Reciprocity versus Reelection: Theory and Experiment*

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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 theoretical model of signaling congruence with voter preferences to gain reelection, where we show that candidates may limit intrinsic reciprocity to signal type 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 signaling model predicts. A key finding is that the desire to be reelected may limit intrinsic reciprocity of an elected leader to reciprocate to the voters who put her in office, but doesn’t eliminate it entirely.

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“MPs ... can’t relate to normal people because they’ve never been normal people.”
Alex Proud, *The Telegraph* 22 April 2014

1 Introduction

It is now widely accepted that the behavior of many people is not described by a model of a purely self-interested individual. People perform kind acts and reciprocate to kind acts. “People ... help other people ... according to how generous these other people are being.” (Rabin [1993], p. 1281). Evidence of such reciprocity is common in everyday life and is seen repeatedly in the experimental lab, as is other-regarding behavior in itself.

However, some argue that in this respect, politicians are different from you and me, at least in their role as politicians. Success in political life requires “hard-headed” calculations rather than sentimentality. Hence, it is argued that behavioral models including other-regarding behavior – such as kindness, reciprocity, etc. – do not describe political leaders. Evidence of such behavior, in the lab or otherwise, is argued not to indicate how politicians might act.

Dictator games however show that individuals tasked with making decisions that affect others, that is, leaders, often act in ways other than pure self interest. Drazen and Ozbay (2017) took the dictator game one step further, considering how the way the dictator was chosen affected the degree of other-regarding behavior. In a laboratory experiment, they consider a one-shot dictator game here subjects are divided into groups of three – two candidates and a citizen, each with most preferred polices or “types”. They are two ways of choosing the leader whose actions will affect the payoffs of all three – she may be elected, that is, chosen by the citizen as voter, or may be appointed, with each candidate having an equal chance of being chosen at random.\(^1\) They found that leaders who are elected are significantly more likely to choose a policy that doesn’t not equal to their “type” than leaders who are appointed. Elected leaders who act non-selfishly will favor the voter rather than the losing candidate, while appointed leaders show no tendency to favor the voter over the losing candidate. They argued that the results provided support for the view that non-selfish behavior of leaders reflects a reciprocity motive.

One may argue however that this experiment does not capture a key situation in which

\(^1\)Throughout the paper for clarity of exposition, we denote candidates, and hence elected leaders by the female pronoun and citizens, and hence voters, by the male pronoun.
elected officials find themselves, namely the desire to get reelected. (Of course, elected leaders must also govern, but this requires inducing others to support their programs, but as we will argue, the central trade-off between intrinsically kind actions versus instrumentally motivated actions will characterize these interactions as well.) That is reciprocity to those who elected them is all well and good, but reelection-minded politicians are forward-looking. In rewarding citizens in an electoral system, they will generally be concerned with attracting votes in the next election rather than rewarding voters in the previous election, unless of course such action will help them get reelected. Hence, when there are reelection pressures “kindness” shown to voters is likely to be instrumentally motivated; when non-instrumental kindness is in conflict with reelection motives, it is argued that politicians will choose the latter.

The purpose of this paper is to investigate reciprocity of elected decision makers when they want to be reelected, and distributing benefits to the voters who elected them may conflict with this desire.² Specifically, we consider a model in which an elected candidate attracts votes in her reelection bid by trying to convince voters that she will enact policies favorable to them if reelected. She does this by showing that her policy preferences are congruent with theirs (as in the model of Drazen and Eslava [2015]). 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.

The conflict between intrinsic reciprocity to past voters and reelection concerns arises when voters who will vote in the upcoming election only partially overlap with those who voted in the previous election. Suppose, for simplicity, there is no overlap and past voters have different policy preferences than future voters. When a candidate’s policy preferences and degree of reciprocity are unknown, too much reciprocity to past voters may be taken as an indicator that she favors their policy preferences, leading future voters not to vote for her. Hence, she may need to limit her reciprocity in order to get reelected.

We present a signaling model of elections and show that such a conflict may exist when voters have a sufficiently high cost of voting relative to the benefits they anticipate if a candidate is elected. We then test the model in the laboratory and find that the predictions of the model are confirmed. Our main results (both theoretical and confirmed in the lab) are as follows. When a reciprocal candidate wants to get reelected, she still shows reciprocity

²Hence, we are talking “intrinsic” rather than “instrumental” reciprocity, as defined by Sobel (2005).
towards those who voted for her, but such reciprocity is reduced when reelection concerns are present and voting costs are high. The model predicts that in some cases candidates distribute benefits to signal the policies they will enact if reelected, and the experimental results confirm this behavior. When a candidate whose policy interests are congruent with those of voters in the upcoming election uses distribution of benefits to signal this, a “non-congruent” candidate may mimic a congruent one. Voters respond to signaling by not voting for a candidate whom they believe doesn’t share their policy interests, a finding confirmed in the lab.

The plan of the paper is as follows. In the next section, we go over the basic conceptual set-up. A model of candidates using benefits given to different groups of voters to signal their preferences is presented in section 3. In section ??? we consider two base cases, that of only selfish candidates and of unobserved benefits to voters. Section ???, which contains our main theoretical results, shows how reciprocal candidates may be constrained in their reciprocity to those who voted for them because of adverse consequences this may have for their reelection chances. Section 6 sets out the experimental design and section 7 presents our experimental results and interprets them. The final section presents conclusions. An appendix (in progress) will present a game-theoretic treatment of the model.

2 Conceptual Set-up

Consider a set-up where an elected leader can distribute benefits to citizens after the election. A citizen’s choice is whether or not to vote for a candidate. With a single election, and no binding commitment before the election on distribution of post-electoral benefits, there can be reciprocity by an elected candidate to the voters who voted for her, but no logical way that distributing benefits can influence voting. In contrast, when an elected candidate is running for reelection, she can try to target benefits after an election to gain votes in the subsequent election.

To consider the possible conflict between rewarding voters who voted in the previous election and using benefits to gain votes in the next election, one may therefore think of an “interior” period between two elections where the incumbent distributes benefits and of two groups of 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. That is, suppose a candidate is elected by an identifiable group of voters, but that
a different group of voters will determine whether she is reelected. The key question set forth at the end of the previous section then becomes *to whom does the elected candidate give benefits?*

### 2.1 Reciprocity to what and whom?

In considering reciprocity by elected politicians to the voters who elected them, one may ask: to what do they reciprocate? One possibility is **actions**, meaning there is a positive relationship between a (possibly) helpful action from $A$ to $B$ and $B$’s reaction, independent of intention, motive, etc. (Fehr and Schmidt [1999], Bolton and Ockenfels [2000]). In the context of a voting model, an elected leader responds to the act of voting or perhaps to the act of voting when the voter is pivotal to the candidate’s having been elected. (In our experiment, with only one voter in each election, voting and being pivotal are equivalent.)

A second possibility is that **intentions** are crucial for reciprocity. Reciprocity to $A$ depends on $A$’s intentions in performing an act, i.e., by choosing an action, did $A$ intend to help or hurt $B$? (Rabin [1993], Dufwenberg and Kirchsteiger, [2004], Falk and Fischbacher [2006]). The *kindness* of $A$’s action depends on its effect on the $B$’s material payoff, more specifically on $B$’s material payoff from $A$’s action relative to reference level, where this effect is common knowledge. Hence $A$ not simply if he performs an act that helps $B$, but if that was his intention. In the context of voting, the voter is aware of the effect of voting on a candidate, and the elected candidate takes this into account in reciprocating to the voter having voted for her.

