Public Voting and Prosocial Behavior[1]

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Abstract

One argument against secret ballots is that such procedures lead to more selfish voting behavior and that public voting can increase prosocial voting and the likelihood of prosocial outcomes when voters are not subject to intimidation and coercion from outside interests. We investigate this supposition as well as voter preferences over observability in voting in this context. We find that voters are significantly more likely to choose nonselfishly when voting is public. These differences in behavior advantage prosocial choices in elections (by 27%) when voting is public. Moreover, voters appear to recognize these differences and a substantial minority of voters whose selfish preference is not the prosocial choice willingly choose public voting even though the likely outcome will be costly to themselves.

The argument that the secret ballot facilitates selfish behavior at the expense of the public good goes back to at least John Stuart Mill (1862). Much recent experimental research finds that observability alone may influence individuals' choices, in particular, their willingness to engage in prosocial behavior.[1] This evidence suggests that Mill's criticism of secret ballots may be correct: that the extent that voting is public may affect individuals' willingness to forgo private selfish concerns for "the greater good."

Of course, one of the main arguments in favor of secret ballots is the fear that when voting is public individuals will be subject to intimidation and coercion, forced to bend to the will of others with greater political power which may not lead at all to a prosocial outcome. But when such concerns are absent or there are safeguards to prevent strong armed tactics by private interests, public voting may have the desirable property of reducing selfish behavior and promoting more prosocial choices.

In this paper we investigate voters' preferences over secrecy in balloting in which some voters' selfish choices are contrary to the prosocial choice and intimidation and coercion by selfishly motivated outsiders is not an issue. We conduct experiments in which voters participate in elections using both secret ballots and public voting and then choose which method of voting to use in subsequent elections. In our experiments we are able to control and manipulate underlying voter preferences and the choices before voters while varying privacy in voting independently so that we can measure voter preferences over voting mechanisms as well as the causal effect of observability directly.

In the next section we briefly review related literature. We then turn to the voting games used in the experiment and equilibrium predictions, our experimental design and results, followed by concluding remarks.

Related Literature

The extent that individuals have privacy in voting is not uniform. Recent studies of e-voting systems which are being adopted or considered in many jurisdictions find that they cannot guarantee the anonymity of a secret ballot (see Jefferson, Rubin, Simons and Wagner, 2004; Loeber and Council, 2008). Mail-in and absentee ballots used in many states and localities are also potentially not secret as individuals' choices may be made in homes and other localities where privacy may not be ensured. Legislatures vary in their use of

[1]See Kahneman, Knetsch and Thaler (1986); Forsythe, Horowitz, Savin and Sefton (1994); Camerer (2011); Koch and Normann (2008); Funk (2010).

secret ballots; although public voting is used for most votes in the U.S. Congress, secret ballots are often used in making committee assignments (see Frisch and Kelly, 2006) as well as in some leadership and other internal decisions. Similarly, while most European countries adopted public voting early in the 20th century, the Italian parliament used secret ballots extensively until 1988 and the President in Italy (not Premier) is still elected by secret ballots of legislators and regional delegates. The European Union parliament allows for the use of secret ballots if requested by 20% or more of its members. Likewise, Robbins (2007) finds that although most law schools in the United States use secret ballots for personnel decisions, nine of the top eleven law schools (according to rankings in U.S. News & World Report) do not use them.

Despite the variance in the extent that voting is public, the theoretical argument that observability makes voters more socially responsible, and the suggestion from other research that observability affects individuals' prosocial behavior, there is no empirical evidence on the question of the effects of secret ballot on the content of voters' choices either in the field or the laboratory nor of how voters would choose between voting mechanisms in the context of a prosocial choice. Most of the empirical research on the secret ballot (both with observational and experimental data) focuses on its effects on turnout in large elections.[2] The observational research suggests that the advent of the secret ballot in U.S. elections led to a large decline in turnout, which most presume resulted from a reduction in vote buying, although some argue that the decline is due to the literacy requirements implicit in a secret ballot.[3]

A recent field experiment conducted during a naturally occurring election suggests a complicated relationship between the secret ballot and turnout in modern day elections. Specifically, Gerber et al. (2013) found that alleviating privacy concerns of voters who do not have a history of participation can increase their turnout, while having little effect on voters who tend to vote regularly. Furthermore, another field experiment on privacy in a naturally occurring election found that voters whose preferences are in the minority are most likely to be concerned about the privacy of their decisions (see Karpowitz et al., 2011), suggestive of a relationship between observability and social conformity.[4] Related to these

[2]See for example, Rusk (1970); Heckelman (1995); Gerber, Huber, Doherty, Dowling and Hill (2013); Karpowitz, Monson, Nielson, Patterson and Snell (2011).

[3]For example, Heckelman (1995) contends that the decline is due to the reduction in vote buying while Kousser (1974) contends that the secret ballot increased the literacy requirement for voting which penalized black and poor voters disproportionately. Vicente (2014) found that a campaign against vote buying in West Africa significantly reduced turnout and increased the vote share of the incumbent.

[4]Grönlund, Setälä and Herne (2010) conducted a deliberation experiment in the field in which they

studies is the work of DellaVigna, List, Malmendier and Rao (2016) and Rogers, Ternovski and Yoeli (2016) who find that participation increases when voters are asked about their voting after the fact. These field studies on turnout, however, are unable to investigate directly whether the secret ballot actually changes individual voters' choices, makes them choose more selfishly and less for socially desirable options. That is, although there may be effects of the secret ballot on vote shares (as found by Vicente, 2014), these effects could be simply due to the effects of observability on turnout, not in voters making different choices. Moreover, in naturally occurring elections it is difficult to measure individuals' private preferences and determine when a voter's selfish preference may be in conflict with an arguably prosocial choice. The closest such study is Funk (2016), who finds differences in stated preferences in a (face-to-face) survey and "revealed preferences" at the (secret) ballot box. Finally, we are unaware of any study of voter preferences over observability in voting in which individuals choose which mechanism to use.[5]

Research Design

Voting Games

We investigate a simple voting game in which there are 10 voters, divided into two groups, labeled A and B voters. There are x type A and $(10-x)$ type B voters, where $x = 6$ in our principal treatments.[6] The size of the electorate and of each type of voters is common knowledge. All voters receive monetary payoffs that depend on which party is elected. Table 1 presents the payoffs in the principal voting games.[7] Subjects were asked to vote for party A, party B, or abstain. Hereafter, for expositional purposes, we label the votes for own party "selfish preference" and the votes for other party "other party voting." Voting for a party is costly, while abstaining is free. The cost of voting was always \$2. Although subjects played 24 voting games in a session (8 games of each type of election), only one voting game of the total was paid. This game was randomly selected by one of the subjects

compared secret ballots with nonsecret deliberation. They found little differences in opinion changes between treatments, but a greater increase in knowledge of participants without secret ballots.

[5] A number of previous experiments compare simultaneous private voting with sequential public voting such as Morton and Williams (1999, 2000), Battaglini, Morton and Palfrey (2007), and Fischbacher and Schudy (2013). In situations of sequential voting, earlier voters may have an incentive to attempt to influence later voters as later voters update based on observed choices. In this paper we wish to isolate the effects of observability of one's vote from the effects of choosing sequentially versus simultaneously.

[6] As explained in Supplemental Online Appendix B, we vary x in our robustness tests.

[7] In the Supplemental Online Appendix A, we discuss the modeling and equilibrium predictions.

at the end of each session.

Table 1: Voter Payoffs in U.S. Dollars

	Election C		Election E1		Election E2	
Voter Type	A wins	B wins	A wins	B wins	A wins	B wins
A	20	5	25	20	25	18
B	5	20	5	20	5	23

We used a random dictator rule to determine the winner in each election. Specifically, in each election all ballots (including abstentions) were placed in a box and a subject was chosen to draw one of the ballots to determine the winner. Subjects were chosen to draw the winners sequentially such that all subjects chose the winner in at least two elections. If the ballot drawn was an abstention then another ballot was drawn until a ballot marked with either A or B was chosen.[8] We used the random dictator rule for four reasons. First, introducing a random effect on the outcome of the election allowed us to identify unique symmetric equilibria to the voting games in our principal treatments, as described below.[9] Second, the random dictator rule introduced some uncertainty over the outcome of the election such that even if all voters voted sincerely, there was a probability that B could win the election. This uncertainty captures the "realism" of naturally occurring voting situations in which individual preferences may be subject to random shocks or variations. Third, the randomness helps to relax the artificial condition that voters know the exact distribution of voter types. Even in the era of scientific polling, estimates of the distribution of voters are imprecise; so while the information about the distribution is precise in the experimental setting, the final outcome is similarly imprecise because of the random dictator rule. Fourth, in order to manipulate the degree of privacy subjects experienced in the voting games (as discussed below), we conducted the experiment "by hand," not via computer networks as is typical for such voting experiments. Hence, it was more time efficient to use the random dictator rule than the traditional counting of the ballots (although we did also publicly count ballots in some treatments as we describe below).

[8]Feddersen, Gailmard and Sandroni (2009) use a similar mechanism. However, in their formulation if the dictator drew an abstention, then the computer randomly chose which choice was the winner.

[9]An alternative method of introducing random effects in voting games is to make the cost of voting random as in Levine and Palfrey (2007). Given that we conducted this experiment without the aid of a computer network in order to manipulate privacy, the added complication of having a random cost of voting would have made the experiment longer than is typically acceptable for subjects. As discussed below, there are asymmetric equilibria in voting games C and E2, but we find little support for these equilibria in the data.

As noted in Table 1, we conducted three types of elections, a *Control Election* (Election C) and two *Prosocial Elections* (Elections E1-E2). Following Feddersen et al. (2009), our payoffs in the prosocial elections meet the following three conditions:

(a) Party B minimizes the inequality in payoffs
(b) Party B maximizes the minimum payoff
(c) Party B maximizes aggregate payoffs

In our Control Election, the inequality in payoffs and the minimum payoff for party A is the same as for party B and neither condition holds for either party. However, voting for party A maximizes the sum of payoffs when $x = 6$ in our Control Election because A voters will be in greater numbers. Thus, in our Control Election voting for party A is weakly prosocial (Condition (c) is satisfied for party A, but not conditions (a) or (b)). Hereafter, vote choices when an A subject chooses party B in E1 and E2 (or when a B subject chooses party A in C) are labeled "prosocial other party voting" and vote choices when a B subject chooses party A in E1 and E2 (or an A subject chooses B in C) are leaded "non-prosocial other party voting."

The prosocial elections vary in whether inequity results when party B wins. That is, in Election E1, both types of voters benefit equally if party B wins, but in Election E2, voting prosocially for A voters means that they give B voters more of a payoff than they receive themselves. Hence Election E1 is a prosocial election without inequity and Election E2 results in inequity. When such inequity exists, A voters may place a lower value on voting prosocially for party B as when such inequity does not exist. Feddersen et al. (2009), for example, set up their prosocial choice so that such inequity does not occur because they anticipate voters will be less willing to sacrifice to benefit others.[10] Thus, if A voters care about the fairness of outcomes in relation to themselves, we expect to observe more prosocial voting in Election E1 than in Election E2. Note also that the aggregate payoffs are the same in E1 and E2, so the only difference is in the degree of fairness.

We assume that with probability θ a voter is a "prosocial" voter and will always vote for the prosocial choice and with probability $1-\theta$ a voter is selfish and will make a voting choice in order to maximize his or her expected selfish payoffs. Implicitly we assume prosocial voters are expressive rather than instrumental since their vote choice is assumed independent of the instrumental benefits of voting. Furthermore, we assume that θ is a function of observability,

[10] Shayo and Harel (2012) similarly set up their prosocial choice to involve an equal distribution of payoffs.

such that an increase in observability of votes increases θ (see Friedrichsen and Engelmann (2017) for a similar study).

We choose to model prosocial behavior in this fashion rather than assuming that a voter receives some utility from voting for the prosocial choice since we are agnostic as to the motivations behind voting prosocially. That is, as Batson and Powell (2003) discusses, prosocial behavior does not imply or require altruistic preferences. Indeed, if observability of voting leads to more prosocial behavior, then arguably one reason is that these voters are engaging in the behavior not because they are more altruistic in such a situation, but because they care about how they are perceived, their social image (note that we minimize possible reciprocity and reputation reasons in our experimental design). Yet, we also do not want to assume that all prosocial voting is due to social images concerns; we wish to allow that some voters are genuinely altruistic and engage in prosocial voting even when ballots are secret and social image concerns are not relevant. Voters may also vote prosocially when voting is secret because of self-image concerns as well. Our experimental design, by varying privacy, allows us to manipulate social image concerns to determine if they affect prosocial voting. We derive the symmetric mixed strategy equilibrium for different levels of θ and calculate the expected payoffs for different types of voters. The results are reported in Table 2.

Table 2: Predictions with Prosocial Voters

			Expected Percent Votes						Pr.	Expected Payoffs			
			From All A's			From All B's			A	Seflish		Prosocial	
θ	p^*	q^*	A	B	Abs.	A	B	Abs.	wins	A	B	A	B
Election C													
0.02	0.325	0.526	34%	0	66%	2%	52%	46%	50%	11.84	11.44	10.5	10.5
0.06	0.255	0.542	30%	0	70%	6%	51%	43%	50%	11.98	11.42	10.5	10.5
0.10	0.184	0.558	27%	0	73%	10%	50%	40%	50%	12.14	11.38	10.5	10.5
0.14	0.113	0.575	24%	0	76%	14%	49%	37%	50%	12.28	11.34	10.5	10.5
Election E1													
0.02	0.008	0.325	0.8%	2%	97.2%	0	34%	66%	4%	22.48	11.76	18.2	17.4
0.06	0.010	0.235	1%	6%	93%	0	28%	72%	4%	22.48	11.92	18.2	17.4
0.10	0.014	0.135	1%	10%	89%	0	22%	78%	4%	22.47	12.22	18.2	17.4
0.14	0.021	0.015	2%	14%	84%	0	15%	85%	4%	22.46	12.46	18.2	17.4
Election E2													
0.02	0.083	0.442	8%	2%	90%	0	45%	55%	20%	21.33	16.62	17.4	17.4
0.06	0.089	0.362	8%	6%	86%	0	40%	60%	20%	21.32	16.78	17.4	17.4
0.10	0.095	0.270	9%	10%	81%	0	34%	66%	20%	21.31	17.06	17.4	17.4
0.14	0.103	0.164	9%	14%	77%	0	28%	72%	20%	21.29	17.18	17.4	17.4

Experiments I and II

In our study we are interested in voters' preferences over observability in voting in the context of a prosocial choice. However, our theory concerning voter preferences is based on the assumption that observability causes voters to be more prosocial, which has not been previously established. Hence, we conduct our study in two Experiments I and II. In Experiment I, we first establish whether there are effects of observability on subjects' prosocial voting behavior and in Experiment II we consider voter preferences between public voting and secret ballots.

The experiments were conducted at a large U.S. university. Subjects were recruited via a subject pool in which there are more than 4,500 registered students from different majors. Subjects were not allowed to participate in more than one session of the experiments. Subjects were identified by their ID numbers; no names were revealed before or after the experiment. Subjects received a show-up fee of $8. On average, the payoff for each subject was about $24.

Experiment I

In Experiment I, we conducted three principal treatments: Secret Ballot (hereafter, S), Secret Ballot with Information (hereafter, SI), and Public Voting (hereafter, P). We wished to provide subjects with anonymity from even the experimenter as well as other subjects in order to ensure that S and SI were equivalent to a true secret ballot (we explain the difference between S and SI below). And in P, we wished to ensure that individuals faced each other and could observe each others' voting choices. As such, we chose to conduct our experiment using pen and paper rather than the standard computerized environment used in such experiments.

To maintain anonymity in S and SI we recruited an additional subject as "monitor." The monitor sat in a room where he or she could not see the subjects but could see the experimenters and hear the experimental instructions. The monitor calculated payoffs for subjects by ID number, but did not know which subject was assigned to which number. In P our special concern was that subjects made decisions simultaneously, but then revealed them sequentially without the ability to change decisions in response to others' choices. We implemented special procedures as a result. We describe our procedures in full detail in the Supplemental Online Appendix B.

One possible confounding factor in P is a possible experimenter effect. That is, in P

as compared to S and SI, not only can other voters observe voters' choices, but also the experimenters. To make sure that the effect we observe is the effect of observability of other voters rather than the experimenter, we also conducted a version of S, SE, in which voters' choices were observed by experimenters but not by other voters, which is reported on in the Supplemental Online Appendix B. We find the same effects when we compare P to SE as we do when we compare P to S and SI.

In Experiment I we conducted 6 sessions which varied by privacy treatment with 2 sessions each of S, SI, and P. Because of the complicated procedures, we used a between-subjects comparison of privacy treatments, but varied elections within each session, using between- and within-subjects comparisons of election types.

We used a fixed order of elections in Experiment I in which $x = 6$ (there were 6 A and 4 B voters) and subjects participated in Elections C, E1, and E2 sequentially, with 8 periods for each for a total of 24 elections. That is, for periods 1-8 subjects played Election C with $x = 6$, for periods 9-16 subjects played Election E1 with $x = 6$, and for periods 17-24 subjects played Election E2 with $x = 6$. Subjects also stayed in the same roles throughout a session. The design was chosen in order to facilitate learning and convergence to equilibria as well as within-subjects' comparisons of behavior across election types. In the Supplemental Online Appendix B we report on robustness tests with other sequences of elections and for other values of x. We find our results are robust across such comparisons.

In P voters necessarily receive information on the distribution of voter choices after an election given that there is no privacy. However, in S, subjects are only given the information of who won each election, not the complete distribution of voter choices after each election. Revealing voter distribution information also allows voters, in some cases, to infer what choices others are making and thus to some extent provides less privacy. For instance, if all voters choose their selfish preference, revealing votes of 6 for party A and 4 for party B, then it may seem a safe inference to voters that everyone is voting selfishly.

Hence, in S we did not reveal vote distribution information. We controlled for the effects of such information as distinct from the variation in privacy by conducting SI, in which the information on the distribution of voter choices was revealed even though the choices were private. SI was conducted exactly as S, except that after each election, the envelopes containing voter's choices were opened and the distribution was tabulated and written on the board for subjects to see. The identities of the voters by choices, were, however, kept anonymous to both the experimenter and the other subjects as described above.

Results: Experiment I

Main Results

Given that all voter decisions are made simultaneously (even when there is limited privacy as in P), the selfish and prosocial voting predictions should continue to hold regardless of privacy condition. Moreover, our design limits the ability of subjects to engage in coercion or otherwise intimidate or bribe fellow voters since the subjects did not know each other in advance, did not know the details of the experiment in advance, and communication between subjects was not allowed during the experiment. Therefore, we do not expect that reductions in privacy should affect voters via those mechanisms. Our focus is on the effects of observability on the willingness of voters to both participate and choose prosocially rather than selfishly without coercion, intimidation, bribes, or communication.

We find minor effects of vote distribution information on voting behavior when comparing SI to S. The results reported in this section are based on the results observed in treatments of Secret Ballots (S and SI) and Public Voting (P). The detailed analysis of selfish voting behavior, the comparison of SI and P and the comparisons of S and P and SI to S, learning, and the design and results from robustness checks are in the Supplemental Online Appendix B. Our main results are qualitatively robust to additional investigations and robustness checks.

