Value for Money? Vote-Buying and Politician Accountability *

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Abstract

While a growing literature analyzes the relationship between vote-buying and the identity of the winning politician, there is little evidence around the effects of vote payments on voters' willingness to hold politicians accountable once elected. In this paper, we postulate a simple model of voter preferences and utilize laboratory experiments conducted in the U.S. and Kenya to demonstrate that vote payments reduce retrospective accountability. Even in the absence of any selection channel, voters who receive payments exhibit a reduced willingness to punish politicians for rent-seeking, and a higher level of rent-seeking is accordingly observed. In addition, these voter responses are larger in magnitude when payments are widely targeted. We demonstrate that the most parsimonious model of preferences consistent with this evidence is a model of multifaceted social preferences encompassing reciprocity and inequality aversion.

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1 Introduction

The ability of political elites to use financial resources to undermine the one-person one-vote principle is widely considered to be an important cause of elite capture of public policy (Acemoglu and Robinson, 2012; Khemani, 2014). One channel through which vote-buying may alter policy-making outcomes is candidate selection: if certain types of politicians are more likely to employ cash to win votes, then vote-buying may lead to the selection of lower quality candidates, or candidates with preferences that do not match those of the electorate. Another, potentially complementary, channel is a decline in incumbent performance conditional on quality. If voters who receive payments are less willing to punish a politician for poor performance once elected, vote-buying may undermine mechanisms of retrospective accountability, reducing politicians' incentives to perform highly and to minimize rent-seeking.

A growing empirical literature has demonstrated that vote-buying does meaningfully alter voters' ballot choices in developing country polities, and further evidence has been presented that this relationship is sustained by reciprocity on the part of the voter vis-a-vis the politician.[1] However, there is very little evidence around the effects of vote-buying on politician performance conditional on selection, and the hypothesis that social preferences may also shape a further response to vote-buying through this second channel of reduced retrospective accountability has remained largely unexplored. (We follow here the definition of social preferences provided by Charness and Rabin (2002): preferences that encompass a concern by subjects for the payoffs of other subjects.) In addition, the literature around social preferences and vote-buying has not analyzed the role of these preferences in generating another commonly observed empirical pattern — the targeting of entire neighborhoods or communities with vote payments (Breeding, 2011; Kramon, 2011; Banerjee et al., 2011).

Our objective in this paper is to develop a model of voters' response to vote-buying in the absence of any selection channel, and use laboratory experiments to provide corroborating evidence. We postulate a simple model in which politicians seek to expropriate rents and win reelection, and voters use their reelection choices to discipline rent-seeking. Following a large literature that highlights the relevance of social preferences,[2] we as-

[1] Vicente (2014) demonstrates that an anti-vote buying campaign in Sao Tome and Principe reduces the challenger's vote share, and argues that this reflects the fact that vote-buying is the challenger's preferred response to the incumbent's use of clientelistic policies. Hicken et al. (2014) report on a campaign in the Philippines that sought to reduce voters' temptation to sell their votes, and demonstrate that it significantly reduced vote-switching from the candidate ex ante preferred by the voter. Finan and Schechter (2012) demonstrate that more reciprocal individuals are more likely to be targeted for vote-buying.

[2] For developing countries, see for example Cardenas (2003), Greig and Bohnet (2008), and Carter and Castillo (2009).

sume subjects are motivated by both self-interest and multifaceted social preferences; while reciprocity has been identified as relevant for sustaining vote-buying, we also analyze inequality aversion (Charness and Haruvy, 2002). We then demonstrate that given this model of preferences, voters respond to vote payments by reducing their willingness to punish the politician for expropriation, and politicians accordingly expropriate more.

Moreover, our model allows us to explore the voter response to payments given social preferences characterized by reciprocity only, inequality aversion only, or both reciprocity and inequality aversion. Only the latter model predicts that voters will be differentially more responsive to collectively-targeted payments, rather than individually-targeted payments, consistent with the stylized fact that collectively targeted payments are commonly observed in the developing world. Models of voter preferences encompassing only reciprocity and self-interest in fact predict the opposite pattern.

We then utilize a series of laboratory experiments conducted in the U.S. and Kenya to identify whether subjects' observed responses to vote payments are consistent with these predictions. Working with a diverse, non-undergraduate subject pool in both Cambridge, Massachusetts and Nairobi, we implement a retrospective voting game in which subjects choose whether to reelect an incumbent who expropriates rents from a common treasury. The reelection choice serves as a tool to punish politicians for expropriation, and voting is secret and costless. No other politician characteristic influences voters' earnings, and there is no alternative candidate; accordingly, voters face no selection motive, and politicians do not use their choice of an expropriation level to signal their type or to pool with honest politician types.[3] Rather, politicians' choice of an optimal level of expropriation is shaped only by voters' choice of punishment given expropriation.

We augment this game by introducing vote payments as a transfer to the voter, distributed to a certain fraction of voters while maintaining the secret ballot. The politician has no agency in the targeting of payments, and does not pay transfers out of his own endowment, or from the public budget. We examine whether the introduction of vote payments alters subjects' willingness to punish the politician for expropriation, and how this response varies as the number of payments increases.

The experimental evidence from both the U.S. and Kenya suggest that subjects who receive a payment do in fact treat the politician more leniently, increasing their tolerance of expropriation. By contrast, non-recipients are more willing to punish the politician. This evidence is inconsistent with the theoretical predictions for purely self-interested subjects, and suggests that reciprocity is a salient component of subjects' preferences. In addition, politicians expropriate more when a majority of subjects receive payments.

[3]See for example Besley and Smart (2007); Besley (2007); Coate and Morris (1995); Canes-Wrone et al. (2001) and Maskin and Tirole (2004) for examples of this class of models.

Next, we analyze games in which all voters receive payments, and find that when all voters receive a payment, the effect per payment on each voter's threshold is around 90% larger relative to an identical game in which four out of five voters receive a payment. The most parsimonious model of subject preferences consistent with this evidence encompasses self-interest as well as reciprocity and inequality aversion. Intuitively, if voters are motivated in part by inequality aversion, a wider distribution of payments narrows the expected gap between the politician's payoff and voters' payoffs, reducing the utility cost of tolerating politician expropriation. Importantly, only models of preferences that include inequality aversion predict this pattern; models of preferences that include only reciprocity predict the opposite, suggesting that politicians purchasing votes would optimally target a simple majority of voters. Perhaps most important, vote-buying generates a decline in politician performance and thus in voter welfare even in the absence of any effect on politician selection — and even in an environment characterized by full information around vote payments.

Our empirical results are consistent with two stylized facts. First, social preferences are salient in low-income communities (Cardenas, 2003; Greig and Bohnet, 2008; Carter and Castillo, 2009). Cardenas and Carpenter (2008) argue that societies characterized by weak formal institutions rely more heavily on social norms and preferences, and our results suggest these preferences may also sustain vote-buying regimes consistent with lower levels of politician performance. Second, community-level targeting of vote payments — rather than individual-level targeting – is frequently observed in developing countries (Breeding, 2011; Kramon, 2011; Banerjee et al., 2011).[4] Again, only models of multifaceted social preferences predict the differential effectiveness of this targeting strategy.

This paper contributes to several related literatures. First, we identify a new channel for the negative relationship between vote-buying and governance outcomes: vote-buying increases voters' tolerance of rent-seeking, even in the absence of any effect on selection. A growing experimental literature demonstrates that vote-buying can alter voters' choice of candidates (Vicente, 2014; Hicken et al., 2014; Cruz et al., 2015). However, to the best of our knowledge, we are the first to provide causal evidence on the link between vote-buying and voters' willingness to punish politicians in the absence of any selection motive. Importantly, this result holds for a diverse sample drawn from two very distinct contexts in the U.S. and Kenya.

Second, we add to the growing literature in behavioral political economy; DellaVigna

[4]The literature on clientelism similarly highlights that clientelistic benefits are generally provided to broad networks of beneficiary clients, with the objective of providing a credible signal of commitment from the politician (Keefer and Vlaicu, 2008; Robinson and Verdier, 2013). These networks can be defined by community boundaries; by caste or other markers of social status; or by ethnicity (Anderson et al., 2015; Burgess et al., 2015; Fujiwara and Wantchekon, 2013).

(2009) and Schnellenbach and Schubert (2015) provide useful reviews. In analyzing the nexus between social preferences and voter responses to vote-buying, our findings also complement Finan and Schechter (2012), who find that more reciprocal individuals are targeted for vote-buying in Paraguay. Other related recent work by Tonguc (2017) provides experimental evidence that reciprocity in conjunction with inequality aversion and guilt aversion facilitates the subject's response to vote-buying in one-shot interactions in the laboratory. Here, we provide evidence that if both inequality aversion and reciprocity are salient, vote-buying generates a deterioration in politician performance, and these effects are amplified if vote payments are broadly targeted.

We also contribute to a growing literature in experimental economics that analyzes varied forms of reciprocity. Similar to Abbink et al. (2002) and Malmendier and Schmidt (2017), we find that subjects exhibit a reciprocal response when receiving a gift, even if this response is at the expense of third parties, and even though the gift is transparently provided in order to influence their behavior. Other recent work consistent with our findings includes Pan and Xiao (2016), who report that recipients favor a gift giver over a third party even when the third party has incurred the same cost and signaled the same intention of giving, and Strassmair (2009), who presents evidence that recipients' response to a gift does not significantly vary given experimental variation in the extent to which the gift arises from selfish motives by the giver. Our results suggest that the model of preferences under gift-giving proposed by Malmendier and Schmidt (2017) may be extended to predict a response to a transfer that is labeled as originating from another subject (the politician), even if that subject exerted no effective control over it.

Finally, our findings increase the common ground shared between the literatures on vote-buying and clientelism. Recent papers argue that clientelistic relationships undermine electoral accountability by enabling the elite to easily win the votes of poor citizens and subsequently engage in rent-seeking (Baland and Robinson, 2008; Anderson et al., 2015). One interesting finding in this literature highlights a strong positive correlation between social capital and elite capture of policy-making (Acemoglu et al., 2014). Our paper suggests that this may reflect the fact that clientelistic relationships are also in part sustained by social preferences.

The remainder of the paper proceeds as follows: Section 2 presents the model. Section 3 describes the experiments, and Section 4 summarizes the empirical analysis. Section 5 concludes.

2 Theoretical framework

We begin by presenting the theoretical predictions for subjects' behavior given both own-regarding and social preferences.[5] We will subsequently use these predictions to inform our empirical analysis. Consider a setting with one **P**olitician (P) and a number N of **V**oters, indexed by $i = 1, ..., N$. Each voter has an endowment $y_i = y$, taxed at rate τ, and the politician has an identical endowment $y_p = y$. The politician has access to the treasury composed of tax receipts, $N\tau y$, out of which he can extract a fraction up to $\lambda^{\max}$.

In the voting procedure, each voter chooses a threshold λ_i for the politician's expropriation level; if the politician chooses to expropriate more than this threshold, the voter votes to remove the politician. Simultaneously, the politician chooses a fraction λ_p to expropriate. If a majority of voters select a threshold greater than or equal to λ_p, then the politician is reelected (denoted $\rho = 1$); otherwise, he is removed (denoted $\rho = 0$) and pays a penalty of $0.5y + \epsilon$, where ϵ denotes a minimal bonus forfeited if the politician fails to win reelection. The expropriated income is retained by the politician regardless of reelection; the funds not expropriated from the treasury, including those funds originally protected from expropriation, are returned to voters, yielding $(1 - \lambda_p)\tau y$ for each voter. In addition, if the politician is not reelected, each voter pays a cost of removal κy. (We can conceptualize κ as a measure of voter support for the candidate, but we do not explore the implications of heterogeneity in κ.)

Given the game described above, the monetary payoff for each voter i is summarized by

$$E_i = (1 - \tau) \cdot y + (1 - \lambda_p) \cdot \tau \cdot y - (1 - \rho) \cdot \kappa \cdot y, \tag{1}$$

and the monetary payoff for the politician is summarized by

$$E_p = 0.5 \cdot y + \lambda_p \cdot N \cdot \tau \cdot y + \rho \cdot (0.5 \cdot y + \epsilon). \tag{2}$$

Payments are introduced as follows. Before subjects choose their reelection thresholds, a subset $n \leq N$ of voters each receive a payment g.[6] The payments are not drawn from the politician's endowment or the treasury, but rather from an external source of funds. Therefore, the payoff for voter i is given by $E_i + g_i$, where $g_i = g$ if the voter is in the subset of payment recipients, and $g_i = 0$ otherwise. All voters are aware of n and the magnitude of g.

We begin by deriving the equilibrium expropriation fraction λ_p and voter threshold λ_i

[5] Again, social preferences are defined as preferences that incorporate sensitivity to the payoff of other subjects, following Charness and Rabin (2002).

[6] To avoid confusion with the politician P, we denote the payments g, as an abbreviation for gift.

under two different specifications of preferences. We limit our analysis to pure strategy Nash equilibria in which all subjects who are identical (payment recipients and payment non-recipients) employ identical strategies: i.e., all payment recipients choose an identical threshold denoted $\lambda_{i,g}$, and all payment non-recipients choose an identical threshold denoted $\lambda_{i,ng}$. All proofs can be found in Appendix A.

2.1 Pure self-interest

If each subject is purely self-interested, then utility can be written as follows:

$$u_i = E_i. \tag{3}$$

Proposition 1 *For any expropriation fraction $\lambda_p \geq \lambda^{\min}$, where*

$$\lambda^{\min} = \lambda^{\max} - \frac{0.5 \cdot y + \epsilon}{N\tau y}, \tag{4}$$

there exists an equilibrium in which the politician expropriates a fraction λ_p of the treasury, and voters set their reelection thresholds at $\lambda_i = \lambda_p$.

Equilibria selection For simplicity, we assume that subjects select the equilibrium according to Nash bargaining weights β for the voters and $1-\beta$ for the politician, where $\beta \in [0,1]$. Notice that the possible equilibria can be utility ranked for both the voters and for the politician; the utility of voters is maximized when the equilibrium played is $\lambda = \lambda^{\min}$, and it decreases monotonically as λ_i increases. Given a bargaining weight for voters of β, the unique equilibrium entails a reelection threshold at $\lambda(\beta) = \beta\lambda^{\min} + (1-\beta)\lambda^{\max}$. We further assume these bargaining weights are consistent in all iterations of the voting game (with and without vote payments). Thus, all of our comparative statics analyze the unique equilibrium conditional on β.

Given this assumption around bargaining weights, we derive the following proposition.

Proposition 2 *For any fixed β and subject preferences characterized by self-interest, the voter threshold $\lambda_i = \lambda(\beta)$ does not change when vote payments are introduced.*

2.2 Multifaceted social preferences

We now consider the case in which each subject is characterized by multifaceted social preferences — reciprocity and inequality aversion —in addition to self-interest. For concision, we will not fully analyze the cases in which subjects are motivated by self-interest in conjunction with reciprocity alone or inequality aversion alone, but will provide an

intuitive overview of the key predictions given these assumptions in the final subsection; full details and the associated proofs can be found in Appendix B.

First, we assume that subjects exhibit intention-based reciprocity as in Rabin (1993) and Dufwenberg and Kirchsteiger (2004). More intuitively, subjects derive utility from being kind to other subjects when they are treated kindly, i.e. equitably; in our experimental context, we focus on the voters' response to the politician when they receive a vote payment, given that the payment is labeled as a payment from the politician. Second, we assume that subjects are characterized by inequality aversion as in Bolton and Ockenfels (2000), and thus seek to minimize the difference between their payoff and the average payoff of the other subjects.