A third possibility is that not only intent, but also $A$’s **motivation** is important in determining $B$’s response. (Stanca et al. [2009], Orhun [2018]). Reciprocity to $A$ depends on $A$’s motivation in performing an act, i.e., by choosing an action which helped $B$, was $A$ motivated by kindness (helping $B$ at a potential cost to himself) or by self-interest? If $A$’s motivation in helping $B$ is to benefit himself, his act would not be considered as kind and hence not warranting reciprocal kindness from $B$. In the context of voting, did the voter vote for a candidate because doing so would mean he gets a positive net benefit (or expects

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3This is similar, but certainly not identical, to a central question in electoral strategy: do candidates win elections from targeting swing or core voters? (Cox, 2010). However, in that literature, core voters are targeted not to thank them for voting for the candidate in previous contests, but to mobilize them to turn out to vote in the current electoral contest. Hence, identifying previous voters as “core” and prospective voters as “swing” in our experiment would be incorrect. These ideas will be clearer once one sees the underlying model.
to get one)? In this case, an elected candidate should feel no need to reciprocate. Motivation is a more difficult issue, and we will model reciprocity to intentions, which in our set-up will be identical to reciprocity to actions, as will be made clear in section 3. Our experiment, however, may shed some light on the issue of reciprocity to motivation.

A further issue is: to which voters does the elected candidate respond? That is, with many voters, there is a likelihood approaching zero that a voter is pivotal and hence crucial in electing a candidate. In reality, even in this case, voting groups may be seen as pivotal. That is, crucial to a winning candidate’s victory. Hence, a candidate may be reciprocal by enacting policies favorable to the group as a whole. In our model and experiment, there is only one voter in each election, so that voter is pivotal by construction. The reader may think of this as representing a voting group.

### 2.2 Reelection strategies

How can distribution of benefits induce citizens to vote for a candidate up for reelection? A simple argument is that a citizen votes for a candidate who has provided him a benefit. If this is an enforceable promise by the voter in exchange for a benefit, this would be a case of “vote-buying”.

An alternative is that voters are not required to vote for a candidate who provided benefits, but nonetheless feel a some desire or “responsibility” to do so. This could be modeled formally as voter reciprocity to receipt of benefits, where candidate behavior to get reelected reflects her knowledge that voters are intrinsically reciprocal.⁴

Counting on voter reciprocity alone to gain reelection is probably not a sure-fire strategy, nor does it seem to reflect why voters vote the way they do in the real world. It is more realistic to argue that a key reason that voters choose to vote for a specific candidate is because of the policies they believe the candidate may enact if elected. Hence, a reelection strategy in the distribution of benefits after one election is to use benefits to signal policies favorable to likely voters after the subsequent election. That, 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 would devote resources to protecting the environment after an election in a way that she would not do if she did not have that priority. Drazen and Eslava (2015).

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⁴Finan and Schechter (2012) find – based on survey information on vote buying in a municipal election combined with experiment-based measure of reciprocity – that individuals are targeted for vote buying are those who have shown reciprocal behavior. Hence, voters being reciprocal and vote buying may be related.
model this idea formally, and we use this idea to represent how distribution of benefits by
the incumbent can be an effective reelection strategy. Our experiment will also test to what
extent candidates engage in signaling of this sort, or of mimicking candidates who do so, as
well as whether such signaling is an effective strategy to gain votes.

3 A Model of Candidate Behavior

We now present a model showing the possible conflict between intrinsic reciprocity and
instrumental motivations on the part of a candidate seeking reelection, where the reelection
strategy the candidate uses is signaling of type. The model is kept simple to highlight the
basic issues. The model focuses on one reelection strategy and only one kind of possibly
other-regarding behavior, namely reciprocity by elected candidates to those who voted for
her. Reciprocity by candidates is to voter intentions to elect a candidate or not – consistent
with the work of Rabin (1993) – which, in our set-up, is identical to reciprocity to actions,
that is, simply the action of the citizen, voting or not. We do not model reciprocity by voters
to candidates, nor inequity aversion by either candidates or voters.

In order to concentrate on candidates’ decisions, we assume voters follow simple cut-
off rules. Such rules are consistent with voter optimal behavior, but we do not model the
multiplicity of equilibria that may arise from different voter beliefs. This will become clear
below.

3.1 Voters, Candidate Types, and Elections

There are two sequential elections, two voters V1 and V2 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 V1 either votes, denoted v, or abstains, denoted ☐ in first election, while voter
V2 votes or abstains in the second election. Hence, 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). The
cost of voting in an election is k, assumed identical for the two elections.

If elected, the C has X to distribute after first election and Y to distribute after second
election, where it is assumed that X > Y. (See section 4.) If C is not elected, the game
ends with no distribution of either X or Y. Denote the amount given to the two voters by
x1 and x2 after the first election (if C is elected) and y1 and y2 after the second election.

Distribution decisions depend on the elected leader’s “policy type” (to be defined below)
\( \tau = 1, 2 \) and on whether she is selfish or reciprocal \( \rho = S, R \). Hence, there are four types of candidates: \((\tau, \rho) \in \{(1, S), (1, R), (2, S), (2, R)\}\). We can then represent distribution decisions upon election by \( x_1(\tau, \rho), x_2(\tau, \rho) = X - x_1(\tau, \rho), y_1(\tau, \rho), \) and \( y_2(\tau, \rho) = Y - y_1(\tau, \rho) \).

### 3.2 Candidate Objectives

We model possible reciprocity by \( C \) to the voter who put her in office as a “psychological game” (Geanakoplos, Pearce and Stacchetti [1989]) where \( C \)’s payoff depends both on her material payoff and her payoff to being reciprocal. To model material payoffs to \( C \), we assume that \( C \) must distribute \( X_i \) in each period between \( V_1 \) and \( V_2 \) – she can keep nothing for herself – but she has preferences over the voters which determine her material payoffs. A policy type 1 candidate directly values benefits \( x_1 \) and \( y_1 \) to \( V_1 \) and places no direct value on benefits \( x_2 \) and \( y_2 \) to \( V_2 \); conversely, a policy type 2 candidate places no direct value on \( x_1 \) and \( y_1 \) and values benefits \( x_2 \) and \( y_2 \) to \( V_2 \). Hence, in the absence of candidate reciprocity \( V_1 \) prefers a policy type 1 candidate and \( V_2 \) prefers a policy type 2 candidate. This is a simple way of representing voters preferences over candidates based on the type of policy they would enact.

A selfish candidate cares only about material payoffs, while a reciprocal elected candidate may also display reciprocity to the voter who put her in office. Reciprocity by candidates to a voter’s action (that is, voting for her rather than abstaining) is equivalent in our set up to reciprocity to a voter’s intention (that is, having the candidate for whom he voted being elected). We have a single voter in each election, so if \( C \) is elected, it is because the voter voted for her, and electing her was clearly his intention. (See Toussaert [2017] for a fuller discussion of modeling intentions.) That is, a reciprocal \( C \) has 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 represent this as follows. There is a psychological payoff which depends on the amount given to the voter in the election that just occurred, as well as the cost of voting. For example, after election 1, a reciprocal candidate who gives \( x_1 \) to \( V_1 \) has a reciprocity payoff of \( \phi(x_1) \), where \( \phi(0) = 0, \phi' > 0, \) and \( \phi'' < 0 \) (i.e., \( \phi(\cdot) \) is increasing and concave in \( x_1 \)). We assume \( \phi(\cdot) \) to be independent of candidate policy type, which seems reasonable. For simplicity, we also assume that the reciprocity function is the same for both periods and
for both types in the second period.\(^5\)

We model, also for simplicity, \(C\)'s material payoffs as linear in benefits given to voters. We can represent the first-period candidate utility as

\[
\begin{align*}
    u^1 (1, R) &= x_1 + \phi (x_1) \\
    u^1 (1, S) &= x_1 \\
    u^1 (2, R) &= x_2 + \phi (x_1) \\
    u^1 (2, S) &= x_2
\end{align*}
\]

A reciprocal type 1 candidate would clearly choose \(x_1 = X\) is she were simply maximizing first-period utility, while a reciprocal type 2 candidate would choose \(x_1 = G \leq X\) defined by \(\phi' (G) = 1\) from the first-order condition for (1c). \(G\) would depend on the concavity of the \(\phi (\cdot)\) function in \(x\).

