Vote-Buying and Reciprocity[*]

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Abstract

While vote-buying is common, most models of elections suggest it should not exist given that politicians and voters cannot credibly commit. We argue that vote-buying is sustained by an internalized norm of reciprocity. Receiving money engenders feelings of obligation, while not receiving money engenders desires for revenge. Combining survey data on vote-buying with experiment-based measures of reciprocity, we show that politicians target reciprocal individuals, and reciprocal individuals are in turn more likely to vote for the party from which they accepted a good. This highlights the importance of social preferences in determining behavior, particularly when commitment problems are present.

1   Introduction

Recently, economists have begun to emphasize the importance of social preferences in determining economic behavior (Fehr & Schmidt 2006). Laboratory experiments have provided ample evidence that preferences for reciprocity, altruism, and inequity aversion can be useful in sustaining cooperative behavior or overcoming information and commitment problems that discourage economic transactions (Fehr & Camerer 2004, Fehr et al. 1993, 2002). However, whether these results can extend beyond the laboratory to real world settings is still an open question. Consequently, our understanding of how social preferences not only affect behavior, but more specifically allow individuals to overcome market frictions remains limited.

In this paper, we investigate how social preferences overcome the commitment problems implicit in vote-buying. Vote-buying is a phenomenon which is common around the world (Schaffer 2007*b*). Yet, most standard models of elections would suggest that vote-buying should not exist. With secret balloting, votes are unobservable, while a politician's promises are unenforceable. With this double commitment problem, there is no formal way to contract for votes in an election (Robinson & Verdier 2003).

We argue that vote-buying is sustained, in part, because of individuals' feelings of reciprocity. Voters who are offered money or material goods in exchange for their votes reciprocate because they experience pleasure in increasing the material payoffs of the politician who has helped them. Similarly, if they are not offered money, they also enjoy decreasing the material payoffs of the politician who has slighted them.

To test this claim empirically, we assemble a rich and novel dataset combining survey information on vote-buying experienced in a 2006 municipal election in Paraguay, with information on behavior in experiments carried out in 2002. Using both survey data and behavior in these experimental games to estimate measures of an individual's reciprocity, we test whether more reciprocal individuals are more likely to be targeted for vote-buying.

We find that reciprocal individuals, both in terms of overall reciprocity measured in the experiment and negative reciprocity measured in the survey, are not only more likely to experience vote-buying, but are also more likely to vote for the party from which they accepted some good. For instance, an individual who claims he would put somebody in a difficult situation if that person put him in a difficult situation is 15.4 percentage points more likely to experience vote-buying than the sample average. Similarly, a one standard deviation increase in our experiment-based measure of reciprocity will increase the likelihood of experiencing vote-buying by 8.1 percentage points. Targeting reciprocal individuals appears to

be a strategy that works. Reciprocal individuals are 12.9 percentage points more likely than the sample average to vote for the party from which they accepted a good.

Although our results are consistent with a simple model in which politicians target more reciprocal individuals for vote-buying, there are other potential explanations for why vote-buying exists in equilibrium which may confound our results. For instance, although votes are not observable, whether or not the individual actually votes is observable. Thus, it could be the case that instead of influencing who the voter votes for, politicians are actually paying individuals to vote, knowing full well which candidate they would prefer (Nichter 2008). Another possibility is that even if political parties do not observe how an individual votes, they do observe voting behavior at a more aggregate level and may choose to contract on these outcomes. We provide evidence against these alternative mechanisms, and also demonstrate the robustness of our results to various other potential confounding factors.

This paper makes at least three contributions to the existing literature. First, our findings are related to the literature on redistributive politics. A central aim of this literature is to understand who gets targeted. For instance, the models of Lindbeck & Weibull (1987) and Dixit & Londregan (1996) argue that politicians will target voters without strong ideological attachments (i.e. swing voters), whereas Cox & McCubbins (1986) suggest that risk-averse politicians are more likely to target their core supporters. Other studies have suggested alternative groups such as the well-informed (Grossman & Helpman (1996); Stromberg (2004)), the relatively poor or numerous (Dixit & Londregan 1996), or those who can solve collective action problems (Persson & Tabellini 2000). However, these predictions are often borne out in a world where politicians can commit to future policies. When this assumption is relaxed and choices must be ex-post rational, politicians may have to target other groups or implement alternative and inefficient forms of redistribution to overcome this commitment issue (see for example Coate & Morris (1995) and Acemoglu & Robinson (2001)).[1] Our paper shows that by targeting voters with higher levels of reciprocity, politicians solve the inherent commitment problem and thus can engage in a form of redistribution that is not otherwise ex-post rational.

Our study also contributes to a nascent but growing literature in economics documenting the importance and prevalence of vote-buying. Overall, the empirical literature on vote-buying is sparse. Recent notable exceptions include Brusco et al. (2004), Stokes (2005), and Vicente (2008). Brusco et al. (2004) and Stokes (2005) analyze vote-buying in Argentina.

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[1]Robinson & Verdier (2003) highlight the commitment issues that arise in vote-buying and how this affects the form of redistribution that occurs. They argue that public employment, though inefficient, helps to overcome these inter-temporal commitment problems.

They argue that vote-buying is a more prevalent strategy when targeting low-income voters and in areas where political parties are better able to monitor voters' actions. Vicente (2008) conducts an innovative anti vote-buying campaign in Sao Tome and Principe to test how changes in vote-buying affect voting behavior. The study finds that the campaign increased the difference in the vote share between the incumbent and challenger.

The theoretical literature on vote-buying in economics (Dal Bo 2007, Dekel et al. 2007, Dixit & Londregan 1996, Robinson & Verdier 2003) is more advanced than the empirical literature, although to sustain vote-buying in equilibrium the authors usually assume that votes are contractible and there is no commitment problem on the part of the voter. The literature in political science recognizes that votes are not contractible and discusses the importance of reciprocity in maintaining vote-buying (Schaffer 2007b). Our study is the first to test empirically the importance of reciprocity for vote-buying.

Finally, our paper represents one of the few studies to link experiment-based measures of preferences with data on behavioral outcomes.[2] Karlan (2005) finds that individuals who are more trustworthy in a trust game are more likely to repay their microfinance loans, while individuals who are more "trusting" save less and have more repayment problems (suggesting they are merely less risk averse). Henrich et al. (2001) use experimental data from 15 small-scale societies and find that in societies with higher market integration, people behave more cooperatively in experiments. Gneezy et al. (2009) find that men living in patriarchal societies behave more competitively in experiments than women, while women living in matrilineal societies behave more competitively than men. Benz & Meier (2008) find a correlation between individuals' behavior in lab experiments involving donations and their charitable giving behavior in natural situations. Carpenter & Seki (2005) find that Japanese fishing crews who behave more pro-socially in experiments are more productive in their fishing. Our study complements these in demonstrating that reciprocity measured in an experiment is correlated with political behavior in the real world. Additionally, and perhaps more importantly, we demonstrate how a social preference such as reciprocity can

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[2]Papers specifically addressing reciprocity include Fehr et al. (2002) who conduct a lab experiment which suggests that food sharing is a social norm enforced by strong reciprocity. Fehr et al. (1993) conduct a lab experiment suggesting that reciprocity is important in labor relationships as employees exert more effort when they are paid more. In contrast, Lee & Rupp (2007) look at airline pilots who experienced pay cuts and only find a decrease in effort for the first week after the pay cut. This effect is only found in non-bankrupt airlines, perhaps because pilots fear things could become even worse at bankrupt carriers or because they believe pay cuts were justified by bankrupt carriers. Gneezy & List (2006) also find that higher pay only induces higher effort for the first few hours for both data entry and fundraising. Evidence in favor of negative reciprocity and the persistent effects of low wages on worker effort are found by Krueger & Mas (2004) and Mas (2006) using data from Firestone workers and policemen respectively.

resolve commitment issues in daily life.[3]

The remainder of the paper is organized as follows. Section 2 provides some basic background information on the political situation in Paraguay. Section 3 presents a theoretical framework explaining why reciprocity may be an important feature of vote-buying. The data and an explanation of how we construct our measures of reciprocity are presented in Section 4. Section 5 presents the main findings of the paper along with a discussion of alternative mechanisms. Section 6 concludes.

2   Background

Paraguay was a dictatorship under the rule of Alfredo Stroessner of the Colorado party from 1954 to 1989. The opposition party is the Liberal party. Until 2008, when an independent bishop won the presidency ending 61 years of Colorado rule, the Colorado party was the longest continuously ruling party in power at the time.[4] Paraguay remains a two-party country, although smaller parties have been gaining in popularity recently. The 2006 elections discussed in this paper saw the election of 66% Colorado mayors, 30% Liberal mayors, and 4% mayors from other parties.

In contrast to other countries, political parties in Paraguay are not very ideologically oriented. According to the British newspaper the Telegraph (2008), "Policy has played little part in the campaigning for Paraguay's top job, as all the candidates are united in their analysis of the problems afflicting this landlocked nation: illiteracy, poverty and overwhelming corruption." Political scientist Rizova (2007) states that "competition among candidates is very personalized and ideological differences are unclear...Movements are formed on the basis of personal friendship rather than on the basis of ideological preferences."