A voter's utility is now described as follows:

$$u_i = E_i + g_i + f\left(\Delta\lambda_i \cdot \Delta g_i | \gamma\right) - h\left(\left|E_i + g_i - \frac{1}{N}\sum_{j \neq i}\left(E_j + g_j\right)\right|\right). \tag{5}$$

The first term captures the voter's monetary payoff, as described above. The second term captures the value of voter i's payment, $g_i \in \{0, g\}$. The third term represents the reciprocal component of preferences, where the parameter γ captures the intensity of this component of preferences.[7] The function $f : \mathbb{R} \to \mathbb{R}$ is concave and takes the following arguments: the measure $\Delta\lambda_i$ of how kind the voter i is to the politician and the measure Δg_i of how kind the politician is to the voter. Both measures capture deviations from the equitable value of these variables, where the equitable expropriation threshold is the average of the possible thresholds on the Pareto frontier, $\lambda^e \equiv 0.5 \cdot \left[\lambda^{\max} - \lambda^{\min}\right]$, and the equitable payment value is the expected payment received by a voter, $g^e \equiv n/N \cdot g$. In other words, $\Delta\lambda_i \equiv \lambda_i - \lambda^e$ and $\Delta g_i \equiv g_i - g^e$. These definitions of the equitable values λ^e and g^e are consistent with the existing literature on reciprocity (Rabin, 1993); while this rules out any shifts in λ^e or g^e driven by changes in social norms, this is consistent with the laboratory setting subsequently employed in which there is minimal scope for large-scale shifts in preferences during the course of the game.

We also assume that the function f satisfies standard properties such that the voter derives higher utility when responding kindly to greater kindness from the politician.[8] Moreover, the voter derives utility from being kind if and only if he is treated kindly: his utility from reciprocity is maximized at a value $\Delta\lambda_i \in (0, \lambda^{\max} - \lambda^e)$ when he receives

[7] Specifically, we assume that the function f is differentiable in γ and $\frac{df}{d\gamma} > 0$, $\frac{d^2 f}{d\lambda d\gamma} > 0$, such that the value of responding reciprocally and the marginal value of a reciprocal response are both increasing in γ.

[8] Formally, $f(0 \cdot \Delta g_i | \gamma) = 0$, $f'(\Delta\lambda_i \cdot \Delta g_i = 0 | \gamma) = 0$ at $\Delta\lambda_i = 0$, $\frac{df(\Delta\lambda_i \cdot \Delta g|\gamma)}{d\Delta g} \geq 0$ if $\Delta\lambda_i \cdot \Delta g \geq 0$, and $\frac{df(\Delta\lambda_i \cdot \Delta g|\gamma)}{d\Delta g} < 0$ otherwise.

a payment, and maximized at a value $\Delta\lambda_i \in \left(\lambda^{\min} - \lambda^e, 0\right)$ when he does not receive a payment.[9] We provide an example for the function f in equation (50) in Appendix B.1, as well as an illustration in Figure B1.

The final term in voters' preferences captures inequality aversion, as $h(\cdot)$ is a decreasing, convex function of the gap between the subject's payoff and the average payoffs of all other subjects. We further assume that the marginal cost of inequality is less than or equal to the marginal benefit of additional monetary rewards.[10]

The politician is assumed to exhibit the same set of preferences; however, he does not receive a payment and does not exercise agency in directing payments to voters, and thus reciprocity is irrelevant in his case. The politician's utility function can accordingly be written as follows:

$$u_p = E_p + \rho \cdot (0.5 \cdot y + \epsilon) - h\left(\left|E_p - E_i - \frac{n}{N}g\right|\right). \tag{6}$$

Analyzing equilibria without payments In the baseline voting game without payments, no mechanism exists to establish a reciprocal relationship, and thus reciprocity does not affect the equilibrium outcome. The inclusion of inequality aversion in subjects' preferences, however, expands the Pareto frontier relative to the case of pure self-interest; the politician now pays an additional cost when choosing to expropriate, as this choice exacerbates inequality. Given that higher expropriation is costlier, deviating to maximal expropriation is less beneficial for the politician. Accordingly, the minimal sustainable expropriation threshold falls, decreasing the equitable value λ^e.

Proposition 3 *For any fixed β and subject preferences characterized by self-interest in conjunction with reciprocity and inequality aversion, there exists a unique Nash equilibrium in which the politician expropriates a fraction λ_p of the treasury and voters set their reelection thresholds at $\lambda_i = \lambda_p$, where $\lambda_p \in [\lambda_p^*, \lambda^{\max}]$. In addition, the minimum sustainable threshold $\lambda_p^* < \lambda^{min}$.*

Equilibria with payments In the game with payments, self-interest and inequality aversion continue to be relevant. Moreover, the addition of reciprocity now also affects the voter's choice of threshold; more specifically, this choice directly enters his utility through the reciprocity component of the utility function even when he is not pivotal. In other words, the voter derives utility from behaving reciprocally, and this is the case even if that response is purely expressive.

[9] Formally, $f'(\Delta\lambda_i \cdot \Delta g_i > 0|\gamma) = 0$ at some $\Delta\lambda_i > 0$, and $f'(\Delta\lambda_i \cdot \Delta g_i < 0|\gamma) = 0$ at some $\Delta\lambda_i < 0$.

[10] Specifically, we assume that $h'\left(\lambda^{\max}\tau\left(N+1\right)y - 0.5y + \kappa y\right) < \frac{N}{N+1}$.

To simplify the analysis, we focus on the cases in which no voter is pivotal in the equilibria in which all voters who receive payments behave identically and all voters who do not receive payments behave identically. No voter is pivotal in these equilibria whenever the number of payments is not 2 or 3. (The experiments conducted similarly excluded these pivotal cases.) In Appendix A.3, we show that allowing for pivotality does not change the qualitative results, but it imposes an upper limit on the values λ that can be sustained in equilibrium.

Returning to the cases of interest here, if a non-pivotal voter deviates in any proposed equilibrium play, this deviation does not change the equilibrium monetary payoffs. It does, however, affect the utility this voter derives from behaving reciprocally. Accordingly, if the chosen λ is different from the λ that maximizes the reciprocal component of utility, all non-pivotal voters who do not receive a payment have a gainful deviation to punishing the politician, and all non-pivotal voters who receive a payment have a gainful deviation to rewarding the politician. Thus, the only possible equilibrium in our class of interest (equilibria in which all payment recipients choose identical thresholds, and all payment non-recipients choose identical thresholds) is the equilibrium in which the λ_i for each voter corresponds to the λ_i maximizing their utility from reciprocity.

We denote by $\lambda_{i,g}^{RI}$ the value of λ that maximizes $f\left(\Delta\lambda_i \cdot (g - \frac{ng}{N})|\gamma\right)$, i.e., the threshold that maximizes the reciprocal component of the utility function for a payment recipient. Similarly, we denote by $\lambda_{i,ng}^{RI}$ the value of λ that maximizes the reciprocal component of the utility function for a payment non-recipient, $f\left(\Delta\lambda_i \cdot (-\frac{ng}{N})|\gamma\right)$.

Proposition 4 *For any fixed β and preferences characterized by self-interest in conjunction with reciprocity and inequality aversion, introducing payments generates the following effects.*

1. *(Effect of payments on voters) There exists a unique pure strategy Nash Equilibrium in which all payment recipients choose the same threshold and all payment non-recipients choose the same threshold. Payment recipients choose the threshold $\lambda_{i,g}^{RI}$, increasing their threshold relative to the baseline voting game without payments, while non-recipients choose the threshold $\lambda_{i,ng}^{RI}$, decreasing their threshold relative to the baseline game.*

2. *(Effect of payments on the politician) If $n > \frac{N+1}{2}$, then the politician plays $\lambda_p = \lambda_{i,g}^{RI}$ and is reelected. If $n \leq \frac{N+1}{2}$, then the politician plays $\lambda_p = \lambda_{i,ng}^{RI}$ and is reelected.*

3. *(Effect of increasing n)*

   (a) *If the marginal cost of inequality $h'(\cdot)$ is smaller than the marginal reciprocal response of gift non-recipients ($\frac{\partial \Delta\lambda_{i,ng}}{\partial n}$) and larger than the marginal recipro-*

cal response of gift recipients ($\frac{\partial \Delta \lambda_{i,g}}{\partial n}$), then threshold $\lambda_{i,g}^{RI}$ increases in n and threshold $\lambda_{i,ng}^{RI}$ decreases in n.

(b) If the marginal cost of inequality is outside the above bounds and is small in magnitude, then the change in $\lambda_{i,g}^{RI}$ and $\lambda_{i,ng}^{RI}$ is qualitatively the same as if preferences exhibited reciprocity only: i.e., both $\lambda_{i,ng}^{RI}$ and $\lambda_{i,g}^{RI}$ decrease in n. If the marginal cost of inequality is outside the above bounds and is large in magnitude, then the change in $\lambda_{i,g}^{RI}$ and $\lambda_{i,ng}^{RI}$ is qualitatively the same as if preferences exhibited inequality aversion only: i.e. both $\lambda_{i,ng}^{RI}$ and $\lambda_{i,g}^{RI}$ increase in n.

The primary result follows from the effect of reciprocity: voters who receive a payment are more willing to tolerate expropriation, while voters who do not receive a payment are less willing to tolerate expropriation. When the number of payments increases, recipients are less reciprocal, because they expected a payment with high probability, and non-recipients are more angry, because they likewise expected a payment with high probability; thus reciprocity would lead all subjects to reduce their reelection thresholds as n increases.

However, inequality aversion produces a second effect, as an increased number of payments reduces the average difference in income between the politician and voters, rendering it less costly for the politician to expropriate funds. Accordingly, low expropriation levels that are sustainable in an equilibrium with fewer payments become unsustainable as n increases, increasing the equitable expropriation threshold λ^e. The direction of the overall response given these two effects depends on how the marginal cost of inequality compares to the marginal propensity to respond reciprocally; if the marginal cost of inequality is high, subjects may increase their reelection thresholds given more payments, allowing the politician to expropriate more.

Finally, it is important to highlight that the above predictions conditional on multifaceted social preferences differ notably from the predicted responses given single-dimensional social preferences (reciprocity alone or inequality aversion alone). Detailed predictions for these cases are provided in Appendix B. While the predictions around the voter response to payments given reciprocity alone are identical to the corresponding predictions for multifaceted preferences, the predictions given inequality aversion alone are different; in this case, the thresholds chosen by subjects who do and do not receive payments are identical. In other words, examining the voter response to payments will allow us to evaluate whether the "inequality only" model of preferences is relevant.

In addition, predictions around the variation in voter response as n increases are distinct; under reciprocity alone, the equilibrium thresholds chosen by all subjects uniformly

decrease in n, while under inequality aversion alone, the equilibrium thresholds uniformly increase in n. Thus examining the shifting voter response as the number of payments increases will allow us to further distinguish between the different postulated models.

2.3 Comparative statics

We also derive comparative statics with respect to two key parameters: the strength of the reciprocal response, captured by the parameter γ, and the fraction of the treasury that is vulnerable to expropriation, captured by the parameter λ^{max}.

Proposition 5 *An increase in the parameter γ increases λ_i for voters who receive payments and decreases λ_i for voters who do not receive payments.*

Intuitively, individuals who derive more utility from a reciprocal response are even more willing to reward a politician who distributes vote payments. Conversely, more reciprocal individuals who do not receive a payment are more willing to punish the politician.

Proposition 6 *An increase in $\lambda^{\max}$ uniformly increases λ_i for all voters.*

A higher $\lambda^{\max}$ increases the minimum sustainable threshold for politician reelection in any pure strategy equilibrium. Intuitively, when the politician can expropriate more, this increases his outside option, rendering it more challenging for voters to discipline him with the threat of removal. Thus, the equitable threshold λ^e increases, as do the equilibrium thresholds $\lambda^{RI}_{i,g}$ and $\lambda^{RI}_{i,ng}$. Moreover, the predicted change is of the same magnitude for both payment recipients and payment non-recipients.

2.4 Unequal endowments

In the laboratory, we also seek to evaluate whether subjects respond differently to an increased endowment as opposed to a labeled vote payment: i.e., rather than receiving payments, voters receive different endowments at the initiation of the game incorporating the value of the payments. Specifically, n voters have endowment $y+p$, and the remaining voters have endowment y. The subjects are then engaged in the simple baseline voting game, without payments.

Proposition 7 *Given fixed β, preferences characterized by self-interest in conjunction with reciprocity and inequality aversion, and unequal endowments, any threshold $\lambda_p \in [\lambda^{**}_p, \lambda^{\max}]$ can be an equilibrium, where $\lambda^{**}_p > \lambda^{*}_p$. All voters and the politician choose the same threshold λ_p.*

Intuitively, when the endowment of n voters increases, the baseline level of inequality between politician and voters is reduced. This lowers the cost of expropriation for the politician, rendering his outside option more attractive. It then becomes more challenging for voters to induce the politician to expropriate at a lower level. Moreover, as reciprocity is no longer relevant, no voter deviates away from a threshold sustainable in equilibrium.

2.5 Key predictions

The objective of the theoretical framework is to generate predictions around the response of both voters and politicians to the introduction of vote payments under two distinct models of preferences: purely self-interested preferences, and multifaceted social preferences. Under the former case, there will be no subject response to payments (propositions 1 and 2); under the latter case, subjects who receive payments will increase their reelection thresholds relative to the baseline game, while subjects who do not receive payments will decrease their reelection thresholds (propositions 3 and 4). We additionally present further hypotheses as to how the voter response to payments varies with the number of payments in proposition 4, and comparative statics with respect to game parameters in propositions 5 and 6.

It is important to note that this theoretical framework abstracts from the potential tradeoff between policy alignment between the voter and the politician and voter tolerance for expropriation. This is similar to other papers in the literature; for example, Finan and Schechter (2012) analyze the relationship between social preferences and vote-buying behavior independent of variation in voters' policy preferences. We argue that the key advantage of our model and experimental design is that it allows us to identify whether there is an effect of vote payments on voters' choices in the absence of any selection channel, and thus an effect on politician performance holding politician identity fixed. In particular, this game is distinct from more complex models in which both adverse selection and moral hazard are relevant and pooling equilibria can emerge in which low-type politicians seek to mimic high-type politicians.[11] Here, by contrast, politicians' choice of an optimal level of expropriation is shaped only by voters' choice of punishment given expropriation, and there is no scope for the expropriation choice to serve as a signal of the politician's type. To our knowledge, this is the first paper to systematically evaluate the potential relationship between vote payments, subjects' willingness to punish politicians, and politician rent-seeking, highlighting an additional and important channel through which vote-buying may shape governance outcomes.

[11] See for example Besley and Smart (2007); Besley (2007); Coate and Morris (1995); Canes-Wrone et al. (2001) and Maskin and Tirole (2004) for examples of this class of models.

3 Experimental methods

We now map the voting games implemented in the laboratory to the model, and describe laboratory procedures.

3.1 Voting games

In the voting game played in the laboratory, six subjects — five voters and one politician — constituted the polity. The endowment y was \$20 in the U.S., and 500 shillings or approximately \$6 in Kenya, while the tax rate τ was 0.5. The fraction of the collective treasury available for expropriation (λ^{max}) was 0.3; thus 15% of each voter's endowment, and 15% of the treasury as a whole, was vulnerable to expropriation. The cost of removing the politician, κy, was set at $0.1y$, and the bonus payment ϵ was between 0 and \$2. In the game incorporating vote payments, the payment size g was also set at $0.1y$.