Similarly second-period candidate utility can be represented as

\[
\begin{align*}
    u^2 (1, R) &= y_1 + \phi (y_2) \\
    u^2 (1, S) &= y_1 \\
    u^2 (2, R) &= y_2 + \phi (y_2) \\
    u^2 (2, S) &= y_2
\end{align*}
\]

where a reciprocal type 1 would choose \(y_2 = G\) and a type 2 candidate would choose \(y_2 = Y\) regardless of whether she was selfish or reciprocal.\(^6\)

A reciprocal candidate’s expected two-period utility as a function of \(x_1\) given his type is

\[
U_{(1, R)} (x_1) = x_1 + \phi (x_1) + \pi (x_1) [(Y - G) + \phi (G)]
\]

for policy type 1 and

\[
U_{(2, R)} (x_1) = (X - x_1) + \phi (x_1) + \pi (x_1) [Y + \phi (Y)]
\]

\(^5\)Identical reciprocity functions across candidate policy types in the second period is less obvious than in the first, since \(V_2\) may have updated his beliefs over types, and his motivation for voting will be affected by these beliefs. Hence, a policy type 1 candidate may view a vote for her as more kind than a type 2 candidate and reciprocate more.

\(^6\)We are assuming, for simplicity of exposition, that \(G\) does not depend on \(X\) or \(Y\), total resources to be given out. Our theoretical result would not be qualitatively affected by this change, and would actually be strengthened.
for policy type 2, where \( \pi(x_1) \) is the probability of reelection. Two-period utility of a selfish candidate is same, but with \( \phi(\cdot) = 0 \) and \( G = 0 \), that is,

\[
U_{(1,S)}(x_1) = x_1 + \pi(x_1)Y \\
U_{(2,S)}(x_1) = X - x_1 + \pi(x_1)Y
\]

The crucial issue for \( C \) is the possible dependence of \( \pi \) on \( x_1 \), or, equivalently, whether \( V_2 \) votes conditional on the observed value of \( x_1 \), that is,

\[
\pi(x_1) = 1 \text{ if } V_2 \text{ votes} \\
\pi(x_1) = 0 \text{ if } V_2 \text{ abstains}
\]  

(If \( x_1 \) is not observed by \( V_2 \) before he votes, then \( \pi \) is independent of \( x_1 \).)

### 3.3 Voters

We assume that voters follow a cut-off or reservation rule with a single cut point. Such a decision rule for voting is standard in models in which a voter must choose a binary action – vote for the incumbent or not – but there is asymmetric information about a key characteristic of the incumbent and the voter only observes a unidimensional indicator correlated with the incumbent’s type. (See for example Ferejohn, (1986) or Banks and Sundaram (1993).)

\( V_1 \)'s decision is made before any benefits are given and is not conceptually related to the issue of reelection versus reciprocity. He votes as long as \( X \) and \( Y \) are high enough relative to the cost of voting, a condition that is easily satisfied in our experimental data.

More relevant is the behavior of \( V_2 \), whose behavior is summarized by a \( \zeta \) between 0 and \( X \), where \( V_2 \) votes for \( C \) if \( x_1 \leq \zeta \) and abstains if \( x_1 > \zeta \). Where \( \zeta \) is a number between 0 and \( X \). We assume that \( \zeta \) depends on \( V_2 \)'s “propensity to vote”, reflecting things like his cost of voting, his non-pecuniary benefits of voting, etc., consistent with the “calculus of voting” approach. A higher cost of voting implies a lower propensity to vote, all else equal, and we use an explicit cost of voting in the experiment to capture this. Whether \( V_2 \) has a high or low propensity to vote will be important in the choices that candidates make.

This fully characterizes \( V_2 \)'s strategy, which the candidate takes as given in her choice of

\(^{7}\)In an appendix, to be completed, we show that this is consistent with formally deriving \( V_2 \)'s behavior from his posterior beliefs on candidate conditional on his observation of \( x_1 \).
benefits. Hence, we are solving for the optimal choices of candidates in a decision-theoretic framework, rather than using a game theoretic approach where we also fully endogenize voter behavior. We investigate that approach in the appendix (in progress).

4 Two Base Cases

4.1 Purely Selfish Candidates

As background, suppose that all candidates are selfish, that is, there are only $(1, S)$ and $(2, S)$ type candidates. If the distribution of benefits after election 1 is not observed by $V2$, so his voting choice cannot be influenced by $x_1$, each type would give the entire amount $X$ to his most preferred voter, that is $x_1 (1, S) = X$ and $x_1 (2, S) = 0$ (that is, $x_2 (1, S) = 0$ and $x_2 (2, S) = X$).

When $V2$ observes $x_1$, the choice of $(2, S)$ is unchanged. For any $\zeta \geq 0$, $(2, S)$ would be reelected, so her material preferences and her desire for reelection are fully consistent.

$(1, S)$ would obviously choose the highest $x_1$ consistent with reelection if she wanted to get reelected and $x_1 (1, S) = X$ if not. In the former case her two-period payoff would be $\zeta + Y$; in the latter, simply $X$. Hence, if

$$\zeta \leq X - Y$$

(1, S) would choose $x_1 (1, S) = X$, if not; $x_1 (1, S) = \zeta$.

Since $(2, S)$ would choose $x_1 (2, S) = 0$ no matter what $(1, S)$ did, the only cutoff $\zeta$ consistent with candidate behavior is $\zeta = 0$. Hence, with only selfish candidates, separation between policy types 1 and 2 is extreme. Intuitively, were $\zeta$ endogenous, high $x_1$ would perfectly indicate type 1 and low $x_1$ would perfectly indicate type 2 to the voter. Reelection concerns have no effect on distribution of benefits after election 1, not because $\pi (\cdot)$ is independent of $x_1$ but because a candidate restricting herself cannot affect her reelection chances. The results with reciprocity will be quite different.

4.2 Reciprocity with Unobserved $x_1$

$^8$Y > X would imply that a type 1 candidate would always want to mimic a type 2 candidate after election 1 in the purely selfish case, implying no possibility of a separating equilibrium.
We now turn to the case where candidates can be either selfish or reciprocal. In general, reciprocity by (some) candidates will generate larger interior behavior in $x_1$ and $y_2$.

We begin with the situation where $V_2$ does not observe $x_1$. In this case, the probability of reelection is independent of $x_1$, so that $C$ chooses $x_1$ to maximize first-period utility (1) yielding

$$x_1^*(1, S) = x_1^*(1, R) = X$$
$$x_1^*(2, S) = 0$$
$$x_1^*(2, R) = G$$

Hence, the values of $x_1$ are identical to the purely selfish case, with the exception of $(2, R)$ who chooses $x_1$ “unconstrained” by reelection concerns. Like the results with purely selfish players, these results serve as a benchmark.