Hypothesis 1 (Experiment I: Direct Effect)**.** *We expect that voters whose selfish preference is not the prosocial choice should vote more prosocially under public voting. That is, observability increases the probability that B voters are prosocial and they vote more for A in Election C under public voting than secret ballots and that A voters are more prosocial and they vote more for B in Elections E1 and E2 under public voting compared to secret ballots.*

Result 1 (Prosocial Voting is Greater When Public)**.** *Voters are generally more likely to choose prosocially when voting is public.*

Support. We first consider the effects of observability on other party voting, our principal interest. Figure 1 below presents other party voting by privacy treatment and voter type in each period in an election type. Prosocial other party voting does appear to be affected by whether voting is public or not, although the effect is not always significant. Specifically, in Election C we expect B voters to vote prosocially for party A. B voters choose party A 11% of the time when voting is public as compared to less than 1% of the time when it is private

($z = 3.32$, $Pr = 0.001$), whereas A voters in Election C vote for party B less than 1% of the time with both secret ballots and public voting ($z = 0.71$, $Pr = 0.48$).[11] In Elections E1 and E2, we expect prosocial other party voting by A voters. We find significant effects in Election E2: A voters choose party B 38% of the time when voting is public as compared to about 12% of the time when it is private, whereas B voters in Election E2 never vote for party A.[12] In Election E1, we do not find a statistically distinguishable difference on other party voting between public voting (6%) and secret ballots (6%) ($z = 0.17$, $Pr = 0.87$). We find slightly more other party voting by B voters under public voting (3% as compared to 1%, $z = 1.23$, $Pr = 0.22$), but an examination of Figure 1 shows that the effect appears a delayed reaction to the change in the voting payoff matrix by some voters. We thus find some support for our prediction concerning the Direct Effect of Observability.

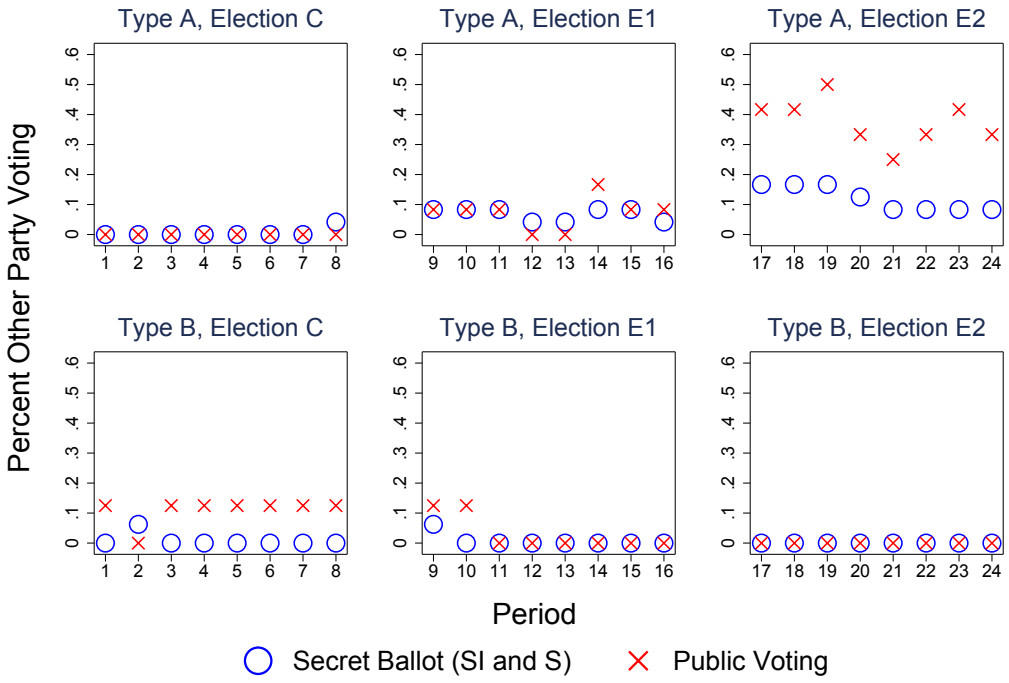

Figure 1: Other Party Voting by Privacy Treatment

However, as discussed in the Supplemental Online Appendix A, increasing θ leads to compensating behavior of non-prosocial voters such that prosocial choices are not actually

[11] We are not able to cluster our observations by subject since our privacy procedures prevent us from identifying individual subjects' choices.

[12] The z statistic comparing Type A voters' choices $= 5.06$, $Pr < 0.001$.

advantaged. That is, selfish voters who prefer the prosocial choice should participate less and selfish voters whose selfish preference is not the prosocial choice should participate more.

Hypothesis 2 (Experiment I: Indirect Effect)**.** *We expect that under public voting selfish voters whose selfish preference is not the prosocial choice will participate more, voting selfishly and those selfish voters whose selfish preference is the prosocial choice will participate less, abstaining more. That is, osbervability also leads to greater voting for B by B voters in Election C and greater voting for A by A voters in Elections E1 and E2. Observability also leads to more abstention of A voters in Election C and B voters in Elections E1 and E2.*

Result 2 (Turnout is Higher Under Public Voting)**.** *Overall, observability of voting behavior results in higher participation of voters. The effects of observability of voting behavior on turnout of voters depends on whether voters' first preference is the prosocial choice.*

Support. Figure 2 below presents percent abstention by privacy treatment, election type, and voter type in each period. We find that overall abstention is significantly lower under Public Voting than under Secret Ballots treatments. A voters abstain about 33% of the time overall under secret ballots but only 20% in P ($z = 3.82$, $Pr < 0.001$), while B voters abstain 41% under secret ballots as compared to 15% in P ($z = 6.43$, $Pr < 0.001$). When we break the effects down by election type, the effects become more nuanced. In Election C, which takes place in the first 8 periods of each session, the greater participation of both A voters (abstention is 20% under secret ballots as compared to 7% in P) and B voters (abstention is 41% under secret ballots as compared to 27% in P), is significant.[13] In E1 we find that the effects of observability on turnout are significant. A voters abstain 44% of the time under secret ballots but only 27% in P ($z = 2.83$, $Pr = 0.005$), while B voters abstain 40% of the time under secret ballots as compared to 14% in P ($z = 3.63$, $Pr < 0.001$). However, we find that in Election E2, there is only a significantly higher participation rate of B voters, whose selfish preference is the prosocial choice (A's abstain 35% of the time under secret ballots as compared to 27% in P and B's abstain 42% of the time under secret ballots as compared to only 3% of the time in P).[14] The Indirect Effect Prediction of Observability suggests that B's should abstain more in P than in S and SI and A's should abstain less. Taken together, while the greater participation of B voters is predicted by the Indirect Effects of Observability, A voters are predicted to abstain more in P than in S and SI, contrary to what we observe.

[13]The z statistic for the comparison with A voters is 2.75, $Pr = 0.006$ and for B voters 2.01, $Pr = 0.04$.

[14]For the comparison for E2, Type A, the z statistic = 1.34, $Pr = 0.18$ and for Type B = 5.61, $Pr < 0.001$.

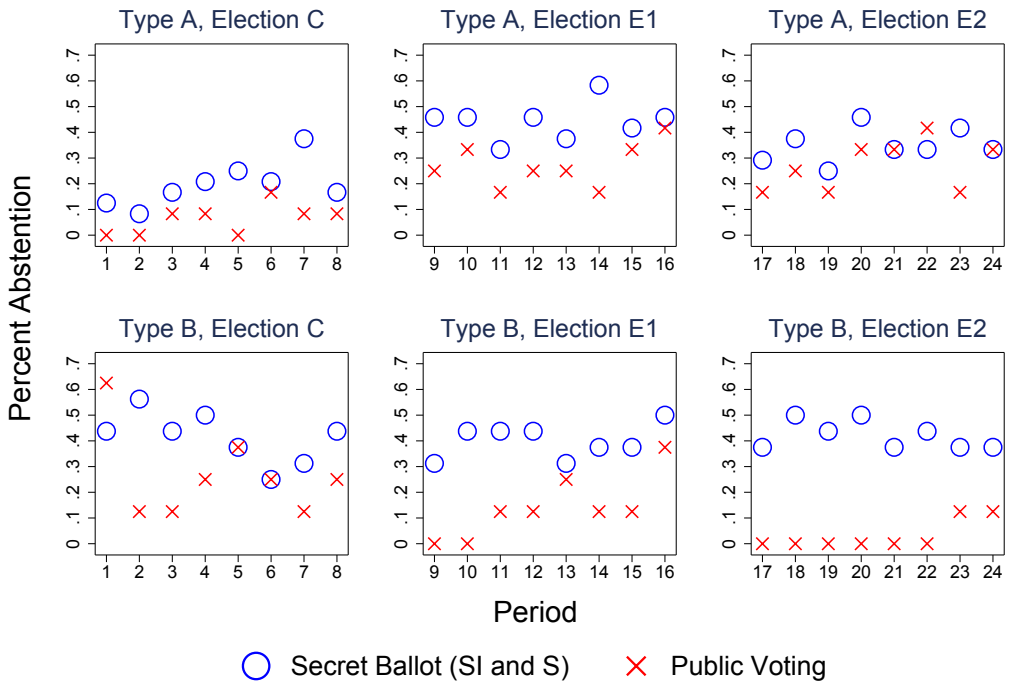

Figure 2: Abstention by Privacy Treatment

One explanation for such behavior may be social image concerns. For example, the field evidence of Karpowitz et al. (2011) suggests that voters whose preferences are in the minority are likely to be more concerned about their privacy in expressing their vote choices. Hence, under public voting we might expect that turnout of those voters who think their vote choices may be contrary to the majority opinion might be lower as compared to S and SI. Instead of engaging in compensating behavior by participating more, selfish voters whose selfish preference is not the prosocial choice may be choosing to participate less because they are unwilling to reveal their preference types. By abstaining, these voters are not "outed" as being selfish and having preferences contrary to the social norm (e.g., Bénabou and Tirole, 2006).

Hypothesis 3 (Experiment I: Joint Effects on Election Outcomes)**.** *The combination of Direct and Indirect Effects implies that observability should have no effect on the probability that the prosocial choice wins unless the effects of observability on prosocial voting is exceptionally large.*

Result 3 (Prosocial Choice Wins Somewhat Higher Under Public Voting)**.** *Prosocial parties are more likely to win in Election E2 when voting is public.*

Support. Given that we find support for the Direct Effects, but no support for the Indirect Effects, then it is not surprising that we find that observability increases the likelihood that prosocial parties win. Nevertheless, the greater turnout and prosocial other party voting actually leads to a higher probability of A winning in Election C under public voting (71%) than secret ballots (68%), although the difference is not significant ($t = 1.17$, $Pr = 0.25$). Similarly, overall in Election E1, the estimate of A winning is slightly higher under public voting (53%) and secret ballots (52%), but the difference is not significant either ($t = 0.27$, $Pr = 0.79$). In Election E2, as expected, the higher prosocial other party voting and the differential effect of observability on turnout under P leads to a significantly lower probability A wins than under secret ballots (26% vs 53%, $t = 6.94$, $Pr < 0.001$). Thus, we find strong evidence that public voting in Election E2 increases the probability that the prosocial choice wins, by approximately 27 percentage points.

Measuring Subject Types

To further explore the implications of our theory, we estimated a mixture model allowing for two different types of voters: the prosocial voters ($\mathcal{P}$) will always vote for the prosocial choice and the selfish ($\mathcal{S}$) voters will sometimes vote for the selfish choice but other times abstain ($\varnothing$).[15] Our method is similar to Cappelen, Hole, Sørensen and Tungodden (2007) in that our model takes into account the presence of different types of players within a population. Let y_{it} be the observed voting choice by subject i at time t, and p $(0 < p < 1)$ denote the probability that an individual is a prosocial voter. Then, the likelihood choice for subject i is:

$$L_i = p \prod_{t=1}^{T} Pr\left(y_{it} = \varnothing|\mathcal{P}\right)^{I_{y_{it}=\varnothing}} Pr(y_{it} = A|\mathcal{P})^{I_{y_{it}=A}}|Pr(y_{it} = B|\mathcal{P})^{I_{y_{it}=B}}$$
$$+ (1-p) \prod_{t=1}^{T} Pr(y_{it} = \varnothing|\mathcal{S})^{I_{y_{it}=\varnothing}} Pr(y_{it} = A|\mathcal{S})^{I_{y_{it}=A}} Pr(y_{it} = Vote\ B|\mathcal{S})^{I_{y_{it}=B}}$$

where $I_{(.)}$ is the indicator function that takes the value 1 if the subscripted expression is true and 0 otherwise. The objective function of the maximum likelihood estimation is therefore given by

[15] More details of the estimation are reported in Appendix B.

$$LogL = \sum_{i=1}^{n} \log L_i$$

Again, we use the results observed in treatments of Secret Ballot (S and SI) and Public Voting (P) to estimate subjects' types. Since our principal interest is on the effects of observability on voters' prosocial behavior, we combine A's voting in E1 and E2; similarly, we focus on B's voting in EC. We report the results of the estimation in Table 3.

Table 3: Distribution of voter types, based on modal behavior

Player	Secret Ballot	Public Voting	Combined	χ^2 statistic	p-value
A's	0.094	0.219	0.135	16.2	0.00
	(360.689)	(204.834)	(573.603)		
B's	0.008	0.109	0.042	10.6	0.00
	(93.878)	(61.603)	(160.794)		

Note: Log-likelihood estimation is reported in parentheses.

The results of the mixture model estimation suggests that the public recognition of good behavior has a significant effect on prosocial voting behavior. Specifically, both A and B voters are more likely to be a prosocial voter in P than under secret ballots. The results of the mixture model analysis are consistent with our main results reported earlier.

Experiment II: Choosing Between Public Voting and Secret Ballot

The Setup of Experiment II

We find strong evidence that voter behavior is affected by observability, even controlling for the possibility of signaling through sequential choices, coercion, or intimidation. Voters whose first preference is the prosocial choice participate at a greater rate and those whose first preference is not the prosocial choice engage in prosocial other party voting and to some extent greater abstention. Prosocial choices are as a consequence significantly more likely to win when voting is public. Although the effects on participation are contrary to our theoretical predictions, the effects of observability on the outcomes of the elections, advantaging the prosocial choice, are not inconsistent with a large effect of observability on prosocial behavior as we predicted. An important question is whether voters would actually

prefer public voting to secret ballots in order to advantage prosocial outcomes. Institutions are endogenous. Hence, in Experiment II, we investigate how voters choose between voting mechanisms.

In Experiment II we conducted six sessions with 10 subjects each in which subjects experienced both types of voting systems and then were given the opportunity to vote over which system they preferred for succeeding periods. Subjects played Election E1 only in these sessions and $x = 6$. In two of these sessions subjects participated in 5 periods of public voting and secret ballots each using Election E1 and then voted over which method to use for the next 5 periods. They then voted again over which method to use for the final 5 periods (Short First Stage). In the other four sessions subjects participated in 10 periods of each type of voting and then voted over which method to use for the final 5 periods (Long First Stage). We used the Long First Stage to increase the experience subjects had with the two mechanisms prior to voting. We varied the order in which subjects experienced the two voting mechanisms, that is, in half of the sessions in each subjects used public voting first and in the other half they used secret ballots first. We used secret balloting for the choice of voting mechanism. Subjects were allowed to abstain if they wished. Table 4 below summarizes the order of these six sessions.

Table 4: Summary of Sessions in Experiment II

Stage	Periods Before Choice	First	Repeat	Non-monitor Subjects
Short First Stage	5 Each Method	Secret	yes	10
Short First Stage	5 Each Method	Public	yes	10
Long First Stage	10 Each Method	Secret	no	20
Long First Stage	10 Each Method	Public	no	20

Note: All periods used Election E1 and there were 6 A voters.

Restricting the comparison to the periods before choosing a voting mechanism, these sessions provide within-subjects comparisons of voting behavior under the two mechanisms, which we examine first. In three sessions public voting was the chosen voting mechanism. To ensure comparability and control for possible selection effects, we restrict our comparisons to the periods in which both mechanisms were used in equal numbers of periods before choosing.

Results of Experiment II

In Experiment II, we first compare subjects behavior under the two mechanisms using our within subject design. We find support for our results in Experiment I in the behavior of subjects. Specificially, we find that A voters are more likely to abstain in P (66% v.s. 57%), but B voters are more likely to abstain in S (43% v.s. 35%).[16] We also find that A voters vote for party B 8% of the time when voting is public and 4% of the time with secret ballots, a difference that is statistically significant, while there is only one B voter engaging in other party voting out of 560 observations.[17] The greater abstention and other party voting of A's in public voting provide strong evidence that is supportive of the results in the between-subjects' sessions in Experiment I.

As explained above, if observability increases θ it affects selfish voters' expected utility. The expected utility of selfish voters whose selfish preference is the prosocial choice increases because they participate less and the expected utility of selfish voters whose selfish preference is not the prosocial choice decreases because they participate more. If θ is large with P, the effects on expected utility are in the same direction but larger because the probability of winning of the prosocial choice increases. Thus, our theory predicts that we should observe the following voting behavior when choosing between mechanisms:

Hypothesis 4 (Experiment II: Voting Privacy Preferences)**.** *We expect that when given the chance to choose between voting mechanisms, voters whose selfish preference is the prosocial choice will prefer Public Voting and voters whose selfish preference is not the prosocial choice will prefer Secret Ballots.*

Result 4 (Privacy Preferences)**.** *Although most A voters choose Secret Ballots and most B voters choose Public Voting, we find that a substantial minority of both types of voters sometimes choose contrary to our predictions (A's choosing Public Voting and B's choosing Secret Ballots), which is somewhat explained by previous wins.*

Support. When we examine the choices subjects made over voting mechanisms, we find that a substantial minority of A voters chose public voting. Specifically, 33% of A voters and 56% of B voters voted for public voting. Three more A voters chose to abstain (6% of A's). The greater tendency of B voters to choose public voting is not surprising given that B is more likely to win under public voting. These results suggest that indeed a consequential

[16]The z statistic for Type A subjects = 2.46, $Pr = 0.014$ and for Type B subjects = 1.76, $Pr = 0.079$.
[17]The z statistic for the comparison of A subject behavior = 1.99, $Pr = 0.047$.

minority of A voters, nearly a third, appear to prefer a mechanism that made it easier for the prosocial choice to win.