Since ideological differences are small, vote-buying and reciprocity may play a larger role in influencing voters' choices. Political scientists note the importance of reciprocity for sustaining successful vote-buying campaigns. According to Schaffer (2007a, p. 193), "embedding vote-buying within ritual gift exchange helps engender feelings of obligation among recipients, and can thus lower the rate of defection." Likewise Hicken (2007, p. 157) states, "in an attempt to change the cultural norms that support vote-buying in Thailand, specifically the norm of reciprocity, a senior Buddhist monk declared that it was not immoral

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[3]Andreoni (2005), Brown et al. (2004), and Fehr et al. (1997) have demonstrated in a laboratory setting the importance of trust and reciprocity as a device for enforcing contracts.

[4]Since the 2008 elections, the Chinese Communist Party has taken over the honor of longest continuously ruling party currently in power.

to take money from one candidate and vote for another."

Dunning & Stokes (2007) find indirect evidence of reciprocity in Mexico where many initially pro-PRI voters who do not receive gifts end up voting for the opposition. People who, in an earlier survey round, say they are planning on voting for the PRI in 2000, but either don't vote at all or don't vote for the PRI are less likely to have received a gift. They interpret this as evidence that party supporters have 'conditional loyalty.'

The importance of reciprocity for the effectiveness of vote-buying is also evident in Paraguay. From July to September of 2005, Transparencia Paraguay (the national branch of Transparency International) carried out a major project involving interviews and focus groups regarding the financing of electoral campaigns. A more detailed description of this project can be found in Appendix A, along with additional quotes. Here we include two quotes suggesting that reciprocity is a well-known phenomenon when it comes to vote-buying in Paraguay.

> During the campaigns we spend money on everything that campaigning involves. This includes propaganda. In addition, to enable us to obtain votes, we visit families personally and, for sure, right then and there, they are going to ask you for a favor. They first ask if you have work for one of the members of that family, help for health expenses, purchase of medicines, water bills, and electricity. They virtually force you to perform, and if you don't then you don't get their vote. -Atilio López (Liberal), head of the municipal legislature in Capiatá

> And the political operatives do their job with the money, specifically, with the money of the candidate. The operative does his work, buying the conscience of the voter with money, with alcohol, buying his id card, a little medicine, sugar, bread, tea, and in this way he goes buying and winning adherents. -Antonio Espinoza, President of the neighborhood committee in Capilla del Monte

Of course, a model in which candidates target reciprocal voters assumes that the candidate knows the level of reciprocity of each voter. While at first glance this assumption may appear strong, there are at least two reasons why it may be reasonable. First, as we demonstrate in the theory section, we do not need to assume that politicians perfectly observe a voter's level of reciprocity. Rather they only observe a noisy measure of the level of reciprocity of a voter. Secondly, and perhaps more importantly, in these rural village settings, candidates do not interact directly with voters, but use political operatives (*operadores políticos*), who act as middlemen between the candidate and the voters. In most

cases, these political operatives are village leaders who have knowledge of the members of their communities. Although there are additional relevant quotes in the appendix, here is just one.

> For the community to conform, the candidate needs an *operador político* in the field: the *operador político*, a professional in politics and leader of his community, becomes the backbone of the election campaign. Through *operadores políticos*, candidates can build their network of promises of aid, favors, and meet the expectations of the poorest people in the electorate.

According to Lehoucq (2007, p. 39) the situation is similar in Taiwan and Thailand. "Candidates circumvented the secret ballot by working with local brokers, who, in the context of small and tightly knit rural communities, could reasonably predict the behavior of voters." Likewise, according to Schaffer (2007*a*, p. 183) in the conclusion of his edited volume on vote-buying, "as several authors in this volume note, candidates who wish to undertake even moderately successful vote-buying campaigns need to know which voters are amenable to having their participation or abstention bought. Gathering this information requires extensive grassroots organizing, using local people with local knowledge."

3 Theoretical Framework

The contribution of this paper is clearly empirical, but in this section we demonstrate how reciprocity can be incorporated into a model of vote-buying. Two political parties compete in an election by giving money to voters.

Politicians' Decision-Making

Politicians may give up-front payments to the voters in the run-up to the election in order to influence their votes. These voters are free to vote for whichever politician they would like and voting behavior is anonymous.

There are politicians from two parties, $P \in \{k, j\}$, and N voters, denoted $i = 1, \ldots, N$. Politicians make monetary transfers, p_i^P, to voters in order to induce them to vote for their party. These payments must be greater than zero, $p_i^k \geq 0$. Each politician has a set budget, B^P, which his total payments to voters cannot exceed. Each politician's goal is to maximize his probability of winning the election. The value the politician from party k receives from winning an election is W^k and the value he receives from losing the election

is 0. A politician from party k will choose the transfers to voters in order to maximize his probability of winning:

$$\max_{\{p_i^k\}_{i=1}^N} \pi W^k \text{ s.t. } \sum_i^N p_i^k \leq B^k \text{ and } p_i^k \geq 0 \quad \forall\, i.$$

Voters' Decision-Making

We model reciprocity as do Cox et al. (2007) and Cox et al. (2008). They lay out the following utility function:

$$u(m, y) = \begin{cases} (m^\alpha + \theta y^\alpha)^{\frac{1}{\alpha}} & \text{if } \alpha \leq 1 \text{ and } \alpha \neq 0 \\ my^\theta & \text{if } \alpha = 0 \end{cases} \tag{1}$$

where m is the consumption of the owner of the utility function ('mine', the voter) and y is the consumption of the first mover ('yours', the politician). The parameter α is one minus the coefficient of relative risk aversion, while θ is the willingness to exchange my consumption for your consumption at the point where my consumption equals your consumption.

We define $\theta = \theta_0 + a_i r(p_i^P)$. Politicians observe the voter's preference for party k relative to party j which is denoted θ_0. Politicians do not observe $a_i \geq 0$, which is reciprocity. The fairness of the politician's transfer is $r(p)$. If the politician transfers an amount which the voter considers fair, then this function is positive. If he transfers an amount which is considered to be too low, then this function is negative. Thus, if a politician transfers a fair amount, the reciprocity piece of the utility function will encourage the voter to want him to win. If the voter thinks the transfer is too low, this will encourage the voter to want him to lose. Although politicians do not observe a_i they do observe $a_i^* = a_i \cdot \epsilon$ and they know that ϵ is uniformly distributed along the interval $\left[1 - \frac{1}{2\xi}, 1 + \frac{1}{2\xi}\right]$. Voters have wealth w_i.

The maximization problem of a voter who assumes that he is the pivotal voter and is deciding whether to vote for the politician from party k ($v = 1$) or party j ($v = 0$) is as follows:

$$\max_{v \in \{0,1\}} u = \frac{1}{\alpha}[(w_i + p_i^k + p_i^j)^\alpha + (\theta_0 + a_i r(p_i^k))(vW^k)^\alpha + (a_i r(p_i^j))((1-v)W^j)^\alpha].$$

Thus a voter prefers party k if

$$(w_i + p_i^k + p_i^j)^\alpha + (\theta_0 + a_i r(p_i^k))(W^k)^\alpha > (w_i + p_i^k + p_i^j)^\alpha + a_i r(p_i^j)(W^j)^\alpha$$

If $a_i = 0$ then there is no reciprocity. The higher a_i is, the more reciprocal a person is, both in terms of gratitude and resentment. Reciprocity varies over individuals.

Equilibrium

The two politicians move simultaneously. Given voters' utility, a politician from k will maximize his probability of winning:

$$\max_{\{p_i^k\}_{i=1}^N} \pi W^k \text{ s.t. } \sum_i^N p_i^k \leq B^k \text{ and } p_i^k \geq 0$$

where

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\begin{aligned}
\pi &= \sum_i \Pr\left[(\theta_0 + a_i r(p_i^k))(W^k)^\alpha > a_i r(p_i^j)(W^j)^\alpha\right] \\
&= \sum_i \Pr\left[(\theta_0 + (\frac{a_i^*}{\epsilon})r(p_i^k))(W^k)^\alpha > (\frac{a_i^*}{\epsilon})r(p_i^j)(W^j)^\alpha\right] \\
&= \sum_i \Pr\left[\epsilon > \frac{1}{\theta_0}(a_i^* r(p_i^j)(W^j)^\alpha - a_i^* r(p_i^k)(W^k)^\alpha)\right] \\
&= \sum_i \xi + \frac{1}{2} + \frac{a_i^* \xi}{\theta_0}(r(p_i^k)(W^k)^\alpha - r(p_i^j)(W^j)^\alpha)
\end{aligned}
$$

We solve for three cases to show that politicians will target the most reciprocal voters.

1. The fairness function $r(p)$ does not depend on p, so $r'(p) = 0$. There is no reciprocity and so it may be the case that no transfers will be made.

2. The fairness function $r(p)$ is linear and increasing, so $r'(p) = r$ where $r > 0$. This leads to a corner solution in which the voter(s) with the highest level of observed reciprocity (a_i^*) receive all the transfers and everyone else receives nothing.

3. The fairness function $r(p)$ is increasing and strictly concave. The size of the transfer will be increasing in observed reciprocity (a_i^*).

We set up the problem as follows:

$$\mathcal{L} = \sum_i \left[\xi + \frac{1}{2} + \frac{a_i^* \xi}{\theta_0}(r(p_i^k)(W^k)^\alpha - r(p_i^j)(W^j)^\alpha)\right] W^k + \lambda(B^k - \sum_i p_i)$$

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subject to the non-negativity constraints.

