

# Promises, promises: Vote-buying and the electoral mobilization strategies of non-credible politicians

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## Abstract

Vote-buying is pervasive, but not everywhere. What explains significant variations across countries in the greater use of pre-electoral transfers to mobilize voters relative to the use of pre-electoral promises of post-electoral transfers? This paper explicitly models the trade-offs that politicians incur when they decide between mobilizing support with vote-buying or promises of post-electoral benefits. Politicians rely more on vote-buying when they are less credible, target vote-buying to those who do not believe their political promises, and only buy votes from those who would have received post-electoral transfers in a world of full political credibility. The enforcement of a prohibition on vote-buying reduces the welfare of those targeted with vote-buying, but improves the welfare of all other groups in society.

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## **Promises, promises: Vote-buying and the electoral mobilization strategies of non-credible politicians**

Vote-buying is an archetype of the clientelist exchange of favors between individual politicians and voters (e.g., Kitschelt and Wilkinson 2006). Scholars have long grappled with its modalities, especially with the question of how politicians ensure that citizens deliver the votes that they sell. A prior question has received less attention, however. Under what conditions do politicians prefer pre-electoral clientelist transfers – vote-buying – to promises of post-electoral clientelist transfers? Existing models of political competition do not address this issue. Typically, they assume that voters make their choices based on the pre-electoral (credible) promises of political competitors (ex ante voting rules) or that voters implicitly coordinate on a performance threshold of incumbent performance and re-elect incumbents who meet that threshold (ex post voting rules). The former requires voters to believe politician promises. The latter assumes that voters can coordinate on a performance threshold. By definition, though, vote-buying entails no promises of post-electoral transfers. On the contrary, it appears to thrive in environments where political credibility is absent and voters cannot coordinate.

In the analysis, politicians can compete for voter support by buying their votes before the election and by promising benefits, both targeted transfers and non-targeted public goods, after the election. They face a tradeoff, however, since resources used to buy votes for the current election cannot be used to fulfill promises made in the last election. Keefer and Vlaicu (2008) find that politicians promise larger post-electoral targeted transfers when there are fewer groups to whom they can make credible commitments. The analysis below concludes that they also make larger pre-electoral transfers – vote-buying – when they are less credible. However, the two strategies are in general not interchangeable: politicians do not buy votes from groups to which they can make credible commitments. Moreover, among those groups to which politicians cannot make credible commitments, only some are targeted with vote-buying – and fewer groups are targeted with vote-buying than would be targeted with post-electoral transfers in settings with greater political

credibility.

These conclusions have implications for the welfare and distributional consequences of vote-buying. The analysis supports the conjecture in Kitschelt (2000) that groups targeted with vote-buying would not, in fact, receive government transfers in the event that vote-buying were banned. They are, therefore, net losers if prohibitions on vote-buying are enforced. On the other hand, all others, including groups that are targeted neither for post- nor pre-electoral transfers, unambiguously gain from the elimination of vote-buying. A different concern among policy makers and scholars is the association of corruption and rent-seeking with vote-buying. Keefer and Vlaicu (2008) show that political credibility drives an association between rent-seeking and post-electoral transfers: less credible politicians confront fewer electoral constraints on rent-seeking and greater electoral imperatives to rely on targeted transfers. In the analysis here, we show that the same logic extends to a dynamic setting that allows for pre-electoral transfers (vote-buying).

The next section presents stylized facts regarding vote-buying and reviews previous research analyzing the phenomenon. We then present the model and close with a discussion of different types of evidence in the literature that supports the plausibility of the model's predictions.