One explanation for A voters choosing public voting may be that due to the random nature of Dictator Rule, A may have happened to win more under public voting than secret ballots. So naive voters may have simply voted for the mechanism in which his or her selfish preference won more elections in the periods prior to voting. We find evidence that voters are responding to the success of their preferred candidate in choosing whether to vote for public voting or secret ballots. In Figure 3 below we graph the percentage choosing public voting versus the difference in percentage wins by A. As the figures show, there is a clear significant relationship between the two variables. However, even when the percentage of wins for A is 20 points higher under secret ballots than in public voting, we observe more than 22% of A's choosing public voting over secret ballots and when the difference in wins is 0, we find approximately 42% of A's choosing public voting. Hence, we find evidence that a substantial minority of A voters chose public voting even when their previous experience suggested public voting reduced the chances A would win.[18]

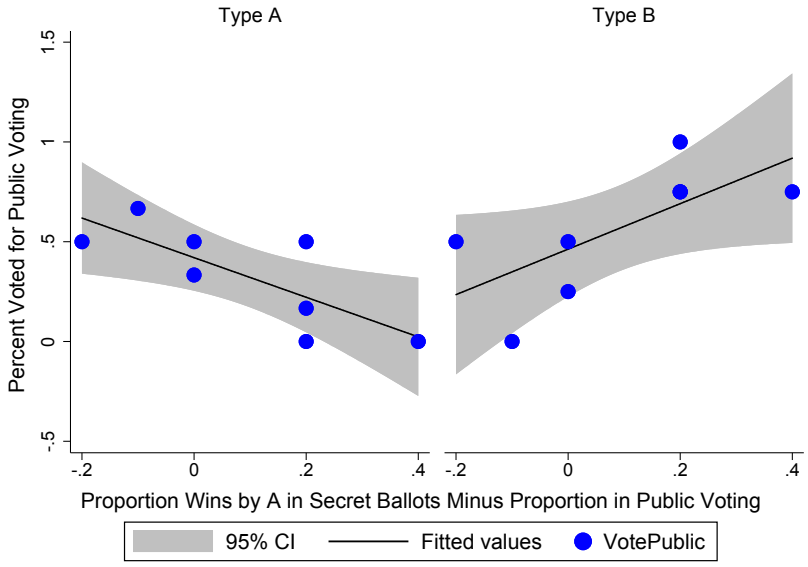

Figure 3: Percent Voting for Public Voting Versus Relative Success of A

[18]Appendix B10 reports the results of probit regressions by subject type in which the dependent variable is the probability of voting for S and the independent variable is the proportion wins by A before choosing the mechanism in S minus the proportion wins by A before choosing in P. We find not surprisingly a relationship which is positive and highly significant for Type A voters and negative and significant at the 6% level for Type B's.

Concluding Remarks

Secret ballots are used in most large elections and many other smaller voting groups ranging from legislative bodies to academic personnel committees. Secret ballots have evolved to be the norm in large elections to prevent vote-buying or more violent coercion and intimidation. Individuals advocate the use of the secret ballot in small group decision-making likewise to encourage candor and truthful revelation of preferences. Secret ballots have been justified for legislators as a way of avoiding coercion from party leaders and other political bosses and to allow them to "vote their conscience" in line with the "trustee" view of representation. In academic circles the concern is that when voting is public individuals will be reluctant to make choices contrary to the preferences of deans and administrators or tenured-faculty if the voter is untenured. These arguments for the use of the secret ballot in academic personnel decisions have been recently articulated by Robbins (2007).

In contrast, as noted in the Introduction, some have contended that the secret ballot leads to more selfish choices by voters than when voting choices are observed. We find support for these concerns with the secret ballot. We find that when voting is public, individuals are significantly more likely to make prosocial rather than selfish choices than when voting is private. We also discover that participation in elections is in general higher when voting is public, but the effect is primarily among those voters whose selfish preferences are the prosocial choice. The participation of voters whose selfish preferences are not prosocial is either largely the same or significantly less when voting is public as compared to secret ballots.

These induced differences in voting behavior caused by observability (higher turnout by voters whose selfish preference is prosocial and prosocial other party voting by some voters) have real consequences on the outcomes of elections. In particular, the differences in behavior advantage prosocial choices in elections such that the probability that the prosocial choice wins is on average 27 percentage points higher under public voting as compared to secret ballots. Moreover, we find that a large minority of voters whose selfish preference is not the prosocial choice prefer public voting (33%) and that many appear to know the consequences of that preference. Hence we find evidence that some voters care about making prosocial choices in themselves, not just to improve their social image, and are willing to use public voting to increase such behavior.

Importantly, our experimental design isolates the effects of observability on voters' choices from possible confounds in public voting (coercion, intimidation, communication,

and sequential voting). Observability alone makes voters choose more prosocially which advantages prosocial choices.

In summary, our results demonstrate that there is a trade-off between positive and negative benefits from ballot secrecy. Secret ballots may help shield voters from strong arm practices and corruption in some cases, but they also lead voters to make more selfish and less prosocial choices. When coercion and intimidation are unlikely under public voting, these negative effects of the secret ballot on the likelihood of prosocial choices may outweigh the benefits of privacy. And even some voters who benefit from secret balloting advantaging their selfish choices may prefer public voting.

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Supplemental Online Appendix for:
"Public Voting and Prosocial Behavior"
Rebecca B. Morton and Kai Ou

Appendix A: Equilibrium Solutions to Voting Games

A1. Equilibrium Behavior Under Selfish Voting

In our experiment we study a simple voting game in which there are 10 voters, divided into two groups, which we label A and B voters. There are x A voters and $(10-x)$ B voters, where $x = 6$ in our principal treatments. The size of the electorate and of each type of voters is common knowledge to all. All voters receive monetary payoffs that are only instrumental, that is, depend on which party is elected. Table 1 presents the payoffs in the principal voting games we used. In the experimental voting games, subjects were asked to vote for party A, party B, or abstain. Hereafter, for expositional purposes, we label the votes for own party "selfish preference" and the votes for other party "other party voting." Voting for a party is costly, while abstaining is free. The cost of voting was always \$2. All type i voters receive the same payoffs if party j is elected, $u_i^j > 0$. Subjects were asked to vote for party A, party B, or abstain. Moreover, type i voters receive higher payoffs if party i is elected; that is, $u_A^A > u_A^B$ and $u_B^B > u_B^A$. Hereafter, for expositional purposes we label u_i^i voter i's "selfish preference." We also label vote choices when voter i chooses party j, $i \neq j$, "other party voting."

As a benchmark for our analysis of the data, we derive the equilibrium predicted voting behavior assuming selfish behavior; that is, that voters care only about their own payoffs. We also focus on symmetric equilibrium strategies, i.e. where voters of the same type with the same information use the same strategies. Define p as the probability that an A voter chooses A and q as the probability that a B voter chooses B. Given the random dictator rule, it is straightforward to show that any vote in favor of a party increases the probability that the chosen party wins the election. Hence, for any distribution of voter choices, voting for one's own party strictly dominates voting for the alternative party. Furthermore, the only choice facing voters is whether to vote for their own party or abstain and the probability that a A (B) voter abstains is given by $1-p$ $(1-q)$. Define π_i as the increase in the probability of party i winning when a voter of type i chooses to vote rather than abstain. We assume voters make their voting decisions using the standard calculus of voting (randomizing when indifferent between abstaining and voting):

$$\begin{array}{ll} \text{If } \pi_i(u_i^i - u_i^j) > 2 & \text{vote for party } i \\ \text{If } \pi_i(u_i^i - u_i^j) = 2 & \text{randomize} \\ \text{If } \pi_i(u_i^i - u_i^j) < 2 & \text{abstain} \end{array}$$

There are no symmetric pure strategy equilibria to any of our voting games. We therefore solve for the symmetric mixed strategy equilibria.[19] The possible symmetric pure strategy equilibria are the cases where either all voters are voting, all are abstaining, or one type is voting and the other type is abstaining. When all voters are voting, $\pi_A = \frac{2}{45}$ and $\pi_B = \frac{1}{15}$ and when each is multiplied by the respective difference in payoffs in all elections the product is less than 2. Therefore, the voters are not optimizing if all are voting. When all voters are abstaining, $\pi_A = \pi_B = 0.5$, which when multiplied by the respective difference in payoffs in all elections the produce is greater than 2. Again voters are not optimizing if all are abstaining. If only A type voters are participating, then $\pi_A = 0$ and each would prefer to abstain; similarly if only B type voters are participating.

We thus turn to symmetric mixed strategy equilibria. To solve for these, we derive the reaction curves for each type of voter as functions of p and q. Specifically, equation (1) below presents the values of p and q such that a voter of Type A is indifferent between voting and abstaining and equation (2) below presents those values such that a voter of Type B is indifferent between voting and abstaining.

Equation (1): $-\frac{1}{10}p^5q^4+\frac{2}{3}p^5q^3-\frac{3}{2}p^5q^2+\frac{10}{7}p^5q-\frac{1}{2}p^5+\frac{5}{18}p^4q^4-\frac{5}{2}p^4q^3+\frac{45}{7}p^4q^2-\frac{20}{3}p^4q+\frac{5}{2}p^4+\frac{20}{7}p^3q^3-10p^3q^2+12p^3q-5p^3-\frac{5}{7}p^2q^4+6p^2q^2-10p^2q+5p^2+\frac{5}{6}pq^4-2pq^3+\frac{10}{3}pq-\frac{5}{2}p-\frac{3}{10}q^4+q^3-q^2+\frac{1}{2}=2/(u_A^A-u_A^B)$

Equation (2): $\frac{1}{10}p^6q^3-\frac{1}{2}p^6q^2+\frac{3}{4}p^6q-\frac{5}{14}p^6-\frac{1}{3}p^5q^3+\frac{9}{4}p^5q^2-\frac{27}{7}p^5q+2p^5-\frac{45}{14}p^4q^2+\frac{15}{2}p^4q-\frac{9}{2}p^4+\frac{10}{7}p^3q^3-6p^3q+5p^3-\frac{5}{2}p^2q^3+\frac{9}{2}p^2q^2-\frac{5}{2}p^2+\frac{9}{5}pq^3-\frac{9}{2}pq^2+3pq-\frac{1}{2}q^3+\frac{3}{2}q^2-\frac{3}{2}q+\frac{1}{2}=2/(u_B^B-u_B^A)$

Solving these two reaction functions simultaneously for Election C yields a unique symmetric mixed strategy equilibrium in which $p \approx 0.345$ and $q \approx 0.52$ as shown in Figure A1 below.

[19] There are asymmetric equilibria in pure strategies in Elections C and E2. In Election C there are asymmetric equilibria where 2 voters of each type participate and in Election E2 there are asymmetric equilibria in which 1 A type votes and 2 B types vote. There are also asymmetric mixed strategy equilibria as well in Elections E1 and E2.

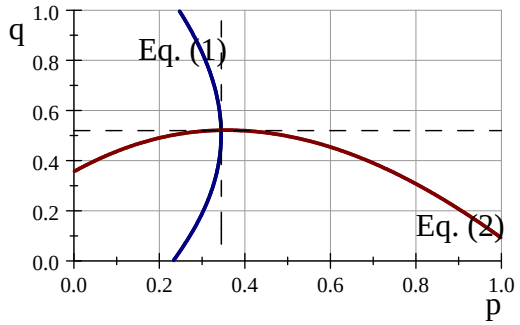


Figure 4: Symmetric Mixed Strategy Equilibrium in Election C

Similarly, the unique symmetric mixed strategy equilibrium in Election E1 (E2) is given by $p \approx 0.0075$ (0.0825) and $q \approx 0.365$ (0.475) as shown in Figures A2 and A3 below.[20]

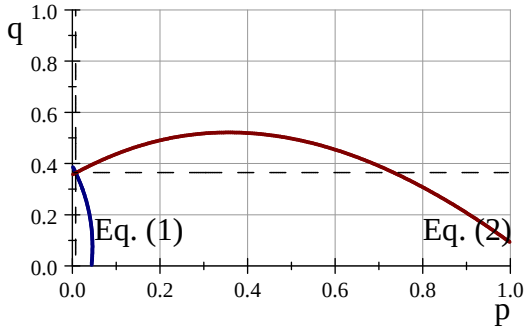


Figure A2: Symmetric Mixed Strategy Equilibrium in Election E1

[20]There are also asymmetric equilibria in Election C in which 2 of each voter types participate. In this case for those A types who are participating, the effect of their vote on the outcome is 1/6, which leads to an expected benefit of $15/6 > 2$. For those A types who are abstaining, the effect of their vote on the outcome is 1/10, which leads to an expected benefit of $1.5 < 2$. Similarly, each B type voter who is voting can be shown to be best responding, while each B type voter who is abstaining is best responding. Simple calculations also show that there are asymmetric equilibria in Election E2 in which one A type votes and 2 B types vote. There are no asymmetric equilibria in Election E1.

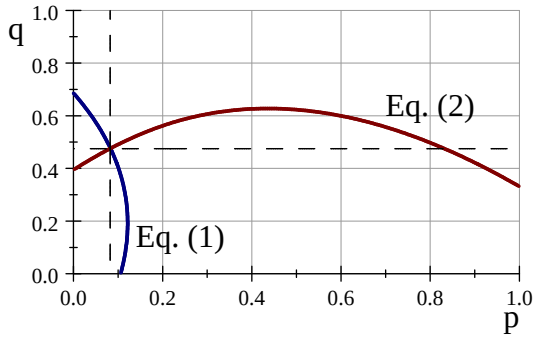


Figure A3: Symmetric Mixed Strategy Equilibrium in Election E2

The analysis above is summarized in Table A1 below:

Table A1: Selfish Predictions

Election	p^*	q^*	Prob. A Wins
C	0.35	0.52	50%
E1	0.01	0.37	4%
E2	0.08	0.48	20%

For Election C, our theoretical analysis provides predictions similar to those found in other experiments using analogous payoff matrices. That is, our analysis predicts that minority voters will turnout at a higher rate than majority voters (the so-called underdog effect), such that the outcome of the election is a toss-up and the minority party, B, is as likely to win as the majority party. For Elections E1 and E2, however, the difference in payoffs to A voters from B winning instead of A are substantially less than the difference for B voters. As a consequence, we expect turnout of A voters to be substantially lower (almost nil) as compared to that of B voters and a much lower probability that A wins as compared to Election C.

A2. Equilibrium Behavior with Prosocial Voting

In our analysis above we assume that voters choose based purely on their selfish preferences and do not receive any utility from making a choice that is deemed more prosocial than the alternative. In our elections, however, if voters have prosocial motivations B voters might be willing to vote for party A in Election C because party A leads to greater aggregate payoffs, higher social welfare. And A voters might be willing to vote for party B in

Elections E1 and E2 because party B not only leads to greater aggregate payoffs, but also maximizes the lowest payoff, and minimizes the inequity in payoffs. Indeed, Feddersen et al. (2009) found evidence suggestive of prosocial other party voting in an election similar to our E1.[21] In particular, they argue that some voters displayed a tendency to engage in what they label "ethical expressive voting" in which they receive some additional consumption utility from voting for the prosocial choice independent of the electoral outcome. As the expected benefits from voting for a selfish choice decline with a decline in the probability of being decisive, then, they contend that selfish voters chose to abstain but prosocial voters continue to participate, advantaging prosocial choices.

We assume that with probability θ a voter is a "prosocial" voter and will always vote for the prosocial choice and with probability $1-\theta$ a voter is selfish and will make a voting choice in order to maximize his or her expected selfish payoffs. Furthermore, we assume that θ is a function of observability, such that an increase in observability of votes increases θ. As θ increases, we expect selfish voters to best respond by engaging in what we call "compensating behavior." That is, we expect selfish voters to change their voting behavior, such that those whose first preference is the prosocial choice abstain more and those whose first preference is not the prosocial choice vote their first preference more often. Table 2 summarizes the equilibrium values of p and q in the different elections for values of $\theta \leq 0.14$. Note that in Election C as θ increases the equilibrium value of p decreases and the equilibrium value of q increases, and in Elections E1 and E2 as θ increases the equilibrium value of p increases and the equilibrium value of q decreases, both of which reflects the compensating behavior discussed above. The compensating behavior should imply that even when we observe prosocial voting, the expected vote shares received by the two parties and the probabilities of winning should be the same as when all voters are selfish. Furthermore, the compensating effect implies that as θ becomes large, participation of voters whose first preference is the prosocial choice, even allowing for some to be prosocial expressive, is less than that predicted with only selfish voters. So for example, when $\theta = 0.10$, the predicted percent votes for A (total participation) from A voters (combining together both selfish and prosocial A voters) in Election C is 27%, as compared to 35% when $\theta = 0$. Similarly, when $\theta = 0.10$, the predicted percent votes for B from B voters in Election E1 (E2) is 22% (34%), as compared

[21] In their experiment they only allowed their equivalent of type A voters to participate and varied the probability that a vote was pivotal by varying the number of type A votes which could determine the outcome. Although they found evidence of type A voters choosing their equivalent of party B, since only these voters could vote they did not compare this tendency to the extent that B voters vote for A or to voter behavior in other elections in which voting for a nonselfishly preferred party was less clearly prosocial.

to 37% (48%) when $\theta = 0$. For $\theta > 0.14$ as θ increases the incentives for both types of voters decline considerably and A is expected to win close to 100% of the time in Election C and close to zero percent of the time in Election E1 (E2).

When $\theta > 0$, the remaining selfish voters are predicted to engage in compensating behavior. To see intuitively how compensating behavior works, consider Election E1. When $\theta = 0$, no voters are prosocial and in equilibrium A voters are predicted to vote for A at a low rate, with a 1% probability, and abstain with a 99% probability since the difference in payoffs between the two alternatives is small and voting is costly. In contrast, B voters are predicted to vote for B with a 37% probability and abstain with a 63% probability given that they have more at stake in the election. However, if $\theta = 0.14$, then some A voters will be voting for B. The remaining selfish A voters now have a greater incentive to participate and are predicted to increase the probability they vote for A to 2%. The selfish B voters, react in the opposite direction. Given that there is an increase in expected votes for B from prosocial voters, then remaining selfish B voters are predicted to vote for B now with only a 2% probability as well.

The compensating behavior has two implications. First, for low values of θ, less than 0.14 in our examples, in equilibrium the existence of prosocial voters does not affect the probability that the prosocial candidate wins. However, as θ becomes large, that probability does increase as prosocial voting becomes sizeable as the incentive to participate for selfish voters becomes inconsequential, even those whose preferences are contrary to the prosocial choice. Second, although the probability that the prosocial choice wins may not be affected by the effect of observability on prosocial voting when θ is within the range 0 to 0.14 in our examples, if given a choice, selfish A voters in E1 prefer secret ballots and selfish B voters in E1 prefer public voting. That is, if θ increases with observability, selfish A voters' expected utility is higher under secret ballots than public voting because they do not have to pay the cost of voting necessitated by compensating behavior and selfish B voters' expected utility is higher under public voting than secret ballots because the change in observability has the opposite effect on their behavior. If the effect on θ from observability is large, these differences in voter expected utility are larger as the probability that B wins will increase with observability. Hence, in E1 selfish A voters are predicted to prefer secret ballots and selfish B voters are predicted to prefer public voting. In general, voters whose selfish preference is not the prosocial choice are predicted to prefer secret ballots and voters whose selfish preference is the prosocial choice are predicted to prefer public voting.

A3. The Larger Game: Choosing Between Voting Mechanisms

Our analysis above suggests that observability can affect voting behavior when the effect on θ is small. If the effect on θ of observability is large, then observability may also increase the probability that the prosocial choices wins. What then do our results imply about voter preferences over voting mechanisms? Consider a larger game in which before voting, voters first choose (by secret ballot) whether to vote in the election using secret ballots or not. Assume that when secret ballots are used $\theta = 0$ but when voting is public $0 < \theta \leq 0.14$. As we can see from Table 2, even though the probability of winning for the two options is predicted to be the same under the two systems, because of the effects on selfish voter behavior, expected utility changes. In Election C, selfish A voters' expected utility is higher with public voting as they are more likely to abstain, but the expected utility of selfish B voters is lower with public voting as they are more likely to participate. In Elections E1 and E2 the opposite effects occur, selfish A voters have lower expected utility under public voting because they participate more while selfish B voters have higher expected utility because they participate less. If $\theta > 0.14$ with public voting, then we expect that the expected utility effects are stronger as the probability of winning of the prosocial choice increases. Hence, we expect that if voters have a chance to choose between secret ballots or not (using secret ballots), selfish voters whose selfish preference is the prosocial choice will choose public voting while those whose selfish preference is not the prosocial choice will prefer secret ballots.