The Kuhn-Tucker conditions are:

$$\frac{a_i^* \xi}{\theta_0} r'(p_i^k)(W^k)^{1+\alpha} - \lambda \leq 0 \quad \forall i$$

$$p_i^k \geq 0 \quad \forall i$$

$$p_i^k (\frac{a_i^* \xi}{\theta_0} r'(p_i^k)(W^k)^{1+\alpha} - \lambda) = 0 \quad \forall i$$

$$B^k - \sum_i p_i^k \geq 0$$

$$\lambda \geq 0$$

$$\lambda(B^k - \sum_i p_i^k) = 0$$

No reciprocity

In this case the fairness function is reduced to $r(p) = r$. This means that the voter does not judge how fair the politician's transfer is and so there is no reciprocity. Since p is no longer a choice variable that affects the objective function (πW^k), the optimal decision does not depend on p. Transfers might be all zero or all positive. The budget might or might not be used up. One option is that no transfers are made. The politician is indifferent between giving transfers and not giving transfers.

Linear $r(p) = rp$

With a linear fairness function there is a corner solution in which everyone except the voter or voters with the very highest level of a_i^* receives nothing. Since $r > 0$, if $a_b^* < a_c^*$ then

$$\frac{a_b^* \xi}{\theta_0} r(W^k)^{1+\alpha} - \lambda < \frac{a_c^* \xi}{\theta_0} r(W^k)^{1+\alpha} - \lambda \leq 0$$

which means that it must be the case that $p_b^k = 0$ in order for the third Kuhn-Tucker condition to hold. The only voters with positive p_i^k will be those for whom nobody has a higher a_i^*.

Strictly concave $r(p)$

With a strictly concave fairness function we use Cramer's Rule to derive comparative static results. The derivation of this result is shown in Appendix B. We show that

$$\frac{dp_1^k}{da_1^*} = -\frac{r'(p_1^k)}{\sum_i a_i^* r''(p_i^k)} > 0$$

and thus the transfer is increasing in observed reciprocity.

Thus, the prediction from this model is that when there is reciprocity, politicians will target the most reciprocal voters. This is the testable implication which we take to the data.

4 Survey and Experimental Data

The data used in the analysis come from a household survey collected in March 2007. The survey represents the fifth round of a longitudinal study initiated in 1991 by the Land Tenure Center at the University of Wisconsin in Madison, in cooperation with the Centro Paraguayo de Estudios Sociológicos in Asunción. The original design of the survey randomly selected households based on their landholdings from 15 randomly chosen villages throughout rural Paraguay.[5] In 2007, 202 out of the original 300 households remained and 247 new households were added to the survey completing 30 households per village, except in one small village where only 29 households were interviewed.

Each round of the survey collects socio-demographic information on each member of the household, including detailed information on income. In 2002, during the fourth round of the survey, 187 of the households sent a member to participate in economic experiments measuring trust, trustworthiness, and risk aversion. In the 2007 round of the survey, a module was added to capture voting and vote-buying behavior as well as other-regarding preferences such as reciprocity.

Reciprocity and Social Preferences

We use one survey-based measure of reciprocity and two experiment-based measures. To measure an individual's level of reciprocity, the survey asked the respondent if he would always, sometimes, or never put somebody in a difficult situation if that person put him in

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[5]A sixteenth village, of Japanese heritage, was also added due to the large farm size in that village. This village was not surveyed in 2007 and is not included in the analysis.

a difficult situation. We classify someone as having a preference for reciprocity if he answers always.[6]

In addition to this survey-based measure, we also construct an experiment-based measure of reciprocity and demonstrate that our results are robust to this alternative specification. This measure of reciprocity is calculated from play in the 2002 trust game (Berg et al. 1995). In the trust game, the first mover was given eight thousand Gs (guaranies) and had to decide whether to send nothing, two, four, six, or eight thousand Gs to the second mover. Whatever he sent was tripled. The second mover received the tripled money and decided how much of it to keep and how much to return to the first mover. All participants in the trust game played both the role of first and second mover. Before finding out how much was sent to him, the second mover was asked how much he would return if he received six thousand Gs, how much he would return if he received 12 thousand Gs, how much if 18 thousand Gs, and how much if 24 thousand Gs. Then he opened the envelope and found out how much was sent to him and had to play according to his previous decision. All play was anonymous and partners did not know with whom they were paired.

Second movers may choose how much to return based both on their level of altruism and on their level of reciprocity. The more altruistic they are, the more they should return in all four cases. The more reciprocal they are, the more they should return when the first mover treats them well, and the less they should return when the first mover treats them poorly.

We construct a measure in the spirit of Cox et al. (2007). They assume that utility is affected by reciprocity multiplied by a function which measures the fairness of the other actor's action. This fairness function is a normalization of the best outcome for the player given the actual action taken by the first mover minus the best outcome for the player given some neutral action taken by the first mover. We assume that when the first mover returns at least half, this is considered better than neutral, but when the first mover returns less than half, this is considered worse than neutral.

A measure of reciprocity (which we will refer to as the 'share difference') is the average share returned when receiving 12, 18, or 24 thousand Gs (signifying the first mover sent half or more of his endowment) minus the share returned when receiving six thousand Gs (signifying the first mover sent only a quarter of his endowment). If play in all four cases is

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[6]We do not classify individuals who answer sometimes as reciprocal because, while 'sometimes' could signify a social preference (e.g., it depends how angry they make me), it could also signify a repeated game (e.g., it depends on my relation with the person). While classifying both those who answer 'sometimes' and those who answer 'always' as negative reciprocal is not our preferred classification, our results are robust to using this alternative classification.

an additive function of both altruism and reciprocity, we will be subtracting out altruism to have a pure measure of reciprocity.

We also use a measure (which we call 'reciprocity') which censors the share difference below 0 so that players who return a higher share when receiving very little have zero rather than negative values of reciprocity.[7] The optimal thing for a politician to do would be to take money away from someone with a negative value of the share difference. But, since transfers from politicians must be positive, the optimal choice for a politician is to transfer nothing to those people. Thus, it is optimal to transfer nothing to people with both negative and zero values of the share difference. This is why we censor that variable. We can link these measures of reciprocity from experiments in 2002 to information on vote-buying in 2006 for 140 of the original 187 players. The correlation between the survey-based measure of reciprocity and the experiment-based measure of reciprocity is positive but not measured with much precision.

Table 1 presents the means of the variables used in the analysis, including our two principal variables of interest: reciprocity and vote-buying. We see that 18 percent of the sample would always reciprocate if someone put them in a difficult situation. On average, the second movers in the 2002 trust game return the same share when receiving a lot from the first mover versus receiving a little, as can be seen from the average share difference of -0.009. The average share returned, which is a measure of trustworthiness and/or altruism, is 43 percent. Out of eight thousand Gs, the average first mover in the trust game sends 3700 Gs, and in a risk game with a similar payoff structure the average player bets 3500 Gs.

Respondents on average would require 200,000 Gs to wait a month rather than accepting 50,000 Gs today. Assuming log utility, this implies an average minimum monthly discount factor of 0.841 with a standard deviation of 0.094.[8] The survey also measures the respondents' risk aversion, by asking a series of hypothetical risk questions. We use the number of risky choices made as our measure of risk aversion. Alternatively, we can calculate a coefficient of relative risk aversion, but 19 percent of the respondents chose a dominated option

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[7]Fehr & Schmidt (2006) summarize models of reciprocity as well as evidence on its economic impact. Papers such as Rabin (1993) for normal form games and Dufwenberg & Kirchsteiger (2004) for extensive form games are extremely complex, involving intentions, beliefs about intentions, etc. Reciprocity has more recently been modeled by Cox et al. (2007) and Cox et al. (2008) based on the second mover's state of mind which is altered by the first mover's actual behavior. Our measure is more in line with the latter papers because we do not attempt to estimate intentions or beliefs about them.

[8]Respondents were asked if they would prefer 50,000 Gs today to 75,000 Gs in a month. If they answered 50,000 today, then they were asked if they would prefer 100,000 Gs in a month. If they still answered 50,000 today they were asked how much they would need to be offered to wait a month. For people who chose 75,000 or 100,000, we can only estimate their minimum discount factor. To do so we assume log utility.

in the first question. For the others, we can calculate a minimum level of risk aversion (they must be at least so risk averse to have turned down a given gamble) given CES utility and we find an average coefficient of 1.84 with a standard deviation of 1.61.

Vote-Buying

Municipal elections for mayors and local assemblies occurred in November of 2006 and the fifth round of surveying took place between March and July of 2007. To measure vote-buying, respondents were asked whether, during the run-up to the November municipal elections, any political party offered them money, food items, payment of utility bills, medicines, and/or other goods. If so, they were then asked the value of the goods and whether they accepted them. They were also asked if a political party had offered to solve a problem for them. For the solving of problems, no monetary value was asked. While there is always a concern of underreporting of vote-buying, given that this question was asked almost 6 months after the election, and given that we did not ask the respondents to identify the name of the party offering them the items, we suspect that this might be minimal.

We find that 70 percent of the sample voted in the previous municipal elections and over 80 percent are registered to vote. Party loyalty does not appear overly strong as only 23 percent claim that voters ought to always vote for their party even if they don't like their party's candidate, and 40 percent claim to support their party strongly.