## **How does past research explain variations in political reliance on vote-buying?**

In countries where vote-buying is pervasive, pre-electoral transfers to voters are substantial. Across the 17 countries surveyed in the 2005-06 wave of the Afrobarometer survey, 19 percent of more than 20,000 respondents reported that they had been offered a gift in the last election. Brusco et al. (2004) surveyed nearly 2,000 respondents in three Argentine provinces three months after the October 2001 elections. Forty-four percent of respondents said that parties had distributed food, clothing and other items to homes in their neighborhoods; 7 percent of respondents acknowledged

receiving something themselves.<sup>1</sup> Wang and Kurzman (2007) estimate that the costs of vote-buying and all other campaign expenditures associated with the elections of a single county executive in Taiwan, China amounted to at least eight million US dollars. Assuming the costs of this single election were 1 percent of total campaign costs incurred by the Kuomintang across all county and national legislative elections, total campaign costs would have amounted to 3.5 percent of government spending in 1993.<sup>2</sup>

Wurfel (1963) estimated campaign costs in the Philippines elections in the 1950s and in 1961 (Ferdinand Marcos came to power in 1965) at approximately 13 percent of the national budget. A large share of the expenditures went to vote-buying and, as Wurfel (1964) argues, much came from government financing: the incumbent Nacionalistas relied on government financing and the opposition Liberals on private wealth in the 1957 elections. In contrast, OpenSecrets.blog, an activist organization that tracks campaign costs in the United States, estimates that the total costs of the 2008 US elections were a tiny fraction of government spending – \$5.8 billion, half of which they attribute to the presidential race, when general government final consumption expenditure was 17 percent of total national income of approximately \$14.2 trillion. Keefer (2002) reports estimates by highly placed insiders who claimed that presidential campaigns in the Dominican Republic cost at least \$20 million, or \$2.50 per Dominican, compared to approximately \$1.00 per American represented by the \$193 million campaign of George W. Bush in 2000. Adjusted for differences in purchasing power parity-adjusted per capita income, which was more than seven times greater in the United States, the differences were on the order of 18 to one.

The prevalence of vote-buying in some countries relative to others raises the question of why

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<sup>1</sup>Direct (and often illegal) transfers to voters are not the only form of vote-buying. Government spending can also finance vote-buying through the expansion of pre-existing transfer programs or the acceleration of infrastructure projects. It can also finance vote-buying indirectly, as when government-funded infrastructure projects are used to raise money from contractors to finance vote-buying, as in Samuels 2002.

<sup>2</sup>Total costs were likely more, taking into account campaigns for the national legislature that occurred in December 1992. The costs of campaigning in the single county were 248 million Taiwanese dollars. Final government consumption expenditures in 1993 were 971,912 million Taiwanese dollars, according to the National Statistics website, <http://ebas1.ebas.gov.tw/pxweb/Dialog/statfile1L.asp>.

countries vary in the degree to which politicians prefer to mobilize support with pre-electoral transfers rather than promises of post-electoral benefits. One possibility that implicitly emerges from the large literature on clientelism and vote-buying is that vote-buying “contracts” are easier to enforce in some countries than in others. This line of research emphasizes the use of social networks to track voter behavior (e.g., Brusco, et al. 2004, Cruz 2013); carbon paper, cell phones and other modalities that turn the vote-buying transaction into a spot market or simultaneous transaction; or the use of patrons to buy voting blocs whose collective behavior can be observed.

In principle, differences in the prevalence of vote-buying could be traced to cross-country variation in the ability of politicians to use these methods. However, while the literature has not investigated this question, it appears that vote-buying appears to be least prevalent in countries where politicians have the greatest access to technology and data to track individual voters. Finan and Schechter (2012) show that vote-buying may rest on the ability of politicians to target voters who are intrinsically motivated to reciprocate (e.g., by voting as expected); they find evidence that such voters are more likely to be targeted for vote-buying.<sup>3</sup> There is no evidence, however, that countries differ systematically in the ability of politicians to identify intrinsically reciprocal voters. In any case, vote-buying politicians appear to tolerate substantial “leakage” (voters who do not necessarily vote for the politicians who pay them, as in Schaffer 2007).