Appendix B: Additional Empirical Results

We conducted three variants of election sequences in Experiment I. In the main text we report the results of our principal or main variant: *Sequence I*. In this article, we refer to the results reported in the main text as the main findings (unless noted otherwise). In Sequence I, we used a fixed order in which $x = 6$ (there were 6 A voters and 4 B voters) and subjects participated in Elections C, E1, and E2 sequentially, with 8 periods for each election type for a total of 24 elections. That is, for periods 1-8 subjects played Election C with $x = 6$, for periods 9-16, subjects played Election E1 with $x = 6$, and for periods 17-24, subjects played Election E2 with $x = 6$. Subjects also stayed in the same roles throughout the session. The design of Sequence I was chosen in order to facilitate learning and convergence to equilibria as well as within-subjects' comparisons of behavior. Although subjects engaged in repeated elections within the same cohort and they knew in advance they would participate in 24 elections, there was no opportunity for punishment of

other voters across election periods since subjects did not know the voting games in advance nor when the voting games would change. Moreover, subjects knew that only one election period would be selected for payment.

For a robustness check on the effect of experiencing more elections on voting behavior, we varied our sequence of elections. In *Sequence II*, subjects participated in Election C for 8 periods and then Election E1 for periods 9-24, also with $x = 6$. We conducted Sequence II for two reasons: (1) Sequence I may have not allowed subjects sufficient learning experience in Election E1 to converge to equilibrium behavior and (2) our comparison of E1 and E2 in Sequence I may be confounded by the fact that E2 always follows E1.

For the second robustness check on the further effects of sequence, fixed roles, and fixed majorities, we conducted additional sessions using a more complicated sequence in which we varied election type by period, rather than in blocks, *Sequence III*, which is described in great detail later in Appendix B8. We also varied by period which party was in the majority and subjects' roles (so that subjects were sometimes A's and other times B's). Finally, we considered an alternative version of Election E2, Election E3, in which when party B wins, each type A voter receives 20 and each type B voter receives 25. That is, in this case the payoff to A voters if party B wins is the same as in Election E1, although the aggregate payoffs are greater. If we see more prosocial other party voting in E3 than in E1, we have greater evidence that the effect is due to the value voters place on aggregate payoffs than they place on fairness. Subjects were told that the elections would vary but they were not told how they would vary.

For the third robustness check on the experimenter demand effect, we conducted a new treatment: Secret Ballot with the Experimenter's Monitor (hereafter, SE). In this treatment, everything was identical to the Secret Ballot (S) treatment, except that the experimenter had a close look at the decision-making process.

Hence, in Experiment I, we conducted 14 sessions with 140 subjects. Table B1 summarizes the sessions we conducted in Experiment I by sequence, x, privacy, and voting rule.

B1. Detailed Analysis of Behavior in the Secret Ballots Treatment

We present here a detailed analysis of voter behavior in S using Sequences I and II and $x = 6$ to the equilibrium behavior under selfish voting. Figures B1 and B2 summarize voter behavior by election type in the Secret Ballot Treatment in these treatments. We measure the percentage voting for one's own party on the horizontal axis and abstention percentage is measured on the vertical axis. The distance between an observation and the diagonal

Table B1: Summary of Sessions in Experiment I

Session Numbers	Sequence	x	Privacy	Non-monitor Subjects
1, 2	I	6	S	20
3, 4	I	6	SI	20
5, 6	I	6	P	20
7, 8	I	6	SE	20
9	II	6	S	10
10	II	6	P	10
11, 12	III	$\{4, 5, 6\}$	S	20
13, 14	III	$\{4, 5, 6\}$	P	20

line measures the percentage voting for the other party. Figure B1 presents behavior of A voters and Figure B2 presents behavior of B voters. C marks the average behavior of voters in Election C, E1 and E2 are likewise measures for the other two elections. We also include voter behavior in E1 under Sequence II in the last 8 periods, represented by the point E1′ as a better point of comparison with E2. CP, E1P, and E2P mark the predicted selfish behavior.

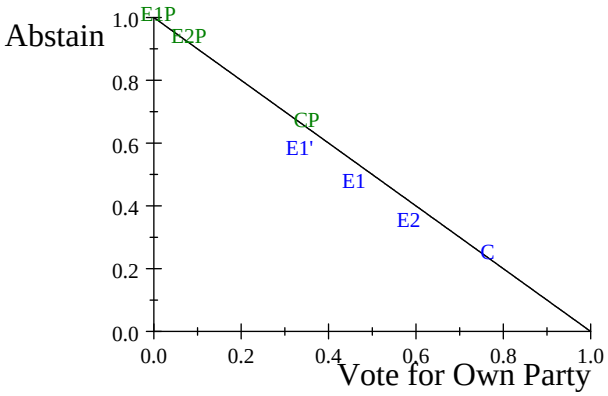


Figure A3: A's Secret Ballot Voting

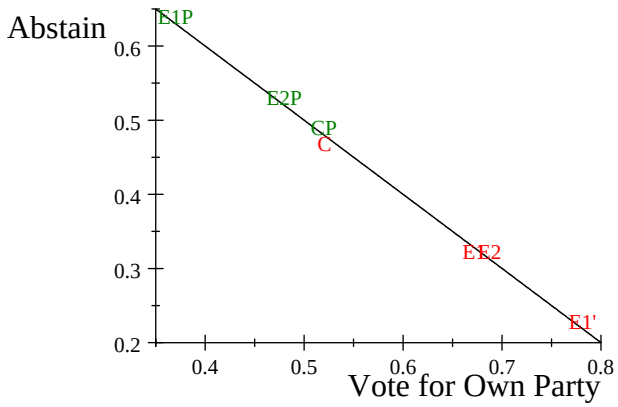


Figure B2: B's Secret Ballot Voting

We find little support for the selfish point predictions overall. First consider abstention rates. Subjects of both types abstain on average much less than theoretically predicted, except for B voters in Election C, who came close to the theoretical prediction. Specifically, A voters abstain on average 23% of the time in Election C, 47% in E1 (56% in the last 8 periods of E1 in Sequence II) and 33% in E2 as compared to the theoretical predictions of (65%, 99%, and 92%). B voters abstain on average 46% of the time in C, 29% in E1 (22% in the last 8 periods of E1 in Sequence II) and 31% in E2 as compared to the theoretical predictions of (48%, 63%, and 52%).

B voters abstain significantly more than A's in Election C.[22] Moreover, we find that A voters abstain more than B's in Elections E1 and E2, but the difference is not significant in E2 and only significant in E1.[23] The selfish prediction is that voters will either vote for their own party or abstain. However, subjects do vote for the other party and prosocial other party voting exceeds non-prosocial other party voting even with secret ballots. In Election C B voters choose party A 2% of the time, which is more than A voters choosing party B in the same election (0%), but the difference is not significant.[24] This other party voting in Election C might be either prosocial or bandwagon voting (voting for the candidate preferred by the majority). In Elections E1 and E2, however, we find stronger evidence in support of prosocial other party voting instead of bandwagon voting. In E1, A voters choose party B 7% of the time and 8% of the time in E2 (as compared to B voters choosing A less than 1% of the time in E1 and 0% of the time in E2). The differences are significant.[25] Bandwagon

[22]The z statistic for the comparison = 3.73, Pr = 0.00.
[23]For E1 the z statistic = 3.31, Pr = 0.00 and for E2 0.28, Pr = 0.78.
[24]The z statistic for the comparison = 0.95, Pr = 0.34.
[25]The z statistic for the comparison in E1 = 2.70, Pr = 0.01 and in E2 = 2.37, Pr = 0.02.

voting would predict that B voters would be voting for party A in these elections, but we find little evidence of such behavior.

However, the near equal other party voting of A voters in E2 as compared to E1 is contrary to our prediction, but may reflect learning and experience since subjects participated in E2 in the last 8 periods of each session. If we restrict our comparison of E2 behavior to the subjects who participated in E1 in the last 8 periods of Sequence II, we find slightly more prosocial other party voting of A voters in E1 than in E2 (10% as compared to 8%), but the difference is not significant.[26] Hence, it appears that prosocial other party voting is more driven by aggregate welfare concerns than fairness concerns. In general, we find evidence suggesting that prosocial other party voting is real and that there are likely prosocial expressive voters even when voting behavior is unobserved.

Our evidence of prosocial other party voting may suggest higher rates of participation of other voters as compensatory behavior, discussed above. But even if prosocial other party voting is 10%, abstention is much lower than predicted except for B voters in Election C. That is, from Appendix A above, when $\theta = 0.1$, A's are predicted to abstain 73% of the time in Election C, 89% in E1, and 81% in E2 and B's are predicted to abstain 40% of the time in C, 78% in E1, and 66% in E2, predictions which are generally higher than the observed abstention rates. Hence, our data shows excessive turnout even when allowing for compensating behavior of selfish voters.

In Election C, the greater than predicted turnout of A voters, the prosocial or bandwagon voting by B voters, and the lack of an underdog effect all result in a significantly higher proportion of expected wins by A than predicted (69% compared to 50%).[27] Even more interesting, we find also that A has a significantly higher probability of winning in Elections E1 and E2 than predicted (45% as compared to 4% in E1 and 52% as compared to 20% in E2).[28] Thus, even though there is prosocial other party voting by A voters in these two elections, because there is also a much greater percentage of selfish voting than predicted, the probability A wins is actually higher than predicted under selfish voting. Prosocial other party voting, then, is insufficient to offset the excessive turnout of majority voters in these elections.

[26]The z statistic for the comparison is 0.41, Pr = 0.68.

[27]We measure the predicted probability of winning as the share of votes received by A, not counting abstentions. The t statistic for the comparison is 8.92, Pr = 0.00.

[28]The t statistic for the comparison for E1 is 17.78, Pr = 0.00 and for E2 is 15.84, Pr = 0.00.

B2. The Comparison of SI and P

When we compare SI and P, we find that prosocial other party voting does appear to be affected by whether voting is public or not, although the effect is not always significant. Specifically, in Election C we expect B voters to vote prosocially for party A. B voters choose party A 11% of the time when voting is public as compared to 0% of the time when it is private ($z = 2.72$, $Pr = 0.007$), whereas A voters in Election C vote for party B less than 1% of the time with both secret ballots and public voting ($z = 1.00$, $Pr = 0.032$). In Elections E1 and E2, we expect prosocial other party voting by A voters. We find significant effects in Election E2: A voters choose party B 38% of the time when voting is public as compared to 16% of the time when it is private, whereas B voters in Election E2 never vote for party A.[29] In Election E1, we find also more other party voting by A voters (6% when voting is public as compared to 5% when ballots are secret) but the difference is not significant ($z = 0.31$, $Pr = 0.76$). We also find slightly more other party voting by Type B voters under public voting (3% as compared to 0%, $z = 1.43$, $Pr = 0.15$), but it is not significant. Figure B3 below presents other party voting by privacy treatment and voter type in each period in an election type.

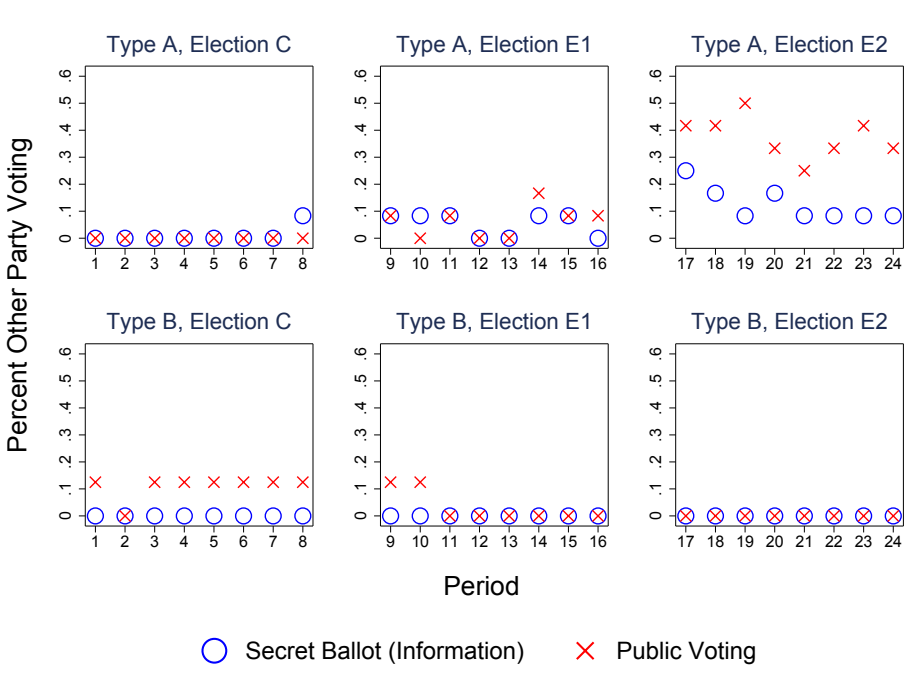


Figure B3: Other Party Voting by Privacy Treatment (SI and P)

[29]The z statistic comparing A voters' choices = 3.43, $Pr = 0.001$.

We find that overall abstention is significantly lower under Public Voting than in the Secret Ballot Information Treatment. A voters abstain 34% of the time overall in SI but only 20% in P ($z = 3.56$, $Pr < 0.001$), while B voters abstain 48% in SI as compared to 15% in P ($z = 7.05$, $Pr < 0.001$). When we break the effects down by election type, the effects become more nuanced. In Election C, which takes place in the first 8 periods of each session, the greater participation of both A voters (abstention is 22% in SI as compared to 7% in P) and B voters (abstention is 42% in SI as compared to 27% in P), which is significant.[30] In E1 we find that the effects of observability on turnout are significant. A voters abstain 43% of the time in SI but only 27% in P ($z = 2.27$, $Pr = 0.023$), while B voters abstain 48% of the time in SI as compared to 14% in P ($z = 4.20$, $Pr < 0.001$). However, we find that in Election E2, there is only a significantly higher participation rate of B voters, whose selfish preference is the prosocial choice (A's abstain 36% of the time in SI as compared to 27% in P and B's abstain 53% of the time in SI as compared to only 3% of the time in P).[31] Figure B4 below presents other party voting by privacy treatment and voter type in each period in an election type.

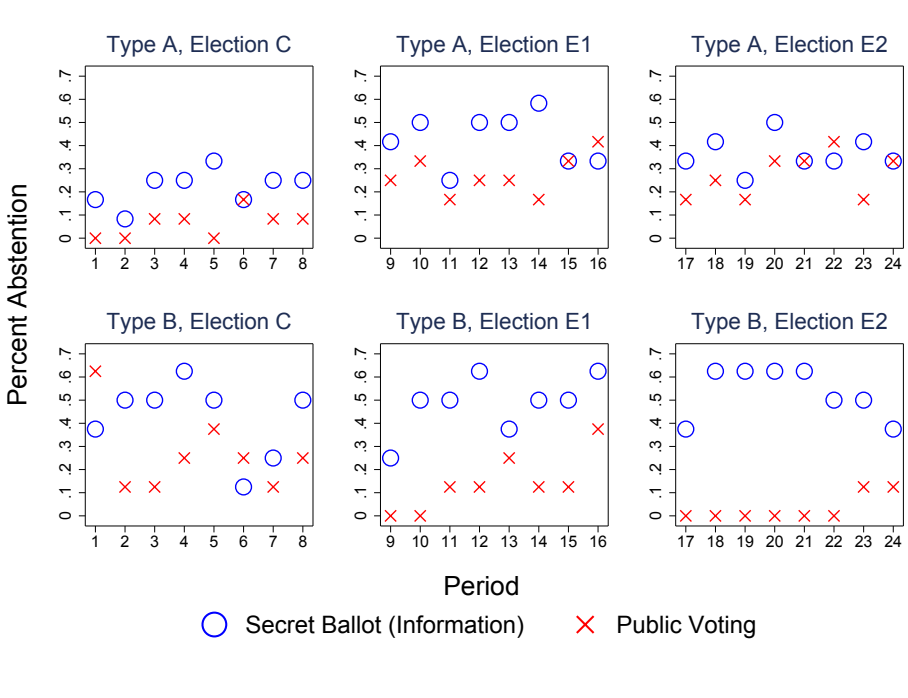


Figure B4: Abstention by Privacy Treatment (SI and P)

[30]The z statistic for the comparison with A voters is 2.86, $Pr = 0.004$ and for B voters 1.86, $Pr = 0.06$.
[31]For the comparison for E2, Type A, the z statistic = 1.40, $Pr = 0.16$ and for Type B = 6.29, $Pr < 0.001$.

B3. The Comparison of S and SI

When we compare voting behavior in SI with S, we find similar behavior with a few differences as shown in Figures B5 and B6 below which compare abstention and other party voting behavior in S with SI, respectively. We find significantly greater abstention in SI by B voters in the prosocial elections.[32] We also find greater other party voting by A voters in SI in the first few periods of E2, but these voters converge to behavior equivalent of those in S. The overall difference is not significant.[33] When we compare the expected probability that A wins in SI with S, we find that there are no significant differences in expected outcomes for Elections C and E2, but that A is significantly more likely to win in Election E1 under SI.[34] The difference in Election E1 is no doubt a consequence of the greater abstention by B voters in SI. The evidence suggests then that revealing vote distributions slightly leads to greater abstention by B voters in both Elections E1 and E2, which generally leads to a somewhat higher probability that A wins in Election E1.

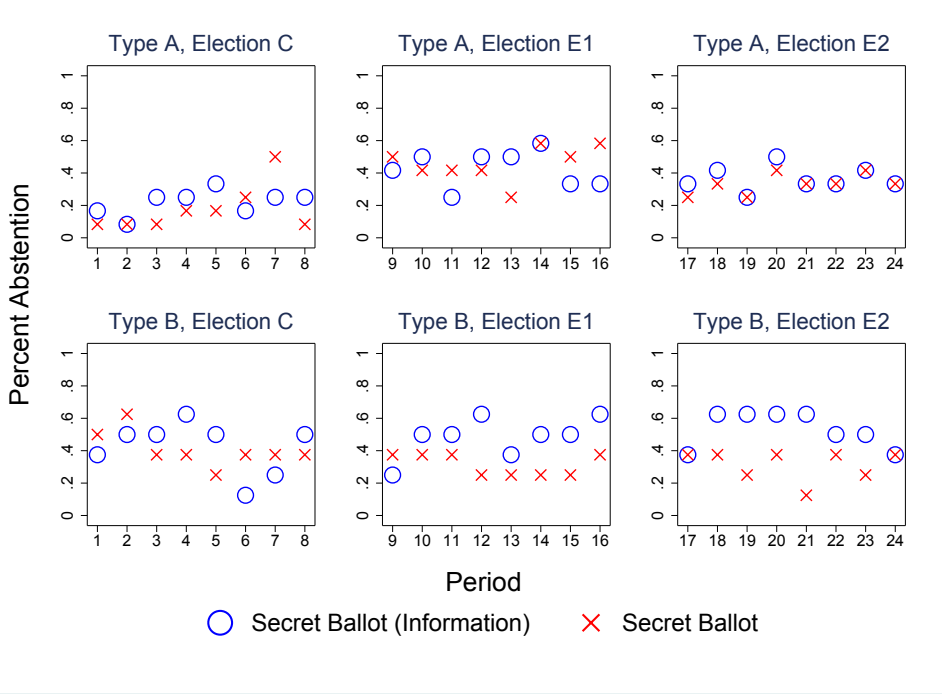


Figure B5: Abstention in SI versus S

[32]The z statistic for the comparison in E1 is 1.99, Pr = 0.05 and for E2 is 2.51, $Pr = 0.01$.
[33]The z statistic for the comparison is 1.56, $Pr = 0.12$.
[34]The t statistic for the comparison of S and SI in Election C is 0.29, $Pr = 0.79$; for Election E1 is 2.98, $Pr = 0.01$, and for Election E2 is 0.57, $Pr = 0.58$.