Given these parameters, it is useful to note that despite the fact that voters and politicians are assigned the same endowment, any equilibrium in the baseline voting game yields higher earnings for the politician. Returning to equation (4) and using $\epsilon = 1$, we can calculate $\lambda^{min} = .08$; thus even given the minimum sustainable level of expropriation, the politician's payoff is \$22.20 relative to a voter payoff of \$19.20, a difference of about 15%. If we assume that the politician and the voter have equal bargaining weights, generating an equilibrium at the midpoint of the sustainable range, then $\lambda^p = .19$; the politician's payoff is \$23.85 and each voter's payoff is \$18.10, a difference of about 32%. This is consistent with the general stylized fact that politicians' income is higher than voters' income, though clearly the magnitude of the gap in real-world settings may be considerably higher.

In every experimental session, subjects first received a detailed overview of the baseline voting game, with no reference to vote payments, and specified their in-game choices.[12] More specifically, each subject specified his choice as a voter, answering the question, "what is the maximum amount you would allow the politician to expropriate and still re-elect him?" He also stated his expectation regarding how much the politician would expropriate. The subject then specified his choice as a politician, answering the question, "what is the amount you would expropriate from the treasury?" He also specified whether he expected to be re-elected.[13]

[12]Game instructions emphasized that subjects would make choices as both the voter and the politician, and would be assigned to a game role (and paid on the basis of their choices in that role) at the conclusion of the session. Subjects answered a set of comprehension questions, and were required to review the correct responses before proceeding.

[13]The specific wording of these questions follows the games employed in the U.S. sessions. Minor differences between the U.S. and Kenya sessions are detailed in Appendix E.

Next, subjects received an overview of the voting game including payments and again specified their in-game choices; there were six different voting game treatments, described in more detail below. In all treatments, the subjects were presented with the following language to elucidate their choices: "suppose you are a voter and that you have received $2 in exchange for your vote. What is the maximum amount you would allow the politician to expropriate and still re-elect him/her, given that you received $2?" To elucidate preferences in the absence of a vote payment, a parallel question was posed: "suppose you are a voter and that you have not received $2 in exchange for your vote. What is the maximum amount you would allow the politician to expropriate and still re-elect him/her, given that you have not received $2?" The order in which these questions were posed varied; an analysis of this variation can be found in Section 4.2. Finally, subjects specified their choices as politicians, again responding to the question "what is the amount you would expropriate from the treasury?", and specified whether they expected to be reelected.[14] In the U.S. sessions, some subjects engaged in the voting game with payments twice, and different numbers of payments were specified in different game rounds.

Each subject's compensation was then based on his choices in one randomly selected role (politician or voter, and voter who did or did not receive a payment), during a randomly selected game round. (A game round refers to a single iteration of the voting game.) During the session, subjects were regularly reminded that any choice could affect their final earnings. Appendix C provides more details around subject compensation, and an example.

The use of the strategy method to elicit subject responses is often described as "cold" decision-making, in contrast to "hot" decision-making in which subjects interact more directly. In general, the two methods yield similar results, though there is some evidence that the strategy method results in lower levels of punishment (Brandts and Charness, 2011). Given that our empirical analysis entails within-subject comparisons across games that are all conducted using the strategy method, we do not regard this as a significant source of bias.

We will now describe the six different "voting game with payments" treatments conducted, and the hypotheses that each was designed to test.

Primary hypotheses: Evaluating the response of voters and politicians The simplest variants of the voting game were denoted public payments and public gifts, and can be described as follows.

[14]The questions posed about subjects' expectation of the game outcome were not incentivized. Again, the specific wording of these questions follows the games employed in the U.S. sessions. Minor differences between the U.S. and Kenya sessions are detailed in Appendix E.

1. *Public payments*: The game instructions stated that some subjects will receive a "payment in exchange for your vote", and specified the number and value of the payments. This treatment was implemented with one, four, and five payments.

2. *Public gifts*: The game instructions stated that "one (four) voter(s) will receive a gift of $2. This gift does not come from the treasury." No quid pro quo for the gift was specified. Again, the instructions specified the number and value of the payments. This treatment was implemented with one and four payments.[15]

Data from these games is used primarily to examine the voter and politician response to the introduction of payments. By examining the shift in the same subject's willingness to tolerate expropriation comparing across the games with and without vote payments, we can examine whether the subject is more or less willing to punish the politician, both when he has hypothetically received a payment and when he has hypothetically not received a payment. Similarly, we can compare the chosen level of expropriation in the games with and without payments to evaluate the effect of introducing payments on politician rent-seeking.

If subjects are motivated solely by self-interest, theory suggests there will be no shift in voter or politician response when payments are introduced (Propositions 1 and 2). However, if subjects are also motivated by social preferences that include reciprocity, individuals who receive payments are predicted to increase their reelection thresholds and thus their tolerance for expropriation, while subjects who fail to receive payments are predicted to decrease their reelection thresholds (Propositions 3 and 4).[16]

In addition, we can compare games in which one, four and five payments were distributed in order to analyze how subject responses shift as the number of payments increases. If subjects are motivated solely by reciprocity, the magnitude of the positive response exhibited by payment recipients is postulated to decrease in magnitude as the number of payments increases. However, if subjects are also motivated in part by inequality aversion, this positive response may increase in magnitude (Proposition 4). Finally, the "public gifts" treatment also enables us to evaluate the hypothesis that gifts distributed without any *quid pro quo* are as effective as vote payments incorporating an explicit exchange between voter and politician.

Secondary hypotheses: Comparative statics We use three additional treatments to evaluate the postulated comparative statics. First, to generate experimental variation

[15]Some combinations of game treatment and number of payments were omitted due to resource constraints.

[16]If subjects are motivated purely by inequality aversion, all subjects would increase their reelection thresholds.

in the salience of reciprocity, we limited the information that subjects received about vote payments and, in an additional treatment, also requested their consent for the payment; both modifications were designed to increase the subject's perception that he was engaging voluntarily in an implicit transaction conditional on a payment. Second, we increased the share of the treasury vulnerable to expropriation. These variants of the voting game can be described as follows.

3. *Limited information*: The game instructions did not specify the number, size, or nature of the payments, but simply stated that some voters would receive payments in exchange for their votes. This treatment was implemented with four payments.

4. *Limited information and prior consent*: The game instructions were identical to the previous treatment. However, prior to choosing their reelection thresholds, subjects were asked if they would accept a payment, if offered. This treatment was implemented with four payments.

5. *Big pot*: The fraction of the treasury vulnerable to expropriation by the politician (λ^{max}) in the basic payment game was increased from 0.3 to 0.5. This treatment was implemented with zero and five payments.

If reciprocity is salient in subjects' preferences, then increasing the experimentally generated sense of reciprocity should render payment recipients more responsive, while payment non-recipients show evidence of a (weakly) larger backlash effect (Proposition 5). Accordingly, the increase (decrease) in expropriation thresholds for subjects who do (do not) receive payments is predicted to be larger in the limited information treatments.

Increasing the share of the treasury that is vulnerable to expropriation is predicted to increase voters' reelection thresholds, as well as politicians' chosen levels of expropriation (Proposition 6). Accordingly, when comparing the voting game with payments to a baseline voting game in which both games are characterized by a higher λ^{max}, the within-subject increases in reelection thresholds and expropriation should be larger. There is no predicted difference in this response comparing across payment recipients and non-recipients.

Robustness check: Unequal endowments We conducted one additional game as a robustness check to evaluate the hypothesis that voters were responding merely to the shift in their endowment, rather than to the payment itself.

6. *Unequal endowments*: Subject endowments were rendered unequal ex ante to mimic the wealth distribution induced by the vote payments; i.e., subjects had an endowment of either \$20 or \$22 (parallel to their endowment if they had received a \$2

vote payment). The standard voting game was played, without reference to vote payments, and each subject specified what threshold he would set for the politician if his endowment was $22, and if his endowment was $20.

By comparing subjects' choices in the unequal endowment game to their choices in the baseline voting game, we can evaluate the hypothesis that their response to the payment is simply driven by a wealth effect. If the shift in voter behavior given a higher endowment is identical to the shift in voter behavior given receipt of a vote payment, that suggests that the voter's choice of reelection threshold may be a channel for externalizing attitudes toward the experimenter, rather than the politician per se. However, if the response to a higher endowment is dissimilar, this pattern is consistent with the hypothesis that subjects are reacting to the labeled vote payment by responding differentially to the politician's behavior. More specifically, theory predicts that subjects with high and low endowments should choose identical reelection thresholds (Proposition 7), in contrast to the diverging behavior predicted for payment recipients and non-recipients.

3.2 Laboratory procedures

We conducted our experiments using zTree at the Harvard Decision Science Lab in Cambridge, MA and the Busara Experimental Laboratory in Nairobi, Kenya between 2013 and 2015. At both sites, subjects were recruited through the laboratories' databases, and each subject participated in only one session. In the U.S., 450 subjects participated in 62 sessions, and each session consisted of six, 12 or 18 subjects. In Kenya, 366 subjects participated in 24 sessions, and each session consisted of 12 or 18 subjects. Tables F1 and F2 in Appendix F provide more details on session structure and the number of subjects included in each session type.

The average age of subjects is 33 at both sites. In the U.S., the subject pool is equally divided by gender, overwhelmingly unmarried, and highly educated. In Kenya, the subject pool is 62% female and has an average of eleven years of education; half are married. Levels of political engagement are high in both subject pools, though higher in Kenya: 72% of U.S. subjects report voting in the last presidential election, while 86% of Kenyan subjects did so. Again, Table F3 provides details.

Each experimental session proceeded as follows: subjects were engaged in simple social preference games, the baseline voting game without payments, the voting game with payments, and a brief questionnaire on demographic characteristics and political experiences. (In the U.S., some subjects played the voting game with payments twice; the game treatment was consistent throughout the session, but the number of payment differed in the two rounds.) The social preference games played by subjects included the

dictator, trust, and ultimatum games, and detailed protocols are provided in Appendix D. The game treatments were also implemented with some minor site-specific variations, described in Appendix E.[17] Figure 1 provides a summary of the session structure, illustrating the four components of each session in order (social preferences, baseline voting game, voting game with payments, and questionnaire), and noting that the voting game with payments could include multiple rounds (in the U.S.) and was drawn from one of the six experimental treatments described above.

4 Empirical analysis

4.1 Data and descriptive statistics

The key unit of interest for the analysis is the subject-decision. In game rounds with zero or five payments, the subject makes a single decision as a voter, specifying a reelection threshold, and also makes a single decision as a politician. However, in game rounds with one or four payments, the subject makes two decisions as a voter — the reelection threshold conditional on a payment, and the reelection threshold unconditional on a payment — as well as a single decision as a politician. There were some differences in how the subjects' reelection thresholds were elicited in the U.S. and Kenya, described in more detail in Appendix E.3. We drop roughly 7% of observations corresponding to Kenyan subjects who exhibited non-monotonic behavior, stating that they would not reelect a politician expropriating a lower amount, but would reelect a politician expropriating a higher amount, leaving a sample of 755 subjects. (We will subsequently demonstrate that our primary results are robust to these subjects' inclusion.)

Panel A of Table 1 reports summary statistics for voter thresholds and politician levels of expropriation, where Kenyan subject choices are rescaled to lie on the 0 to \$15 scale employed in the U.S.[18] The average voter reelection threshold in the pooled sample is the equivalent of \$7.33, with significantly higher voter thresholds in the U.S. (\$7.70) than Kenya (\$6.59). Kenyan subjects are also significantly more likely to set their reelection threshold at zero. Again, a higher threshold suggests a greater tolerance by subjects as voters of expropriation by politicians. Figure F1 in the Appendix shows the corresponding kernel densities and histograms of subject choices as voters for subjects in

[17] We denote country-specific session types by numbers. For example, session type A corresponds to public payments; session type A1 was implemented in the U.S., and session type A2 in Kenya. A given session can have up to three game rounds, denoted "game round I", "game round II", and "game round III". Table F1 in the Appendix summarizes the session types implemented and the game rounds included in each session.

[18] In addition, choices made by subjects in the big pot games are re-scaled to lie on the same scale from 0 to \$15.

the U.S. and Kenya. At around \$8, the average level of politician expropriation is above the average voter threshold; this is again significantly higher in the U.S. (\$8.39) than in Kenya (\$7.21).

Panel B of the same table reports measures of social preferences.[19] We find that 66% of U.S. subjects send a positive amount to a partner in the dictator game, compared to 81% of Kenyan subjects. U.S. subjects are more likely to send a positive amount in the trust game, but conditional on receiving a positive amount, Kenyan subjects are more likely to return a non-zero amount. Kenyan subjects also exhibit greater inequality aversion; at \$5.72 out of a maximum of \$10, the minimum transfer that Kenyans would accept from a partner in the ultimatum game is roughly double the reported threshold for U.S. subjects (\$2.91).[20]

4.2 Voter response to payments

We first evaluate subjects' responses to vote payments as voters and politicians, as well as variation in these responses given a varying number of payments. To evaluate the effect of vote payments on the reelection thresholds chosen by voters, we estimate the following equation. Here, T_{idgs} denotes the threshold chosen by subject i in game decision d in game round g in session s.

$$T_{idgs} = \beta_1 R_{idgs} + \beta_2 P_{gs} + \phi_i + \epsilon_{idgs} \tag{7}$$

R_{idgs} is a dummy equal to one if subject i's decision is conditional on payment receipt, and P_{gs} is a dummy equal to one if the game includes vote payments. All specifications are estimated with and without subject fixed effects, with standard errors clustered at the session level. Specifications without subject fixed effects include a Kenya dummy, a control variable for the order in which questions about vote payments are posed, and comprehension index fixed effects.

Table 2 reports the primary results analyzing voter behavior, employing all session

[19] The sample includes 653 subjects (372 in the U.S. and 281 in Kenya); this includes all subjects other than those included in session type F, unequal endowments, for whom social preferences are not observed. In the U.S., these choices were not incentivized, and thus subjects were not paired with a partner in order to calculate a payoff. In Kenya, these choices were incentivized, and subjects were paired with a partner and informed of their payoff. This payoff was added to their earnings in the voting game.

[20] We construct an additional index of reciprocity Rec_i, defined as $Perc_i^{high} - Perc_i^{low}$, censored at zero; where $Perc_i^{high}$ ($Perc_i^{low}$.) is the percentage of funds received that a subject would return to sender in the trust game if he received more than 50% of endowment (less than 50%). In the 2013 sessions and in Kenya, a simpler trust game was employed in which the sender has the choice only to send all or nothing; accordingly, Rec_i can be constructed only for the 2014 U.S. sessions. The mean index of reciprocity is .06. Interestingly, this is extremely close to the average level (.04) reported by Finan and Schechter (2012) for their Paraguay sample.

types except big pot and unequal endowments.[21] First, we observe in Columns (1) and (2) a positive and significant coefficient on recipient (β_1), demonstrating that subjects who receive a payment increase their reelection thresholds relative to non-recipients. Second, there is a negative and significant coefficient on payment (β_2), suggesting a backlash effect: subjects engaged in a voting game with payments who do not receive a payment are harsher in their treatment of the politician relative to the baseline game, lowering their reelection thresholds.[22] The bottom row reports the sum of β_1 and β_2, capturing the response of payment recipients relative to the baseline voting game; it is positive and significant conditional on subject fixed effects.

These results suggest that subjects are motivated by self-interest in conjunction with social preferences, and that these social preferences include reciprocity, given that all models of preferences including reciprocity predict both a positive response by payment recipients and a backlash effect for payment non-recipients. However, this evidence does not allow us to draw conclusions around the relevance of inequality aversion.