Dekel, et al. (2008) consider both vote-buying and post-electoral promises, but their focus is on the welfare implications of each rather than on the conditions that promote politician reliance on one mobilization strategy versus the other. They analyze the efficiency and distributional differences between pre-electoral vote-buying, where campaign promises are not possible; and vote mobilization that relies on campaign promises, where pre-electoral vote-buying is not possible. Politicians bid sequentially against each other for voter support rather than make simultaneous offers. In contrast to the analysis below, politicians do not choose whether to buy votes or make

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<sup>3</sup>A similar logic may explain the findings of the field experiment described in Wantchekon (2003), showing that women were less susceptible to clientelist promises than men.

promises; campaign promises are not always credible; and politicians must simultaneously choose their electoral strategies. As in the analysis below, Dekel, et al. (2008) predict that politicians obtain higher rents when electoral competition rests on pre-electoral vote-buying, but the underlying mechanism in their analysis is unrelated to the ability of politicians to make credible commitments.

Dal Bó (2007) is also concerned with normative issues, rather than with the question of why politicians might choose to mobilize support with vote-buying. He focuses on a particular type of vote-buying in which a principal promises to pay committee members contingent on their vote regarding an issue of interest to the principal. Because principals can credibly promise to reward those who vote in their favor and to punish those who do not, their capacity to issue these promises reduces the rents of committee members. The analysis here concerns the efforts of politicians to persuade voters who do not believe their promises and yields the opposite prediction: vote-buying increases the rents of those whose votes are bought relative to what they would have received if vote-buying were not possible.

In contrast to nearly all of the research on clientelism and vote-buying, research on political budget cycles is explicitly concerned with the temporal phenomenon of government spending just prior to elections. As Hanusch and Keefer (2013) argue, in view of the resources dedicated to vote-buying in many countries, vote-buying is likely to play a role in political budget cycles. It is reasonable, therefore, to ask whether the literature on political budget cycles can explain variations across countries in the reliance of politicians on pre-electoral transfers to voters. That literature, unlike the analysis here, emphasizes the role of information asymmetries: in countries where these are greater, political budget cycles – and, implicitly, vote-buying – are likely to be greater.

In much of the political budget cycle literature, the information problem arises because voters are uncertain of politician competence. Politicians can spend resources to demonstrate their competence, but because perceptions shift over time, they undertake this spending just before the election (see Shi and Svensson 2006, Alt and Lassen, 2006a, Saporiti and Streb 2008, and Hanusch 2012 a, b, all drawing on Lohmann, 1998)). Brender and Drazen (2005, p. 1273) argue

that in ‘new’ democracies “fiscal manipulation may work because voters are inexperienced with electoral politics or may simply lack the information needed to evaluate fiscal manipulation that is produced in more established democracies”. Alternatively, as in Brender and Drazen (2007), new democracies are more vulnerable to coups, particularly at election time, so incumbents use election-year spending to convince voters about the ability of elected officials to deliver benefits to them. In Khemani (2004) and Drazen and Eslava (2008), the information problem concerns the identity of pivotal voters, which changes over time. Since politicians do not know who will be pivotal at election time, they wait until close to the election to direct resources to them.

There is little direct qualitative or quantitative evidence for these asymmetries and their contribution to political budget cycles. Shi and Svensson (2006) find that a variable that captures both radio penetration and freedom of broadcasting drives political budget cycles. However, restrictions on broadcaster freedoms may reflect non-informational influences on political incentives to expend resources just before elections. Alt and Lassen (2006 a, b) argue that fiscal transparency mutes political budget cycles. Again, political decisions to ensure transparency may be related to other, non-informational effects.

To explain variations in vote-buying, the analysis below abstracts from informational concerns and focuses instead on the (lack of) credibility of political promises. Previous research supports this focus. Keefer and Vlaicu (2007) argue that variations across countries in the reliance of politicians on post-electoral clientelist transfers can be linked to the inability of politicians to make broadly credible commitments to voters. Their static analysis does not address vote-buying, specifically, however; it examines only on promises of post-electoral transfers. Keefer (2007) attributes the systematically different pattern of government policies in young versus old democracies to the inability of politicians in younger democracies to make credible commitments to voters, and their corresponding greater reliance on clientelist policies. Hanusch and Keefer (2013) find that older political parties moderate political budget cycles. While older parties might be better positioned to solve information problems, they are also more likely to be organized to make credible commit-

ments to voters.