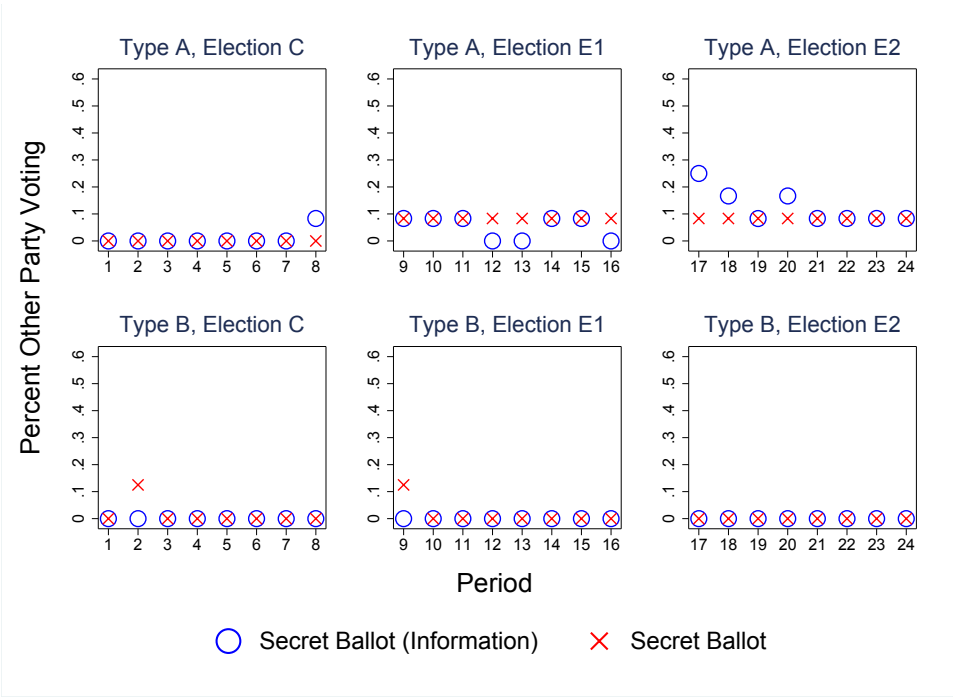


Figure B6: Other Party Voting in SI versus S

B4. The Comparison of S and P

When we compare the results of S and P, we find identical findings as when we compare SI and P. Specifically, in Election C we expect B voters to vote prosocially for party A. B voters choose party A 11% of the time when voting is public as compared to 2% of the time when it is private ($z = 2.19$, $Pr = 0.03$), whereas A voters in Election C never vote for party B with both secret ballots and public voting. In Elections E1 and E2, we expect prosocial other party voting by A voters. We find significant effects in Election E2: A voters choose party B 38% of the time when voting is public as compared to 8% of the time when it is private, whereas B voters in Election E2 never vote for party A.[35] In Election E1, we find 6% other party voting by A voters under public voting as compared to 8% when ballots are secret, which is not significantly different ($z = 0.56$, Pr= 0.58). We find slightly more other party voting by Type B voters under public voting (3% as compared to 2%, $z = 0.58$, $Pr = 0.56$), which is identical to what we noted above. Figure B7 below presents other party voting by privacy treatment and voter type in each period in an election type.

[35]The z statistic comparing Type A voters' choices = 4.81, $Pr < 0.001$.

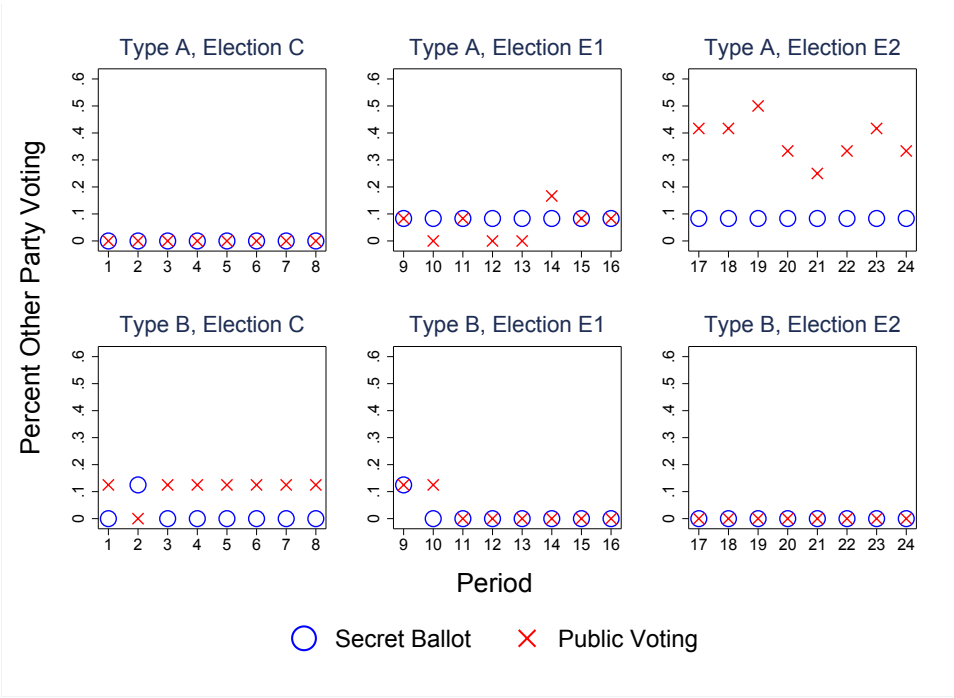


Figure B7: Other Party Voting by Privacy Treatment (S and P)

We find that overall abstention is significantly lower under Public Voting than in the Secret Ballot Information Treatment. A voters abstain 32% of the time overall in S but only 20% in P ($z = 3.21$, $Pr = 0.001$), while B voters abstain 34% in S as compared to 15% in P ($z = 4.51$, $Pr < 0.001$). When we break the effects down by election type, the effects become more nuanced. In Election C, which takes place in the first 8 periods of each session, the greater participation of both A voters (abstention is 18% in S as compared to 7% in P) and B voters (abstention is 41% in SI as compared to 27% in P), which is significant.[36] In E1 we find that the effects of observability on turnout are significant. A voters abstain 46% of the time in S but only 27% in P ($z = 2.70$, $Pr = 0.007$), while B voters abstain 31% of the time in S as compared to 14% in P ($z = 2.32$, $Pr = 0.02$). However, we find that in Election E2, there is only a significantly higher participation rate of B voters, whose selfish preference is the prosocial choice (A's abstain 33% of the time in S as compared to 27% in P and B's abstain 31% of the time in S as compared to only 3% of the time in P).[37] Figure B8 below presents other party voting by privacy treatment and voter type in each period in an election type.

[36]The z statistic for the comparison with A voters is 2.18, $Pr = 0.03$ and for B voters 1.68, $Pr = 0.09$.
[37]For the comparison for E2, Type A, the z statistic $= 0.94$, $Pr = 0.35$ and for Type B $= 4.22$, $Pr < 0.001$.

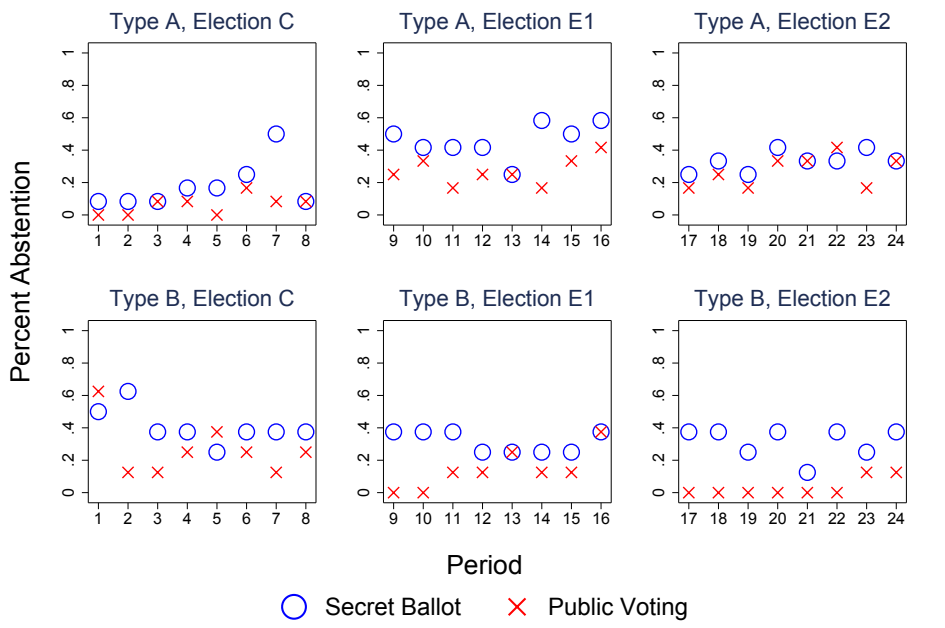


Figure B8: Abstention by Privacy Treatment (S and P)

B5. Voter Type Estimation

We assume that there are n subjects, each of whom has been observed over t times. Let y_{it} be the observed voting choice by subject i at time t. As the experimental results demonstrate, different voters' decisions may be driven by their types and characteristics. Following our theory discussed in the main text and complementary appendix, we assume that the prosocial voters ($\mathcal{P}$) will always vote for the prosocial choice, and the selfish ($\mathcal{S}$) voters will sometimes vote for the selfish choice but other times abstain ($\varnothing$).

The existence of the two distinct types of subject leads to a finite mixture model (Cappelen et al., 2007). We introduce two mixing proportions, $p_{\mathcal{P}}$ and $p_{\mathcal{S}}$, which represent the proportion of the population who are prosocial and selfish, respectively. Let p, $0 < p < 1$, denote the probability that an individual is a prosocial voter. Then, the likelihood choice for subject i is:

$$L_i = p\prod_{t=1}^{T} Pr\left(y_{it} = \varnothing|\mathcal{P}\right)^{I_{y_{it}=\varnothing}} Pr(y_{it} = A|\mathcal{P})^{I_{y_{it}=A}}|Pr(y_{it} = B|\mathcal{P})^{I_{y_{it}=B}}$$
$$+ (1-p)\prod_{t=1}^{T} Pr(y_{it} = \varnothing|\mathcal{S})^{I_{y_{it}=\varnothing}} Pr(y_{it} = A|\mathcal{S})^{I_{y_{it}=A}} Pr(y_{it} = Vote\ B|\mathcal{S})^{I_{y_{it}=B}}$$

where $I_{(\cdot)}$ is the indicator function that takes the value 1 if the subscripted expression is true and 0 otherwise. The sample log-likelihood is then:

$$LogL = \sum_{i=1}^{n} log(L_i)$$

The prosocial voters' conditional probability of voting for the prosocial choice is straightforward. On the selfish voters' conditional probabilities of voting for the selfish choice and abstaining, for the sake of simplicity, we assume that voters myopically do not think about the cross effects. They think of themselves as having a fixed probability of being a dictator based on the number of voters. The selfish voters will vote to maximize their own expected utility. Hence, we consider a logit model in which selfish voters vote for the selfish choice or abstain based on the optimization of the expected utility. Specifically, for a selfish voter, the probability of taking each action is the following:

$$Pr(\text{Selfish Choice}|sel) = \frac{e^{U_{\text{Selfish choice}}}}{e^{U_{\text{Selfish choice}}} + e^{U_{\text{Abstain}}}}$$
$$Pr(\text{Abstain}|sel) = \frac{e^{U_{\text{Abstain}}}}{e^{U_{\text{Selfish choice}}} + e^{U_{\text{Abstain}}}}$$

where $U_{\text{Selfish choice}}$ and U_{Abstain} are the perceived expected utility of voting for the selfish choice and abstaining, respectively. Note that the probabilities of voting for A, B, and abstaining are characterized by the expected utility from choosing these decisions. By an abuse of notation, the objective function of the maximum likelihood estimation is therefore given by

$$LogL = \sum_{i=1}^{n} \log L\left(u^{\text{Abstain}}, u^{\text{Selfish Choice}}, p\right)$$

The theoretical framework of the finite mixture model and the setup of our experimental design naturally determine that our analysis will focus on the conflict between selfish voting and other-party voting. As what we discussed earlier, the prosocial voting is the A's voting for B in E1 and/or E2 and B's voting for A in EC. Except for the specified prosocial voting, any other choice is selfish behavior. In the estimation, we assume that the strategic/selfish voters follow equilibrium behavior. The estimation is then done by using Matlab to find the value of p that maximizes the log likelihood function. We combine A's voting in E1 and E2; similarly, we focus on B's voting in EC. We report the results of the estimation in Table 3.

The results of the mixture model estimation suggests that the public recognition of good behavior has a significant effect on voting behavior. Specifically, A voters are more likely to be a prosocial voter in Public Voting than in Secret Ballot. B voters' posterior probability of being a prosocial voter is affected by the privacy too, although the posterior estimation of prosocial B voters is not higher than 14%. The results of the mixture model analysis are consistent with our main results reported earlier.

B6. Learning

We now examine whether the data demonstrate learning effects within sessions. If learning occurs within a session we would expect that voting behavior would change over time. To determine if there was learning, we investigate whether an individual's propensity to vote in the next period decrease in the current margin of victory. Specifically, we estimate the probability that party A wins in each period, then we consider a Probit model in which an individual's voting decision is a function of the margin of victory of the last period. In all the regressions reported below, we use the probability that party A wins as the independent variable.

The regression analysis is based on the results of SI and P treatments. It is worth noting that our privacy procedures of the experimental design prevent us from identifying individual subjects' choices, so in the regressions we are not able to cluster our observations by subject. The results of these tests are summarized in Table B2 below.[38]

[38]We do not have estimations for B voters' other party voting under secret ballots because B voters never engage in other party voting under secret ballots.

Table B2: Probit of Voting Behavior (Marginal Effects)

Treatment	Coefficient	Std. Error	z	$Pr > \|z\|$
Dependent Variable: A Voter Abstention				
Secret Ballots	0.670	0.209	3.20	0.001
Public Voting	-0.306	0.115	-2.67	0.008
Dependent Variable: B Voter Abstention				
Secret Ballots	0.319	0.253	1.26	0.208
Public Voting	0.260	0.118	2.20	0.028
Dependent Variable: A Voter Other Party Voting				
Secret Ballots	-0.492	0.118	-4.16	0.000
Public Voting	-0.727	0.160	-4.53	0.000
Dependent Variable: B Voter Other Party Voting				
Secret Ballots	-	-	-	-
Public Voting	-0.313	0.245	-1.28	0.202

We find that the margin of party A winning has a significant influence on an individual's voting decision. Specifically, under secret ballots, a Type A voter is significantly more likely to abstain as the margin of party A winning increases. However, with public voting, a Type A voter is significantly less likely to abstain as the margin of party A winning increases. Moreover, we find that the margin of party A winning has a significant positive effect on Type B voters' abstention decisions such that a Type B voter is more likely to abstain as party A is more likely to win, although it is only significant under public voting. With respect to other party voting, we do not find clear evidence that the margin of party A winning affects B voters' other party voting. However, A voters seems to be significantly less likely to vote for party B as party A is more likely to win.

We then test whether the coefficients are significantly different by treatment. The coefficient of each treatment is statistically indistinguishable by treatment. For the paired comparisons of A voters' abstention between Secret Ballots and Public Voting ($\chi^2 = 0.06, Pr = 0.809$). For the paired comparisons of B voters' abstention between Secret Ballots and Public Voting ($\chi^2 = 0.30, Pr = 0.585$). For the paired comparisons of A voters' other party voting between Secret Ballots and Public Voting ($\chi^2 = 0.47, Pr = 0.492$). These results suggest that although learning occurs in some treatments, because there is no significant difference of how the margin of party A winning affects an individual's voting between Secret Ballots and Public Voting, only minor and limited differences in the observed treatment effects are related to learning.

B7. First Robustness Check - Sequence II

The principal experiment (SI, S, and P) may have not allowed subjects sufficient learning experience in Election E1 to converge to equilibrium behavior and our comparison of E1 and E2 may be confounded by the fact that E2 always follows E1. To check if our main findings are robust to experiencing more elections, we conducted sessions using Sequence II in which subjects participated in Election C for 8 periods and then Election E1 for periods 9-24, also with 6 type A voters and 4 type B voters.

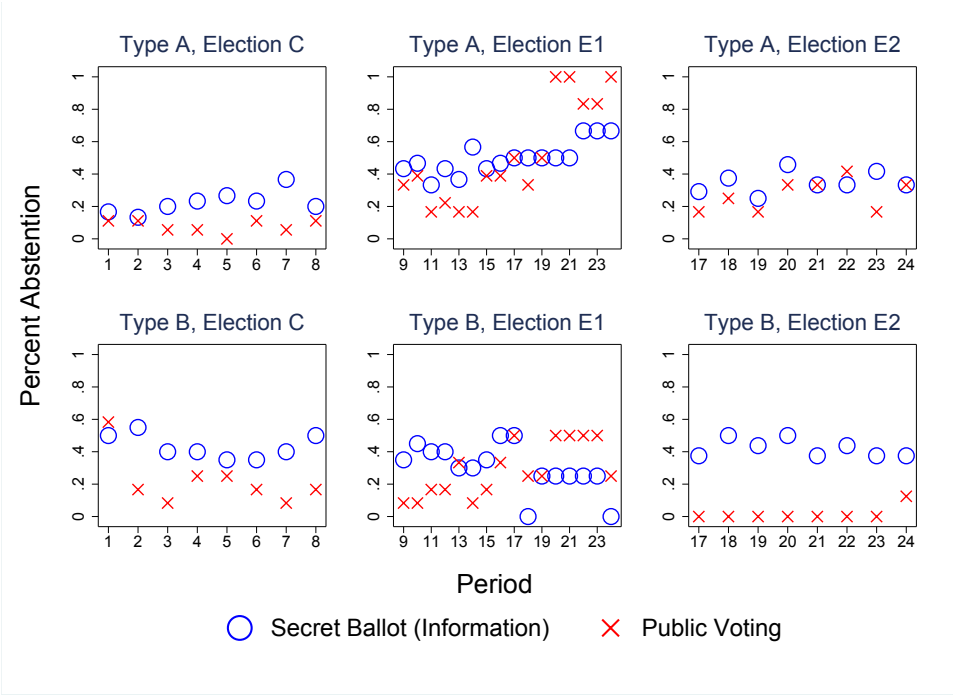


Figure B9: Abstention by Privacy Treatment in Sequence I and II (including S, SI, and P)

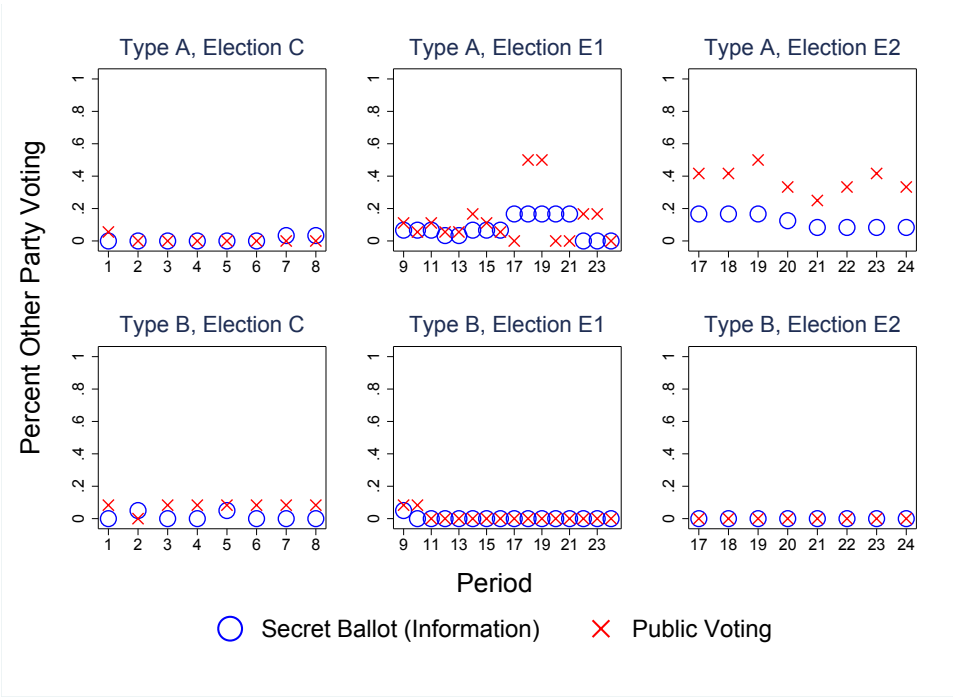


Figure B10: Other Party Voting by Privacy Treatment in Sequence I and II (including S, SI, and P)

When we compare behavior in secret ballots with public voting, we find essentially the same findings as reported in the main text. Specifically, public voting leads to less abstention of both types of voters overall (A voters abstain overall 35% with secret ballots as compared to 26% with public voting, while B voters abstain overall 40% with secret ballots as compared to 18% with public voting).[39] When we break the effects down by election type, the effects become more nuanced. B voters abstain significantly less in public voting in Elections EC ($z = 3.63$, $Pr < 0.001$), E1 ($z = 2.28$, $Pr = 0.023$), and E2 ($z = 5.61$, $Pr < 0.001$). The difference in abstention rates for A voters is significant only in Election EC in which their selfish preferences are also the prosocial choice.