Municipalities are relatively large compared to the villages. Assuming two registered voters live in each household, the median village makes up three percent of the electorate. This number ranges from one percent to 22 percent. The prevalence of vote-buying is not correlated with the share of the electorate made up by the village.

We see in Table 1 that at least 33 percent of the sample was offered something in exchange for their votes in the past municipal elections including a problem being solved, and 26 percent was offered something excluding a problem being solved. Of these 116 individuals, 74 percent accepted the items. The average value of the transfer offered is 48 dollars and the mean is 18 dollars. A day of labor in agriculture earns between three and four dollars, so this is a sizeable amount. It is not the case that everyone is offered a transfer of equal value. The tenth percentile amount offered is 4 dollars while the 90th percentile amount offered is 77 dollars. Much of this variation is within village rather than across village.

While 26 percent of the conditional sample was offered cash, 25 percent of the conditional sample was offered foodstuffs, and 66 percent of the conditional sample was offered other gifts (medicine, payment of utility bills, and plowing of fields). Vote-buying is concentrated in

some locations. In half of the villages, fewer than 20 percent of voters are offered something of value, while in 20 percent of the villages more than half of the voters are offered something of value.

Both main parties participate in vote-buying. We find that 38 (31) percent of those who claim to be Colorado and 29 (23) percent of those who claim to be Liberals experienced vote-buying including (excluding) a problem being solved. It is also the case that 26 (13) percent of those who claim to be affiliated with neither main party experienced vote-buying. The amounts offered, conditional on being offered, are also quite similar, with Colorados being offered slightly more. The average offer to a Colorado is 52 dollars, to a Liberal is 41 dollars, and to someone who claims affiliation with neither is 38 dollars. As mentioned before, the 2006 elections saw the election of 66% Colorado mayors, 30% Liberal mayors, and 4% mayors from other parties. Villages contain a mix of Colorados and Liberales. The share of respondents in a village claiming to be Colorado ranges from 0.37 to 0.83 with a median value of 0.53. All but one village have values between 0.30 and 0.70.

Our estimates of both the incidence of vote-buying and the amount are consistent with several estimates in the literature. For instance, in Argentina Brusco et al. (2004) find that seven percent of the respondents were asked to sell their votes. In Taiwan Wang & Kurzman (2007) find that, in an important township campaign in 1993, officials of one party claim to have bought 67 percent of eligible votes at a non-negotiable price of approximately $10 each. They also cite results from four other research projects in Taiwan in the 1990s finding 24, 27, 30, and 45 percent of respondents in different years and different areas who admit to having sold their vote. In Sao Tome and Prinicipe, Vicente (2008) reports that 38 percent of the respondents said a personal liaison of theirs was offered to sell his vote.

Transparency International (2004) reports figures suggesting that payments to voters can range from as low as $0.60 in a poor neighborhood of Manila to as high as $60 in Taiwan. According to Phongpaichit et al. (2000), in Thailand, one third of households were offered vote-buying in the 1996 general election and one fifth of those with the right to vote were offered something in the municipal elections. In Thailand, the average offer per household in the 1996 general election was $27. One legislative candidate in Taiwan might distribute up to $3 million. In Thailand, there are estimates that a total of $460 million was distributed in the 2001 legislative elections.

Correlates of Vote-Buying and Reciprocity

To get a sense for how some of these characteristics are associated with our variables of interest, Table 2 presents correlates of both vote-buying and reciprocity. In column 1, the dependent variable is an indicator variable for being offered something in exchange for your vote (including a problem solved) on a set of individual and household level controls, in addition to a set of characteristics about voting behavior. An important predictor of being targeted for vote-buying is household wealth, which is negatively correlated with vote-buying. Households that are registered are more likely to be offered something, as are individuals who attended a political rally in the previous year. In column 2, we find similar patterns when the dependent variable is the amount of the offer.

In columns 3, 4, and 5 of Table 2 we explore the correlates of the survey and experiment-based measures of reciprocity. Few individual or household characteristics are predictive of the survey-based measure of reciprocity. The exception is education, as more educated individuals are less willing to punish someone that caused them harm. More educated people are also less reciprocal according to the experiment-based measure. People who attended a political rally are more reciprocal, but individuals who are strong party supporters are not more reciprocal.

5 Empirical Results

In this section, we provide empirical evidence that more reciprocal individuals are more likely to be offered goods in exchange for their votes. These individuals, in turn, are then more likely to vote for the political party that offered them these goods. These findings are robust not only to various empirical specifications, but also to whether the measure of reciprocity is survey versus experiment based.

Vote-Buying and Reciprocity

To examine the relationship between reciprocity and the likelihood that someone is targeted for vote-buying, we estimate a series of linear probability models of the following form

$$offered_i = \alpha + \beta reciprocity_i + X_i'\delta + \epsilon_i \tag{2}$$

where $offered_i$ is a binary variable indicating whether or not an individual i was offered some good in exchange for his vote. The variable $reciprocity_i$ denotes either a survey-based or

experiment-based measure of reciprocity, whereas the vector X_i represents a set of observable characteristics at the individual, household, and village level. The error term, ϵ_i, denotes unobserved characteristics that determine a vote-buying exchange.

Survey-based reciprocity

Table 3 presents our basic results documenting the relationship between experiencing vote-buying and an individual's level of negative reciprocity as measured in the survey. Column 1 reports the unadjusted relationship between whether or not the person was offered goods in exchange for his vote and whether or not the respondent would put somebody in a difficult situation if that person put him in a difficult situation. The specification presented in column 2 controls for a basic set of individual and household characteristics (gender, age, education level, wealth, and number of family members eligible to vote), whereas column 3 further adjusts for various political attributes (registered voter, believes the ballot is anonymous, has strong political sentiment, votes by party, supports Colorado party, and number of registered voters in the municipality). While several of these variables are themselves equilibrium outcomes and should arguably not be included in the regression, variables such as political sentiment and party allegiance may serve to proxy for some unobserved determinants that might be correlated with reciprocity. The specification in column 4 includes these additional controls, but uses only within village variation to identify the association between vote-buying and reciprocity.

From the bivariate relationship in column 1, we see that more reciprocal individuals are 15.4 percentage points more likely to experience vote-buying, which represents a 46.7 percent increase from the average vote-buying experienced by the sample. As seen in the other columns, the inclusion of additional controls has a minimal effect on the point estimate. For example in column 4, which controls for village intercepts and various individual and household-level characteristics, the estimated effect (point estimate =0.123; and standard error = 0.059) is statistically and economically indistinguishable from the unadjusted estimate presented in column 1.

In column 5, we reexamine the relationship between vote-buying and reciprocity using as the dependent variable the logarithm of one plus the amount that was offered. Column 5 reports the marginal effects from estimating a Tobit model, with censoring at zero. Again, we find that more reciprocal people are offered goods of higher value.

In column 6, we re-estimate the model using as the dependent variable whether the respondent reported that he voted for the political party conditional on being offered and

accepting some good from that party. Even after controlling for various individual and household characteristics, we find a strong correlation between reciprocity and voting for the party that bought one's vote. Reciprocal individuals are 12.9 percentage points more likely to vote for the party, which represents a 15.9 percent increase from the sample average.

Experiment-based reciprocity

Overall the results presented in Table 3 suggest that politicians who engage in vote-buying target individuals who exhibit a higher degree of negative reciprocity. One potential concern with this interpretation is that our measure of reciprocity is based on a hypothetical situation, rather than from an experimental setting where subjects are "incentivized" with real payoffs.[9] To account for this, we construct a measure of reciprocity based on the trust game that was conducted in 2002. This allows us to relate an individual's vote-buying experience in 2006 with his level of reciprocity as measured in 2002. Unfortunately, because only 140 of the 187 individuals who played the games in 2002 could be found, the results are restricted to a smaller and select sample of survey respondents.

Figure 1 shows a non-parametric estimate of the unconditional relationship between being offered a good in exchange for one's vote and the respondent's experiment-based measure of reciprocity. For individuals who do not exhibit reciprocity (i.e., the share difference is negative, meaning they returned a *higher* share when the first mover was *less* generous), there is almost no relationship between experienced vote-buying and reciprocity. This lies in stark contrast to individuals who behaved reciprocally in the trust game. In the interval [0, 0.4], we see a strong positive association between vote-buying and reciprocity.

The general pattern presented in Figure 1 is also borne out in the regression analysis. In Table 4, we present estimation results from specifications similar to those presented in Table 3, yet using the experiment-based measure of reciprocity as opposed to the survey-based measure of negative reciprocity. The table presents two alternative functional form specifications. In the odd columns, our measure of reciprocity is the share difference censored at zero, whereas in the even columns we include the share difference and its square.

Consistent with the results reported in Table 3, reciprocity is positively associated with the respondent experiencing vote-buying. This relationship holds across both functional form assumptions, as well as when we consider the dollar value of the good offered (see columns 5 and 6). In columns 7 and 8, we examine the extent to which our experiment-based measure of

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[9]Smith & Walker (1993) review the conflicting evidence from studies comparing measures of preferences gathered in an experimental setting with those from a survey, although no studies that we know of have done so for measures of reciprocity.

reciprocity is correlated with whether the respondent reported to have voted for the political party from which he accepted the good. Despite having only 22 observations, we still find a strong and statistically significant association.