In order to further refine our understanding of subject preferences, we utilize additional evidence around variation in the voter response to payments as the number of payments increases. More specifically, we estimate the following specification; it includes the recipient dummy variable interacted with the dummy variables P^1_{gs} and P^4_{gs}, denoting game rounds in which payments are distributed to one and four subjects, as well as the dummy All_{gs}, equal to one for game rounds in which all subjects receive payments. Again, this specification is estimated with and without subject fixed effects.

$$T_{idgs} = \beta_1 R_{idgs} \times P^1_{gs} + \beta_2 R_{idgs} \times P^4_{gs} + \beta_3 P^1_{gs} + \beta_4 P^4_{gs} + \beta_5 All_{gs} + \phi_i + \epsilon_{idgs} \qquad (8)$$

The results in Columns (3) and (4) in Table 2 provide robust evidence that the positive effect of payments on recipients' reelection thresholds is growing in magnitude as the number of payments increases. The bottom rows of the table report the linear combinations $\beta_1+\beta_3$ and $\beta_2+\beta_4$, capturing the net effect of a payment when one payment and four payments are distributed, respectively. The net effect of a \$2 payment in the one-payment game is insignificant. The net effect of a \$2 payment in the four-payment and five-payment games is positive and significant, and larger for the all-payment game; payment recipients allow the politician to expropriate about 40 cents more if four voters receive payments, and 70 cents more if all voters receive payments. We can reject the

[21] This is a sample of 2136 subject-decisions. The unequal endowment session types, F1 and F2, also include some game rounds with five payments. For clarity of the within-subject comparisons, however, data from session types F are omitted. The results are consistent if this data is also included.

[22] The sign and significance of β_1 and β_2 are consistent irrespective of the order in which the "reelection threshold - payment" and "reelection threshold - no payment" questions are asked. These results are available upon request.

hypothesis that the net effect of a single payment, $\beta_1 + \beta_3$, is equal to the effect of five payments, β_5. The hypothesis that $\beta_2 + \beta_4 = \beta_5$ cannot be rejected, though p=.11 for the specification employing subject fixed effects.[23]

This evidence of a voter response to payments that increases in magnitude given increasing n is not consistent with a model of subject preferences in which only reciprocity is relevant. Rather, this pattern suggests social preferences are multifaceted, incorporating both reciprocity and inequality aversion. Only subjects who are also averse to inequality will respond differentially to payments that are widely distributed.[24]

Finally, we estimate the following specification to examine whether there is any heterogeneity in the response to payments when the payment is framed as a gift with no quid pro quo.

$$T_{idgs} = \beta_1 R_{idgs} + \beta_2 R_{idgs} \times Gift_{gs} + \beta_3 P_{gs} + \beta_4 P_{gs} \times Gift_{gs} + \phi_i + \epsilon_{idgs} \tag{9}$$

Columns (5) and (6) report the results, and we observe that β_2 and β_4 are small in magnitude and insignificant. That suggests subject responses generally do not vary when alternate framings of an identical payment are introduced; if we interact the gift dummy with dummy variables for framings including specific numbers of payments, we observe the same pattern.[25]

To sum up, the observed gap in reelection thresholds between subjects who do and do not receive a payment, in conjunction with an increase in the magnitude of the recipient response as the number of payments increases, is inconsistent with a model of pure self-interest. Rather, this evidence is consistent with the hypothesis that subjects are characterized by multifaceted social preferences encompassing both reciprocity and inequality aversion.

[23]The absence of an increase in voters' thresholds when one payment is introduced is inconsistent with the theoretical predictions given λ is modeled as continuous. However, this empirical pattern could be consistent with an alternate model where λ is modeled as discrete.

[24]In addition, the results suggest that the backlash effect is somewhat increasing in magnitude as the number of payments increases (a vote payment of $2 leads to a decline of about 60 cents in threshold set by non-recipients in the one payment game, and a decline of 73 cents in the four payment game); however, the difference between these two coefficients is not statistically significant. While noisy, this evidence is consistent with the prediction in Proposition 4 for the case in which the marginal cost of inequality is at an intermediate level, and thus the backlash effect also increases in magnitude as the number of payments increases.

[25]In Appendix F, we reproduce the core results around voter behavior reported in Table 2 employing two alternate samples. Table F5 expands the sample to include Kenyan subjects who exhibit non-monotonic behavior, and Table F6 limits the sample to exclude subjects who score in the bottom decile of game comprehension. In both cases, our results are robust.

4.3 Politician response to payments

Do politicians' expropriation choices shift when vote-buying is introduced? Our model predicts that politicians should set their expropriation level equal to the reelection threshold chosen by the majority of voters. Given our previous findings, this suggests that politician expropriation should increase when four or five payments are introduced, and this increase should be larger in magnitude for games including five payments. To test this hypothesis, we estimate the following specification:

$$Exp_{igs} = \beta_1 P_{gs} + \phi_i + \epsilon_{igs} \tag{10}$$

Exp_{igs} denotes the amount expropriated by subject i as a politician in game round g in session s. Parallel specifications will be estimated including dummy variables for various numbers of payments, as well as an interaction with the gift framing.

Table 3 presents the results. Columns (1) and (2) show that the introduction of vote payments increases politician expropriation by around \$0.50, an increase of 6% relative to the mean. Columns (3) and (4) show a larger increase in expropriation when payments are distributed to all subjects, but the difference is statistically insignificant. In addition, the fact that there is an increase in politician expropriation when only one payment is distributed is inconsistent with the theoretical predictions suggesting a decline in politician expropriation in this case; however, this increase is not statistically significant in the absence of subject fixed effects. Finally, in Columns (5) and (6) we observe no variation in expropriation when the gift framing is employed. In addition, we observe no shift in subjects' reelection expectations once payments are introduced.

Considering the welfare of subjects as voters, the increase in expropriation renders voters who do not receive the transfers worse off when vote payments are introduced. This evidence is consistent with the hypothesis that there is some welfare loss generated by the deterioration in governance, and the associated increase in rent-seeking, in a polity characterized by widespread vote-buying.

4.4 Interpreting the role of social preferences

Clearly, in this experimental context subjects show a robust response to the introduction of vote payments as both voters and politicians, and this observed response is inconsistent with simpler models of returns-maximizing preferences. Thus the empirical evidence suggests that social preferences are salient.

Interestingly, this result emerges despite the fact that the experimental design arguably minimizes the potential role of these preferences. More specifically, vote-buying

in our experimental context is not targeted (i.e., politicians have no agency in choosing the recipients of vote payments); given that the games are fully anonymous and subjects do not interact, subjects acting as politicians do not in any case have access to any information that would allow them to target payments. In addition, vote-buying is not costly to the politician. The politician has no choice to retain the vote payment, and thus does not forgo any compensation when voters receive payments.

Is it surprising that reciprocity is still operative in this setting? In fact, our results are consistent with an emerging literature on reciprocity, analyzing the breadth of subjects' responses in a range of experiments in which the traditional prerequisites for reciprocity are absent. Evidence from Malmendier and Schmidt (2017) suggests that subjects respond robustly to a gift even in a single-shot interaction when recipient and giver are matched anonymously by the experimenter, and even when the sending of a gift reflects selfish motivations; instead, subjects respond to the stated intention of the gift. Additional evidence from Pan and Xiao (2016) suggests that recipients favor a gift giver over a third party who has incurred the same cost and signaled the intention to send a gift, indicating that the costliness of a gift to the sender is not a prerequisite for a reciprocal response. In this sense, we contribute to this burgeoning literature by evaluating whether the simple labeling of a gift for one subject as attributed to another subject may be sufficient to induce a response.

It should also be noted that the experimental choice to render the vote payments zero cost to the politician also has advantages in terms of analyzing the precise mechanism of politician accountability. This feature of the experimental design ensures that the payment itself is not viewed as a signal of the politician's characteristics (generosity and/or altruism), thus prompting subjects to view their reelection choice partly as a mechanism to select a politician who has desirable intrinsic characteristics. Rather, the reelection choice can be used purely to punish the politician's choice of rent-seeking.

Importantly, our model also seeks to illuminate the importance of inequality aversion. In particular, the inclusion of inequality aversion generates the prediction that vote payments that saturate a polity have a disproportionate effect on voters' tolerance of expropriation, a phenomenon observed in the empirical results. By contrast, models of preferences including only reciprocity suggest that vote payments will in fact be less effective when they are widely distributed, a prediction that is clearly at odds with the results presented here. As previously noted, the multifaceted model of preferences is also consistent with the general empirical stylized fact that vote-buying often saturates local polities in developing countries, rather than targeting a bare majority of voters as would be optimal given preferences characterized by reciprocity alone.

4.5 Comparative statics

4.5.1 Variation in reciprocity

In the laboratory, we sought to experimentally vary the subjects' degree of reciprocity toward the politician in two ways: limiting information about vote payments to increase the perception that the payment is targeted, and requesting the subject's active consent to receive the payment, in order to mimic a contract between the politician and the voter. In order to test the hypotheses that these treatments increase subjects' responsiveness to payments, we estimate the following specification including interaction terms with the limited information and prior consent framings. The limited information dummy variable is equal to one for sessions that employ limited information and no prior consent.[26]

$$T_{idgs} = \beta_1 R_{idgs} + \beta_2 R_{idgs} \times Lim_{gs} + \beta_3 R_{idgs} \times Cons_{gs} + \beta_4 P_{gs} + \beta_5 P_{gs} \times Lim_{gs} + \beta_6 P_{gs} \times Cons_{gs} + \beta_7 All_{gs} + \beta_8 Cons_{gs} + \phi_i + \epsilon_{idgs} \quad (11)$$

The results are reported in Columns (1) and (2) of Table 4; in general, the introduction of limited information and prior consent does not significantly shift voters' responses. While the interaction terms with the payment dummy β_5 and β_6 are negative, consistent with the theoretical prediction of larger backlash effects given a higher degree of reciprocity, the coefficients are small in magnitude. The estimated interaction terms for the limited information and prior consent framings β_2 and β_3 are heterogeneous in sign; there is some weak evidence that soliciting prior consent renders voters more responsive to payments.

4.5.2 Comparing the U.S. and Kenya

As previously noted, the primary effects of introducing vote payments — including a higher threshold for payment recipients, and a lower threshold for payment non-recipients — are qualitatively the same in both experimental sites. However, further suggestive evidence around the role of reciprocity can be generated by comparing the response of U.S. and Kenyan subjects, given that Kenyan subjects on average demonstrate much higher levels of reciprocity. Subjects at both sites are engaged in a simple trust game in which the sender has the option to send all or none of an endowment of $4 or 120 shillings, and whatever is sent is tripled prior to the partner's choice of how much to

[26]The dummy variables All_{gs} and $Cons_{gs}$ vary within-subject and thus are included in subject fixed effect specifications. The gift, limited information, and prior dummy variables, by contrast, only vary across subjects and are omitted from subject fixed effects specifications. More details on coding are provided in Table F4 in the Appendix. In the specifications without subject fixed effects, we continue to include controls previously enumerated for the no subject fixed effect specification.

return. In the case of a positive transfer, Kenyan subjects return on average $.50 more to the sender, and are 14 percentage points more likely to return a non-zero amount. (The magnitudes are normalized with respect to the U.S. endowment.)

Perhaps unsurprisingly, we also observe that the Kenyan subjects' response to payments is around 60% larger, though this difference should be interpreted extremely cautiously given that these two subject pools have many different characteristics. (Kenyan subjects are also significantly more averse to inequality, have lower levels of education and income, and have significantly greater personal experience of vote-buying.) However, the observed pattern is consistent with an emerging hypothesis in the literature that stronger social preferences may sustain higher levels of clientelism, and could be a channel for adverse governance outcomes observed in many developing country contexts (Acemoglu et al., 2014; Anderson et al., 2015).

4.5.3 Variation in the maximum expropriation level

The second comparative static of interest entailed increasing the fraction of the treasury vulnerable to expropriation λ^{max} from 35% to 50%, while the vote payment remained fixed at $2. To evaluate the effect of this increase in the maximum expropriation level, we estimate the following specification, where Big_{gs} is equal to one if the session includes a big pot vulnerable to expropriation.[27]

$$T_{idgs}^{frac} = \beta_1 P_{gs} + \beta_2 R_{igds} + \beta_3 Big_{gs} + \beta_4 P_{gs} \times Big_{gs} + \phi_i + \epsilon_{idgs} \tag{12}$$

Columns (3) and (4) of Table 4 report the results: the big pot dummy is positive and significant, while the interaction between big pot and payment is insignificant. These coefficients are consistent with the theoretical prediction that voters' selected thresholds should increase given an increase in λ^{max}, and there is no heterogeneity in this response across subjects.

This evidence suggests that even given the higher potential costs of expropriation, payment recipients continue to demonstrate a disproportionate willingness to tolerate expropriation by politicians, relative to payment non-recipients. Moreover, the effectiveness of a payment that is constant in magnitude in shifting voters' behavior in a context of increased potential welfare losses from rent-seeking is consistent with the empirical stylized fact that incentives offered to voters are often trivial in value relative to the estimated magnitude of politician rent-seeking.

[27] Given that the big pot treatment included only games with zero and five payments, the interaction of big pot and a dummy for payment recipient is omitted.

4.6 Robustness check: Unequal endowments

An alternative interpretation of the results presented thus far is that the subjects' responses as voters simply reflect a reaction to the receipt of a payment that is directed at the experimenter, but externalized via the reelection choice. For example, subjects who receive a payment may be gratified and feel generous; subjects who do not receive a payment may be angry. To test this hypothesis, we use the "unequal endowments" game. This game is equivalent to the simple voting game without payments; however, four voters have endowments of $22, and one voter has an endowment of $20, parallel to the endowments induced in the four-payment voting game.

Our model of subject preferences suggests a very different response to this variation in endowments, relative to the response to a payment. While all subjects will increase their reelection thresholds relative to the baseline voting game, there should be no heterogeneity in this response with respect to the subject's own endowment. To test this hypothesis, we consider the full sample of games excluding big pot (session types A–D and F), and estimate the following specification with and without subject fixed effects.[28]

$$T_{idgs} = \beta_1 R_{idgs} + \beta_2 High_{idgs} + \beta_3 P_{gs} + \beta_4 Ineq_{gs} + \phi_i + \epsilon_{idgs} \tag{13}$$

The dummy variable $High_{idgs}$ is equal to one if a subject has a high endowment, and zero otherwise; $Ineq_{gs}$ is equal to one for the unequal endowment game rounds.

The results are reported in Columns (5) and (6) of Table 4, and show a coefficient β_2 that is consistently insignificant, suggesting that high endowment and low endowment individuals do not show any evidence of different reelection thresholds. The coefficient β_4 on the unequal endowment dummy is positive, large in magnitude, and statistically significant, also consistent with theoretical predictions. We can also conduct the statistical tests $\beta_1 = \beta_2$ and $\beta_1 + \beta_3 = \beta_2 + \beta_4$, testing whether the effect of a payment is the same as the effect of a high endowment, and whether the net effect of a payment in a payment game is the same as the net effect of a high endowment in the unequal endowments game. In both cases, we can reject these hypotheses at the five percent level, suggesting that the effect of receiving a payment is not the same as the effect of a high initial endowment.[29] While the results should be interpreted cautiously given that the salience of an additional transfer (in the form of a payment) may be significantly greater

[28] The sample includes game round I (no payments) and any game round including four payments from session types A-F as specified in Table F1: A1-III, A2-II, B1-III, B2-II, C1-II, C2-II, D1-II, D2-II, F1-I, F2-I and F2-II. In the specifications without subject fixed effects, we include a Kenya dummy, a control variable for the order in which questions about the receipt of vote payments is posed, and comprehension index fixed effects.