The Indirect Effect Prediction of Observability suggests that B's should abstain more under public voting than the secret ballots, and A's should abstain less. However, in E1 we find that the effects of observability appears to not be long-lasting for B's, but that A's begin to abstain more under public voting than the secret ballots.

How does experiencing more elections affect voting behavior? In Sequence II in which subjects participate in 16 periods of E1 elections, in the latter half of the periods abstention is actually higher under public voting than the secret ballot. Specifically, in the first 8 periods

[39]The z statistic for the comparison for A voters is 3.17, Pr = 0.002 and for B voters is 6.27, $Pr < 0.001$.

of E1 combining Sequence I and II, A voters abstain 44% of the time under secret ballots, but only 28% of the time under public voting and B voters abstain 38% of the time under secret ballot, but only 18% of the time under public voting.[40] But in the last 8 periods of E1 in Sequence II, A voters abstain 56% of the time under secret ballots compared to 75% of the time under public voting and B voters abstain 22% of the time under secret ballot compared to 41% of the time under public voting ($z = 1.62$, $Pr = 0.11$). Although we find that observability leads to higher abstention for both types of voters in the latter half of E1, when examining the behavior more carefully, we see that abstention is much higher for A voters, whose first preference is not the prosocial choice, under public voting, than for B voters. In fact, in some periods, A voters abstain 100% of the time. Higher B voter abstention is to be expected after elections in which A voters are publicly abstaining as such high rates, which is evidence of some compensatory behavior by B voters. The results, nevertheless suggest that indeed observability has a differential effect on voters depending on whether their first preference is the prosocial choice, but in the opposite direction from predicted.

Our conclusions about the effect of observability on prosocial other party voting is also supported when we compare the pooled data of secret ballots with public voting; we find that other party voting is significantly higher for B voters in Election C and for A voters in Election E2.[41]

Finally, when we compare the expected probability that A wins under secret ballots with public voting we find similar results as in our previous analysis; that is, there is no significant differences in the expected probability that A wins in Elections C and E1, but that the expected probability A wins is significantly less in Election E2 (26% as compared to 53%).[42]

B8. Second Robustness Check - Sequence III

In our principal treatments subjects had fixed roles and the size of the majority was constant. We also used a fixed sequence of elections, with Election C always first. Our sessions using Sequence II partly controls the sequencing effect of E2 always following E1, but

[40]The z statistic for the comparison for A is 3.13, $Pr = 0.002$ and for B is 3.44, $Pr = 0.001$.

[41]The z statistic for Type A voters in Election C is 0.15, $Pr = 0.88$; for Election E1 1.69, $Pr = 0.09$; and for Election E2 5.06, $Pr < 0.001$. For Type B voters in Election C is 2.54, $Pr = 0.011$, for Election E1 0.95, $Pr = 0.34$; and for in neither treatment did these voters engage in other party voting in Election E2.

[42]The t statistic for the comparison for Election C is 1.17, $Pr = 0.25$; for Election E1 0.27, $Pr = 0.79$; and for Election E2 6.94, $Pr < 0.001$.

in order to determine if our results of the effects of privacy are robust to a more complicated environment, we also conducted sessions using Sequence III in which the election types varied randomly, majority sizes changes, and subjects' changed roles randomly.

Specifically, in Sequence III, subjects played elections C, E1, and E3 in a predetermined random order which was the same for both the S and P treatments as shown in Tables B3 and B4 below.

Table B3: Voter Payoffs in U.S. Dollars

	Election C		Election E1		Election E3	
Voter Type	A wins	B wins	A wins	B wins	A wins	B wins
A	20	5	25	20	25	25
B	5	20	5	20	5	20

We used three values of $x \in \{4, 5, 6\}$ and three election types. Therefore, there were 9 different election/majority combinations. Time constraints from changing these combinations each period meant that we conducted 18 elections (2 of each combination) in total in sessions using Sequence III. As noted above subjects' types also varied randomly given the variation in x.

Table B4: Order of Sequence III

Period	Election	x	Period	Election	x
1	E3	4	10	E1	4
2	C	6	11	E1	6
3	E3	5	12	C	4
4	E3	6	13	E1	6
5	C	6	14	E3	4
6	C	4	15	C	5
7	C	5	16	E1	5
8	E3	5	17	E3	6
9	E1	5	18	E1	4

Figures B11 and B12 summarize abstention and other party voting, respectively, by Election, Voter Type, and x (number of A voters). We find significant support for the effects of privacy on overall voting behavior found with our principal treatments in the sessions using the more complicated design. We find that observability leads to greater participation and prosocial other party voting in sessions with Sequence III, and voters engage in more

other party voting when they are in the minority. Furthermore, prosocial other party voting is much higher when the voters whose selfish preference is not the prosocial choice are in the minority.

Abstention overall is much lower when voting is public (21%) as compared to when it is private (45%) in these sessions. Furthermore, when voting is public we find stronger evidence of prosocial other party voting. In our sessions using Sequence III, there were 304 cases in which a voter's selfish preference was not the prosocial choice. When voting was public (152 observations), 15% of the votes were for the prosocial choice, while when the secret ballot was used (152 observations), only 4% of the votes were for the prosocial choice, a significant difference.[43]

Figure B11: Abstention in Sequence III Sessions

[43]The z statistic for the comparison of proportions is 3.32, Pr = 0.00.

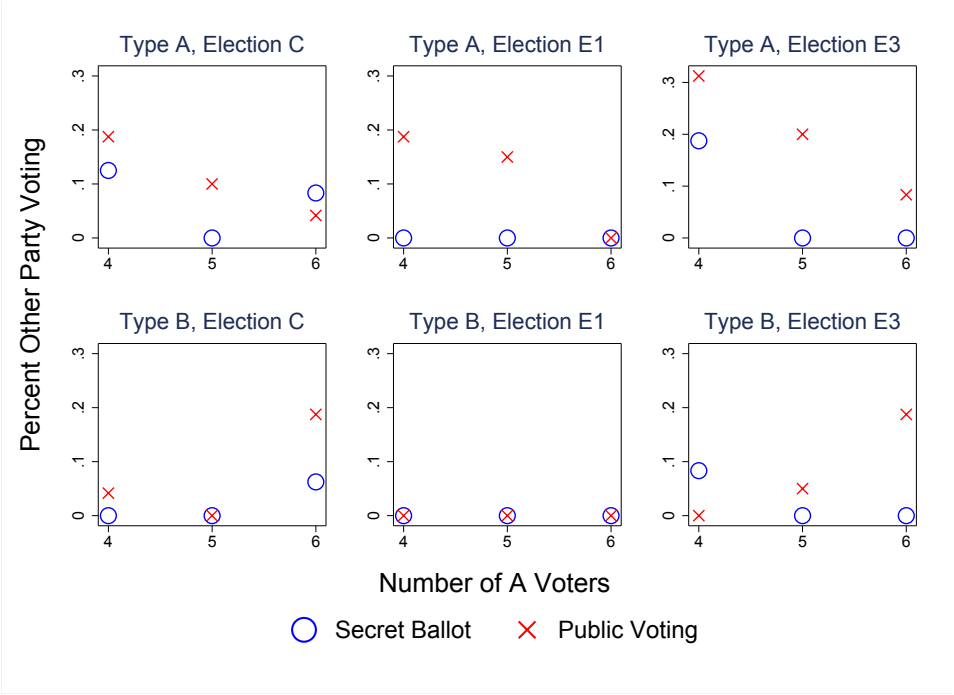


Figure B12: Other Party Voting in Sequence III Sessions

In Sequence III we consider situations in which we vary the size of the majority in Election E1 and E3, such that in some cases the prosocial choice is also the selfish preference of the majority of voters ($x = 4$) as well as cases where $x = 5$ or 6 (recall that in Sequence I $x = 6$). We find that the percentage of voters whose selfish preference is not the prosocial choice who engage in prosocial other party voting is significantly greater when $x = 4$, 17%, as compared to 5% when $x = 5$ or 6.[44] The difference is significant both when voting is secret (9% prosocial other party voting when $x = 4$ as compared to 0%) and when voting is public (25% prosocial other party voting when $x = 4$ as compared to 10%).[45] Our results, then, suggest that voters are more likely to vote prosocially instead of selfishly when they are in the minority and most likely to do so when voting is public (when 25% of votes are prosocial other party votes). This result is consistent with the fact that when $x = 4$, the aggregate social benefit from choosing the prosocial choice is greater given that more B voters benefit than when $x = 5$ or 6.

We find that in Sequence III voters engage in non-prosocial bandwagon voting when voting is public. Given that the observed prosocial other party voting is greater when the

[44]The z statistic = 2.99, Pr = 0.00.

[45]The z statistic for the comparison when voting is secret = 2.90, Pr = 0.00 and when voting is public = 2.05, Pr = 0.04.

prosocial choice is the selfish preference of the majority, what appears to be prosocial other party voting might be interpreted as bandwagon voting (voting for the candidate supported by the majority). We find little evidence of bandwagon voting when the prosocial choice is the selfish preference of the minority overall. We find of those voters whose selfish preference is the prosocial choice, about 5% of minority ones cast non-prosocial other party votes and about 2% of non-minority ones do so.[46]

However, we find evidence of non-prosocial bandwagon voting when voting is public in Sequence III. Specifically, of the voters whose selfish preference is the prosocial choice, when voting is public we observe about 9% minority ones casting non-prosocial other party votes and only 1% of nonminority ones doing so, which is significantly different.[47] We find the difference is in the opposite direction and nonsignificant, though, when voting is secret (0% of such votes when in the minority versus 2% when nonminority).[48] Therefore, we find some evidence that observability not only leads to greater prosocial other party voting but also non-prosocial bandwagon voting in Sequence III and that some of the increase in prosocial other party voting may be due to bandwagon effects rather than an effect of observability on prosocial preferences alone. Notably, we found no evidence of such non-prosocial bandwagon voting in Sequence I and II and no effect of observability on non-prosocial bandwagon voting, when voters were allowed greater opportunities to gain experience and learn. So although we find some conformity effects of observability in Sequence III, these effects do not appear to be robust.

Taken together, our main finding of the effects of observability on voting and election outcomes are robust to additional investigations. If anything, to the extent that the choice of the treatment and setup may miss some differences between the two voting environments, then the experimental analysis of this study could only lead to under-estimation of the effects of observability on political behavior and preferences.

B9. Third Robustness Check - Experimenter Demand Effect

Although we study a situation without intimidation and coercion, because in public voting the experimenter knew who made which decisions, it might result in experimenter demand effects. To identify the impact of the possible experimenter demand effects on our main findings, we conducted a new treatment: Secret Ballot with the Experimenter's

[46]The z statistic = 1.31, Pr = 0.19.
[47]The z statistic = 2.22, Pr = 0.03.
[48]The z statistic = 0.86, Pr = 0.39.

Monitor (hereafter, SE). In this treatment, everything was identical to the Secret Ballot (S) treatment, except that the experimenter had a close look at the decision-making process.

The treatment was conducted using paper and pencil as the other treatments. Both subject roles and their ID numbers were marked on every ballot ticket and the "For Payment" piece of paper. No monitors were required, as the experimenter could tell each decision-maker's decision according to the submitted ballot tickets. The winner was determined by the random dictator rule as noted earlier. After the winner of an election was decided, the experimenter recorded the remaining votes in the ballot box on board. Only the experimenter knew who made which decisions. Subjects' decisions were anonymous to other subjects.

The experiment was conducted at the same laboratory using the same subject pool. We conducted two sessions for this treatment and 20 subjects participated in this study. Sessions averaged approximately 90 minutes each and the average payment was about $25. We conducted the three elections as in S and P and used Sequence I in this treatment.

If experimenter demand effects resulted in the differences, then we expect that we would observe more other party voting in SE than S and no difference between SE and P. Compared to SE, we find little to no differences in other party voting in S, but significantly more other party voting in P.

When we compare voting behavior in SE with S, we find similar behavior with a few differences as shown in Figures B14 and B13 below which compare other party voting behavior and abstention in SE with S, respectively. In both S and SE, voters rarely voted for the other party. The overall difference is not significant (4% in SE vs 6% in S, The z statistic for the comparison for A voters is 3.17, Pr = 0.002). Type A voters voted for Party B 4% of the time in SE and 6% in S ($z = 0.775$, Pr= 0.44), and type B voters voted for Party A about 2% of the time in SE and 1% in S ($z = 0.823$, Pr= 0.41). When we compare voting behavior in SE with P in Sequence I, however, we find that public voting leads to significantly more other party voting. That is, type A voters voted for Party B about 15% of the time in P but 4% in SE, which is significantly more ($z = 4.29$, $Pr < 0.001$). And type B voters voted for Party A more in P (5%) than in SE (2%), although it is only marginally significant under an one-sided proportion test ($z = 1.41$, $Pr = 0.08$). When we break the effects down by election type, we find essentially the same results as what we reported in the main findings.

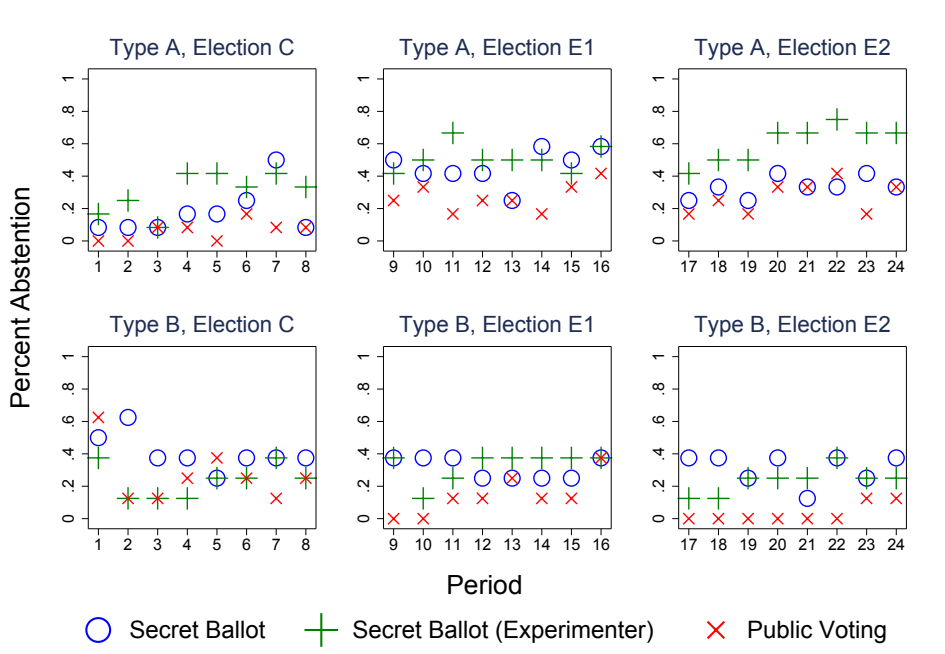


Figure B13: Comparisons of Abstention under S, SE, and P in Sequence I Sessions

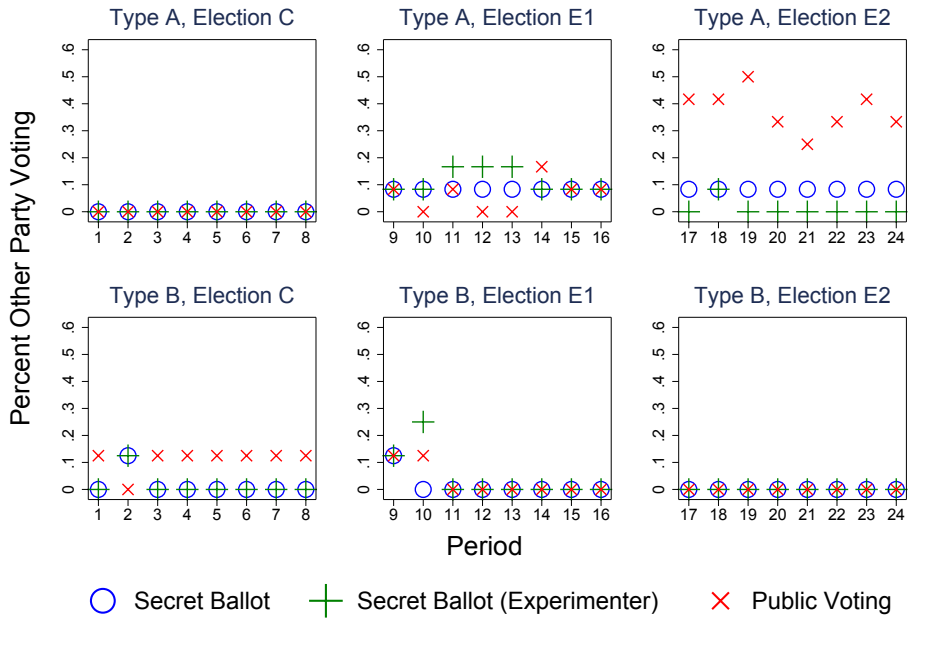


Figure B14: Comparisons of Other Party Voting under S, SE, and P in Sequence I Sessions

B voters choose party A 11% of the time when voting is public as compared to about 2%

of the time when it is private but with the experimenter's monitor ($z = 2.19$, $Pr = 0.029$), whereas A voters in Election C never vote for party B in both P and SE. We find significant effects in Election E2: A voters choose party B 38% of the time in P as compared to 1% of the time when in SE, whereas B voters in Election E2 never vote for party A.[49] In Election E1, we find more other party voting by A voters (6% in P as compared to 11% in SE) but the difference is not significant ($z = 1.27$, $Pr = 0.20$).[50]

On the experimenter demand effect on voter turnout, the theoretical implication is not clear. Then the effect is an empirical question. As noted earlier, we have learned that both A and B voters abstain more frequently in secret ballot. Now, when we compare the turnout in SE with S, we find that type A voters abstain even more in SE.[51]. The difference is consistent across election types, and most salient in E2.[52] For type B voters, the effect is mixed. Type B voters in general turn to abstain less, however, in most cases the differences between SE and S are statistically undistinguishable.[53] When we compare B's abstention in SE to P, we find that B voters abstain significantly less in P as compared to SE.[54]

When we compare the expected probability that A wins in SE with P, we find qualitatively the same result as reported in our main findings. That is, A is significantly more likely to win in EC under public voting (71% in P vs 58% in SE, $t = 4.17$, $Pr < 0.001$), and it is significantly less likely to win in E2 under public voting (26% in P vs 42% in SE, $t = 4.86$, $Pr < 0.001$). However, we find that the estimate of A winning in E1 is 53% in P and 38% in SE ($z = 2.55$, $Pr = 0.02$), which is different from our main results. Taken together, our experimental design controls for the experimenter demand effect. The comparisons between SE and S (P) suggests that our main findings of prosocial behavior are robust to the potential experimental demand effect, and the implications of the treatment effects between SE and P are largely consistent with our main results.