Such evidence is consistent with the prevalence of vote-buying in countries where parties are ephemeral and formed out of the (often temporary) fusion of candidates with their own individual clientelist networks. Across Sub-Saharan Africa, for example, where vote-buying is endemic, political parties are notoriously weak and non-programmatic. Where parties are short-lived and weakly institutionalized, the credibility of candidate promises depends on their personal relationships with voters rather than the party's. Candidates in such systems still confront the problem of mobilizing support among those who do not have a relationship with them and, therefore, no reason to believe their promises regarding post-electoral transfers.

Much of the literature analyzes vote-buying in the context of well-organized "machine" parties – the Peronists of Argentina or the Democrats and Republicans of the United States (e.g., Brusco, et al. 2004, Cox and Kousser 1981). One might expect that arguments regarding the credibility of pre-electoral political commitments are less salient in the context of such parties. Well-organized "machine" parties can make credible commitments to party members, since the parties are organized precisely to facilitate transactions between party members and party leaders.<sup>4</sup> However, machine parties are not organized to make credible policy commitments to non-party members. Again, like candidates in systems with loosely-organized parties, machine parties confront the problem of mobilizing voters who do not believe their promises. Vote-buying is one way to accomplish this.

The association of vote-buying with the inability of political parties, including machine parties, to make programmatic commitments, is widely recognized, though not systematically analyzed in the literature. Kitschelt (2000), for example, concludes that vote-buying is more common in countries with non-programmatic political parties. Brusco, et al. (2004) present evidence that Argentine "machine" parties target vote-buying to voters who are likely to be most skeptical of the

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<sup>4</sup>Machine party organization allows party leaders to make credible promises to party members of targeted rewards in exchange for services rendered to the party. For a review and further analysis, see Keefer (forthcoming).



party's promises, implying that even organized parties may engage in vote-buying to mobilize the support of those voters who are least likely to believe their promises. Reports of vote-buying in the United States, as in Argentina, reflect exceedingly well-organized parties mobilizing to identify "floaters" and core voters (e.g., Cox and Kousser, 1981, Argersinger 1985-1986, p. 678). However, the literature emphasizes that immigrants – those who were least likely to believe the promises of political parties with which they had scant previous acquaintance and no "identification" – were also preferentially targeted for vote-buying (ibid:676).<sup>5</sup>

The analysis below is relevant for, but does not directly focus on, other ways in which politicians use transfers to voters before the election. Nichter (2008) emphasizes the importance of turnout-buying – when voting behavior is unobservable, politicians pay voters who are likely to support them simply to vote. Cox and Kousser (1981) analyze the opposite phenomenon: a key development after the introduction of the secret ballot in the United States was to pay opponents' voters to stay home ("deflationary" vote-buying).<sup>6</sup> The analysis here is entirely consistent with either turnout-buying or deflationary vote-buying, since both entail pre-electoral transfers that politicians make instead of relying on pre-electoral promises of post-electoral benefits.

## The model

Keefer and Vlaicu (2008) conclude that clientelist public policies are more likely to emerge the smaller is the fraction of voters to whom political competitors can make credible commitments.

Under these circumstances, politicians are less likely to promise broadly beneficial public goods to

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<sup>5</sup>Cornwell (1964, p. 27) describes party machines as "virtually the only agency facilitating the political-and economic – integration of immigrants into the American community." He and others argue that when the flow of immigration stopped during the 1920s and government-sponsored welfare services increased, the era of the party boss – that is, of the party machine – essentially ended.

<sup>6</sup>They rely on newspaper reports to quantify the prevalence of deflationary vote-buying and "inflationary" (or "turnout") vote-buying. Before the secret ballot, deflationary vote-buying was rare (fewer than 3 percent of newspaper articles on corruption discussed it). Even after the secret ballot was introduced, though, inflationary vote-buying was significantly more common. Deflationary vote-buying accounted for 23.7 percent of articles, compared to 43.4 percent accounted for by inflationary vote-buying (32.9 percent of articles on corruption were of an uncertain modality) (Cox and Kousser p. 659).

voters and more likely to promise narrow transfers, targeted to those few voters who believe their promises. However, their static model does not inform the inherently dynamic question of when politicians will make narrow transfers prior to the election (vote-buying) or promise transfers after the election. We construct a dynamic model that allows such tradeoffs to be directly analyzed.