5 Observed Benefits and Constrained Reciprocity

We now turn to the main motivation of the paper, namely the case where $x_1$ is observed by $V_2$ and where candidates may be reciprocal. The question then becomes how the desire of reciprocal candidates to be reelected affects their choice of distribution of benefits after election 1. We begin with the decisions of different types of candidates given $V_2$’s cut-off rule $\zeta$. We then investigate when reciprocal types may constrain their reciprocity in order to get reelected.

5.1 Critical values of $x_1$

We begin by looking at critical values of $x_1$ that make each type indifferent between being reelected or not.

5.1.1 Type $(2, S)$

The choice of $(2, S)$ is unaffected. For any $\zeta \geq 0$, $C$ is reelected for sure when choosing $x_1 = 0$. Hence, the existence of reciprocal types or observability of benefits does not affect the behavior of $(2, S)$.

5.1.2 Type $(1, S)$

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If type $(1, S)$ knows that her choice of $x_1$ would mean she is not reelected, she would obviously choose $x_1 = X$. Conversely, if her choice of $x_1$ ensures reelection, her utility is $x_1 + Y$ as in (5). Hence, her critical value of $x_1$ is simply

$$\bar{x}_1 (1, S) = X - Y > 0$$

(10)
as in the case of only selfish candidates. Hence if $\zeta \leq \bar{x}_1 (1, S)$, that is, if being reelected requires restricting $x_1$ “too much” to get reelected, she chooses $x_1 = x_1^* (1, S) = X$, her myopic first-best, and forgoes reelection. Otherwise, she chooses $x_1 = \zeta$ and is reelected, then choosing $y_1 = y$ (and $y_2 = 0$). Intuitively, if she needn’t reduce $x_1$ too much to get reelected, she masquerades as a candidate more favorable to $V^2$ by giving him $X - \zeta$.

5.1.3 Type $(1, R)$
The critical value for $(1, R)$ is found in a similar way. The critical value at or below which $(1, R)$ would be unwilling to reduce $x_1$ to get reelected would be found from equating the values of (3) for $\pi = 1$ and $\pi = 0$, with $(1, R)$ choosing her myopic optimum $X$ when $\pi = 0$. This yields

$$x_1 + \phi (x_1) + (Y - G) + \phi (G) = X + \phi (X)$$

(11)
or

$$\bar{x}_1 (1, R) = (X - Y) + (\phi (X) - \phi (\bar{x}_1 (1, R))) - (\phi (G) - G)$$

(12)
implicitly defining a critical $\bar{x}_1 (1, R)$. Hence if $\zeta \leq \bar{x}_1 (1, R)$, that is, if as in the case of $(1, S)$, being reelected requires restricting $x_1$ “too much”, she chooses $x_1 = x_1^* (1, R) = X$ and forgoes reelection. Otherwise, she chooses $x_1 = \zeta$ and is reelected, then choosing $y_1 = Y - G$ (and $y_2 = G$). Intuitively, if she needn’t reduce $x_1$ too much to get reelected, she masquerades as a candidate more favorable to $V^2$.

We note that without further restrictions on $\phi (\cdot)$, $\bar{x}_1 (1, R)$ may be greater or smaller than $\bar{x}_1 (1, S)$.\footnote{While it would seem that $\bar{x}_1 (1, R) > \bar{x}_1 (1, S)$ since $(1, R)$ values $x_1$ more due to her valuing reciprocity (and hence suffers a greater loss than $(1, S)$ by not playing her single-period first best $X$), we cannot unambiguously rank the two values without further assumptions on $\phi (x_1)$. This may be seen by substituting (10) into (12) to yield $\ddot{x}_1 (1, R) - \ddot{x}_1 (1, S) = (\phi (X) - \phi (\ddot{x}_1 (1, R))) - (\phi (G) - G)$. Both terms in parentheses on the right-hand side are positive ($\phi (0) = 0$ and $\phi (x)$ is strictly concave in $x$, then $\phi (G) > G$ since $\phi' (G) = 1$), making it impossible to sign the difference.} For ease of exposition and without loss of generality, consider the case where $\ddot{x}_1 (1, S) < \ddot{x}_1 (1, R)$. (We argue below this is consistent with the data, but also theoretically intuitive, as explained in the previous footnote.) We then have three regions depending on
the location of \( \tilde{x}_1 (1, S) \) and \( \tilde{x}_1 (1, R) \) relative to \( \zeta \) as in Figure 1. For \( \zeta \leq \tilde{x}_1 (1, S) \), (a “strict” re-election standard) neither \( (1, S) \) nor \( (1, R) \) are reelected, both choosing their myopic first-best instead. We can think of this as a full separation from \( (2, R) \). For \( \tilde{x}_1 (1, S) < \zeta \leq \tilde{x}_1 (1, R) \), type \( (1, S) \) chooses a value of \( x_1 \) such that she is reelected, while \( (1, R) \) does not, a “semi-separating” result. Finally if \( \zeta > \tilde{x}_1 (1, R) \), both type 1 candidates are reelected, pooling with \( (2, R) \).

![Figure 1: Behavior of \((1, S)\) and \((1, R)\)](image)

Note further that different levels of desired reciprocity – that is different \( \phi (\cdot) \) functions – imply different levels of reciprocity. The more reciprocal a \((1, R)\) candidate, that is the higher level of \( G \), the higher is \( \tilde{x}_1 (1, R) \).

5.1.4 Type \((2, R)\)

To find a critical value for \((2, R)\), suppose \( \zeta = 0 \), so that she could either set \( x_1 = 0 \) (and \( x_2 = X \)) and get reelected (setting \( y_2 = Y \)) or set \( x_1 = x_1^* (2, R) = G \) and forgo reelection. In this case, the utility value of being reelected still exceeds that of not being reelected, that is

\[
X + Y + \phi (Y) = X - G + \phi (G)
\]

Hence, her critical value is \( \tilde{x}_1 (2, R) = 0 \), that is, for any cut-off level \( \zeta \geq 0 \), she always prefers setting setting \( x_1 \leq \zeta (x_1 (2, R) < \zeta \) if \( \zeta > G \)) and getting reelected.

5.2 Constrained versus Unconstrained Reciprocity

We now turn to our key question – whether the desire to get reelected restrains reciprocity to past voters? A related question is: how this possibility affects choices of different types of candidates?
For \((2, R)\) the argument just above answers the first question, since she always finds it optimal to be reelected. As in Figure 2, if \(\zeta \geq G\), \((2, R)\) chooses \(G\), that is, not be constrained in her reciprocity. Conversely, if \(\zeta < G\), \((2, R)\) needs to choose \(x_1 = \zeta < G\) in order to get reelected. Hence if \(\zeta\) is low, she is constrained and if \(\zeta\) is high she is not. In the experimental data, this will correspond to a high versus a low cost of voting.

![Figure 2: Constrained versus Unconstrained Reciprocity](image)

This may seem mechanical, but the value of \(\zeta\) should not be seen as simply some number between 0 and \(X\). The difference between low and high \(\zeta\) reflects, as we argued above, the “propensity to vote” – the greater is the propensity to vote, the higher is \(\zeta\). It’s not surprising that a higher propensity to vote may lower the probability that a candidate is constrained in her choice of \(x_1\). What is less obvious is whether observable determinants of propensity to vote affect candidate behavior in the predicted way. The results of the experiment help address this question.

Of course, \(V_2\)’s choice of whether or not to vote depends on the unobserved posteriors he puts on candidate types based on their choices of \(x_1\) and his expected \(y_2\) given their types. Relating \(\zeta\) to voter beliefs, that is, fully endogenizing \(\zeta\) requires a game-theoretic equilibrium where we specify voter beliefs consistent with candidate actions in equilibrium. (An appendix with endogenous voter behavior and full equilibrium is in progress.)