[49]The z statistic comparing Type A voters' choices = 6.40, $Pr < 0.001$.

[50]We also find slightly more other party voting by Type B voters in SE (5% as compared to 3%, $z = 0.46$, $Pr = 0.65$), but an examination of Figures B7 shows that the effect appears a mistake of voting or a reaction to the change of elections that did not survive after 1 or 2 rounds of voting, which is similar to the behavioral pattern that we reported in the main findings.

[51]The z statistic for A voters is 3.66, $Pr < 0.001$. The z statistic for B voters is 2.36, $Pr = 0.018$

[52]For EC, $z = 2.03$, $Pr = 0.04$; for E1, $z = 0.72$, $Pr = 0.47$; for E2, $z = 3.76$, $Pr < 0.001$.

[53]For EC, $z = 2.29$, $Pr = 0.02$; for E1, $z = 0.58$, $Pr = 0.56$; for E2, $z = 1.20$, $Pr = 0.23$.

[54]Overall, $z = 2.21$, $Pr = 0.027$. For EC, $z = 0.62$, $Pr = 0.54$; for E1, $z = 1.76$, $Pr = 0.08$; for E2, $z = 3.21$, $Pr = 0.001$.

B10. Survey in Experiment II

We conducted a short survey after subjects completed the voting decisions in the experiment. The survey questions can be found below.

1. What type of voter were you?
2. Most of the time how did you vote when ballots were secret?
3. Most of the time how did you vote when ballots were public?
4. Which voting method did you prefer? Briefly explain why you preferred that voting method.

Examining the survey, we see that many voters seem to clearly perceive the source of the benefits to B from public voting and made their choices for either secret or public voting because of these benefits. Figure B15 below summarizes the responses to our survey by voter type. 47% of A voters and 40% of B voters explicitly expressed such motivations.[55] Hence, we find evidence that voters were aware of the differences in the systems when making their choices. Of course, some voters expressed other reasons. Some of the B voters who chose secret ballots expressed a desire for privacy and to avoid tension. Some A subjects also wrote that secret ballots were more fair, allowing one to express one's true feelings without outside pressure. Such answers for A's seem to imply that they also felt pressured to abstain or vote for B in public voting, while they did not explicitly say so. We attempted as much as possible to ensure that each voting mechanism took the same amount of time, nevertheless 3 voters perceived that one or the other was faster and preferred the faster one. Although we observed only 3 abstentions in actual voting over the mechanism (all from A subjects), 14 subjects contended there was no difference in the voting mechanisms and claimed that they had no preference.

[55]For example, one A voter who admitted to having voted for B wrote: "Either way I voted, basically the same, though I abstained more often in secret because I didn't have to prove that I was being generous." To quote one B voter: "Public voting outed people as selfish [derogatory term deleted] if they voted A. So I think it made more people abstain if they were an A Type."

Table B5: Probits of Voting for Secret Ballots

Type A	Dependent Variable	dF/dx	Std. Err.	z	P $>\|z\|$
	% A Wins in S - % A Wins in P	1.70	0.45	3.75	0.000
	Number of Observations = 48				
	Pseudo $R^2 = 0.23$				
Type B	Dependent Variable	dF/dx	Std. Err.	z	P $>\|z\|$
	% A Wins in S - % A Wins in P	-1.22	0.60	-2.05	0.040
	Number of Observations = 32				
	Pseudo $R^2 = 0.14$				

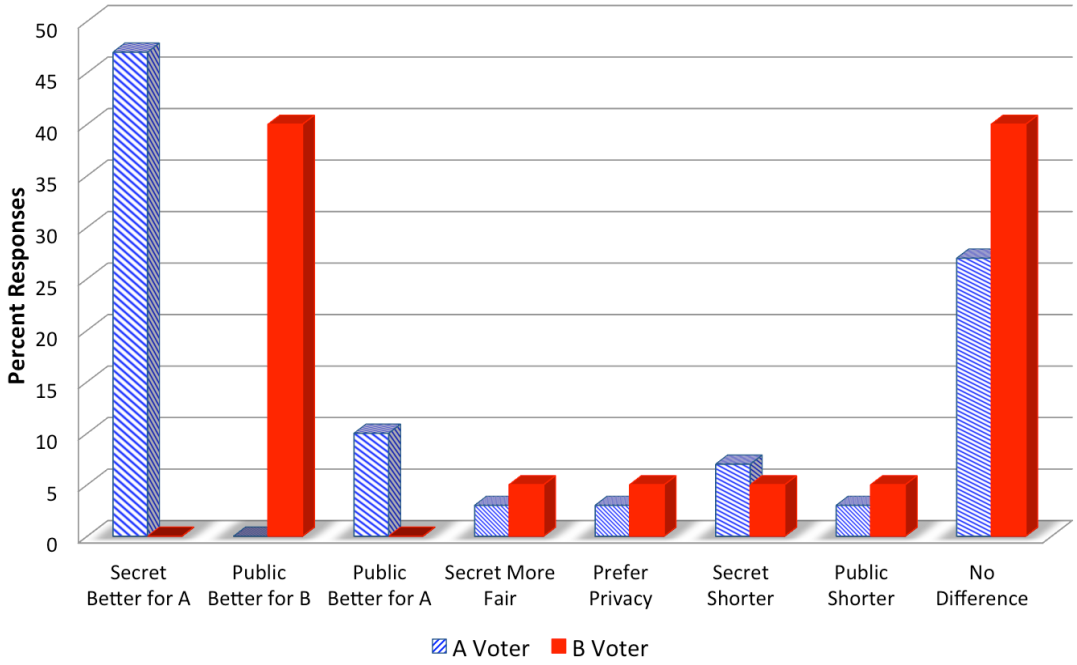


Figure B15: Survey Responses by Voter Type

Appendix C: Description of Procedures

Instructions were read by the same experimenter in all sessions. The experimenters had not known any participants previously. After obtaining subjects' consent to participate, the experimenters gave each participant a copy of the written instructions and 24 large sealed envelopes. Each of these large envelopes had a number written on the front for each experimental period. Subjects were asked to open the sealed envelope labeled number 1 in the first period. Similarly, during the next period, they were asked to open the sealed envelope

labeled number 2, and so forth, for 24 periods. Each large envelope contained standard letter sized envelopes in different colors and ballot tickets, which are described below. Instructions were read orally, allowing subjects to ask questions privately and to make sure that everyone had common knowledge of the decision tasks. As discussed above, in each period, after all the votes had been collected, one of the subjects was randomly chosen to draw one voting choice from the ballot box to decide the winner of that period. If an abstention ballot was drawn then another ballot was drawn in its place until one containing a party choice was selected. If all voters had abstained, then one of the parties would have been randomly chosen as the winner; as it happened this never occurred. Again, as discussed above, at the end of the experiment, only one of the rounds was randomly chosen by a subject as the period to be paid.

C1. Secret Ballot Treatment

In the Secret Ballot Treatment or S, subjects were told that neither the other participants nor the experimenter knew their decisions and payments, and the experimenters explained how the experiment worked to achieve this goal. In order to ensure anonymity in the Secret Ballot Treatment, subjects were randomly given the sealed envelopes which contained their role assignments etc. Furthermore, one subject was randomly chosen to serve as a monitor to ensure credibility and calculate subjects' payoffs as described below (so we recruited 11 subjects for each Secret Ballot Treatment).[56] After being chosen, the monitor was asked to wait in another room. The room had an open door such that the monitor could hear what was occurring during the experiment but not see the other subjects or observe their choices. The other subjects randomly chose their ID number cards. The experimenters had marked the same number on two pieces of paper and had stapled them together in advance. So, every subject received two ID number cards.

In each period, subjects were asked to make voting decisions. Subjects were seated at individual work stations which were shielded such that their neighbors (either next to or behind) could not observe their choices. In each large envelope for each period, the two standard sized envelopes were orange and blue, and the ballot tickets were marked "Vote

[56]To avoid design issues pointed out by Forsythe et al. (1994) and Koch and Normann (2008), the monitor was selected publicly. The experimenters put eleven pieces of paper into an envelope. Ten of them were marked "Subject," and one of them was marked "Monitor." When all subjects entered the laboratory, the experimenters asked them to draw one piece of paper from the envelope to decide who was the monitor. All subjects were present during the entire process, which reduced any belief that subjects had that the monitor was a confederate of the experimenters.

for Party A," "Vote for Party B," and "Abstain." The large envelope also contained a "For Payment" piece of paper. Subjects' roles—A type voters or B type voters—were marked on every ballot ticket and "For Payment" piece of paper, but their ID numbers were not marked on the tickets. If voting for Party A, subjects were asked to put "Vote for Party A" in the orange envelope, "For Payment," "Vote for Party B," and "Abstain" in the blue envelope; if voting for Party B, they were asked to put "Vote for Party B" in the orange envelope, "For Payment," "Vote for Party A," and "Abstain" in the blue envelope; if abstaining, they were asked to put "Abstain" in the orange envelope, "For Payment," "Vote for Party A," and "Vote for Party B" all in the blue envelope. After making their choices, the experimenters collected the orange envelopes into the ballot box, which was opaque. The experimenters were extremely careful not to collect ballots before subjects had completed making their decisions and not to scrutinize the orange envelopes.

Only the votes in the orange envelopes were used to determine the winner in the election using the random dictator rule discussed above. At the end of the session and the paid period had been selected, the blue envelopes of that period as well as one ID number card were given to the monitor who then calculated subjects' payoffs without knowing the identities of particular subjects. The monitor calculated the payoffs by consulting the submitted blue envelopes for the selected period. Specifically, the monitor saw on the "For Payment" sheet which revealed to the monitor a subject's type in the period and therefore how much he or she should be paid. The monitor checked whether the subject abstained or not by examining whether the subject included the "Vote for Party A" and "Vote for Party B" ballot tickets in the blue envelope. If the subject had included both of these, then the monitor knew the subject had abstained and did not deduct \$2 from the payoff. If the monitor did not see both of these ballot tickets in addition to the "For Payment" piece of paper, then he or she deducted the \$2 from the payoff.

Next, the monitor put subjects' payoffs in new white envelopes, sealed them and gave them to the experimenters. Subjects' ID number cards were taped on the front of the white envelopes so that the experimenters could check the second ID card in each subject's hands and accordingly give the sealed payoffs to the subjects. But the experimenters did not know how particular subjects voted by ID number nor how much they earned. The monitor was asked to add up the total amount that he or she paid to the subjects. The experimenters, from examining the orange envelopes and knowing the distribution of voter types, could tell how many voters abstained and calculate the total as well to check the monitor's calculation. Subjects were also asked to check their payments. If any subject had

reported a wrong payment, the monitor forfeited his or her payment. However, no subject objected to his or her payoff calculation and monitor calculations always fit the expected total.

C2. Public Voting Treatment

The Public Voting Treatment or P, was identical to the previous treatment except the experimenters modified the ballot tickets and the function of the colored envelopes, adding an additional green envelope. Subjects received ballot tickets that were not marked "Vote for Party A," "Vote for Party B," or "Abstain," Only their roles and ID numbers were printed on the ballot tickets. They were asked to put one ballot ticket into every envelope. Next, if they voted for party A, they submitted the orange envelope; if they voted for party B, they submitted the blue envelope; if they abstained, they submitted a green envelope. Subjects were asked in a randomly determined order which varied each period to go to the rostrum and put their decisions into the ballot box. At the same time, the experimenters recorded their decisions of each period on the white board. This design was aimed to guarantee that, although subjects' identities were anonymous to each other, everyone knew who made which decisions. Special care was taken by the experimenters to make sure that subjects made their decisions simultaneously while behind the privacy screens and were not able to change their decisions after observing others' choices. Hence, although voters cast their ballots sequentially, the choices were actually made simultaneously.

We instituted measures to prevent subjects from observing the votes of others prior to making their own voting decisions. Specifically, subjects were instructed to choose which envelope to keep for their vote and put it aside. The experimenters collected the two envelopes that voters did not plan to use. The experimenters made sure that other subjects were not allowed to see this collection by placing the collected envelopes in a large opaque envelope. Then subjects individually put their votes in the ballot box publicly. Although some subjects might have seen how others had voted before they put their vote in the ballot box, there was no way for them to change their choices. Under sequential voting, subjects choices may be significantly different than when voting is simultaneous, particularly when the decisions are observed. See Battaglini et al. (2007) for a discussion of sequential versus simultaneous voting. One of the subjects was randomly chosen to draw one envelope from the ballot box to decide the winner of that period. Note that the box in which the envelopes were placed was opaque. The subject could not see inside the box when the he or she made the random draw. Next, if the envelope was orange then party A was declared the winner; if

the envelope was blue then party B was declared the winner; if the envelope was green then a new envelope was randomly drawn from the ballot box to decide the result.

C3. Instructions for Secret Ballot Treatment

Welcome to our experiment. When you entered the laboratory, you were asked to draw a card. The subject who drew the card marked "monitor" is assigned to be the monitor in this experiment. He or she makes the payments to the other subjects at the end of experiment. The monitor is being paid a flat amount which equals the maximum that can be earned in this experiment.

For all the other subjects, after the monitor was assigned to wait in another room, the experimenters asked each of you to randomly draw your experimental ID number cards. The ID numbers are used to calculate your payments. Note that you received 2 ID number cards simultaneously. Each had the same number. Be careful not to lose any of the ID cards. Since now the monitor is in another room, the monitor does not know which person has which ID number. At the same time, each of you does not know other participants' ID numbers. Please note that, there is no connection between the seat number and your ID number. As we explain shortly, the monitor will calculate your payments anonymously using the ID numbers.

Voting Procedure

During the following experiment, we require your complete and undivided attention, and ask that you follow the instructions carefully. Please turn off your cell phones. For the duration of the experiment, do not take actions that could distract you or other participants. Peeking at other participants' decisions is not allowed during the session. And do not let others observe your decisions. If you have any questions during the experiment, please raise your hands. The experimenters will come to you privately and answer your questions. If we think the questions are of a general nature, we will announce the answers to everyone. Please restrict these questions to clarifications about the directions only. If you break silence while the experiment is in progress, you will be asked to leave the experiment.

Please find 24 envelopes on your tables. Each of these envelopes has a number written on the front. This experiment will last for 24 rounds. In the first round, you are asked to open the large numbered envelope labeled number "1." Similarly, during the next round, you are asked to open the large numbered envelope labeled number "2," and so forth, for 24 rounds.

In each of these envelopes, there are

1. three envelopes: ORANGE, BLUE, GREEN
2. three ballot tickets: "Vote for Party A," "Vote for Party B," and "Abstain"
3. one piece of paper: "For payment"

In the experiment, there are two groups of players: A-type voters and B-type voters. Beside the "monitor," ten participants of this experiment will be randomly assigned as one of these two types players. There are always 6 A-type voters and 4 B-type voters who are asked to make a series of voting decisions in this experiment. You can find your role—A or B-type voter—on the ballot tickets, and your role will remain the same throughout the entire experiment.

In each round, you need to decide whether to vote for party A, vote for party B, or abstain. Then once you decide, please select the associated ballot ticket and put it into the corresponding envelope as described below.

- If you vote for Party A, put "Vote for Party A" in the ORANGE envelope, "For Payment" in the GREEN envelope, "Vote for Party B" and "Abstain" in the BLUE envelope.
- If you vote for Party B, put "Vote for Party B" in the ORANGE envelope, "For Payment" in the GREEN envelope, "Vote for Party A" and "Abstain" in the BLUE envelope.
- If you abstain, put "Abstain" in the ORANGE envelope, "For Payment," "Vote for Party A," "Vote for Party B" all in the GREEN envelope, NOTHING in the BLUE envelope.

You should **FOLD** your ballot tickets before putting them into the envelopes so that your vote choice cannot be seen through the envelope. After you make your voting decisions, the experimenters will come around and collect the ORANGE envelopes. Please put the leftover envelopes back to the numbered large envelopes. Please note that neither the experimenters nor the other participants know your vote choices. When you are making your decisions, please place the ballot tickets confidentially and do not let others know your decision. Please raise your hand when you have made your decision.

Winning Rule

Only the votes in the ORANGE envelopes will be used to determine the winner in the election. In each round, after the ORANGE envelopes have been collected, one of you will be randomly chosen to draw one of the ORANGE envelopes from the ballot

box and open it. If the envelope contains the paper marked "Vote for Party A" then Party A is declared the winner; if the envelope contains the paper marked "Vote for Party B" then Party B is declared the winner; if the envelope contains the paper marked "Abstain," or the envelope contains more than one ballot ticket, then a new envelope is randomly drawn from the ballot box in order to decide the result.

Costs and Payoffs

You will receive $8 for showing up. You will also earn an additional payoff based on the outcome of the election in the chosen round and your type. That is, at the end of the experiment, one of the 24 rounds is randomly chosen to be "paid." The experimenters will randomly invite one of you to choose the round that will be paid. Your payoff will depend on your type and which party wins the election in the chosen round. For each election you will be given a separate set of instructions with a payoff table that explains what your payoffs will be in that election. Please read the instructions carefully for each round. The payoff tables may change from round to round.

Voting is costly. You will pay $2 if you vote for either party A or party B. If you choose to abstain (not vote) you do not need to pay this additional amount. The cost of voting will stay at $2 for the entire experiment. You will be paid based on your type and who the winner is for the selected round to be paid. So, if you abstain, you will also be paid. But please note that, whether you vote or abstain decides the probabilities that party A and party B wins the elections.

Privacy

Your decisions and payments are absolutely anonymous. Neither the other participants nor the experimenter knows this information.

In order to achieve absolute anonymity, the experimenters sealed all the large envelopes after they randomly put all the necessary materials into them. Then, the experimenters randomly distributed these large envelopes to your tables.

When the round to be paid is selected, you need to find the GREEN envelope of the selected. Please only submit the GREEN envelope of the selected round, but not the ones of other rounds. Also, you need to clip one of your ID numbers to the GREEN envelope using the provided paper clips. Note that, you need to FOLD the ballot tickets so that your decisions cannot be seen through the envelope.