Alternative Theories of Vote-Buying and Potential Confounds

Thus far our results are consistent with the simple idea that when buying votes, politicians target more reciprocal individuals. And, because of reciprocity, vote-buying remains prevalent throughout much of the world despite the fact that voting is often conducted with a secret ballot. There are, however, other potential explanations for why vote-buying exists in equilibrium which may confound our results. In this section, we discuss these alternative hypotheses and demonstrate that our findings are robust to these other possibilities.

Turnout-buying

Although votes are not observable, whether or not the individual actually votes is observable. Thus, it could be the case that instead of encouraging voters to change the identity of the person they will vote for (vote-buying), politicians are actually paying individuals to vote, knowing full well which candidate they would prefer (turnout-buying) (Nichter 2008). Moreover, because it is cheaper to buy the turnout of reciprocal individuals, politicians have an incentive to target more reciprocal voters even in a model of turnout-buying. While it is difficult to reject this hypothesis, we can shed some light on this mechanism by examining the reduced-from relationship between reciprocity and voting. To see this, suppose that an individual i's decision to vote v_i is determined by whether the person received money in exchange for voting p_i, his level of reciprocity a_i, and a vector X_i of other characteristics that capture the costs and benefits of voting:

$$v_i = \alpha_0 + \alpha_1 p_i + \alpha_2 a_i + X_i'\delta + \nu_i \tag{3}$$

where ν_i represents unobserved factors that determine voting. Thus, for $\alpha_1 > 0$, individuals who receive money are more likely to vote, which would be evidence of turnout buying. The coefficient α_2 captures the possibility that reciprocal individuals are also more likely to vote.

From the results presented in Tables 3 and 4, whether a voter is targeted is also associated with his level of reciprocity:

$$p_i = \beta_0 + \beta_1 a_i + X_i'\gamma + \epsilon_i \tag{4}$$

18

Inserting Equation 4 into Equation 3, we then get the following reduced-form relationship:

$$v_i = \lambda_0 + \lambda_1 a_i + X_i'\psi + \xi_i \tag{5}$$

where $\lambda_0 = \alpha_0 + \alpha_1\beta_0$, $\lambda_1 = \alpha_1\beta_1 + \alpha_2$, and $\xi_i = \alpha_1\epsilon_i + \nu_i$.

Column 1 of Table 5 presents OLS estimates of Equation 5. We do not find any evidence that reciprocal people are more likely to vote. The point estimate for $\hat{\lambda}_1$, which is 0.015 with a robust standard error of 0.047, is small and not statistically significant. Given our previous estimates of $\hat{\beta}_1 = 0.15$, it must be the case that $\alpha_1 > 0$ and $\alpha_2 < 0$, or $\alpha_1 < 0$ and $\alpha_2 > 0$, or α_1 and α_2 are both positive and close to zero. Of these three scenarios, only the first would be evidence of turnout buying since only the first involves a large positive α_1. But, this first case seems unlikely since it would imply that reciprocal individuals are less likely to vote. The second case would imply that politicians are targeting individuals not to vote which seems unlikely since voting and being offered are positively correlated. Individuals who have been targeted are 8 percentage points more likely to vote (robust standard error =0.036). Thus, the third scenario seems the most likely, implying that turnout buying is not a concern given that transfers do not affect one's decision to vote. This is suggestive evidence that we are not witnessing turnout-buying. In addition, although we cannot completely reject a turnout-buying hypothesis, reciprocity does appear to be playing an important role in politicians' targeting decisions.

Repeated game, aggregate signals, and signaling

Another possible explanation for the existence of vote-buying is that, although politicians do not observe how an individual votes, they do observe voting behavior at a more aggregate level and may be able to punish groups of voters if the voting shares are not what they expected. In Paraguay, vote shares are observable at the level of the voting table, which is typically where 300 residents are registered to vote. Party operatives, who are engaged in a repeated game, could potentially contract based on these observable outcomes.

Nevertheless, there exist both theoretical and empirical reasons why this explanation is unlikely. Theoretically, results by Levine & Pesendorfer (1995) suggest that in the case of voting with an Australian ballot (i.e. individual voting behavior is not observable, but average voting behavior is observed with noise), a repeated game will not be sustainable.[10] They provide an anti-folk theorem showing that, with a finite number of agents, if average

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[10]A similar result was found by Sabourian (1990).

play is observed with enough error and individual play is not observed, individual deviations cannot be rewarded or punished. The aggregate vote may be observed with noise because of things like hanging chad or other mistakes in the recording of individual votes, or because of other concurrent elements of electoral fraud (such as stuffing ballot boxes) which would make the announced aggregate vote shares be noisy measures of the true voting behavior.

Even if individual voting behavior were partially observable, given that elections occur once every couple of years, voters may not be patient enough to sustain a repeated game. In addition, multiple villages vote at the same polling station and voting tables are determined based on alphabetical order. So, the information available regarding how a village as a whole voted is quite noisy. The villages in our sample range from 0.7 percent of the registered voters in their municipality, to 21.5 percent of the registered voters in their municipality. In only two of our villages is the share of registered voters among registered voters in the municipality higher than ten percent. Of course, reciprocity and partial observability of voting behavior are not mutually exclusive reasons for the existence of vote-buying, and may in fact complement one another.

To test this possibility empirically, in column 2 of Table 5, we re-estimate the relationship between experiencing vote-buying and reciprocity controlling for voting table fixed-effects. If vote-buying exists because politicians can punish or reward based on observing aggregate voting behavior, then reciprocity should no longer affect vote-buying once we account for table intercepts. This is because the voting table is the lowest level of aggregation at which voting behavior is observable. When we account for table fixed-effects, we find that the point estimate remains virtually unchanged from our original specification (point estimate 0.117 versus 0.123 with village fixed-effects), but given that there are 173 tables, 90 of which have only one observation, we lose precision. In column 3, we re-estimate the model using polling station fixed-effects, which is one level of aggregation above the table (44 polling stations). The estimated effect is 0.148 (standard error = 0.071) and significant at the 5 percent level.

Instead of contracting on aggregate signals that are noisy yet observable, politicians may be using vote-buying as a signaling mechanism. For instance, in a model in which a politician's type (i.e., ability or competency) is unobservable, if vote-buying provides information about one's type then politicians will have an incentive to engage in vote buying prior to an election. Yet in the standard political economy models with signaling (e.g., Rogoff & Sibert (1988) and Rogoff (1990)) it is not clear why politicians would specifically target reciprocal voters since all voters, independent of their level of reciprocity, would prefer a competent politician.

Alternatively however, one could modify the model so that signals gave information regarding unobserved preferences (see for example Drazen & Eslava (2006)). In this framework, politicians have unobserved preferences over groups of voters. Because preferences are correlated over time, a politician can use vote-buying as a signal to groups of voters that they will receive support in the future. In this view of the world, our results would suggest that politicians are targeting voters based on some observable characteristic that happens to be correlated with their level of reciprocity. While we cannot directly reject this hypothesis, as demonstrated in Tables 3-5, our results are remarkably robust to controlling for an extensive set of individual and household characteristics that capture all the standard socio-economic characteristics that have been emphasized in the redistributive politics literature (e.g. age, gender, education, income level, strength of party preferences, etc). Thus politicians would have to be targeting individuals based on some other attribute that is also correlated with voters' level of reciprocity.

Other-regarding preferences

Reciprocity may not be the only social preference to affect vote-buying. Other personal traits, such as altruism, trustworthiness, risk aversion, or time preference, may also influence the selection of voters targeted. For instance, voters may be risk averse to the uncertainty of the true anonymity of their vote. Candidates might also target trustworthy voters who can be trusted to fulfill their end of the bargain. Altruism is also arguably an important determinant of voting behavior (see Fowler (2006) and Rotemberg (2007)).

In columns 4 and 5, we test for whether the association between reciprocity and vote-buying is robust to controlling for these other personal traits. Column 4 controls for an individual's level of risk aversion, time preference, and trust in candidates based on survey data, and altruism based on an experimental game conducted in 2007 (the amount sent in an anonymous dictator game). Controlling for these additional characteristics has little effect on the outcome of interest, as we see that reciprocal voters are still 14.8 percentage points more likely to experience vote-buying. In column 5, we re-estimate the specification in column 4, but use only experiment-based measures of these personal traits from the games conducted in 2002 (with the exception of impatience which is still survey-based).[11] Again we find a robust relationship.

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[11]In column 5, trust is the amount sent by the first mover in the trust game, trustworthiness/altruism is the average share returned by the second mover in the trust game, and risky is the amount bet on the roll of a die.

Social networks and civic mindedness

Another possibility is that politicians may target voters with larger social networks, since it may be a more effective manner of vote-buying. Offering something to a well-connected person may potentially induce externalities either through social learning or conformity. If individuals with larger social networks are also more reciprocal, then our effects are likely to be overestimated.

In the recent round of the survey, effort was made to measure each survey respondent's social network. The social network includes all households to which gifts were given or from which gifts were received and to which money was lent or from which money was borrowed in the past year; households to which one would go if one needed to borrow 20,000 Gs or who would go to them if they needed to borrow 20,000 Gs; households with parents, children, or siblings of the household head or his spouse; and households with compadres of the household head.[12] The degree is the number of households in the village with which the household is connected, the clustering coefficient is a measure of how connected the household's friends are to one another, and the contagion time is a measure of how long it would take information to get from the household to everyone else in the village. In column 6 of table 5, we control for all three measures of an individual's social network and find that our estimated effect remains virtually unchanged. If we control for each separately (results not shown) none of the network variables are significant and the estimated effect does not change.