Our experimental data suggest that some type 1 candidates choose \(x_1 << X\) and get reelected. The behavior of those candidates after reelection seems primarily reasonably selfish, suggesting that \(\bar{x}_1(1, S) \leq \zeta < \bar{x}_1(1, R)\) may be a reasonable characterization of voter behavior. We find this to be the case both when voting costs are high and \((2, R)\)

---

10For example, we already noted in section 4 that in the case of purely selfish candidates the fact that \((2, S)\) chooses \(x_1 = 0\) means that \(\zeta = 0\) is the only sensible cutoff.
restricts his choice of $x_1$ (consistent with $\bar{x}_1(1,S) \leq \zeta < G \leq \bar{x}_1(1,R)$) and when voting costs are low (consistent with $\bar{x}_1(1,S) \leq G < \zeta \leq \bar{x}_1(1,R)$)

We now turn to the experimental results.

6 Experimental Design

The aim of our experiment is to investigate the interaction between intrinsic reciprocity and reelection concerns (“instrumental reciprocity”) on candidate behavior as suggested by the signaling model above. We implemented four treatments in a 2 x 2 experimental design. Treatments differed in the cost of voting, $1 in treatments 1 and 3 (the “low cost of voting games”) and $6 in treatments 2 and 4 (the “high cost of voting games”). Additionally, as in the two information cases in the model, treatments varied in the possibility of signaling type to affect reelection chances in treatments 1 and 2 (“the signaling games”) or the impossibility of signaling type for reelection purposes in treatments 3 and 4 (called the “no information games”) following Grosskopf and Sarin (2010).

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

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

Each round consisted of two sequential elections, with $V_1$ voting in the first election and $V_2$ voting in the second election. In each election, the respective voter decided whether

\footnote{Instructions for each treatment are found at https://www.dropbox.com/sh/pfbxh6woyxr8ojn/AABNf6V8UvYzOkCJCEGVMhHea?dl=0}
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 election 1 (election 2). If a voter abstained in an election, then the candidate was not elected and the round immediately came to an end. Thus, if the candidate was not elected in the first election, then the second election did not occur. The treatments may be summarized as follows:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Signaling or Mimicking Possible?</th>
<th>Cost of Voting</th>
<th>Distribution after Election 1 (X)</th>
<th>Distribution after Election 2 (Y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Yes</td>
<td>$1</td>
<td>$15</td>
<td>$10</td>
</tr>
<tr>
<td>2</td>
<td>Yes</td>
<td>$6</td>
<td>$15</td>
<td>$10</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>$1</td>
<td>$15</td>
<td>$10</td>
</tr>
<tr>
<td>4</td>
<td>No</td>
<td>$6</td>
<td>$15</td>
<td>$10</td>
</tr>
</tbody>
</table>

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.

7 Results and Interpretation

7.1 Distribution and Voting Patterns

A summary of the distribution patterns are given in Table 1, where the elected candidate has $15 to distribute in the first election and $10 to distribute in the second election.
### Table 1: Distribution of $ Benefits

<table>
<thead>
<tr>
<th></th>
<th>Treat 1</th>
<th>Treat 2</th>
<th>Treat 3</th>
<th>Treat 4</th>
<th>Treat 1</th>
<th>Treat 2</th>
<th>Treat 3</th>
<th>Treat 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type 1</strong></td>
<td>9.07</td>
<td>10.05</td>
<td>13.61</td>
<td>11.88</td>
<td>1.39</td>
<td>2.36</td>
<td>1.61</td>
<td>3.31</td>
</tr>
<tr>
<td></td>
<td>(2.21)</td>
<td>(3.26)</td>
<td>(2.16)</td>
<td>(2.96)</td>
<td>(1.87)</td>
<td>(2.77)</td>
<td>(1.96)</td>
<td>(2.50)</td>
</tr>
<tr>
<td><strong>Type 2</strong></td>
<td>3.50</td>
<td>2.82</td>
<td>2.59</td>
<td>4.93</td>
<td>8.38</td>
<td>9.18</td>
<td>8.72</td>
<td>8.02</td>
</tr>
<tr>
<td></td>
<td>(3.29)</td>
<td>(2.97)</td>
<td>(3.53)</td>
<td>(3.60)</td>
<td>(2.06)</td>
<td>(1.39)</td>
<td>(1.77)</td>
<td>(1.82)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>6.78</td>
<td>6.14</td>
<td>8.56</td>
<td>8.49</td>
<td>4.88</td>
<td>7.12</td>
<td>4.81</td>
<td>5.42</td>
</tr>
<tr>
<td></td>
<td>(3.85)</td>
<td>(4.76)</td>
<td>(6.21)</td>
<td>(4.78)</td>
<td>(4.02)</td>
<td>(3.67)</td>
<td>(4.02)</td>
<td>(3.23)</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>119</td>
<td>109</td>
<td>120</td>
<td>119</td>
<td>96</td>
<td>73</td>
<td>111</td>
<td>78</td>
</tr>
</tbody>
</table>

Mean, standard deviation in parentheses.

Voting proportions are given in Table 2. (Figures 11 and 19 show voting patterns by $V_2$ in the second election broken down by actual candidate types.)

### Table 2: Vote Proportions

<table>
<thead>
<tr>
<th></th>
<th>Treat 1</th>
<th>Treat 2</th>
<th>Treat 3</th>
<th>Treat 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voter 1</strong></td>
<td>0.952</td>
<td>0.872</td>
<td>0.960</td>
<td>0.952</td>
</tr>
<tr>
<td></td>
<td>(0.215)</td>
<td>(0.335)</td>
<td>(0.197)</td>
<td>(0.215)</td>
</tr>
<tr>
<td><strong>Voter 2</strong></td>
<td>0.807</td>
<td>0.670</td>
<td>0.925</td>
<td>0.655</td>
</tr>
<tr>
<td></td>
<td>(0.397)</td>
<td>(0.472)</td>
<td>(0.264)</td>
<td>(0.477)</td>
</tr>
</tbody>
</table>

Mean vote proportions, standard deviation in parentheses.

### 7.2 Existence of Intrinsic Reciprocity

The first question we investigate is whether candidates exhibit intrinsic reciprocity to the voters who elected them when they are free from reelection motives. We focus on the no information games (treatments 3 and 4) where candidates are unable to signal their policy type to $V_2$, so that observed reciprocity must be intrinsic rather than instrumental. We look at whether a 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.\footnote{One might argue that candidates are free from re-election 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 signaling of type is possible after the first election, it may be that observed candidate behavior after the second election behavior may be affected by signaling mechanism in the first election, including selection of more selfish types in the semiseparating equilibrium as discussed in the formal model.}

As we see in the histograms in Figures 3 and 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 give $1.61$ and $3.31$ to $V_2$ in the first election in treatments 3 and 4 respectively (Figure 3); type 2 candidates give $2.59$ and $4.93$ to $V_1$ in the second election in treatments 3 and 4 respectively (Figure 4).