After collecting all the GREEN envelopes, the experimenters will give them to the monitor who sits in another office of the laboratory. The monitor does not know who you are. He or she will simply put the voucher into each GREEN envelope based on the outcome of

the election and your type in the selected round. The monitor will be able to calculate the payoffs by consulting your GREEN envelopes for the selected round. That is, the monitor will see on the "For payment" sheet your type. That will tell the monitor what your payoff from the election should be given who the winner is. The monitor can also see whether you abstained or not by seeing if you have included the "Vote for Party A" and "Vote for Party B" pieces of paper. If you have included both of these, then the monitor knows you abstained and does not deduct $2 from your payoff. If the monitor does not see both of these pieces of paper in addition to the "For payment" piece, then she or he will deduct the $2 from your payoff. The monitor will add up the total amount that she is going to pay to subjects. The experimenters, from examining the orange envelopes and knowing the distribution of voter types, will be able to tell how many abstained and be able to calculate the total as well to check the monitor to be sure the monitor's calculation is right. But the experimenters will never know whether you IN PARTICULAR abstained or not and if you voted, how you voted. No one will know this information.

Then, the experimenter gives back the GREEN envelope to each of you without knowing your payments. When you receive your payment, please check that it is the right amount that you should receive from participating in the experiment. If you have any problems with your payment, please report it to the experimenters. If your payment is correct, please come to the experimenter and sign your name on the receipt. The experiment is over and you are free to leave.

Summary

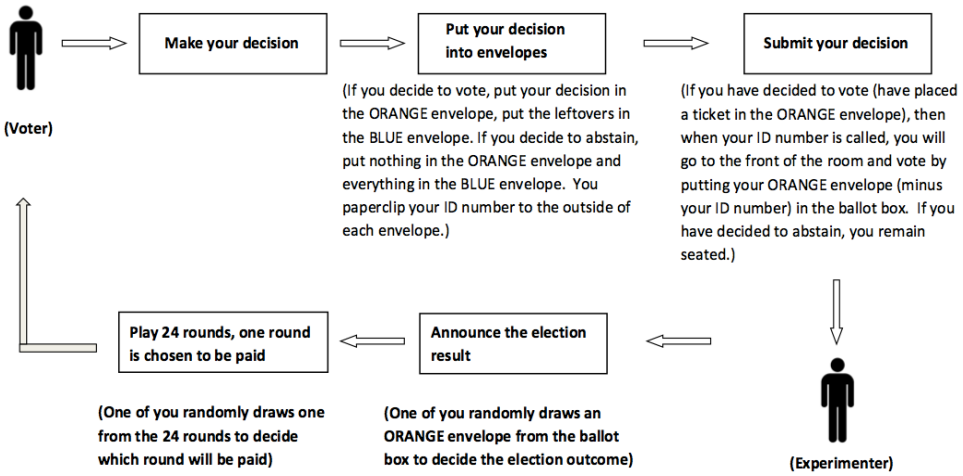
- There are two types of voters: A type and B type. You will randomly be assigned as one of these types. There are 6 A type voters and 4 B type voters who are asked to make a series of voting decisions in this experiment. The number of A type and B type voters, and your role—A type or B type—will remain the same throughout the entire experiment. But the payoff tables may change from round to round. You need to read the instructions carefully in each round.

- You need to pay $2 to vote. If you abstain, you do not need to pay the voting cost. You will be paid based on your type and who the winner is for the selected round to be paid. So, if you abstain, you will also be paid. But please note that, whether you vote or abstain decides the probabilities that party A and party B wins the elections.

- You need to select the associated ballot tickets, FOLD, and put them into corresponding envelope as required. In each round, one of the participants will be asked to

randomly draw an envelope from the ballot box to decide the winner of the election. After the 24 voting games have been finished, the experimenters randomly ask one of you to draw one round from the 24 rounds as the round to be paid.

- Your decisions and payments are absolutely anonymous. Neither the other participants nor the experimenter knows this information.



If you have any questions, please ask them now.

DO NOT TURN TO THE NEXT PAGE UNTIL INSTRUCTED TO DO SO.

Typical Page for a Period

In this round, there are 6 A-type voters and 4 B-type voters. Please check your role in the envelope. The payoff table for the two types of voters is shown below (Here subjects would find a table with the voting payoffs for the period).

This table tells you the payoffs you and the other members of the group receives for every potential winning alternative. For example, if Party A wins, A type voters receive 20 dollars, B type voters receive 5 dollars. If Party B wins, A type voters receive 5 dollars, B type voters receive 20 dollars.

Remember that voting is costly and if you choose to vote, you will pay \$2 for voting. So, if you are an A type voter, and you choose to vote, and A wins, you receive \$20-2 = \$18. If you are a B type voter, and you choose to vote, and A wins, you receive \$5-2=\$3. If you abstain, you do not have to pay the \$2 to vote.

Please make your decision now!

- If you vote for Party A, put "Vote for Party A" in the ORANGE envelope, "For Payment" in the GREEN envelope, "Vote for Party B" and "Abstain" in the BLUE envelope.

- If you vote for Party B, put "Vote for Party B" in the ORANGE envelope, "For Payment" in the GREEN envelope, "Vote for Party A" and "Abstain" in the BLUE envelope.

- If you abstain, put "Abstain" in the ORANGE envelope, "For Payment," "Vote for Party A," "Vote for Party B" all in the GREEN envelope, NOTHING in the BLUE envelope.

C4. Instructions for Experiment II

Welcome to our experiment. During the following experiment, we require your complete and undivided attention, and ask that you follow the instructions carefully. Please turn off your cell phones. For the duration of the experiment, do not take actions that could distract you or other participants. Peeking at other participants' decisions is not allowed during the session. And do not let others observe your decisions. If you have any questions during the experiment, please raise your hands. The experimenters will come to you privately and answer your questions. If we think the questions are of a general nature, we will announce the answers to everyone. Please restrict these questions to clarifications about the directions only. If you break silence while the experiment is in progress, you will be asked to leave the experiment.

General Description

This is a voting experiment, which consists of three parts and will last for 22 periods. For all parts of this experiment you will play a voting game, which we will describe shortly, with the same group of participants. In Part I (Periods 1-10), you will vote by secret ballots (which we explain below) and in Part II (Periods 11-20), you will vote publicly (which we explain below). In Part III, you will have the opportunity to vote to decide whether to use secret ballots or public voting. That is, In Period 21, you will be asked to vote to decide whether to use secret ballots or public voting in the following 5 periods; then in Periods 22-26, the voting experiment will be organized based on the selected winner of Period 21.

Please find large envelopes on your tables. Each of these envelopes has a number written on the front. In the first period, you are asked to open the large numbered envelope labeled

number "1." Similarly, during the next period, you are asked to open the large numbered envelope labeled number 2," and so forth, for 26 periods.

In the experiment, there are two groups of players: A-type voters and B-type voters. The ten of you will be randomly assigned as one of these two types players. There are always 6 A-type voters and 4 B-type. You can find your role—A or B-type voter—on the ballot tickets, and your role will remain the same throughout the entire experiment. Even though the voting procedure changes, your assignment as an A-type or a B-type never changes. If you are an A-type when we use secret ballots you will also be an A-type when we use public voting.

In each period, you need to decide whether to vote for party A, party B, or to abstain. The payoff table for the two types of voters is shown below:

Voter Type	If Party A wins	If Party B wins
A	25	20
B	50	20

This table tells you the payoffs you and the other members of the group receive for every potential winning alternative. For example, if Party A wins, A-type voters receive 25 dollars; B-type voters receive 5 dollars. If Party B wins, A-type voters receive 20 dollars, B-type voters receive 20 dollars.

Voting is costly and if you choose to vote, you will pay \$2 for voting. So, if you are an A-type voter, and you choose to vote, and A wins, you receive $\$25 - 2 = \$23$. If you are a B-type voter, and you choose to vote, and A wins, you receive $\$5 - 2 = \$3$. If you abstain, you do not have to pay the \$2 to vote. So if you are an A-type voter, and you do not choose to vote and A wins you receive \$25. If you are a B-type voter, and you do not choose to vote, and A wins, you receive \$5. This payoff matrix will stay the same throughout the experiment. Note you will also receive \$8 for showing up.

Part I-Secret Ballot Voting

With secret ballots, your decisions and payments are anonymous to both the experimenters and the other participants. We explain the mechanism of how we maintain such anonymity below.

When you entered the laboratory, you were asked to draw a card. The subject who drew the card marked "monitor" is assigned to be the monitor in this experiment. He or she makes the payments to the other subjects at the end of experiment. The monitor is being paid a flat amount which equals the maximum that can be earned in this experiment.

For all the other subjects, after the monitor was assigned to wait in another room, the experimenters asked each of you to randomly draw your experimental ID number cards. The ID numbers are used to calculate your payments. Note that you received 2 ID number cards simultaneously. Each had the same number. Be careful not to lose any of the ID cards. Since now the monitor is in another room, the monitor does not know which person has which ID number. At the same time, each of you does not know other participants' ID numbers. Please note that, there is no connection between the seat number and your ID number. The monitor will calculate your payments anonymously using the ID numbers.

You will engage in the secret ballot from Period 1 to Period 10. You will be asked to open envelopes from "1" to "10," respectively. In each of these envelopes, there are

- A smaller white envelope.
- Three ballot tickets: "Vote for Party A," "Vote for Party B," and "Abstain."

In each period, you need to decide whether to vote for party A, vote for party B, or abstain. Then once you decide, please select the associated ballot ticket and put it into the smaller white envelope as described below.

- If you vote for Party A, fold the "Vote for Party A" ticket so that it cannot be read through the envelope and put it in the smaller white envelope.
- If you vote for Party B, fold the "Vote for Party B" ticket so it cannot be read through the envelope and put it in the smaller white envelope.
- If you abstain, fold the "Abstain" ticket so it cannot be read through the envelope and put it in the smaller white envelope.

Remember to FOLD your ballot tickets before putting them into the envelopes so that your vote choice cannot be seen through the envelope. After you make your voting decisions, the experimenters will come each period and collect the envelopes. Please put the leftover materials back to the numbered large envelopes. Please note that neither the experimenters nor the other participants know your vote choices. When you are making your decisions, please place the ballot tickets confidentially and do not let others know your decision. Please raise your hand when you have made your decision.

Winning Rule

In each period, after the envelopes have been collected, one of you will be randomly chosen to draw one of envelopes from the ballot box and open it. If the envelope contains

the paper marked "Vote for Party A" then Party A is declared the winner; if the envelope contains the paper marked "Vote for Party B" then Party B is declared the winner; if the envelope contains the paper marked "Abstain," or the envelope contains more than one ballot ticket, then a new envelope is randomly drawn from the ballot box in order to decide the result.

Privacy of Payment with Secret Ballots

When voting by secret ballot, your decisions and payments are anonymous to both the experimenters and the other participants. Although your role is marked on the ballot ticket, and your ID number is anonymous to others, so neither the experimenters nor the other participants know in particular who make which decisions.

As noted above, one of the voting periods (with the exception of Period 21) will be randomly selected to be paid. If the period to be paid is an election using secret ballots, you will need to find the leftover ballot tickets of the selected period, and return them to the experimenters in a blank white envelope which the experimenters will provide for you at that time. FOLD the tickets so they cannot be read through the envelope. Please only submit the leftover ballot tickets of the selected period, but not the ones of other periods. Also, you need to clip one of your ID numbers to the envelope using the provided paper clips. Note that, you need to FOLD the ballot tickets so that your decisions cannot be seen through the envelope.

After collecting all your envelopes as well as the corresponding ballot tickets of the period to be paid, the experimenters will give them to the monitor who sits in another office of the laboratory. Although each envelope has an ID number, the monitor does not know which of you has which ID number. He or she will simply put the voucher into each envelope based on the outcome of the election in the selected period and your type. The monitor will be able to calculate the payoffs by consulting your envelope for the selected period. That is, the monitor will see on the ballot tickets your type, and check the ballot ticket(s) in the envelope to know if you voted. If you vote, that is, the monitor does not see both "Vote for Party A" and "Vote for Party B", the monitor will deduct $2 (the cost of voting) from your payment. If you abstain, the monitor sees that both ballots are in the envelope, the monitor will not deduct $2 from your payment. That will tell the monitor what your payoff from the election should be given who the winner is. The period number is marked on the ballot tickets. Please only submit the ballot tickets of the selected period. If you put the ballot tickets of other periods in the envelope, you forfeit your payment.

The monitor will add up the total amount that she or he is going to pay to you. At the

same time, the experimenters, from examining the envelopes you submitted of the selected period, will be able to calculate the total as well to check the monitor to be sure the monitor's calculation is right. Because there is no information on your ID numbers, the experimenters will never know whether you IN PARTICULAR abstained or not and how you voted. No one will know this information. Note that, the ID cards used with secret ballots and with public voting are different.

If the monitor's calculation is right, then the monitor will put the cash vouchers into the corresponding envelopes and give the envelopes to the experimenters. Then the experimenters give back the envelopes to each of you without knowing how you voted and your payments. You use another ID number card in your hands to exchange your payoff.

When you receive your payment, please check if your payment is correct. If you have any problems with your payment, please report your problems to the experimenters. If your payment is correct, please sign your name on the receipt, and take the two ID number cards away from the laboratory.

Remember the following:

1. You will be assigned to a voting type. 6 of you will be assigned as type A voters and 4 of you will be assigned as type B voters. Your type will stay the same throughout the experiment. You will never change your type.

2. First you will play the voting game with secret ballots for Periods 1-10. You have a secret ballot ID card that will be used only for Secret Ballots. It is marked with an S.

3. Then you will play the voting game with public voting for Periods 11-20 (we will explain the procedures of how public voting works in Period 6 so there is not too much to remember, but simply put everyone will observe how everyone else votes). You have a public voting ID number that will be used for Public Voting. It is marked in ballot tickets. Your ID cards of secret ballot voting and public voting are different and unrelated to each other – the Secret Ballot ID cards are letters and the Public Voting ID numbers go from 1-10.

4. In Period 21 you vote whether to use secret ballots or public voting in Periods 22-26.

5. After all the voting has concluded, we randomly draw one period (excluding Period 21) to be paid.

6. If we used secret ballots in the selected period, we will use the payment procedures described above.

7. If we used public voting in the selected period, we will pay you according to your ID number in the public voting games.

   If you have any questions, please raise your hand and an experimenter will come and answer them privately.

Part II-Public Voting

When voting is public, whether you vote or abstain, and how you vote is known to all participants and the experimenters. We explain the mechanism of how we organize public voting below.

You will vote by public voting from Periods 11 to 20. You will be asked to open envelopes from "11" to "20," respectively. In each of these large envelopes, there are

- Three envelopes: ORANGE, BLUE, and GREEN.
- One piece of paper: "For payment"

In each election you first decide whether to vote for party A, vote for party B, or to abstain. Then once you decide, please select the associated ballot ticket and put it into the corresponding envelope as described below.

- If you vote for Party A, put "For payment" in the ORANGE envelope, and then put the blue and green envelopes back to the numbered large envelope. Make sure that no one can see which envelope you have kept.
- If you vote for Party B, put "For payment" in the BLUE envelope, and then put the orange and green envelopes back to the numbered large envelope. Make sure that no one can see which envelope you have kept.
- If you abstain, put "For payment" in the GREEN envelope, then put the orange and blue envelopes back to the numbered large envelope. Make sure that no one can see which envelope you have kept.

Note that, when you are making your decisions, please make sure that no other subjects or the experimenters can observe which envelopes you have kept and which have been placed back in the large. It is extremely important that you do not let others know your decision before you are called upon to cast your vote publicly. If you reveal your voting decision in any way before publicly casting your vote as called on by the experimenters, you will forfeit your

payment. Please raise your hand when you have made your decision. The experimenters will come to you and collect the numbered large envelope, which will contain the other two smaller envelopes, so that in each period you cannot change your decision after you know other participants' choices.

When we collect all the large envelopes, the experimenters will come to you and collect your decisions. We will ask you to put your decisions into the ballot box publicly by putting the envelope with the "for payment" piece of paper in the ballot box and announcing your decisions loudly. At the same time, the experimenters record your decisions of each period on the white board, so that everyone will know who make which decisions.

Winning Rule

Note that, when you are making your decisions, please make sure that no other subjects or the experimenters can observe which envelopes you have kept and which have been placed back in the large. It is extremely important that you do not let others know your decision before you are called upon to cast your vote publicly. If you reveal your voting decision in any way before publicly casting your vote as called on by the experimenters, you will forfeit your payment. Please raise your hand when you have made your decision. The experimenters will come to you and collect the numbered large envelope, which will contain the other two smaller envelopes, so that in each period you cannot change your decision after you know other participants' choices.

When we collect all the large envelopes, the experimenters will come to you and collect your decisions. We will ask you to put your decisions into the ballot box publicly by putting the envelope with the "for payment" piece of paper in the ballot box and announcing your decisions loudly. At the same time, the experimenters record your decisions of each period on the white board, so that everyone will know who make which decisions.

Payment Procedures if Period Selected Uses Public Voting

If the period selected for payment used public voting, then the experimenters will find the submitted colored envelopes of the selected period. The experimenters will know your votes by seeing the color of the envelope, and calculate your payoff by seeing on the ballot tickets which will have your type and public voting ID number. If you vote, that is, the experimenters see you submitted the ORANGE or BLUE envelopes, the experimenters will deduct \$2 (the cost of voting) from your payment. If you abstain, the experimenters see the GREEN envelope, the experimenters will not deduct \$2 from your payment. That will tell the experimenters what your payoff from the election should be given who the winner is. You will be privately paid for your participation with a cash voucher at the end of the

session. When you receive your payment, please check if your payment is correct. If you have any problems with your payment, please report your problems to the experimenters. If your payment is correct, please sign your name on the receipt

If you have any questions, please raise your hand and an experimenter will come and answer them privately.

Part III and Period 11

In Period 21, you are asked to vote to decide whether to use secret ballots or public voting in the following 5 periods. You will vote over which voting process to use using secret ballots. In the envelope marked "21," there are

- One smaller WHITE envelope.
- Three ballot tickets: "Secret Ballot," "Public Voting," and "Abstain"

Note that each ballot ticket is marked with Period II and your type (A or B voter). But there is no ID number on any of the tickets, so your choice is anonymous to the experimenters and your fellow voters. Also, there is no cost of voting. Voting is free in this election. Once you decide, please select the associated ballot ticket, FOLD it, and put it into the corresponding envelope as described below.

- If you vote for using secret ballots, put "Secret Ballot" in the WHITE envelope
- If you vote for using public voting, put "Public Voting" in the WHITE envelope
- If you wish to abstain, put "Abstain" in the WHITE envelope.

Note that, your decisions are anonymous to both the experimenters and the other participants. Again, after the envelopes have been collected, one of you will be randomly chosen to draw one of the envelopes from the ballot box and open it. If the envelope contains the paper marked "Secret Ballot" then you will use secret ballots in the following 5 periods; if the envelope contains the paper marked "Public Voting" then you will use public voting in the following 5 periods; if the envelope contains both of the two ballot tickets or "abstain," then a new envelope is randomly drawn from the ballot box in order to decide the result. If a decision is not made after all envelopes have been drawn, a coin will be flipped to determine the winner. Remember there is no cost to voting in this election.

If you have any questions, please raise your hand and an experimenter will come and answer them privately.