Elements of the basic set-up are standard. We assume a probabilistic voting framework with heterogeneous groups, as in Dixit and Londregan (1996). The electorate consists of a continuum of groups of measure  $N$ , each group of measure one. All citizens have the same income, normalized to one. Each group is indexed by the variable  $m \in [0, N]$ . Two political parties,  $A$  and  $B$ , compete for power. Voter  $i$  in group  $m$  has a partisan bias given by  $\sigma_i(m)$ . Positive values of  $\sigma_i$  signal that voter  $i$  prefers party  $B$ ; negative values, party  $A$ . As is usual, to deliver a closed form solution the bias in group  $m$  is assumed to have the density function  $\phi(m)$ , distributed uniformly over the interval  $[-\frac{1}{2\phi(m)}, \frac{1}{2\phi(m)}]$ . Politicians know the distribution of partisan bias of each group. In groups with greater dispersion, the distance of the average group member from the unbiased median is greater, making it harder for politicians to mobilize such groups with transfers and public goods. Without loss of generality, the index of groups,  $m$ , is ordered such that the density of groups falls as the index rises. That is, groups are ordered from those with the highest density – with voters who are easiest to persuade with transfers and public goods – to those with the lowest.<sup>7</sup>

To mobilize support, politicians can promise public goods, which benefit all groups  $[0, N]$ , and targeted transfers that benefit only individual groups. For a large enough number of groups, it is cheaper for politicians to deliver benefits via the provision of public goods rather than of targeted transfers, as will be made clear below. The first important divergence from the standard set-up is that only voters in groups  $m_c \in [0, n)$  believe politicians' pre-electoral promises. Since groups are

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<sup>7</sup>The introduction of groups with these ideological characteristics ensures that politicians' compete for the support of all citizens and their optimization problem is continuous with respect to the provision of targeted transfers to some parts of society and not others. This formulation has an intuitive interpretation, however. Groups can, for example, be thought of as geographic jurisdictions with citizens who have heterogeneous partisan tendencies. Within groups, members could have different partisan inclinations for many reasons, including within-group ethnic or religious heterogeneity or because group members belong to different clans.

ordered from the most to the least persuadable (from the highest to the lowest  $\phi(m)$ ), this implies that groups that believe political promises are more persuadable than the groups that do not.<sup>8</sup>

This assumption is plausible. It is well-known that ethnicity plays a large role in political competition in sub-Saharan Africa: politicians can most easily persuade their co-ethnics. While it is often the case that they cannot make credible commitments even to their co-ethnics (Keefer 2010), co-ethnics are more likely to believe their promises than those from other ethnic groups. The assumption is not, however, necessary for the conclusions of the analysis below to hold. On the contrary, by allowing politicians to make credible commitments to the most persuadable groups, the analysis creates a bias against finding any vote-buying. The discussion around Propositions 2 and 3 makes clear that their conclusions are strengthened under two plausible alternative assumptions about the preference distributions within groups that believe political promises.

The second important divergence from the standard set-up is the assumption that, within each group,  $m$ , politicians are able to conduct vote-buying transactions prior to the elections with a fraction of voters, assumed identical across all groups,  $\eta$ . For a number of reasons noted in the literature, including the fact that politicians are not able to monitor the voting behavior of all citizens,  $\eta$  is likely less than one.

Third, following nearly all of the qualitative, empirical and theoretical literature on vote-buying, we assume that vote-buying cannot take the form of public good provision that benefits all groups. This assumption follows immediately from two observations. First, politicians cannot easily persuade a subset of voters that they have provided a non-targeted benefit to all voters in exchange for their individual votes. Second, it is more difficult to schedule public good provision to coincide with elections. The consequences of (counter-factually) relaxing this assumption are

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<sup>8</sup>This ordering is consistent with the argument in Keefer and Vlaicu (2008). In that analysis, the number and identity of groups that believe political promises are endogenous to the decision of politicians to invest in their credibility with some groups and not others. As they show, it is most cost-effective for politicians to invest in their credibility with those groups that are most persuadable, so that the groups that believe political promises are, as here,  $m_c \in [0, n)$ , where group 0 has the highest density and is the most persuadable group, and group  $n$  is the least persuadable group (the group with the lowest density) on which political competitors are willing to spend resources to establish their credibility.

described below.