We test whether this apparent reciprocity is statistically different from zero in tables 3 and 24. We use an OLS regression that accounts for possible learning effects across periods (which we do not find) and is clustered at the candidate level (to account for serial correlation in a given candidate’s choices). We find that the constant term is significant and positive in treatments 3 and 4, indicating that the amount candidates give to the voter who elected them is statistically different from zero. It is interesting to note that the amount of intrinsic reciprocity is greater in the high voting cost game (treatment 4) than the low voting cost game (treatment 3). This might reflect candidates showing higher reciprocity when voting costs are higher.
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treat 3</td>
<td>Treat 4</td>
<td></td>
<td>Treat 3</td>
<td>Treat 4</td>
</tr>
<tr>
<td>Period</td>
<td>-0.332*</td>
<td>-0.294</td>
<td></td>
<td>-0.00461</td>
<td>-0.322</td>
</tr>
<tr>
<td></td>
<td>(0.165)</td>
<td>(0.258)</td>
<td></td>
<td>(0.328)</td>
<td>(0.271)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.615***</td>
<td>4.109***</td>
<td></td>
<td>2.605**</td>
<td>5.973***</td>
</tr>
<tr>
<td></td>
<td>(0.713)</td>
<td>(0.957)</td>
<td></td>
<td>(1.004)</td>
<td>(1.278)</td>
</tr>
<tr>
<td>Observations</td>
<td>61</td>
<td>43</td>
<td></td>
<td>55</td>
<td>58</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.068</td>
<td>0.027</td>
<td></td>
<td>0.000</td>
<td>0.015</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses
Clustered at candidate level.

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

Table 3: OLS of Type 1 Candidate
$ Benefits to V2 in Election 2

Table 4: OLS of Type 2 Candidate
$ Benefits to V1 in Election 1

### 7.3 High Voting Cost

We begin with the results for a high cost of voting with (treatment 2) and without (treatment 4) the observation of benefits by V2 after election 1, that is with and without the possibility of C signaling her type. We find results consistent with the theoretical model.

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

Second, consistent with our theoretical assumptions, we find that V2’s propensity to vote increases with the benefits he received after the first election. In the aggregated data, V2’s behavior most closely resembles a cut-off strategy, with his likelihood of voting increasing significantly if he receives \( x_2 \) around $5 – $6 or more after the first election.

Given V2’s cut-off strategy, we then ask what do different types of candidates do in the laboratory.

#### 7.3.1 \((2, R)\) Constrained Reciprocity

Our main finding is that type 2 candidates who display reciprocity limit the amount they give to V1 after election 1, deviating from their first-best in order to help their reelection
chances. We regard this as a key result, as it indicates that reelection concerns may limit reciprocity. Let’s consider the results as a whole.

When the cost of voting is high, we find that some type 2 candidates are selfish, but the majority display reciprocity towards V1 in the first election. In treatment 2 (treatment 4), 31.88% (21.67%) of candidates give $x_1 = 0$ to V1 in the first election, and the remaining 68.12% (78.33%) select interior values of $x_1$. We focus on the motives of the non-selfish type 2 candidates.

We show evidence of the constraints signaling concerns place on a type 2’s intrinsic reciprocity. As shown in Table 5, type 2 candidates give on average $2.11 more to V1 in the no information game than in the signaling game ($4.93 in treatment 4 and $2.82 in treatment 2). The same trend is found if restricting the data to type 2 candidates who select $x_1 > 0$ and thus might be labeled reciprocal ($6.35 in treatment 4 and $4.50 in treatment 2).

<table>
<thead>
<tr>
<th></th>
<th>First Election</th>
<th>Second Election</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat 2</td>
<td>2.82</td>
<td>0.82</td>
</tr>
<tr>
<td></td>
<td>(2.97)</td>
<td>(1.39)</td>
</tr>
<tr>
<td>Treat 4</td>
<td>4.93</td>
<td>1.98</td>
</tr>
<tr>
<td></td>
<td>(3.60)</td>
<td>(1.82)</td>
</tr>
<tr>
<td>Observations</td>
<td>117</td>
<td>86</td>
</tr>
</tbody>
</table>

Mean, standard deviation in parentheses.

Table 5: Type 2 Candidate $ Benefit to V2 with High Cost of Voting

This can be seen visually in the histograms in Figure 5, with much higher density towards the middle of the treatment 4 graph.

Figure 5: Type 2 Candidate First Election Benefits with High Voting Cost
Furthermore, Figure 6 shows that the CDF of a type 2 candidate giving to V1 in the first election of treatment 4 first-order stochastically dominates that in treatment 2. We get a p-value of 0.007 using a two-tailed Kolmogorov-Smirnov test for the equality of the distributions (corrected for small sample size).

![Figure 6: Type 2 Candidate First Election Benefits with High Cost of Voting](image)

Moreover, consider only type 2 candidates who are re-elected (which is 86.4% of them, as shown in Figure 11). The scatter plots in Figure 7 display the benefit given to V1 in each election. As one can see, there is a lot more mass to the left side of the treatment 2 scatter plot than the treatment 4 scatter plot, indicating that in the former type 2 candidates constrain their reciprocity to V1.

![Figure 7: Type 2 Candidate Second and First Election Distribution with High Cost of Voting](image)

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

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat 4</td>
<td>2.944*</td>
</tr>
<tr>
<td></td>
<td>(1.196)</td>
</tr>
<tr>
<td>Period</td>
<td>-0.629**</td>
</tr>
<tr>
<td></td>
<td>(0.241)</td>
</tr>
<tr>
<td>Observations</td>
<td>117</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

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

SE clustered at candidate level.

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

### 7.3.2 (1, S) Mimicking and (1, R) Separating

Our main findings are that some type 1 candidates play their first-best in distributing first election benefits, thus foregoing reelection, while at the same time, many type 1 candidates pool with type 2 candidates in order to be reelected. We show evidence that a large mass of the type 1 candidates who pool with (2, R) to be re-elected can be regarded as selfish (i.e. (1, S)).

First, we show evidence that signaling motives lead type 1 candidates to mimic type 2 candidates in order to help their reelection chances. As the theoretical section explains, such behavior requires the existence of reciprocal type 2 candidates. As shown in table 7, type 1 candidates give on average $1.83 more to $V_2$ in the first election when there is no information about benefits than when there is ($4.95 in treatment 2 and $3.12 in treatment 4).
<table>
<thead>
<tr>
<th></th>
<th>First Election</th>
<th>Second Election</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat 2</td>
<td>4.95</td>
<td>2.36</td>
</tr>
<tr>
<td></td>
<td>(3.26)</td>
<td>(2.77)</td>
</tr>
<tr>
<td>Treat 4</td>
<td>3.12</td>
<td>3.31</td>
</tr>
<tr>
<td></td>
<td>(2.96)</td>
<td>(2.50)</td>
</tr>
<tr>
<td>Observations</td>
<td>111</td>
<td>65</td>
</tr>
</tbody>
</table>

Mean, standard deviation in parentheses.

Table 7: Type 1 Candidate $ Benefit to V1 with High Cost of Voting

This can be seen visually in the histograms in Figure 8 showing type 1 candidate first election distribution to \( V_2 \), where there is a much higher density towards the left in the treatment 4 histogram (lower benefit to \( V_2 \)) and the middle in the treatment 2 histogram (higher benefit to \( V_2 \)).

![Figure 8: Type 1 Candidate First Election Distribution with High Cost of Voting](image)

This may be seen also in Figure 9, which shows that the CDF of what type 1 candidate gives to \( V_2 \) in the first election of treatment 2 first-order stochastically dominates that in treatment 4. We get a p-value of 0.014 using a two-tailed Kolmogorov-Smirnov test for the equality of the distributions (corrected for small sample size).
Figure 9: Type 1 Candidate First Election Benefits with High Cost of Voting

Table 8 presents a two-limit (from below at $0 and above at $15) tobit regression clustered at the candidate level (to account for serial correlation in a given candidate’s choices). The coefficient on the treatment 4 dummy shows that the amount type 1 candidates give to V2 in the first election is significantly lower in treatment 4 than in treatment 2, that is, without versus with the possibility of signaling.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat 4</td>
<td>-2.374**</td>
</tr>
<tr>
<td></td>
<td>(1.116)</td>
</tr>
<tr>
<td>Period</td>
<td>-0.535**</td>
</tr>
<tr>
<td></td>
<td>(0.265)</td>
</tr>
<tr>
<td>Observations</td>
<td>111</td>
</tr>
</tbody>
</table>

Robust standard errors in parentheses

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

SE clustered at candidate level.