A confound could also arise if civic-minded individuals, who are more likely to vote and thus potentially experience more vote-buying, are also more reciprocal. While it is likely that we capture some of this behavior when controlling for altruism since civic-mindedness means one expresses concern for one's community, which may in part be determined by altruism (see columns 4 and 5), in column 7 we include in the regression whether the person attended a political rally. Again, we find that the estimated effect of reciprocity remains similar and statistically significant.

Truthfulness and recall bias

One might be worried that people misreport vote-buying. If reciprocal people are also more honest or better able to remember the instances in which such an exchange was proposed, then the results may be confounded. Note that our variable of interest is being offered something in exchange for a vote, not actually accepting the offer. In addition, in column

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[12]A compadre is a co-parent. This is the relationship between the biological parents and the godparents of a god-child.

8, we control for two other variables which act as measures of how likely the respondent is to tell the truth. We ask people if they would participate in an illegal transaction and the potential answers are probable, sometimes, or improbable.[13] We also ask the World Values Survey question measuring trust in people. If a person trusts people more, he may trust more that the enumerator will not do anything prejudicial with the vote-buying information. When controlling for these variables both are insignificant and the coefficient on reciprocity remains unchanged.[14]

As an alternative test of recall bias, we also estimate the association between reciprocity and a measure of recall bias. The survey collected detailed information on social and economic networks. We calculate the share of people who claim to have interacted with the respondent in the past year for gift-giving/receiving or lending/borrowing for which the respondent agrees. For example, this measure would equal 0.5 for person Y if person X claimed to borrow money from person Y and person Z claimed to give gifts to person Y, but person Y only agreed that money was lent to person X but did not mention that gifts were received from person Z. If more reciprocal individuals have better recall of these types of gift exchanges, then we would expect a positive association between the degree of agreement and reciprocity. Although not reported in Table 5, the coefficient is only 0.03 (robust standard error =0.065) and not statistically or economically meaningful.

6   Conclusions

Vote-buying is a phenomenon which is common around the world. Prior to an election, politicians will offer individuals money, goods, or favors in exchange for their votes. However, in light of secret balloting, it is not clear why vote-buying continues to exist. Votes are unobservable, while a politician's promise of future policies is unenforceable. Given this double commitment problem, vote-buying in the form of one-shot monetary transfers should not occur in equilibrium.

In this paper, we argue that vote-buying is sustained by social preferences, particularly reciprocity. Using a novel dataset that combines survey information on vote-buying with

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[13]We include people who answer probable or sometimes as being willing to participate in an illegal transaction.

[14]In results not shown here, we look at an alternative dependent variable which people should not be afraid to admit to, being offered a hat or a shirt advertising the candidate. If people are offered money at the same time they are offered a hat, then this variable will be correlated with vote-buying. At the same time, there is no incentive for individuals to lie about the answer to this question. The results are weaker, but still go in the same direction.

information on behavior in experiments, we show that politicians are 15.4 percentage points more likely to offer reciprocal individuals something in exchange for their votes than the average individual. Reciprocal individuals are in turn 12.9 percent more likely to vote for the party that offered them a good than the sample average. These results are robust to various other specifications and controlling for alternative mechanisms.

The question of why social norms and institutions, particularly dysfunctional ones, are slow to change over time has received much attention recently. Our findings lend empirical support to the hypothesis that social preferences may be useful in sustaining interactions which could not otherwise be sustained. Emotions and social preferences of reciprocity, altruism, and inequity aversion allow societies to overcome crucial commitment and information problems that might otherwise discourage social exchanges.

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A   Appendix: Relevant Quotes from Transparencia Paraguay

From July to September of 2005, Transparencia Paraguay (the national branch of Transparency International) carried out a major project regarding the financing of electoral campaigns. This project included interviews carried out in 10 municipalities across the country with legislators, mayors, and members of civil society. Focus groups were also carried out in four municipalities with political operatives and middle men (the people who are actively involved in carrying out the vote-buying).

The final write-up contains an explanation written by Transparencia Paraguay as to how the political campaign works. They state the following regarding the role of the "operador político".

> For the community to conform, the candidate needs an *operador político* in the field: the *operador político*, a professional in politics, leader of his community, who becomes the backbone of the election campaign. Through *operadores políticos*, candidates can build their network of promises of aid, favors, and meet the expectations of the poorest people in the electorate. This will allow the candidate to form the community which will sustain his candidacy on election day.
>
> ...
>
> In the scheme of an election campaign such as the one we drew out on previous pages, based both on the promotion of the candidate, as well as building a clientele available to vote for him on election day, the figure of the *operador político* assumes particular importance, so much so that they are considered by many legislators and mayors as the key to success at the polls.
>
> The *operador político* is a professional in politics. He is the one who visits potential voters during the election campaign, bringing them the proposals of the candidate and also becoming a kind of caseworker for families with limited resources (almost half the population of the country), bringing them immediate solutions such as: medicine, food, payment of bills and more. But, for an *operador político* to be successful he must also be committed to the candidate, and he must be recognized in the neighborhood where he works, a local *caudillo*, who the voters recognize as someone to go to when there's a problem.
>
> ...
>
> The third circle is composed of *operadores políticos*. They are essential for the

election campaign and their value is directly proportional to both their commitment to the candidate and their integration with the community in which they seek votes for the candidate. The more they are recognized as a community leader, or at least as someone who solves the problems of the community, the better they can perform their job as promoter of the candidate during the election campaign.

The interviews and focus groups are extremely interesting in their own right. Here are excerpts which say something about reciprocity.

"I am going to explain how a primary election takes place. One candidate from one party calls the political operative of the other to complain. He says to him: "It's a shame. In school X, on the day of the elections, you are buying the votes for 70,000 guaraníes." And the other person replies: "How could we be buying for 70 when you are buying for 100?" That happens in all the primaries. The candidate that spends better on election day wins the primaries. And the candidate who positions himself badly loses. This is so much the case that there is the accusation of treason in one of the biggest parties - I will not say which one. The problem was that the money did not arrive in time to buy the votes; thus, the other candidate could buy them. This happened in Cordillera. The voters were waiting for the money to go out and vote, but the money did not arrive; what arrived instead was the message 'vote for whoever you want.' On the corner, the political operatives of the other candidate were waiting, and they bought all the votes for sale. The consequences were that there were layoffs, anger, and annoyances. They were supposed to have spent so many millions of dollars on the day of the elections, and only a fraction of that sum was spent." -Hermes Rafael Rambo Saguier (Liberal), ex representative in the national legislature.

"The voters prostitute themselves and cause the campaign to be very expensive. Everyone gets sick; their ceiling needs repair; their taxes need to be straightened out. If you don't go out prepared, you are not going to win. That's the way it is, and that is 40 days before the election. You could take care of a person for a year, and then five days before the election you don't bring him the medicine that he asked you for and he votes for someone else." -Derlis (Colorado), municipal government worker in Coronel Oviedo.

30

"The issue of medicine was a big one because several of the candidates for governor, mayor, and representatives were doctors. It is true that doctors can be of service and the service they provide is important. But, what happens when the people become accustomed? The first thing they say to you is "Is there a little medicine? Are there free appointments?" The voters say to you "You're a lawyer. Mr So-and-so helped me out with a judgement. You could do that too." That is the condition. "Could you help me out with this, because if you don't then I am going to go to the other side and So-and-so is going to help me." It is a blackmailing attitude. Then I say to the voter that I don't think our situation will ever improve with that kind of attitude. I believe that the electoral authorities must make voting obligatory, but no one controls it. If people are going to vote then they should go ahead and vote for whomever they want, that's not a problem, as long as people go and perform their civic duty. Nevertheless, nowadays you have to take them to go to vote in a minibus, you have to pick them up, you have to give them breakfast or a snack, and that's the only way they'll go. If they don't have shoes then you have to buy them that. They'll tell you "I am not going to go to vote because I don't have shoes," and so you have to buy them. Nowadays that is our situation. Politics is a business deal." -Enrique (Liberal), lawyer and ex-member of the municipal legislature in Coronel Oviedo.

I just want to say what the campaigns cost, the banners, the posters, all that has a cost, the shirts, the pens. And who are the ones that criticize you? The press and the radio criticize you. We are captives of the radio, because the radio is what arrives in the rural area and we are protective of our electorate in the rural areas because in the rural areas people still believe in the power of their word. When they pawn their word, they respect it. Nevertheless, in the urban and peri-urban areas, the majority goes with the highest bidder, but in the rural areas the pawned word is respected. -Adela (Colorado), staff in the Ministry of Health in Coronel Oviedo and member of the Council of Colorado Women.

"There is a new way that the people do things, especially in urban areas. Someone tells you, "I have access to 30 votes, I have their ID cards here." He tells you 30 people, 30 ID cards. He went out to collect them and then he brings them to you. Then you ask him if they know who they are going to vote for and he answers no. He says "For 10,000 each we will vote for you", and if there are

thirty of them then it's 300,000 Gs. Some are more expensive but others only need 5,000 so they can buy some liquor or cigarettes for that same day. These are the people from the marginal districts. That's how they work and that's what they dedicate themselves to on election day. You have to have money in your pocket. If you already invested however many millions in the campaign and then for 300,000 you are going to lose 30 votes which could change the results." -Adela (Colorado), nurse working for the Ministry of Health in the regional offices in Coronel Oviedo.