[29] More specifically, for the specification reported in Column (5) of Table 4, the corresponding p-values are .000 and .028; for the specification reported in Column (6) of Table 4, the p-values are .000 and .025.

than a higher endowment assigned at the initiation of the game session, this pattern is consistent with the hypothesis that voters are not simply responding to the payment by externalizing a general sense of gratitude at the experimenter.

5 Conclusion

Vote-buying is an important phenomenon in polities around the world, and there is a growing consensus that it can generate meaningful shifts in electoral outcomes, leading to the selection of candidates who are lower quality or whose preferences do not necessarily match those of the electorate. However, there is relatively little evidence around a second, potentially complementary channel: vote-buying may lead to a deterioration in politicians' performance, conditional on their selection, if it renders voters less willing to discipline politicians for poor performance.

The objective of this paper is to develop a theoretical framework analyzing the response of both voters and politicians to the introduction of vote payments in the absence of any selection channel, and test these theoretical predictions in the laboratory. We present evidence drawn from a diverse experimental sample including subjects in both the U.S. and Kenya, suggesting that subjects acting as voters do in fact respond to vote payments by increasing their tolerance of expropriation on the part of the politician. An increase in rent-seeking on the part of the politician is correspondingly observed, consistent with the hypothesis that vote-buying has adverse effects on the quality of governance even in the absence of any selection effects.

Importantly, both effects are evident for subjects at both experimental sites, for subjects exposed to full information about the payment regime, and for subjects who simply receive a vote payment without any allusion to a quid pro quo. Moreover, both effects are sustained even in an experimental context that seemingly minimizes the opportunity to establish a reciprocal tie between voter and politician.

In addition, the increase in voter tolerance of rent-seeking is considerably magnified when the number of vote payments distributed within the hypothetical polity increases. This pattern is consistent only with a model of multifaceted social preferences in which aversion to inequality within the polity — in addition to reciprocity between the voter and the politician — shapes voters' response to vote payments. In addition, this evidence is consistent with the stylized fact that vote-buying in developing country contexts often entails the saturation of neighborhoods or communities with payments. More broadly, evidence about the increased effectiveness of broadly targeted payments suggests that social preferences are relevant not only in sustaining the effectiveness of vote payments in general, but also in rendering widely targeted vote payments particularly potent in

shifting voter behavior.

Our paper contributes to the existing literature by providing one of the first sources of evidence that vote-buying can directly reduce voters' willingness to hold politicians accountable, independent of any shift in the identity of the politician. This channel of reduced accountability is relevant to the broader relationship between vote-buying and clientelism and the quality of governance. In addition, the evidence presented here also links to an emerging literature suggesting there is a positive correlation between social capital and elite capture of the policy-making process in developing countries (Acemoglu et al., 2014; Anderson et al., 2015). One channel for this correlation could be that strong social capital renders clientelistic mechanisms such as vote-buying more effective, even when vote payments are relatively anonymous and unenforceable. This implies that enhancing other, non-electoral methods of political accountability may be particularly important.

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6 Figures and Tables

Figure 1: Structure of game session

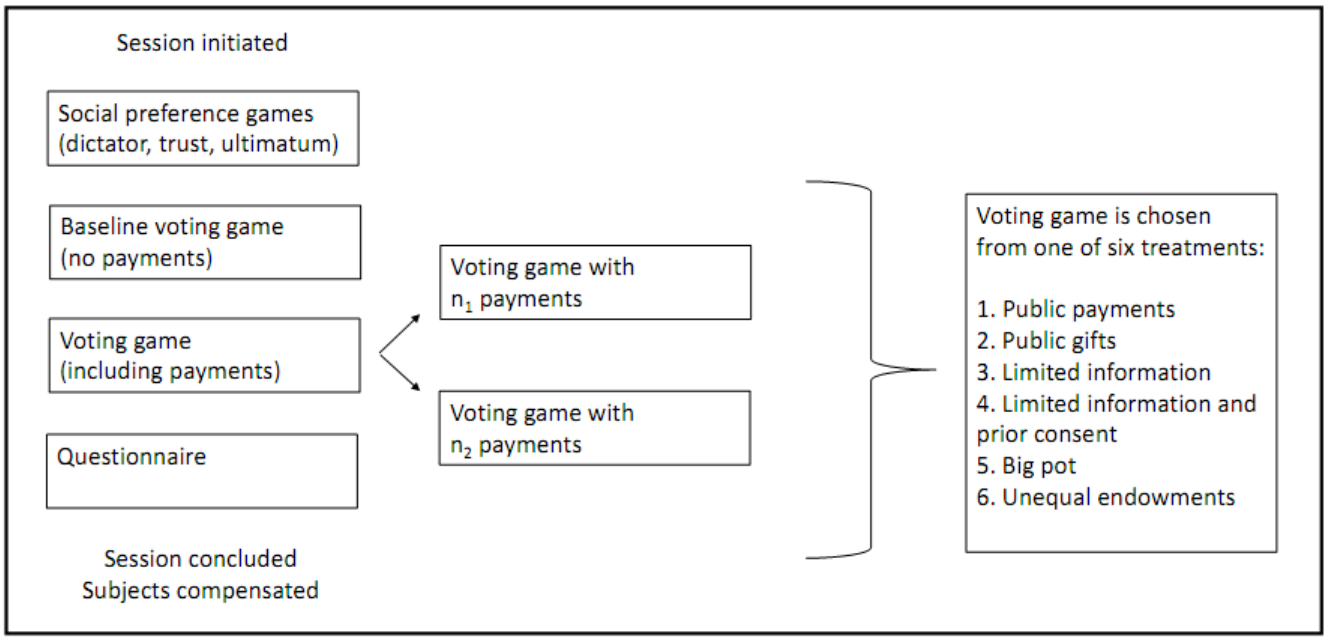


Table 1: Summary statistics

	U.S. mean	Kenya mean	U.S. obs.	Kenya obs.
Panel A: Subject choices in voting game				
Voter threshold	7.70	6.59	1794	886
Dummy for threshold at zero	.11	.16	1794	886
Politician expropriation	8.39	7.21	1236	610
Dummy for zero expropriation	.09	.26	1236	610
Dummy for full expropriation	.20	.22	1236	610
Panel B: Experimental measures of social preferences				
Dummy for sending in the dictator game	.66	.81	372	281
Dummy for sending in trust game	.83	.64	372	281
Dummy for returning in trust game	.42	.58	372	281
Threshold in ultimatum game	2.91	5.72	150	118
Reciprocity	.06		222	

Notes: Each panel reports means of the specified characteristics by experimental site. The data reported for Kenyan subjects is restricted to subjects who exhibit monotonic behavior and are thus included in the primary sample. Panel A reports summary statistics for subjects' choices as voters and politicians, including the reelection threshold as a voter, a dummy for the threshold at zero, the amount expropriated as a politician, and dummy variables for expropriating the minimum or maximum amount. This data is reported at the level of the subject-game round-game decision.

Panel B reports summary statistics for subjects' social preferences; this sample includes all subjects other than those included in session type F (unequal endowments). The measures reported include a dummy variable for sending a positive amount in the dictator game, a dummy variable for sending a positive amount in the trust game, a dummy variable for whether the subject returned any funds in the trust game, a reciprocity index, and the threshold in the ultimatum game; the reciprocity index can be calculated only for U.S. subjects in 2014 and 2015, and the ultimatum game threshold is available only for subjects in 2014. The reciprocity index is defined as $Perc_i^{high} - Perc_i^{low}$, censored at zero. All variables are normalized with respect to the dollar scales employed in the U.S.

Table 2: Voter behavior

	Voter reelection threshold					
	(1)	(2)	(3)	(4)	(5)	(6)
Recipient	.963 (.138)***	.964 (.135)***			.920 (.185)***	.922 (.179)***
Recipient x one payment			.278 (.205)	.278 (.205)		
Recipient x four payments			1.116 (.163)***	1.116 (.163)***		
Recipient x gift					.123 (.271)	.121 (.269)
Payment	-.703 (.196)***	-.670 (.188)***			-.702 (.279)**	-.687 (.255)***
One payment			-.595 (.313)*	-.597 (.253)**		
Four payments			-.752 (.189)***	-.733 (.188)***		
All payments			.593 (.301)**	.729 (.224)***		
Payment x gift					-.003 (.393)	.057 (.367)
$\beta_1 + \beta_2$	.260 (.173)	.294 (.170)*				
$\beta_1 + \beta_3$			-.318 (.270)	-.319 (.224)		
$\beta_2 + \beta_4$			.364 (.195)*	.383 (.191)**		
Sample	Session types A-D					
Mean dep. var.	7.07	7.07	7.07	7.07	7.07	7.07
Fixed effects		Subject		Subject		Subject
Obs.	2136	2136	2136	2136	2136	2136

Notes: The dependent variable is the maximum threshold of expropriation at which the subject will vote to reelect the politician. The independent variables are a dummy variable for receiving a payment and receiving a payment in a game with one or four payments; the dummy variables for the game including payments or including one or four payments; a dummy for the game including payments for all subjects; and the recipient and payment dummies interacted with a dummy for the gift framing. $\beta_1 + \beta_2$ reports the sum of the coefficients on recipient and payment. $\beta_1 + \beta_3$ and $\beta_2 + \beta_4$ report the sum of the recipient and payment dummies interacted with the one payment and four payment dummies, respectively.

Fixed effects are as specified in the table; specifications without subject fixed effects include a Kenya dummy, a dummy for ordering of the payment questions, and comprehension index fixed effects. All specifications include standard errors clustered at the experimental session level. Asterisks indicate significance at the ten, five, and one percent level.

Table 3: Politician behavior

	Politician expropriation					
	(1)	(2)	(3)	(4)	(5)	(6)
Payment	.499	.553			.432	.427
	(.211)**	(.202)***			(.285)	(.277)
One payment			.482	.478		
			(.357)	(.212)**		
Four payments			.492	.523		
			(.242)**	(.239)**		
All payments			.561	.806		
			(.364)	(.256)***		
Payment x gift					.205	.381
					(.442)	(.356)
Sample	Session types A-D					
Mean dep. var.	7.82	7.82	7.82	7.82	7.82	7.82
Fixed effects		Subject		Subject		Subject
Obs.	1404	1404	1404	1404	1404	1404

Notes: The dependent variable is the politician's level of expropriation. The independent variables are dummy variables for the game including payments, and for the game including one or four payments; a dummy for the game including payments for all subjects; and the payment dummy interacted with a dummy for the gift framing. Fixed effects are as specified in the table; specifications without subject fixed effects include a Kenya dummy, a dummy for ordering of the payment questions, and comprehension index fixed effects. All specifications include standard errors clustered at the experimental session level. Asterisks indicate significance at the ten, five, and one percent level.

Table 4: Comparative statics

	Voter threshold					
	(1)	(2)	(3)	(4)	(5)	(6)
Recipient	1.073	.968	.975	.964	.989	.960
	(.179)***	(.156)***	(.137)***	(.135)***	(.142)***	(.133)***
Recipient x secret	-.654	-.548				
	(.506)	(.494)				
Recipient x consent	.153	.259				
	(.274)	(.255)				
Payment	-.602	-.550	-.703	-.670	-.717	-.676
	(.248)**	(.228)**	(.197)***	(.188)***	(.201)***	(.183)***
Payment x secret	-.048	-.229				
	(.464)	(.439)				
Payment x consent	-.309	-.416				
	(.522)	(.472)				
Big pot			2.936	12.864		
			(.797)***	(.191)***		
Big pot x payment			-.041	-.063		
			(.346)	(.338)		
High endowment					.216	.216
					(.162)	(.162)
Unequal endowment					1.316	.877
					(.531)**	(.364)**
Sample	Session types A-D		Session types A-E		Session types A-D, F	
Mean dep. var.	7.07	7.07	7.28	7.28	7.18	7.18
Fixed effects		Subject		Subject		Subject
Obs.	2136	2136	2326	2326	2466	2466

Notes: The dependent variable is the maximum threshold of expropriation at which the subject will vote to reelect the politician. In Columns (1) and (2), the independent variables are a dummy variable for receiving a payment and its interactions with dummy variables for the secret payment framing and the prior consent framing, as well as a dummy variable for the game including payments, also interacted with the secret and prior consent framing. In Columns (3) and (4), the independent variables include the recipient and payment dummies, a dummy for the big pot game, and the interaction between the payment and big pot dummies. In Columns (5) and (6), the independent variables include the recipient and payment dummies, and the dummy variables for the unequal endowments framing and for an individual receiving a high endowment.

Fixed effects are as specified in the table; specifications without subject fixed effects include a Kenya dummy, a dummy for ordering of the payment questions, and comprehension index fixed effects. All specifications include standard errors clustered at the experimental session level. Asterisks indicate significance at the ten, five, and one percent level.

Appendix - for on-line publication only

A Proofs from main text

A.1 Proof of Proposition 1

We begin by noting again that no voter is pivotal in the equilibria of interest; accordingly, no voter benefits from altering his reelection threshold, conditional on the choice of a given threshold λ by all other voters. The politician's expected payoff from playing the strategy λ and winning reelection is $y + \lambda N\tau y + \epsilon$. If he deviates to the maximum expropriation $\lambda^{\max} N\tau y$, he obtains payoff $0.5y + \lambda^{\max} N\tau y$. Thus, the minimum threshold $\lambda^{\min}$ that can be sustained in equilibrium can be described implicitly as follows:

$$0.5y + \lambda^{\max} N\tau y = y + \lambda^{\min} N\tau y + \epsilon. \tag{14}$$

A.2 Proof of Proposition 2

Assume that n voters receive a payment g, where $n \notin \{N/2, (N+1)/2, (N-1)/2\}$. In the equilibria we consider, no voter is pivotal; accordingly, no voter has a gainful deviation from the equilibrium λ. For the politician, the payment enters additively in the utility function. Accordingly, the same analysis as in the proof to Proposition 1 yields the following result.

$$\lambda^{\min} = \lambda^{\max} - \frac{0.5y + \epsilon}{N\tau y}. \tag{15}$$

A.3 Pivotality

Consider the case in which the number of payments $n = 3$ is such that a simple majority is formed by the voters who receive payments. Any of these three voters is pivotal, because a choice by any single voter to lower his reelection threshold leads to a new equilibrium threshold above which the politician is removed from office. For some threshold λ, a pivotal voter would prefer to lower his threshold if the cost he pays for removing the politician, κy, is lower than the difference between the inequality aversion components of utility with and without removal.

$$h\left(\frac{N-1}{N}\lambda\tau y - \frac{N-n+1}{N}g - \frac{(0.5-\kappa)\,y}{N}\right) - h\left(\frac{N-1}{N}\lambda\tau y - \frac{N-n+1}{N}g + \frac{\epsilon}{N}\right) > \kappa y.$$

As $h(\cdot)$ is a convex function, there exists a threshold $\overline{\beta}$ such that the above inequality holds for $\beta < \overline{\beta}$ (and therefore $\lambda > \lambda\left(\overline{\beta}\right)$). Thus, for low values of β, an observed change

in a voter's choice of λ may be capped by hitting the threshold $\lambda\left(\overline{\beta}\right)$. If this upper cap is not reached, then the voter's behavior should be the same as for a non-pivotal voter; however, if the cap is reached, pivotality reduces the observed change in λ conditional on receipt of a payment.