Table 8: Two-Limit Tobit, Type 1 Candidate $ Benefit to V2 in First Election (Treatments 2 vs. 4)

While it is clear that mimicking is going on, an important next question is what kind of type 1 candidates – (1, R), (1, S) or both – are mimicking (2, R) in their choice of $x_1$? While both types are concerned about reelection, (1, R) also places a value on reciprocating to V1. Hence, we saw in section 5.1.3 that the theoretical model does not give an unambiguous answer, but argued that there is a presumption that type (1, S) is more likely to mimic. The scatter plots of distribution of to V2 in the first and second election in Figure 10 suggest that
this is likely the case. The large mass at the bottom left of the treatment 4 graph disappears in the treatment 2 graph, and a new mass appears in the bottom middle. This suggests that many of the mimickers are \((1, S)\), with a signaling motive leading her to give near half of total dollar benefits to \(V^2\) in the first election but little in the second election.

Figure 10: Benefits to \(V^2\) by Type 1 Candidate in the Two Elections

Similarly, Figure 11 shows the benefits by type 1 candidates to \(V^2\) in the second election based on the benefits she gave to \(V^2\) in the first election. If we compare the \$6-$10 bins (as they are the interior bins with the greatest density in the treatment 2 histogram), it appears that re-elected type 1 \(C\) who give similar benefits to \(V^2\) in the first election reciprocate less to \(V^2\) in the second election of treatment 2 than of treatment 4 (thus indicating that the former is more selfish).\(^{13}\)

Figure 11: Expected Benefits to \(V^2\) by Type 1 Candidate in the Second Election Based on Benefit in First Election

\(^{13}\)Note that the high bar in the \([\$4 - \$6)\) bin of treatment 2 is driven by only three (reelected) type 1 candidate observations, and the greater density of (reelected) type 1 candidate observations is in the \([\$6 - \$10)\) range.
Indeed, of the type 1 candidates who give at least $6 and less than $10 to V2 in the first election of treatment 2 (who constitute 48.00%, or 24 out of 50 type 1 candidate observations), 66.67% are re-elected (16 of 24 type 1 candidate observations); and, of those that are re-elected, 62.50% (10 of 16 give type 1 candidate observations) giving nothing to V2 and the entire $10 to V1 in the second election. Mimicking increases their total payoff above the $15 they would receive if the simply maximized their first period payoff by giving everything to V1 after election 1 as short-sighted selfishness would dictate.

7.3.3 V2’s Propensity to Vote

Is restricting $x_1$ an effective reelection strategy? To answer that question we consider the voting behavior of V2 when he has information about $x_1$ before voting. Consistent with, we show that V2 is substantially more likely to vote not simply when C is indeed type 2 (remember that C’s type is never directly revealed to V2), but also the higher is the amount of money he received after the first election (the higher is $x_2$).

First, we look at V2’s propensity to vote given his benefits received in the first election ($x_2$). The scatter plot in Figure 12 shows that the likelihood of V2 voting increases in $x_2$, and strongly suggests that he uses a cut-off strategy, only considering voting when he receives at least $5 to $8 in the first election.

![Figure 12: V2 Decision by Benefit Received in First Election of Treatment 2](image)

Furthermore, Figure 13 shows that both the probability of V2’s voting and a type 2 candidate decline sharply near this range. This supports the assumptions made of V2’s behavior in the theoretical exposition.
Figure 13: Probabilities of Candidate Type and Voting by $V_2$ versus $x_2$ (Treatment 2)

We more closely examine $V_2$’s abstention rate given a candidate’s type in Figure 14. When the candidate is in fact type 2, $V_2$ abstains only 13.6% of the time, about the same as the 12.8% overall abstention by $V_1$ in election 1 (in treatment 2) and much lower than the 34.5% overall abstention by $V_2$ in treatment 4 where he had no information about either $x_1$ or the candidate’s type. (We might expect some subjects to always abstain due to high risk aversion.) In contrast, when the candidate is in fact type 1, $V_2$ abstains 56% of the time, much higher than the 13.6% abstention rate with a type 2 candidate and the 34.5% abstention rate with no information. Note that the significant non-zero abstention rate when the candidate is actually type 2 can be explained by some subjects having high risk aversion, combined with uncertainty about candidate type.

Figure 14: Voter 2 Voting Decision by Candidate Type in Treatment 2

This is confirmed in the logit regression results in Table 9 which shows $V_2$’s likelihood of voting is significantly higher when facing a type 2 candidate in the signaling treatment with high voting costs.
### Table 9: Logit Results on Marginal Effect of Candidate’s Type on V2’s Probability of Voting in Treatment 2

<table>
<thead>
<tr>
<th>Type 2</th>
<th>0.520***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(4.47)</td>
</tr>
<tr>
<td>Period</td>
<td>-0.0709*</td>
</tr>
<tr>
<td></td>
<td>(-2.21)</td>
</tr>
<tr>
<td>Observations</td>
<td>109</td>
</tr>
<tr>
<td>Baseline Predicted Probability</td>
<td>0.579</td>
</tr>
</tbody>
</table>

* $t$ statistics in parentheses
* Baseline predicted probability calculated for treatment 2, period 1 and a type 1 candidate.
* SE clustered at voter two level.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

### 7.4 Low Voting Cost

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

Consider first the choice of a type $(2, R)$ candidate. Our main finding, consistent with the result in section 5.2, is that with low voting cost, there is *not* a conflict between showing intrinsic reciprocity to $V_1$ and getting reelected, even when such benefits are observable by $V_2$. That is, $(2, R)$ can show his desired reciprocity to $V_1$ without hurting his reelection chances. This is a key finding of the paper.

The results also suggest that a type $(1, S)$ candidate often pools with $(2, R)$ in order to get reelected, as in the case with a high cost of voting. As in the case of a high cost of voting, type $(1, R)$ often play their first-best in the first election and forego re-election.

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

#### 7.4.1 $(2, R)$ Unconstrained Reciprocity
When the cost of voting is low we find that some type 2 candidates are selfish, but the majority display reciprocity towards $V_1$ in the first election (as was the case with a high cost of voting). In treatment 1 (treatment 3), 24.00% (32.76%) of candidates give $x_1 = 0$ to $V_1$ in the first election, and the remaining 76.00% (67.24%) select interior values of $x_1$. Again, we focus on the motives of the non-selfish type 2 candidates.

The results indicate that type $(2, R)$ candidates do not limit their reciprocity in order to get reelected relative to the case where first period choices do not affect reelection probabilities. That is, we see no discernible differences in choices made by type 2 candidates when signaling of type is possible (treatment 1) and when it is not (treatment 3): in both cases they play their first best. This reflect the low cost of voting relative to $V_2$’s expected benefits if $C$ is reelected. This can be seen in Table 10 showing the mean type 2 candidate first election benefits to $V_1$ in the two treatments. Type 2 candidates display intrinsic reciprocity to $V_1$ in the first election of both treatments. If anything, they give a little more ($0.91$) to $V_1$ when type may be signaled by distribution of benefits than when it cannot. This is the opposite direction from what one would expect if the need to signal created a conflict between intrinsic reciprocity and the desire to be reelected, as is the case with a high cost of voting.