"I am going to tell you one thing. I go and I tell my friend who has 4 children, let's pick a name, Mary, let's go vote. How am I going to tell her to vote for free? She has to feed her 4 kids who she is leaving home alone to go vote. I at least have to give her 20,000 Gs." -Guadalupe (Colorado), leader of the Colorado youth organization in Asunción.

"Obviously, with the needs that exist in this country, when one goes to visit the neighborhoods one receives a lot of requests for assistance. This could be in the form of medicine, payment of electricity bills, payment of water bills, telephone, payment of school fees, university fees, rent, various loans, payment for foodstuffs or for things that have been pawned, everything, everything that you can imagine happens. All these problems seem to be just waiting for the moment when there's an election campaign, and one has to deal with such situations. If someone comes up to you and you don't solve those problems, then you're not a leader. You simply don't exist if you can't find a solution to these problems.... And the people said, "I am with you. I have so many people and give me so much [money]." I said, "No, No, I don't have it". So then they go and that's that. There were candidates who had economic resources and so they paid them. But on one opportunity I denounced them [to the police] because a sort of, as it's called, 'little train' came up and there were 15 guys, and one came and told me "Well, here I have 15 ID cards and there the people are all seated on the wall"." -Martin Arévalo (Colorado), head of the municipal legislature in Asunción

B   Appendix: Comparative Statics when $r(p)$ is Strictly Concave

To do comparative statics in this case, we use Cramer's Rule:

$$\begin{bmatrix} \frac{a_1^*\xi}{\theta_0}r''(p_1^k)(W^k)^{1+\alpha} & 0 & \cdots & 0 & -1 \\ 0 & \frac{a_2^*\xi}{\theta_0}r''(p_2^k)(W^k)^{1+\alpha} & 0 & \cdots & -1 \\ \vdots & & \ddots & & \vdots \\ 0 & \cdots & 0 & \frac{a_N^*\xi}{\theta_0}r''(p_N^k)(W^k)^{1+\alpha} & -1 \\ -1 & -1 & \cdots & -1 & 0 \end{bmatrix} \begin{bmatrix} dp_1^k \\ dp_2^k \\ \vdots \\ dp_N^k \\ d\lambda \end{bmatrix}$$

$$= \begin{bmatrix} -\frac{\xi}{\theta_0}r'(p_1^k)(W^k)^{1+\alpha}da_1^* \\ -\frac{\xi}{\theta_0}r'(p_2^k)(W^k)^{1+\alpha}da_2^* \\ \vdots \\ -\frac{\xi}{\theta_0}r'(p_N^k)(W^k)^{1+\alpha}da_N^* \\ -dB^k \end{bmatrix}$$

The determinant of the Bordered Hessian (the first matrix above) is $-\sum_i \frac{a_i^*\xi}{\theta_0}r''(p_i^k)(W^k)^{1+\alpha}$. Replacing the first column of the Hessian with the column vector $\left[-\frac{\xi}{\theta_0}r'(p_1^k)(W^k)^{1+\alpha}da_1^*, 0, \cdots, 0\right]'$ and taking the determinant of that new matrix we get $\frac{\xi}{\theta_0}r'(p_1^k)(W^k)^{1+\alpha}da_1^*$. So, this tells us that

$$\frac{dp_1^k}{da_1^*} = -\frac{r'(p_1^k)}{\sum_i a_i^* r''(p_i^k)} > 0$$

and thus the transfer is increasing in observed reciprocity.

TABLE 1: SUMMARY STATISTICS

	Mean	Standard deviation
Vote buying		
Offered something (excluding a problem solved)	0.258	0.438
Conditional on being offered (excluding a problem solved)		
Accepted	0.741	0.440
Value (in US Dollars)	$48.03	179.77
Money	0.302	0.461
Food	0.250	0.435
Gifts	0.707	0.457
Offered something (including a problem solved)	0.334	0.472
Conditional on being offered (including a problem solved)		
Problem Solving	0.493	0.502
Personal traits (survey 2007)		
Negative reciprocity	0.176	0.381
Impatience (in 1000s of Gs)	199.354	561.218
Risky	2.087	1.773
Didn't understand risk survey question	0.189	0.392
Altruism (experiments 2007)	5.089	2.677
Personal traits (experiments 2002)		
Reciprocity	0.043	0.076
Share difference	-0.009	0.137
Trustworthiness/Altruism	0.426	0.195
Trust	3.671	2.002
Risky	3.532	2.147
Voting behavior		
Voted in 2006 Election	0.702	0.458
Believes the ballot is anonymous	0.535	0.499
Political sentiment	0.401	0.491
Registered voter	0.829	0.377
Votes by party	0.227	0.419
Supports Colorado party	0.557	0.497
Registered voters in the municipality (in thousands)	9.139	4.677
Household characteristics		
Male	0.673	0.470
Age	49.915	15.582
Years of schooling	5.054	2.980
Household wealth (in US dollars)	$33,356	138,833
Number of family members eligible to vote	2.849	1.163

Notes: The summary statistics are based on 449 observations, except when the sample is conditioned on have been offered or for the personal traits from the 2002 experiments or 2007 experiments. Conditioning on being offered (including a problem solved) limits the sample to 150 observations. Negative reciprocity is 1 if a person says he would always (rather than sometimes or never) put somebody in a difficult situation if that person put him in a difficult situation. For personal traits (survey 2007): Impatience is the amount a person would have to be offered in one month rather than accepting 50 thousand Gs today. Risky is the number of risky choices the respondent made in a series of hypothetical gambles. Didn't understand is an indicator for whether the respondent chose a dominated strategy. Altruism is the amount sent, out of 14 thousand Gs in an anonymous dictator game. For personal traits (experiments 2002): Trustworthiness/Altruism is the average share returned across all four possible amounts received in the trust game. Trust is the amount sent as first mover in the trust game. Risky is the amount bet on a roll of the die in a risk game. Share difference is the average share returned when receiving 24, 18, or 12 thousand Gs in the trust game minus the share returned when receiving 6 thousand Gs. Reciprocity is the share difference censored below 0. Political sentiment is 1 if the person says he is a strong party member of either of the two main parties. Vote by party is 1 if the person says voters ought to always vote for their party even if they don't like their party's candidate. Anonymous ballot is an indicator for whether the respondent thought someone could figure out how a person in his polling locale had voted.

TABLE 2: CORRELATES OF VOTE-BUYING AND RECIPROCITY

Dependent variable:	(1) Offered	(2) Log(Amount offered)	(3) Negative Reciprocity	(4) Reciprocity	(5) Share Difference
Female	-0.006	-0.094	0.002	0.002	0.036
	[0.049]	[0.209]	[0.040]	[0.012]	[0.030]
Age	0	0.003	-0.001	0.000	0.000
	[0.002]	[0.006]	[0.001]	[0.001]	[0.001]
Education	0	-0.001	-0.011	-0.002	-0.011
	[0.008]	[0.033]	[0.006]*	[0.002]	[0.006]*
Log(Wealth)	-0.027	-0.164	0.007	-0.006	-0.012
	[0.012]**	[0.050]***	[0.011]	[0.004]	[0.008]
Number of family members eligible to vote	0.005	0.044	0.015	-0.004	0.000
	[0.020]	[0.084]	[0.017]	[0.006]	[0.012]
Political sentiment	0.017	0.079	0.02	-0.018	-0.051
	[0.049]	[0.212]	[0.041]	[0.015]	[0.026]*
Registered	0.14	0.547	-0.04	-0.002	0.035
	[0.055]**	[0.207]***	[0.053]	[0.032]	[0.050]
Vote by party	0.039	0.152	0.064	-0.010	-0.041
	[0.054]	[0.233]	[0.046]	[0.014]	[0.031]
Colorado	0.059	0.257	0.062	-0.001	0.010
	[0.045]	[0.192]	[0.038]	[0.013]	[0.023]
Anonymous ballot	-0.072	-0.246	0	-0.016	-0.002
	[0.045]	[0.197]	[0.038]	[0.015]	[0.026]
Registered voters in the municipality (in thousands)	0.002	-0.017	-0.004	-0.002	0.000
	[0.005]	[0.024]	[0.004]	[0.001]	[0.002]
Attended a political reunion	0.224	0.942	0.056	0.030	0.040
	[0.048]***	[0.209]***	[0.040]	[0.013]**	[0.024]*
Observations	446	446	446	139	139
R-squared	0.06	0.06	0.03	0.12	0.13

Notes: Columns (1)-(5) display the estimates of a linear regression where the dependent variable is indicated at the top of each column. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 3: VOTE-BUYING AND NEGATIVE RECIPROCITY

	Offered				Amount offered	Reciprocated
	OLS	OLS	OLS	OLS	Tobit	OLS
	(1)	(2)	(3)	(4)	(5)	(6)
Negative Reciprocity	0.154	0.159	0.15	0.123	0.602	0.129
	[0.061]**	[0.061]***	[0.060]**	[0.059]**	[0.272]**	[0.076]*
Mean of dependent variable	0.33	0.33	0.33	0.33	1.15	0.81
Individual characteristics	N	Y	Y	Y	Y	Y
Voting characteristics	N	N	Y	Y	Y	Y
Village Intercepts	N	N	N	Y	N	N
Observations	446	446	446	446	446	86