A.4 Proof of Proposition 3

First, we impose the following assumption throughout the analysis.

$$h'\left(\lambda^{\max}\tau\left(N+1\right)y-0.5y+\kappa y\right)<\frac{N}{N+1}. \tag{16}$$

Second, we note that the reciprocity component of the utility functions is irrelevant in this case, since no payments are distributed or expected. Accordingly, if the politician chooses to expropriate fraction λ_p, his utility is given by

$$\begin{aligned} u_p &= 0.5y+\lambda_p\tau Ny+\rho\left(0.5y+\epsilon\right) && (17)\\ &\quad -h\left(\left|\lambda_p\tau\left(N+1\right)y+\epsilon-\left(1-\rho\right)\left(0.5y+\epsilon-\kappa y\right)\right|\right). && (18)\end{aligned}$$

Consider the case in which $\rho=1$ (i.e., the politician is reelected). Then, the difference between the politician's payoff and the average voter payoff equals $\lambda_p\tau\left(N+1\right)y+\epsilon>0$. Therefore, the politician is always better off than the average voter. If $\rho=0$ (i.e., the politician is not reelected), the politician is better off than the average voter if the following condition holds.

$$\lambda_p\tau\left(N+1\right)\geq 0.5-\kappa y, \tag{19}$$

In other words, the politician is better off whenever the level of expropriation is sufficiently high.

$$\lambda_p\geq\frac{0.5-\kappa}{\tau\left(N+1\right)}. \tag{20}$$

If this condition is not satisfied, the politician who fails to win reelection is worse off than the average voter.

Case 1. If condition (20) holds, then the first-order condition for λ_p in the politician's problem is given by

$$N-\left(N+1\right)\cdot h'\left(\left(\lambda_p\tau\left(N+1\right)-0.5+\kappa\right)y\right)\geq 0. \tag{21}$$

Under the assumption described in (16), the optimal expropriation fraction chosen by the politician is $\lambda^{\max}$.

If the voters impose the reelection threshold $\lambda_p^*>0$, and the politician expropriates

exactly λ_p^*, he obtains utility

$$u_p = y + \lambda_p^* \tau N y + \epsilon - h\left(\lambda_p^* \tau \left(N+1\right) y + \epsilon\right), \tag{22}$$

If the politician deviates, he obtains utility

$$u_p^{dev} = 0.5y + \lambda^{\max} \tau N y - h\left(\lambda^{\max} \tau \left(N+1\right) y - 0.5y + \kappa y\right). \tag{23}$$

Therefore, the minimum sustainable value of λ_p^* is described implicitly by

$$\begin{aligned} \lambda_p^* \tau N y - h\left(\lambda_p^* \tau \left(N+1\right) y + \epsilon\right) &= \lambda^{\max} \tau N y - 0.5y - \epsilon \\ &\quad - h\left(\lambda^{\max} \tau \left(N+1\right) y - 0.5y + \kappa y\right). \end{aligned} \tag{24}$$

Since $\tau N y \lambda^{\min} = \lambda^{\max} \tau N y - 0.5y - \epsilon$, equation (24) implies

$$\lambda_p^* \tau N y - h\left(\lambda_p^* \tau \left(N+1\right) y + \epsilon\right) = \tau N y \lambda^{\min} - h\left(\tau N y \lambda^{\min} + \epsilon + \lambda^{\max} \tau y + \kappa y\right). \tag{25}$$

Given the assumption described in (16), if $\lambda_p^* \geq \lambda^{\min}$, then

$$\begin{aligned} \lambda_p^* \tau N y - h\left(\lambda_p^* \tau \left(N+1\right) y + \epsilon\right) &\geq \tau N y \lambda^{\min} - h\left(\tau N y \lambda^{\min} + \epsilon\right) \\ &> \tau N y \lambda^{\min} - h\left(\tau N y \lambda^{\min} + \epsilon + \lambda^{\max} \tau y + \kappa y\right). \end{aligned} \tag{26}$$

Thus, it must be the case that $\lambda_p^* < \lambda^{\min}$.

Case 2. If condition (20) does not hold, the first-order condition for λ_p in the politician's problem is described by

$$N + \left(N+1\right) \cdot h'\left(\left(0.5 - \kappa - \lambda_p \tau \left(N+1\right)\right) y\right) \geq 0, \tag{27}$$

This equation implies that the politician would like to choose λ_p such that condition (20) does in fact hold. Hence, this case cannot be observed.

Since the reciprocity component is zero in the voters' utility, no voter is pivotal. Therefore, no voter has a profitable deviation from the equilibrium at λ_p^*.

A.5 Proof of Proposition 4

Part 1. For the politician's problem, the reciprocity component of preferences is irrelevant. Accordingly, the politician's choice is the same as described in the proof to Proposition 3: the politician does not deviate if the threshold played satisfies $\lambda_p \in \left[\lambda_p^*, \lambda^{\max}\right]$.

Consider a given threshold $\lambda_p \in \left[\lambda_p^*, \lambda^{\max}\right]$ played in equilibrium. For voter i, a

deviation from λ_p to some λ_i is profitable if

$$u_i(\lambda_p) < u_i(\lambda_i). \tag{28}$$

In the equilibria we consider, no voter is pivotal, and thus a single deviation to λ_i does not change the voting outcome. Accordingly, for voter i, λ_p is sustainable in equilibrium if and only if $\lambda_p = \arg\max_{\lambda_i} f(\Delta\lambda_i \cdot \Delta g_i|\gamma)$. Then, for the voter who receives a payment, the sustainable threshold is $\lambda_{i,g}^{RI}$, and for the voter who does not receive a payment, the sustainable threshold is $\lambda_{i,ng}^{RI}$. The only equilibrium is therefore the one in which payment non-recipients select $\lambda_{i,ng}^{RI}$, and payment recipients select $\lambda_{i,g}^{RI}$.

Part 2. Given the voter thresholds that are sustainable in equilibrium, it follows that the politician selects the same threshold as the majority of voters: $\lambda_{i,ng}^{RI}$ if $n < (N+1)/2$ and $\lambda_{i,g}^{RI}$ if $n > (N+1)/2$.

Part 3. Absent any payments, the set of equilibrium thresholds is $[\lambda_p^*, \lambda_p^{\max}]$. Thus,

$$\lambda^e = \frac{\lambda^{\max} + \lambda_p^*}{2}. \tag{29}$$

From equation (24),

$$\frac{d\lambda_p^*}{dn} = \frac{\left(\tau(N+1)y - \frac{g}{N}\right)h'(A) + \frac{g}{N}h'(B)}{\tau N y} > 0, \tag{30}$$

where $A = \lambda_p^*\tau(N+1)y + \epsilon - \frac{n}{N}g$ and $B = \lambda^{\max}\tau(N+1)y - 0.5y + \kappa y - \frac{n}{N}g$. This implies

$$\frac{d\lambda^e}{dn} > 0. \tag{31}$$

In the unique equilibrium, the payment non-recipients choose

$$\lambda_{i,ng}^{RI} = \arg\max_{\lambda_i} f((\lambda_i - \lambda^e)\cdot(-ng/N)|\gamma). \tag{32}$$

Given the properties of the function $f(\cdot)$, for $\Delta g = -ng/N < 0$ the maximum is achieved at $\Delta\lambda = \lambda_i - \lambda^e < 0$, and thus $\lambda_i < \lambda^e$. An increase in n implies Δg decreases and λ^e increases. Applying the Envelope Theorem to (32), the partial effect on $\Delta\lambda$ of increasing n coming through Δg equals

$$\frac{\partial \Delta\lambda_{i,ng}^{RI}}{\partial \Delta g}\left(-\frac{g}{N}\right) = \frac{\partial \lambda_{i,ng}^{RI}}{\partial \Delta g}\left(-\frac{g}{N}\right)$$
$$= \frac{g}{N}\frac{\partial^2 f\left(\left(\lambda_{i,ng}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\lambda\partial\Delta g}\left(\frac{\partial^2 f\left(\left(\lambda_{i,ng}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\lambda^2}\right)^{-1} < 0. \quad (33)$$

The effect of n increasing on λ^e is given by

$$\frac{\partial\lambda^e}{\partial n} = \frac{1}{2}\frac{\partial\lambda_p^*}{\partial n} > 0. \quad (34)$$

Thus, the overall effect of n on $\left(\lambda_{i,ng}^{RI}-\lambda^e\right)$ is negative if

$$\frac{g}{N}\frac{\partial\Delta\lambda_{i,ng}^{RI}}{\partial\Delta g} > \frac{\partial\lambda^e}{\partial n}, \quad (35)$$

so if

$$-\frac{g}{N}\frac{\frac{\partial^2 f\left(\left(\lambda_{i,ng}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\Delta g\partial\lambda}}{\frac{\partial^2 f\left(\left(\lambda_{i,ng}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\lambda^2}} > \frac{\alpha\left[\left(\tau\left(N+1\right)y-\frac{g}{N}\right)h'\left(A\right)+\frac{g}{N}h'\left(B\right)\right]}{2\tau N y} \quad (36)$$

Since $\alpha h'\left(A\right)$ and $\alpha h'\left(B\right)$ are bounded above by $\frac{N}{N+1}$, as per (16), a sufficient condition for this inequality to hold is that

$$\frac{g}{N}\frac{\partial^2 f\left(\left(\lambda_{i,ng}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\Delta g\partial\lambda} > \frac{1}{2}\left(-\frac{\partial^2 f\left(\left(\lambda_{i,ng}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\lambda^2}\right). \quad (37)$$

In the unique equilibrium, the gift recipients choose

$$\lambda_{i,g}^{RI} = \arg\max_{\lambda_i} f\left(\left(\lambda_i-\lambda^e\right)\cdot\left(\frac{N-n}{N}g\right)|\gamma\right). \quad (38)$$

Given the properties of the function $f(\cdot)$, for $g-ng/N>0$ the maximum is achieved at $\Delta\lambda>0$, so $\lambda_{i,g}^{RI}>\lambda^e$. An increase in n implies $g-ng/N$ decreases and λ^e increases. Applying the Envelope Theorem to (38)

$$-\frac{g}{N}\frac{\partial\Delta\lambda_{i,g}^{RI}}{\partial\Delta g} = -\frac{g}{N}\frac{\partial\lambda_{i,g}^{RI}}{\partial\Delta g}$$
$$= \frac{g}{N}\frac{\partial^2 f\left(\left(\lambda_{i,g}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\Delta g\partial\lambda}\left(\frac{\partial^2 f\left(\left(\lambda_{i,g}^{RI}-\lambda^e\right)\cdot\Delta g|\gamma\right)}{\partial\lambda^2}\right)^{-1} < 0. \quad (39)$$

The overall effect of n on $\left(\lambda_{i,g}^{RI}-\lambda^{e}\right)$ is positive if

$$\frac{g}{N}\frac{\partial\Delta\lambda_{i,g}^{RI}}{\partial\Delta g}<\frac{\partial\lambda^{e}}{\partial n}, \tag{40}$$

thus if

$$-g\frac{\frac{\partial^{2}f\left(\left(\lambda_{v,g}^{RI}-\lambda^{e}\right)\cdot\Delta g|\gamma\right)}{\partial\Delta g\partial\lambda}}{\frac{\partial^{2}f\left(\left(\lambda_{v,g}^{RI}-\lambda^{e}\right)\cdot\Delta g|\gamma\right)}{\partial\lambda}}<\frac{\alpha\left[\left(\tau\left(N+1\right)y-\frac{g}{N}\right)h'\left(A\right)+\frac{g}{N}h'\left(B\right)\right]}{2\tau y}. \tag{41}$$

By Jensen's inequality,

$$\begin{aligned}&\left(\tau\left(N+1\right)y-\frac{g}{N}\right)h'\left(A\right)+\frac{g}{N}h'\left(B\right)\\ >\;&\tau\left(N+1\right)yh'\left(\left(1-\frac{g}{N\tau\left(N+1\right)y}\right)A+\frac{g}{N\tau\left(N+1\right)y}B\right),\end{aligned} \tag{42}$$

we obtain a sufficient condition for equation (41) to hold.

$$g\frac{\partial^{2}f\left(\left(\lambda_{v,g}^{RI}-\lambda^{e}\right)\cdot\Delta g|\gamma\right)}{\partial\Delta g\partial\lambda}<-\frac{\partial^{2}f\left(\left(\lambda_{v,g}^{RI}-\lambda^{e}\right)\cdot\Delta g|\gamma\right)}{\partial\lambda^{2}}\frac{\left(N+1\right)}{2}\alpha h'\left(C\right), \tag{43}$$

where $C\equiv\left(1-\frac{g}{N\tau(N+1)y}\right)A+\frac{g}{N\tau(N+1)y}B$.

From equations (36) and (41), it follows that payment recipients increase their thresholds as n increases and gift non-recipients decrease their threshold as n increases if

$$\frac{g}{N}\frac{\partial\Delta\lambda_{i,g}^{RI}}{\partial\Delta g}<\frac{\partial\lambda^{e}}{\partial n}<\frac{g}{N}\frac{\partial\Delta\lambda_{i,ng}^{RI}}{\partial\Delta g}.$$

All voters increase their thresholds if $\max\left\{\frac{g}{N}\frac{\partial\Delta\lambda_{i,g}^{RI}}{\partial\Delta g},\frac{g}{N}\frac{\partial\Delta\lambda_{i,ng}^{RI}}{\partial\Delta g}\right\}<\frac{\partial\lambda^{e}}{\partial n}$, and all voters decrease their thresholds if $\frac{\partial\lambda^{e}}{\partial n}<\min\left\{\frac{g}{N}\frac{\partial\Delta\lambda_{i,g}^{RI}}{\partial\Delta g},\frac{g}{N}\frac{\partial\Delta\lambda_{i,ng}^{RI}}{\partial\Delta g}\right\}$.

A.6 Proof of Proposition 5

Applying the Envelope Theorem to the voter's maximization problem, we obtain

$$\frac{\partial\lambda_{i}}{\partial\gamma}=-\frac{\partial f\left(\Delta\lambda\cdot\Delta g|\gamma\right)}{\partial\lambda\partial\gamma}\left(\frac{\partial^{2}f\left(\Delta\lambda\cdot\Delta g|\gamma\right)}{\partial\lambda^{2}}\right)^{-1} \tag{44}$$

Accordingly, $\frac{\partial\lambda_{i}}{\partial\gamma}\leq(\geq)0$ if $\Delta\lambda<(>)0$.

A.7 Proof of Proposition 6

The increase in $\lambda^{\max}$ implies

$$\frac{\partial \lambda^{\min}}{\partial \lambda^{\max}} = 1, \frac{\partial \lambda^{e}}{\partial \lambda^{\max}} = 1. \tag{45}$$

Thus, applying the Envelope Theorem to the voter's maximization problem, we obtain

$$\begin{aligned} \frac{\partial \lambda_i}{\partial \lambda^{\max}} &= -\frac{\partial f\left(\Delta\lambda \cdot \Delta g|\gamma\right)}{\partial \lambda \partial \lambda^{e}} \left(\frac{\partial^2 f\left(\Delta\lambda \cdot \Delta g|\gamma\right)}{\partial \lambda^2}\right)^{-1} \\ &= \frac{\partial f\left(\Delta\lambda \cdot \Delta g|\gamma\right)}{\partial \lambda^2} \left(\frac{\partial^2 f\left(\Delta\lambda \cdot \Delta g|\gamma\right)}{\partial \lambda^2}\right)^{-1} \\ &= 1 \end{aligned} \tag{46}$$

Accordingly, $\lambda^{RI}_{i,ng}$ and $\lambda^{RI}_{i,g}$ both increase.