<table>
<thead>
<tr>
<th>Treat 1</th>
<th>First Election</th>
<th>Second Election</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.50</td>
<td>1.62</td>
</tr>
<tr>
<td></td>
<td>(3.29)</td>
<td>(2.06)</td>
</tr>
<tr>
<td>Treat 3</td>
<td>2.59</td>
<td>1.28</td>
</tr>
<tr>
<td></td>
<td>(3.53)</td>
<td>(1.77)</td>
</tr>
<tr>
<td>Observations</td>
<td>104</td>
<td>98</td>
</tr>
</tbody>
</table>

Mean, standard deviation in parentheses.

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

The histograms in Figure 15 and CDFs in Figure 16 also shows no apparent impact of restricting reciprocity when $V_2$ uses first election choices to update his voting decision. We get a p-value of 0.229 using a two-tailed Kolmogorov-Smirnov test for the equality of the distributions (corrected for small sample size).

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

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In the Tobit regression shown in Table 11, the coefficient on the treatment 3 dummy confirms that there is no statistically significant difference in type 2 candidate choice of first-election benefits when these benefits may affect $V_2$’s choice of whether to vote or abstain and when they cannot.
Treat 3  -1.250  
    (1.237) 
Period    0.0714  
    (0.313) 

<table>
<thead>
<tr>
<th>Observations</th>
<th>104</th>
</tr>
</thead>
</table>

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1
SE clustered at candidate level.

Table 11: Two-Limit Tobit, Type 2 Candidate $

Benefit to $V1$ in Election 1 (Treatments 1 vs 3)

### 7.4.2 (1,S) Mimicking and (1,R) Separating

Next, we show evidence that type 1 candidates pool with type 2 candidates in order to help their re-election chances. As shown in Table 12, type 1 candidates give on average $4.54 more to $V2$ in the first election when signaling of type is possible than when it is not. ($5.93 in treatment 1 and $1.39 in treatment 3).

<table>
<thead>
<tr>
<th>First Election</th>
<th>Second Election</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treat 1</td>
<td>5.93</td>
</tr>
<tr>
<td></td>
<td>(2.21)</td>
</tr>
<tr>
<td>Treat 3</td>
<td>1.39</td>
</tr>
<tr>
<td></td>
<td>(2.16)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Observations</th>
<th>135</th>
<th>109</th>
</tr>
</thead>
</table>

Mean, standard deviation in parentheses.

Table 12: Type 1 Candidate $ benefit to $V2$ with Low Cost of Voting

This can be seen visually in the histograms in Figure 17 showing type 1 candidate first election benefits to $V2$, with much higher density towards the left in the treatment 3 histogram (lower benefit to $V2$) and the middle in the treatment 1 histogram (higher benefit to $V2$).
Figure 18 shows that the CDF of type 1 candidate giving to V2 in the first election of treatment 1 first order stochastically dominates that in treatment 3. We get a p-value of 0.000 using a two-tailed Kolmogorov-Smirnov test for the equality of the distributions (corrected for small sample size).

This pattern is confirmed by the Tobit regression in table 13, which shows that this difference in a type 1 candidate’s first election behavior with and without the possibility of signaling type is statistically significant.
Table 13: Two-Limit Tobit, Type 1 Candidate $\text{\$ Benefit to } V_2 \text{ in Election 1 (Treatment 1 vs 3)}$

As in the case with a high voting cost, we argue pooling with $(2, R)$ is often by selfish rather than reciprocal type 1 candidates, that is, by $(1, S)$ but not $(1, R)$. The scatter plots in Figure 18 show type 1 candidate giving in both elections of each treatment. It seems that the large mass to the bottom left of the treatment 3 graph disappears in the treatment 1 graph, and a new mass appears in the bottom middle. This supports the claim that many of the mimickers are $(1, S)$, as the signaling motive induces her to give near half of the pie to $V_2$ in the first election but little to $V_2$ in the second election.

![Figure 19: Type 1 Candidate Second and First Election Benefits with Low Cost of Voting](image)

Similarly, Figure 20 shows the average benefits by type 1 candidates to $V_2$ in the second election based on her benefits to $V_2$ in the first election. If we compare the $\$4-$\$10$ bins (as they are interior bins with the greatest density in the treatment 1 histogram), it appears that re-elected type 1 C who give similar benefits to $V_2$ in the first election reciprocate less to $V_2$ in the second election of treatment 1 than of treatment 3 (thus indicating that the former is more selfish).
Indeed, as shown in Figure 17 above, the modal amount of benefits type 1 candidates give to V2 in the first election of treatment 1 is $7.5 (31%, or 22 out of 70 candidate observations), exactly half the pie. Of the type 1 candidates who give at least $4 and less than $10 to V2 in the first election of treatment 1 (who constitute 84.29%, or 59 out of 70 type 1 candidate observations), 77.97% are re-elected (46 out of 59 candidate observations). Of those that are re-elected, 54.35% (25 out of 46 type 1 candidate observations) give $0 to V2 in the second election and 65.22% (30 out of 46 type 1 candidate observations) give $1 or less. As argued above in the case of high voting costs, by not giving $15 to V1 after election 1, as one period optimization would imply, they get reelected and enjoy a higher overall payoff.

7.4.3 V2’s Propensity to Vote

Analogous to the discussion in section 7.3.3, we consider the voting behavior of V2 in the signaling game with a low voting cost. While V2 voted in fairly high proportions due to the low voting cost, we find – analogous to the high voting cost case, that he is substantially more likely to vote the more money he received in the first election and when C is indeed type 2 (where C’s type is never directly revealed to V2).

The scatter plot in Figure 21 shows clear evidence that V2 uses a cut-off strategy, only considering voting when he receives at least $5 to $8 in the first election.
This can also be seen in the histogram in Figure 22 which shows that both the probability of V2’s voting and of a type 2 candidate declines sharply near this range.

The pie graphs in Figure 23 show V2’s abstention rate for each type of candidate. When the candidate is in fact type 2, V2 abstains only 2.0% of the time (1 out of 49 observations), slightly lower than the 4.8% overall abstention by V1 (in treatment 1) and the 7.5% overall abstention by V2 in treatment 3 when there is no possibility of the candidate signaling her type with no information. In contrast, when C is in fact type 1, V2 abstains 31.4% of the time, significantly lower than V2’s 56.0% abstention rate found when voting costs were high. Additionally, this is much higher than the 2.0% abstention rate with a type 2 candidate and the 7.5% abstention when no information about candidate type is conveyed.
The type 2 candidate dummy in the logit regression results in Table 14 shows that V2’s voting likelihood is significantly higher when facing a type 2 candidate (when candidates’ first election choices are observable to him).

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>t statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 2</td>
<td>0.688**</td>
<td>(3.16)</td>
</tr>
<tr>
<td>Period</td>
<td>0.0184</td>
<td>(0.48)</td>
</tr>
</tbody>
</table>

Observations 119
Baseline Predicted Probability 0.655

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

Table 14: Logit Results on Marginal Effect of Candidate’s Type on V2’s Probability of Voting in Treatment 1
8 Conclusions

Reciprocity to kind actions characterizes human behavior. Those chosen to make decisions for others often show gratitude to those who chose them, a finding confirmed in the lab whereby elected leaders show reciprocity to voters who elected them. But, will elected leaders be similarly reciprocal to past voters when this may conflict with the desire to get reelected? We study this question in this paper by setting out a theoretical model of this conflict when reelection requires a candidate signaling 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 signaling unobserved candidate type, subjects in the lab act in accordance with a basic signaling model. Candidates play their first-best choices where signaling is not possible but restrict those choices when signaling of type may help their reelection chances. Voters appear to read the signals correctly.

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

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


