: $u^1_{(1,\theta,\alpha)}(x_1, X - x_1) + u^2_{(1,\theta,\alpha)}(Y - \theta Y, \theta Y) \geq u^1_{(1,\theta,\alpha)}(X - \overline{\alpha}X, \overline{\alpha}X)$. It can be shown that $\nabla(x_1') \subseteq \nabla(x_1'')$ if $x_1' < x_1''$. In other words, the set of $\tau = 1$ candidates who are willing to mimic is decreasing as they must deviate further from their first-bests. Furthermore, it can be shown that $\nabla(x_1)$ is a compact set.

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 $\nabla(\theta_2(k)X)$, then V_2 still votes. Let $H(\theta, \alpha)$ define the joint distribution of θ and α.

Define $\theta_2(k)$ implicitly by $\frac{\int_{\theta_2(k)}^{\overline{\theta}} \int_0^{\overline{\alpha}} (1-\alpha) G(\alpha) F(\theta) + \int_{\nabla(\theta_2(k)X)} \theta H(\theta)}{1 - F(\theta_2(k)) + H(\nabla(\theta_2(k)X))} = \frac{k}{Y}$ if it exists and $\theta_2(k) = \underline{\theta_1}$ otherwise where $\underline{\theta_1}$ is defined as follows. $\underline{\theta_1} \in [0, \frac{X-Y}{X}]$ is implicitly defined such that the most altruistic $\tau = 1$ candidate with zero reciprocity would be indifferent to mimicking at $x_1 = \underline{\theta_1}X : u^1_{(1,0,\overline{\alpha})}(\underline{\theta_1}X, X - \underline{\theta_1}X) + u^2_{(1,0,\overline{\alpha})}(Y, 0) = u^1_{(1,0,\overline{\alpha})}(X - \overline{\alpha}X, \overline{\alpha}X)$.

Claim 2. For a given k, the set of equilibria satisfying the intuitive off-equilibrium beliefs $\Phi(k)$ is non-empty and strictly includes equilibria where:

$(1, \theta, \alpha)$: $x_1 = \widehat{\theta}X$ if $(\theta, \alpha) \in \nabla(\widehat{\theta}X)$ and $x_1 = (1 - \alpha)X$ otherwise.
$y_2 = \theta Y$ if re-elected.
$(2, \theta, \alpha)$: $x_1 = \widehat{\theta}X$ if $\theta \geq \widehat{\theta}$ and $x_1 = \theta X$ otherwise. $y_2 = (1 - \alpha)Y$ if re-elected.
V_2 strategy: Vote if $x_1 \leq \widehat{\theta}X$. Otherwise, abstain.

for any arbitrary $\widehat{\theta} \in [\underline{\theta_1}, \theta_2(k)]$.

First, we check that the elements of $\Phi(k)$ constitute equilibria. Each type C's strategy is optimal by construction. V_2's beliefs satisfy the equilibria conditions and could be supported by letting $p(1, 0, 0) = 1$ off the equilibrium path. V_2's strategy is clearly optimal for $x_1 \leq \widehat{\theta}X$. Furthermore, V_2's strategy is optimal at $x_1 > \widehat{\theta}X$ because V_2 is unwilling to reelect any non-mimicking $\tau = 1$ candidate. As explained in the text, this follows because $E(\theta | \ \theta \geq \widehat{\theta_1}) \leq \frac{k}{Y}$. Thus, the elements of $\Phi(k)$ are equilibria. The argument that $\Phi(k)$ constitutes the entire set of equilibria follows the same logic as in the proof of Proposition 2. ■

Proof of Proposition 5. Here, we show there is a unique equilibrium with $\widehat{\theta} = \theta_2(k)$ that candidate dominates all others in $\Phi(k)$: 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 $\Phi(k)$ 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 $\Phi(k)$ also receive a strictly higher two period utility. ■

Proof of Corollary 2. We want to show that $\frac{d\theta_2(k)}{dk} \leq 0$. Suppose $\theta_2(k) \neq \underline{\theta_1}$ (if $\theta_2(k) = \underline{\theta_1}$, 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 4) 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 must increase since the former give more second election benefits to V_2. As $\theta_2(k)$ decreases, the mass of $\tau = 2$ candidates $1 - F(\theta_2(k))$ increases and the mass of $\tau = 1$ candidates $H(\nabla(\theta_2(k)X))$ decreases. Thus, $\theta_2(k)$ must decrease for the equation to hold. ■