Notes: Columns (1)-(4) report the OLS estimates where the dependent variable is an indicator for whether or not the respondent was offered something in exchange for his vote. Column (5) reports the marginal effects of the Tobit specification where the dependent variable is the amount offered expressed in logs. Column (6) reports the OLS estimates where the dependent variable is an indicator for whether or not the respondent voted for the party from which he accepted the good. Individual characteristics include: gender, age, education level, number of family members eligible to vote, and household wealth. Voting characteristics include: registered voter, believes the ballot is anonymous, has strong political sentiment, votes by party, supports Colorado party, and number of registered voters in the municipality. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%

TABLE 4: VOTE-BUYING AND EXPERIMENT-BASED RECIPROCITY

	Offered						Reciprocated	
	OLS	OLS	OLS	OLS	Tobit	Tobit	OLS	OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Reciprocity	1.065		1.251		4.489		1.338	
	[0.527]**		[0.587]**		[1.730]***		[0.627]**	
Share difference		0.381		0.399		1.457		0.967
		[0.297]		[0.326]		[0.928]		[0.343]**
Share difference squared		3.607		4.107		13.201		-0.292
		[1.090]***		[1.170]***		[3.297]***		[1.441]
Mean of dependent variable	0.32	0.32	0.32	0.32	1.05	1.05	0.86	0.86
F-test on reciprocity		5.57***		6.16***		8.32***		4.83**
Individual characteristics	N	N	Y	Y	Y	Y	Y	Y
Voting characteristics	N	N	Y	Y	Y	Y	N	N
Village Intercepts	N	N	N	N	N	N	N	N
Observations	139	139	139	139	139	139	22	22

Notes: Columns (1)-(4) report the OLS estimates where the dependent variable is an indicator for whether or not the respondent was offered something in exchange for his vote. Columns (5)-(6) report the marginal effects of the Tobit specification where the dependent variable is the amount offered expressed in logs. Columns (7)-(8) report the OLS estimates where the dependent variable is an indicator for whether or not the respondent voted for the party from which he accepted the good. Individual characteristics include: gender, age, education level, number of family members eligible to vote, and household wealth. Voting characteristics include: registered voter, believes the ballot is anonymous, has strong political sentiment, votes by party, supports Colorado party, and number of registered voters in the municipality. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%. The F-test is for the joint hypothesis that the coefficients on Share Difference and Share Difference Squared are zero.

TABLE 5: ROBUSTNESS

| Dependent variable:	Turnout buying Voted	Coarse Information Offered		Other preferences Offered	
	(1)	(2)	(3)	(4)	(5)
Negative Reciprocity	0.015	0.117	0.149	0.148	
	[0.047]	[0.103]	[0.071]**	[0.081]*	
Altruism (game 2007)				-0.001	
				[0.012]	
Risk (survey)				-0.005	
				[0.020]	
Trust in candidates (survey)				-0.015	
				[0.022]	
Didn't understand risk survey questions				-0.16	
				[0.089]*	
Reciprocity					1.353
					[0.582]**
Trustworthiness/altruism (game 2002)					-0.188
					[0.240]
Trust (game 2002)					-0.021
					[0.022]
Risky (game 2002)					-0.025
					[0.020]
Impatience (survey)				0.04	0.063
				[0.069]	[0.065]
Unadjusted coefficient on reciprocity	0.017	0.134	0.159**	0.164**	1.07**
Mean of dependent variable	0.7	0.36	0.36	0.35	0.32
Individual characteristics	Y	Y	Y	Y	Y
Voting characteristics	Y	Y	Y	Y	Y
Table intercepts (173 tables)	N	Y	N	N	N
Polling station intercepts (44 polling stations)	N	N	Y	N	N
Observations	446	371	371	279	139

Notes: Column (1) reports the OLS estimates where the dependent variable is an indicator for whether the respondent voted in the 2006 election. Columns (2)-(8) report the OLS estimates where the dependent variable is an indicator for whether or not the respondent was offered something in exchange for his vote. In columns 2 and 3, the unadjusted coefficient is computed with table and polling station intercepts, respectively, thus only excluding individual and voting characteristics. Individual characteristics include: gender, age, education level, number of family members eligible to vote, and household wealth. Voting characteristics include: registered voter, believes the ballot is anonymous, has strong political sentiment, votes by party, supports Colorado party, and number of registered voters in the municipality. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

	Social networks	Civic	Truthfulness
Dependent variable:	Offered	Offered	Offered
	(6)	(7)	(8)
Negative Reciprocity	0.152	0.131	0.149
	[0.060]**	[0.059]**	[0.060]**
Network degree	-0.004		
	[0.005]		
Network clustering coefficient	-0.047		
	[0.134]		
Network contagion time	0.003		
	[0.016]		
Atttended political reunion		0.217	
		[0.048]***	
Trust in people			0.003
			[0.025]
Would participate in illegal transaction			0.007
			[0.083]
Unadjusted coefficient on reciprocity	0.154**	0.154**	0.154**
Mean of dependent variable	0.33	0.33	0.33
Individual characteristics	Y	Y	Y
Voting characteristics	Y	Y	Y
Table intercepts (173 tables)	N	N	N
Polling station intercepts (44 polling stations)	N	N	N
Observations	446	446	446

Notes: Column (1) reports the OLS estimates where the dependent variable is an indicator for whether the respondent voted in the 2006 election. Columns (2)-(8) report the OLS estimates where the dependent variable is an indicator for whether or not the respondent was offered something in exchange for his vote. Individual characteristics include: gender, age, education level, number of family members eligible to vote, and household wealth. Voting characteristics include: registered voter, believes the ballot is anonymous, has strong political sentiment, votes by party, supports Colorado party, and number of registered voters in the municipality. Robust standard errors are reported in brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

FIGURE 1: VOTE-BUYING AND RECIPROCITY
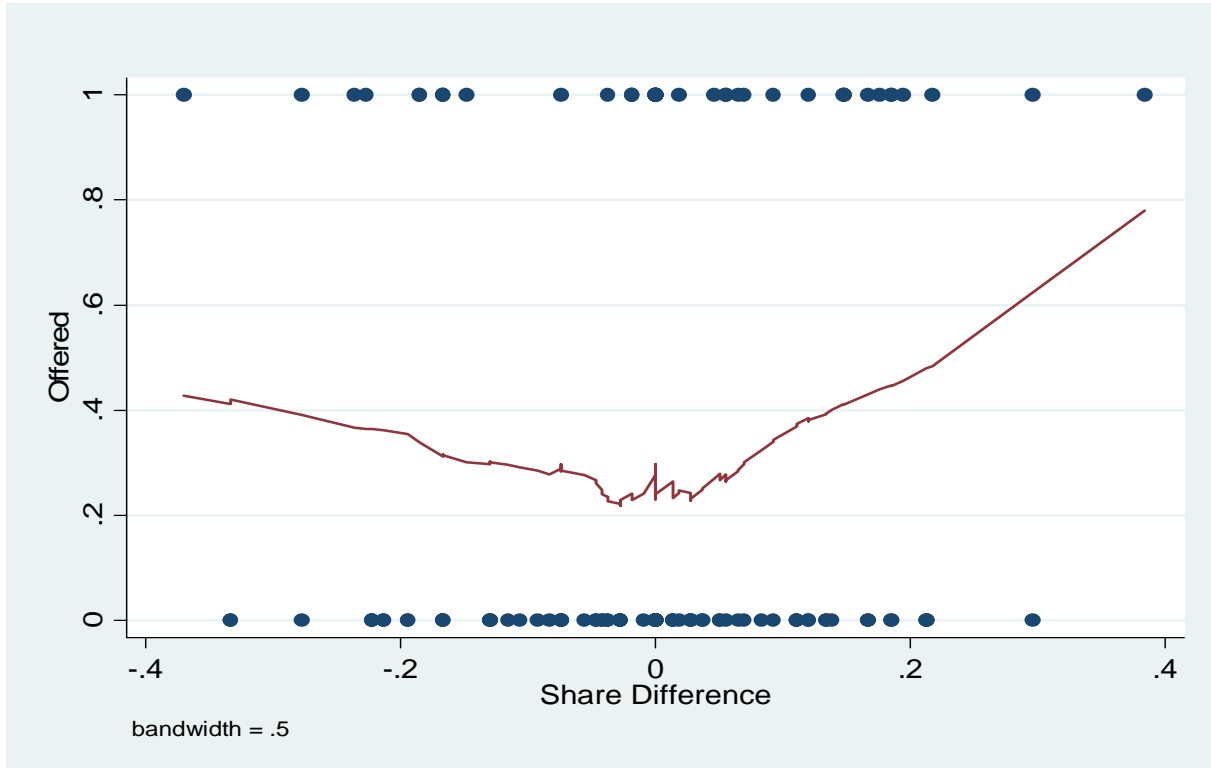
Notes: This figure depicts the nonparametric relationship between being offered a good in exchange for one's vote and the respondent's experimental measure of reciprocity. The estimates are based on a lowess regression with a 0.5 bandwidth.