A.8 Proof of Proposition 7

The utility of the politician is described by

$$\begin{aligned} u_p &= 0.5y + \lambda_p \tau N y + \rho\left(0.5y + \epsilon\right) \\ &\quad -h\left(\left|\lambda_p \tau\left(N+1\right)y + \epsilon - ng - \left(1-\rho\right)\left(0.5y + \epsilon - \kappa y\right)\right|\right) \end{aligned} \tag{47}$$

The analysis is analogous to the proof of Proposition 3, and it immediately implies that the minimum sustainable threshold λ_p^{**} is described implicitly by

$$\begin{aligned} \lambda_p^{**}\tau N y - h\left(\lambda_p^{**}\tau\left(N+1\right)y + \epsilon - ng\right) &= \lambda^{\max}\tau N y - 0.5y - \epsilon \\ &\quad -h\left(\lambda^{\max}\tau\left(N+1\right)y - ng - 0.5y + \kappa y\right) \end{aligned} \tag{48}$$

Given assumption (16), and $ng > 0$, it follows that $\lambda_p^{*} > \lambda_p^{**}$.

B Additional models of preferences

B.1 Self-interest and reciprocity only

Given preferences that exhibit self-interest and reciprocity only, the utility of each voter i can be written as follows:

$$u_i = E_i + g_i + f\left(\Delta\lambda_i \cdot \Delta g_i|\gamma\right). \tag{49}$$

The properties of the function $f(\cdot)$ are described in the main text. Below, we provide an example of a function that satisfies the required properties:

$$f\left(\Delta\lambda_i \cdot \Delta g_i|\gamma\right) = -\frac{1}{\gamma}\left(\Delta\lambda_i \cdot \Delta g\right)^2 + \Delta\lambda_i \cdot \Delta g. \tag{50}$$

Figure B1 illustrates this example function.

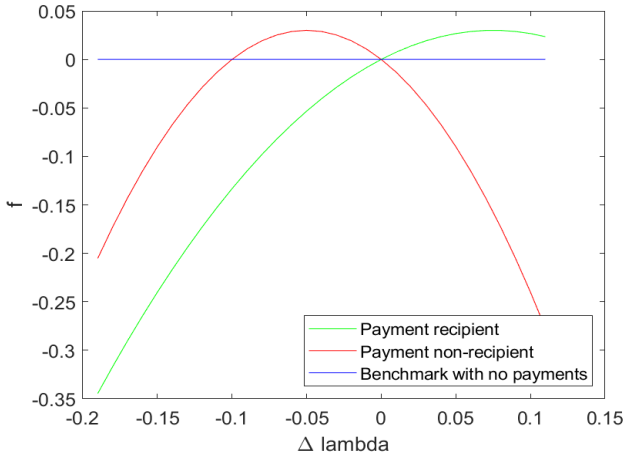


Figure B1: Illustration of the reciprocity component of the utility function given $\gamma = 0.12$.

We consider first the equilibrium without payments.

Proposition 8 *Given fixed β and subject preferences characterized by self-interest in conjunction with reciprocity, there exists a unique pure strategy Nash Equilibrium identical to the equilibrium described in Proposition 1.*

Proof. Without gifts, $\Delta g_i = 0$ and thus $f\left(\Delta\lambda_i \cdot \Delta g_i|\gamma\right) = 0$. ■

Next, we analyze the introduction of payments.

Proposition 9 *(Effect of payments) Given fixed β and preferences characterized by self-interest in conjunction with reciprocity, introducing payments generates the following effects.*

1. *(Effect of payments) There exists a unique pure strategy Nash Equilibrium identical to the equilibrium described in Proposition 4.*
2. *(Effect of increasing n) Increasing the number of payments n decreases the equilibrium thresholds $\lambda_{i,ng}^{RI}$ and $\lambda_{i,g}^{RI}$.*

Proof. The proof of the first part of the proposition (effect of payments) is analogous to the proof of Proposition 4. For the proof of the second part of the proposition, we note that as shown in the proof to Proposition 4,

$$\frac{\partial \Delta \lambda_i^{RI}}{\partial \Delta g}\left(-\frac{g}{N}\right) = \frac{\partial \lambda_i^{RI}}{\partial \Delta g}\left(-\frac{g}{N}\right) < 0, \tag{51}$$

where $\lambda_i^{RI} \in \left\{\lambda_{i,g}^{RI}, \lambda_{i,ng}^{RI}\right\}$ and

$$\frac{\partial \lambda^e}{\partial n} = 0. \tag{52}$$

Thus, the overall effect of n on $\left(\lambda_{i,ng}^{RI} - \lambda^e\right)$ and $\left(\lambda_{i,ng}^{RI} - \lambda^e\right)$ is negative. ■

B.2 Self-interest and inequality aversion only

Given preferences that exhibit self-interest and inequality aversion only, the utility of each voter i can be written as follows:

$$u_i = E_i + g_i - h\left(\left|E_i + g_i - \frac{1}{N}\sum_{j \neq i}\left(E_j + g_j\right)\right|\right), \tag{53}$$

where the properties of the function $h(\cdot)$ are described in the main text. We again consider first the equilibrium without payments.

Proposition 10 *Given fixed β and subject preferences characterized by self-interest in conjunction with inequality aversion, there exists a unique pure strategy Nash Equilibrium identical to the equilibrium described in Proposition 3.*

Proof. The analysis is the same as in the proof to Proposition 3. ■

Next, we analyze the introduction of payments.

Proposition 11 *Given fixed β and preferences characterized by self-interest in conjunction with inequality aversion, introducing payments generates the following effects.*

1. *(Effect of payments) There exists a unique pure strategy Nash Equilibrium in which the politician expropriates fraction λ_p of the treasury and voters set the reelection threshold at $\lambda_i = \lambda_p \in \left[\lambda_p^{**}, \lambda^{\max}\right]$, where $\lambda_p^{**} > \lambda_p^*$. The thresholds chosen by subjects who do and do not receive payments are identical.*

2. *(Effect of increasing n) Given a fixed β, increasing the number of payments n increases the equilibrium threshold λ_p.*

Proof.

Part 1. If the politician chooses to expropriate a fraction λ_p, his utility is given by

$$\begin{aligned} u_p &= 0.5y + \lambda_p \tau N y + \rho\left(0.5y + \epsilon\right) \\ &\quad -h\left(\left|\lambda_p \tau\left(N+1\right) y + \epsilon - \left(1-\rho\right)\left(0.5y + \epsilon - \kappa y\right) - ng\right|\right). \end{aligned} \tag{54}$$

Consider the case in which $\rho = 1$ (i.e., the politician is reelected). Then, the difference between the politician's payoff and the average voter payoff equals $\lambda_p \tau\left(N+1\right) y + \epsilon > 0$. Therefore, the politician is always better off than the average voter. If $\rho = 0$ (i.e., the politician is not reelected), the politician is better off than the average voter if

$$\lambda_p \tau\left(N+1\right) \geq 0.5 - \kappa y + ng, \tag{55}$$

In other words, the politician is better off whenever the level of expropriation is sufficiently high:

$$\lambda_p \geq \frac{0.5 - \kappa + ng}{\tau\left(N+1\right)}. \tag{56}$$

If this condition is not satisfied, the politician who fails to win reelection is worse off than the average voter.

Case 1. If condition (56) holds, then the first-order condition for λ_p in the politician's problem is given by

$$N - \left(N+1\right) \cdot h'\left(\left(\lambda_p \tau\left(N+1\right) - 0.5 + \kappa\right) y - ng\right) \geq 0. \tag{57}$$

Under (16), the optimal expropriation fraction chosen by the politician is $\lambda^{\max}$. If the voters keep the politician at threshold $\lambda_p^{**} > 0$, and the politician expropriates exactly λ_p^{**}, he obtains utility:

$$u_p = y + \lambda_p^{**} \tau N y + \epsilon - h\left(\lambda_p^{**} \tau\left(N+1\right) y + \epsilon - ng\right), \tag{58}$$

while if the politician deviates, he obtains utility

$$u_p^{dev} = 0.5y + \lambda^{\max} \tau N y - h\left(\lambda^{\max} \tau\left(N+1\right) y - 0.5y + \kappa y - ng\right). \tag{59}$$

Therefore, the minimum sustainable value of λ_p^* is described implicitly by

$$\begin{aligned} \lambda_p^{**} \tau N y - h\left(\lambda_p^{**} \tau\left(N+1\right) y + \epsilon - ng\right) &= \lambda^{\max} \tau N y - 0.5y - \epsilon \\ &\quad -h\left(\lambda^{\max} \tau\left(N+1\right) y - 0.5y + \kappa y - ng\right) \end{aligned} \tag{60}$$

Equation (60) along with assumption (16) and the convexity of $h(\cdot)$ implies $\lambda_p^{**} > \lambda_p^*$.

Case 2. If condition (56) does not hold, the first-order condition for λ_p in the politician's problem is described by

$$N + (N+1) \cdot h'\left((0.5 - \kappa - \lambda_p \tau (N+1)) y - ng\right) \geq 0, \tag{61}$$

This equation implies that the politician would like to choose λ_p such that condition (56) holds. Hence, this case cannot be observed.

Since no voter is pivotal, no voter has a profitable deviation from the equilibrium at λ_p^{**}.

Part 2. From equation (60),

$$\frac{\partial \lambda_p^{**}}{\partial n} > 0, \tag{62}$$

and therefore $\lambda(\beta) = \beta \lambda_p^{**} + (1-\beta)\lambda^{\max}$ increases in n. ■

C Subject compensation

As an example of how subject compensation was calculated, consider a session with two game rounds: the voting game without payment, and the voting game with four payments. In each round, subjects specify their choices as both voters and politicians without any information about other subjects' choices. At the conclusion of the session, subjects receive the following information.

1. The game round randomly chosen as the basis of payment: either the voting game without payment, or the voting game with payment.

2. The game role to which they were randomly assigned: a politician, a voter who did receive a payment, or a voter who did not receive a payment.[30]

3. The game outcome: how much the politician expropriated, subjects' reelection thresholds, and whether the politician was reelected. (For subjects selected to receive payments, the thresholds they specified conditional on payment are used to determine whether the politician is reelected. For subjects not selected to receive payments, the thresholds they specified unconditional on payment are employed.)

4. Subjects are then informed of their individual earnings, and receive payment.

[30] In experimental sessions with more than six subjects, subjects were randomly constituted into polities of six prior to randomly assigning game roles.

Total time required for the game session was around 90 minutes in the U.S. and 180 minutes in Kenya. In the U.S., subjects were paid in cash at the conclusion of the game; payments were distributed in envelopes to maintain confidentiality and ensure that subjects could not compare their payoffs. In Kenya, subjects received at the conclusion of the session the show-up fee of 200 Ksh in cash as well as a bonus of 50 Ksh if they arrived on time or early on the day of the experimental sessions. The full payoff from their choices in the experimental session was subsequently distributed (within 1-2 days) via the electronic money transfer system Mpesa.

D Structure of social preference games

In the first part of the experimental session, social games, subjects were informed they possessed a hypothetical endowment in the dictator game E_d and allowed to freely choose how much to send to another, unidentified, subject. Next, they were provided with a (different) hypothetical endowment for the trust game, E_t, and they could choose whether to send E_t or zero to another, unidentified subject; they were advised that this amount would be tripled, and the recipient would then have the opportunity to choose how much to return to the sender. Subjects were allowed to specify their behavior as both senders and receivers. They were also asked to estimate how much, on average, subjects would send in both the dictator and trust games.

Finally, they were provided with a new hypothetical endowment in the ultimatum game, E_u, and were asked to specify how much they would propose to send to a partner, and the minimum amount they would accept when sent by a partner. The ultimatum game was implemented only in 2014.

In games conducted in 2014 and 2015 in the U.S., the trust game was implemented with a larger set of choices: the subject could choose to send any integer amount of the endowment ($4) to the partner; this amount was again tripled. The subject could then specify how much of the endowment he would return if he received each hypothetical level of transfer.

E Comparing game sessions in the U.S. and Kenya

The relative ratios of key game parameters were maintained fixed across experimental sessions in the U.S. and Kenya to ensure that the choices faced by subjects were uniform. The voter endowment, y, was set to be $20 in the U.S. and 500 shillings (approximately $5.80) in Kenya. Thus all parameters in the voting game in the U.S. can be multiplied by 25 to yield the corresponding parameter (in shillings) in Kenya.

Half of the endowment was taxed away, and 30% of tax revenue was vulnerable to expropriation. Accordingly, the common treasury was equal to 15% of the total endowment of the five voters, $15 in the U.S. and 350 shillings in Kenya. The politician's salary was also $20 shillings or 500 shillings, of which half was forfeited if the politician was not reelected.

Vote payments were 10% of the voters' endowment: $2 in the U.S. and 50 shillings in Kenya. The reelection bonus was set to be between 0 and 10% of the politician's salary, again $2 in the U.S. and 50 shillings in Kenya. Subjects were not informed of the distribution of the reelection bonus, but were simply informed that it was a positive amount between 0 and the specified upper limit.[31]

In determining subject earnings in Kenya relative to the U.S., the objective was threefold: first, to comply with the Busara lab's policies on minimum subject payments, which is around $3-$6 for a (maximum) four-hour experimental session, depending on the distance traveled by subjects; second, to ensure that incentives in the game (particularly the vote payment) were large enough to be salient to the subjects; and third, to maximize the subject pool relative to available funds. The subject pool at Busara is predominantly drawn from nearby informal settlements, particularly the Kibera slum, where 50 shillings is the price of a bag of maize flour or one-way transportation to the city center; 50 shillings is also the lowest available denomination of paper money. Accordingly, this was viewed as an important psychological break point above which a payment would be regarded as significant, and all other game parameters were set relative to this minimum vote payment.

Recruitment in each experimental site employed the labs' centralized database. In the U.S., subjects were contacted by email with information about the study and an invitation to sign up; in Kenya, they were contacted by text message. In both cases, the experimental session was described as focusing on political behavior. Subjects could sign up on-line (in the U.S.) or by text message (in Kenya). In the event the number of subjects who showed up for a particular session was not divisible by six (the polity size), excess subjects were paid the show-up fee and invited to sign up again.

There were, however, some minor differences in the structure of the U.S. and Kenya sessions. These differences were largely dictated by the requirements of adopting a relatively complex game protocol to accommodate a population with more limited literacy and numeracy in Kenya. Differences in the game session are described in the order in which activities were conducted.

[31] In both cases, the reelection bonus was chosen from a uniform distribution between 0 and the upper limit, rounded to the nearest $.25 in the U.S. and the nearest 10 shillings in Kenya.

E.1 Social games

In the U.S., the dictator endowment E_d was equal to \$10, the trust endowment E_t was equal to \$4, and the ultimatum game endowment was equal to \$10; in Kenya, the comparable magnitudes were 100 Ksh, 40 Ksh, and 120 Ksh. Thus while the relative endowments in the trust and dictator games are comparable across U.S. and Kenya, the ratio of the endowment in the social games to the voter's endowment in the subsequent voting game is lower in Kenya. This choice was made primarily to maximize the sample size given budget constraints, and is presumed to have limited relevance given that subjects have no information about the voting game at this point in the experimental session.[32]

In both the U.S. and Kenya, subjects were required to choose an amount that was an integer (in the U.S.) or divisible by 10 (in Kenya), i.e. the choice was not fully continuous. Subjects in the U.S. inputted their choice directly, while Kenyan subjects selected a button from an interactive touch screen.

In the U.S., subjects were not paid on the basis of their choices in social games. In Kenya, subjects were paid on the basis of their choices in this game; they were randomly assigned to one of four or six roles (dictator sender, dictator receiver, trust sender, or trust receiver in 2013, and dictator sender, dictator receiver, trust sender, trust receiver, ultimatum sender, or ultimatum receiver in 2014) and paid their earnings from that role. They also received 50 Ksh bonuses if they correctly estimated the average amount sent in the dictator and trust games.

E.2 Introduction to the voting game

Subjects in the U.S. and Kenya were not provided with identical introductory materials and comprehension questions. In the U.S., subjects began with an overview of the game described on screen in the experimental terminal. They answered simple questions about the game structure, and were then asked to consider a number of game scenarios, identify whether or not the politician would be reelected in that scenario, and calculate the associated payoffs. After each set of comprehension questions, they were shown the correct responses and were required to remain on the associated screen for a minimum of sixty seconds. Subjects were also provided with a scripted oral explanation of the game and an explanatory graphic. While they were free to pose questions directly to the supervising research staff, they were not required to interact with anyone else.

In Kenya, information was provided primarily orally and graphically given the more limited literacy of the subject population. While the same comprehension questions about basic game structure were employed, subjects were not asked to calculate a full set of

[32]The endowment in the ultimatum game is also slightly higher in Kenya.

payoffs given specific scenarios. The focus in comprehension questions was clarifying the structure of the payoffs, the available choices faced by both voters and politicians, and the use of a majority vote in determining reelection outcomes. Subjects were also asked to calculate how much would be redistributed to voters given various expropriation choices by the politician.

All comprehension questions were posed using multiple-choice touch screens. If a subject answered a question incorrectly, a supervising staff member was required to unlock the screen in order to allow the subject to make a new selection, and would use this opportunity to discuss the question and clarify any misconceptions. Ultimately, the number of incorrect choices made by the subject prior to the correct choice was recorded. The written explanatory materials were provided in English, as this is standard practice in the laboratory, and subjects would have been exposed to English-language instruction in school. However, staff members could speak Swahili in providing explanations as necessary.

E.3 Voting game without payments

The only difference between the voting game without payments as played by the subjects in the U.S. and Kenya was in the specification of the choice made by the voter and the politician. As described above, in the U.S., subjects could specify the maximum amount they would allow the politician to expropriate and still reelect him/her, naming any integer between 0 and $15, inclusive. Similarly, they could specify the amount that they would expropriate as the politician.

In Kenya, subjects were asked to respond to a series of questions inquiring whether or not they would vote to reelect a politician who expropriated a specified amount: 0, 75, 150, 250, 300, and 375 Ksh. As politicians, they were allowed to choose how much to expropriate from the same set of choices. The reason for this alternate design, particularly for the voters' decision, was to increase comprehension by presenting the voters with a series of binary choices. These responses are employed to construct a variable corresponding to the subject's maximum threshold for reelection that is equal to the median of the maximum threshold at which the subject stated he would reelect and the minimum threshold at which he stated he would not reelect: for example, the reelection threshold for a subject who would reelect a politician who expropriated 75 shillings, but not a politician who expropriated 150 shillings, was set at 112.5 shillings.

E.4 Introduction to voting games with payments

There were no major differences in the overview material and comprehension questions provided here. The same information was delivered on-screen in the U.S. and orally and using graphics in Kenya. The structure of comprehension questions followed the model described above: in the U.S., subjects were required to review the correct answers, while in Kenya, subjects were required to interact with a laboratory staff member following any incorrect response.

E.5 Voting game with payments

Here, subjects again made their choices as voters and as politicians by specifying an integer choice in the U.S. and responding to a series of questions about thresholds in Kenya.

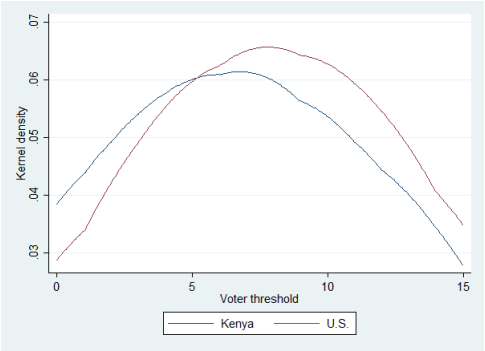
E.6 Questionnaire

The questionnaire was generally parallel in both countries, though slightly shorter in the Kenya sessions given the time required for experimental activities.

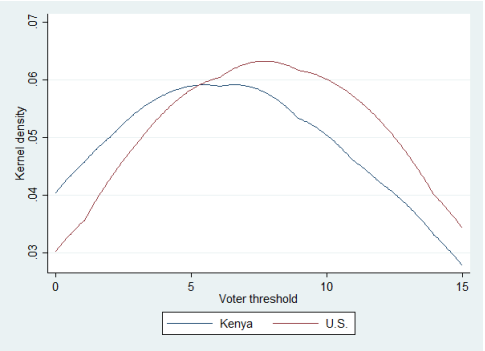
F Appendix Figures and Tables

Figure F1: Subject choices in the U.S. and Kenya

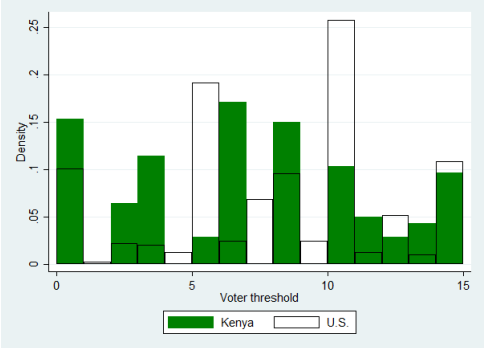
(a) Voters: Simple voting game



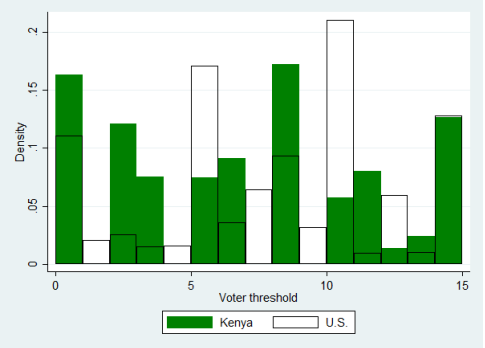
(b) Voters: Full sample



(c) Voters: Simple voting game



(d) Voters: Full sample



Notes: These kernel densities and histograms show the subjects' choice of reelection threshold in the U.S. and Kenya. All subject choices are normalized to lie on the scale employed in the U.S. sessions, from 0 to $15. In Figures F1a and F1c, the sample is restricted to the simple voting game with no payments. Figures F1b and F1d employ data from all game rounds observed.

Table F1: Sessions conducted

Session type	Framing	Round I	Round II	Round III	Location
A1	Public payments	0 payments	1 payment	4 payments	U
A2	Public payments	0 payments	4 payments		K
B1	Public gift	0 payments	1 payment	4 payments	U
B2	Public gift	0 payments	4 payments		K
C1	Limited - prior	0 payments	4 payments	5 payments	U
C2	Limited - prior	0 payments	4 payments		K
D1	Limited - posterior	0 payments	4 payments	5 payments	U
D2	Limited - posterior	0 payments	4 payments		K
E	Big pot	0 payments	5 payments		U, K
F1	Unequal endowments	0 payments ("uneq")	5 payments		U, K
F2	Unequal endowments	0 payments	0 payments ("uneq")	5 payments	U

Notes: There were several aberrations in conducting experimental sessions. In 2013, a session of type A1 in the U.S. was conducted inadvertently omitting the game round with no payments. In 2014, a session of type C1 in the U.S. was conducted inadvertently omitting the game round with four payments. Also in 2014, four sessions including 24 subjects of type F1 in the U.S. were conducted substituting the big pot all payment game for the simple all payment game for game round II. These game rounds were dropped. In addition, politician choices in the unequal endowments sessions are not analyzed.

Table F2: Sample size by session

Session type	Framing	Location	Sessions	Subjects	Subject-game rounds	Subject-decisions	Monotonic only
A1	Public payments	U	8	78	234	378	378
A2	Public payments	K	6	96	192	288	258
B1	Public gift	U	10	102	306	510	510
B2	Public gift	K	6	90	180	270	231
C1	Limited - prior	U	11	66	192	252	252
C2	Limited - prior	K	4	60	120	180	111
D1	Limited - posterior	U	9	60	180	240	240
D2	Limited - posterior	K	4	60	120	180	156
E	Big pot	U, K	13	96	192	192	190
F1	Unequal endowments	U, K	7	60	120	180	162
F2	Unequal endowments	U	8	48	144	192	192
	Total		86	816	1980	**2862**	**2680**

Note: 30 sessions were conducted in 2013, 41 in 2014 and 15 in 2015. 366 subjects were included in experimental sessions in 2013 (180 in the U.S., and 186 in Kenya); 360 subjects were included in experimental sessions in 2014 (180 in the U.S., and 180 in Kenya); and 90 subjects were included in experimental sessions in 2015, all in the U.S.

Table F3: Demographic characteristics of subjects

	U.S. mean	Kenya mean	U.S. obs.	Kenya obs.	p-value
Age	33.46	32.53	444	323	.349
Years of education	15.58	10.55	444	365	.000
Female	.50	.62	443	365	.000
Married	.11	.45	444	365	.000
Voted in last presidential election	.72	.86	425	366	.000
Attempted to persuade others (in same election)	.46	.51	424	366	.202
Attended event in support of candidate (in same election)	.20	.59	426	366	.000
Joined a protest event in last year	.16	.17	426	366	.779

Notes: For each characteristic, the mean is reported by experimental site; the p-value reports a test for equality of the specified covariate comparing across the U.S. and Kenyan sample. 450 subjects are observed in the U.S.; questionnaire data was missing for six subjects, and some subjects failed to provide responses to other questions. 366 subjects are observed in Kenya, but age data for some subjects was missing from the laboratory's subject database.

Table F4: Definition of dummy variables

Session type	Framing	Game round I	Game round II	Game round III	Location
A1	Public payments	All zero	$P^1_{gs} = 1$	$P^4_{gs} = 1$	U
A2	Public payments	All zero	$P^4_{gs} = 1$		K
B1	Public gift	$Gift_{gs} = 1$	$Gift_{gs} = 1$, $P^1_{gs} = 1$	$Gift_{gs} = 1$, $P^4_{gs} = 1$	U
B2	Public gift	$Gift_{gs} = 1$	$Gift_{gs} = 1$, $P^4_{gs} = 1$		K
C1	Limited - prior	$Lim_{gs} = 1$, $Cons_{gs} = 1$	$Lim_{gs} = 1$, $Cons_{gs} = 1$	$All_{gs} = 1$	U
C2	Limited - prior	$Lim_{gs} = 1$, $Cons_{gs} = 1$	$Lim_{gs} = 1$, $Cons_{gs} = 1$		K
D1	Limited - posterior	$Lim_{gs} = 1$	$Lim_{gs} = 1$	$All_{gs} = 1$	U
D2	Limited - posterior	$Lim_{gs} = 1$	$Lim_{gs} = 1$		K
E	Big pot	$Big_{gs} = 1$	$Big_{gs} = 1$, $All_{gs} = 1$		U, K
F1	Unequal endowments	$Ineq_{gs} = 1$	$All_{gs} = 1$		U, K
F2	Unequal endowments	All zero	$Ineq_{gs} = 1$	$All_{gs} = 1$	U

Table F5: Voter behavior - including non-monotonic subjects

	Voter reelection threshold					
	(1)	(2)	(3)	(4)	(5)	(6)
Recipient	.988 (.140)***	.990 (.137)***			.968 (.189)***	.980 (.184)***
Recipient x one payment			.278 (.205)	.278 (.205)		
Recipient x four payments			1.132 (.166)***	1.132 (.166)***		
Payment	-.831 (.196)***	-.803 (.190)***			-.858 (.290)***	-.844 (.267)***
One payment			-.681 (.314)**	-.686 (.254)***		
Four payments			-.887 (.189)***	-.871 (.188)***		
All payments			.507 (.304)*	.645 (.228)***		
Recipient x gift					.045 (.273)	.033 (.271)
Payment x gift					.093 (.387)	.125 (.344)
$\beta_1 + \beta_2$	.157 (.19)	.188 (.188)				
$\beta_1 + \beta_3$			-.403 (.272)	-.408 (.228)*		
$\beta_2 + \beta_4$			.245 (.217)	.261 (.214)		
Sample	Session types A-D					
Mean dep. var.	7.37	7.37	7.37	7.37	7.37	7.37
Fixed effects		Subject		Subject		Subject
Obs.	2298	2298	2298	2298	2298	2298

Notes: The dependent variable is the maximum threshold of expropriation at which the subject will vote to reelect the politician, and the sample includes subjects reporting non-monotonic behavior. The independent variables are a dummy variable for receiving a payment and receiving a payment in a game with one or four payments; the dummy variables for the game including payments or including one or four payments; a dummy for the game including payments for all subjects; the recipient and payment dummies interacted with a dummy for the gift framing; and the all payment dummy interacted with a big pot dummy. $\beta_1 + \beta_2$ reports the sum of the coefficients on recipient and payment. $\beta_1 + \beta_3$ and $\beta_2 + \beta_4$ report the sum of the recipient and payment dummies interacted with the one payment and four payment dummies, respectively.

Fixed effects are as specified in the table; specifications without subject fixed effects include a Kenya dummy, a dummy for ordering of the payment questions, and comprehension index fixed effects. All specifications include standard errors clustered at the experimental session level. Asterisks indicate significance at the ten, five, and one percent level.

Table F6: Voter behavior - high-comprehension sample

	Voter reelection threshold					
	(1)	(2)	(3)	(4)	(5)	(6)
Recipient	.968 (.149)***	1.010 (.145)***			.897 (.191)***	.958 (.186)***
Recipient x one payment			.200 (.239)	.200 (.239)		
Recipient x four payments			1.187 (.171)***	1.187 (.171)***		
Payment	-.706 (.200)***	-.764 (.199)***			-.576 (.264)**	-.694 (.256)***
One payment			-.398 (.286)	-.655 (.272)**		
Four payments			-.808 (.198)***	-.839 (.199)***		
All payments			.365 (.270)	.683 (.227)***		
Recipient x gift					.201 (.298)	.140 (.298)
Payment x gift					-.397 (.413)	-.199 (.402)
$\beta_1 + \beta_2$	.262 (.178)	.246 (.178)				
$\beta_1 + \beta_3$			-.198 (.261)	-.455 (.246)*		
$\beta_2 + \beta_4$			.379 (.199)*	.348 (.199)*		
Sample	Session types A-D					
Mean dep. var.	7.12	7.12	7.12	7.12	7.12	7.12
Fixed effects		Subject		Subject		Subject
Obs.	1966	1966	1966	1966	1966	1966

Notes: The dependent variable is the maximum threshold of expropriation at which the subject will vote to reelect the politician, and the sample is restricted to exclude those subjects scoring in the bottom decile of game comprehension. The independent variables are a dummy variable for receiving a payment and receiving a payment in a game with one or four payments; the dummy variables for the game including payments or including one or four payments; a dummy for the game including payments for all subjects; the recipient and payment dummies interacted with a dummy for the gift framing; and the all payment dummy interacted with a big pot dummy. $\beta_1 + \beta_2$ reports the sum of the coefficients on recipient and payment. $\beta_1 + \beta_3$ and $\beta_2 + \beta_4$ report the sum of the recipient and payment dummies interacted with the one payment and four payment dummies, respectively.

Fixed effects are as specified in the table; specifications without subject fixed effects include a Kenya dummy, a dummy for ordering of the payment questions, and comprehension index fixed effects. All specifications include standard errors clustered at the experimental session level. Asterisks indicate significance at the ten, five, and one percent level.