Every member of group  $m$  has preferences over government policy and vote-buying represented by the familiar quasi-linear utility function  $W_i(m) = J(k_t(m)) + \beta[1 - \tau_{t+1} + I(f_{t+1}(m)) + H(g_{t+1})]$ :  $\tau$  is the tax rate;  $f(m)$  is the post-election per capita transfer promised to members of group  $m$  and the function  $I$  describes the contribution those transfers make to utility;  $g$  is public good provision and  $H(g)$  is the utility of public goods to all members of all groups. Vote-buying is given by  $k(m)$ , the pre-electoral per capita transfer made to members of group  $m$ ;  $J$  determines the contribution to utility of vote-buying transfers. The subscripts indicate when voters can receive these benefits. Central to the analysis here is that politicians can mobilize support with pre-electoral payments at time  $t$  or promises of post-electoral payoffs at time  $t + 1$ . Benefits received in the next period are discounted relative to those received prior to the election; the discount factor is  $\beta$ .

The functions  $H$ ,  $I$ , and  $J$  are, as usual, non-decreasing, concave and differentiable. The marginal effect of vote-buying (pre-electoral transfers) and post-electoral transfers on utility is less than one for all positive transfers:  $J' < 1$ ,  $I' < 1$ , capturing the idea that transfers incur deadweight losses and that there is leakage between the transfers authorized for targeted citizens and the amounts that they actually receive. If vote-buying is a less efficient way of delivering transfers to citizens, then  $J' < I'$ . The marginal deadweight losses increase, and the marginal utility that the transfers deliver correspondingly decreases, with the level of transfers, or  $J'' < 0$ ,  $I'' < 0$ .

Public good expenditures  $g$  deliver welfare benefits  $H(g)$  to all voters. Capturing the notion that all citizens value public goods,  $H'(0) > 1$ . For a large enough number of voters, expenditures  $g$  in the form of public goods deliver a larger increase in voter welfare than if politicians had taken the same expenditures and distributed them among the voters in the form of transfers. The assumption that every voter benefits from an increase in  $g$  is an abstraction, of course, since many government programs that have public good attributes can still be targeted to specific populations.

However, even if it is the case that most policies can be targeted, the distinction between public goods  $g$  and transfers  $f$  captures two important dimensions along which policies vary: the ease and accuracy of targeting, and the efficacy with which they improve welfare.

Two additional assumptions are common in probabilistic models and used here. First, political parties seek rents  $(R + \gamma r)$ , where rents  $R$  are non-pecuniary “ego” rents, and pecuniary rents  $r$  are discounted by  $\gamma \leq 1$ , the costs to politicians of turning public into private resources. Second, politicians know the distribution of the partisan bias of the electorate, but this distribution is subject to a shock that politicians do not observe. The shock,  $\delta$ , is also distributed uniformly, over the interval  $[\frac{-1}{2\psi}, \frac{1}{2\psi}]$ .

The order of play is the following. In the period  $t$  before the election, and before the shock to partisan bias occurs, politicians make pre-electoral promises regarding taxes, transfers and public goods and they buy votes. After pre-electoral transfers (vote-buying) are complete and the shock to partisan bias occurs, citizens vote. After the election, in period  $t + 1$ , the winner carries out the promised policies.

Two aspects of the electoral process are key. First, incumbent politicians finance vote-buying out of current tax revenues. The greater is vote-buying, the less politicians can use tax revenues to satisfy policy promises made prior to the last election. Anticipating this, all political competitors trim their pre-electoral promises in order to finance vote-buying prior to the next election. As is usual (see, e.g., Dekel, et al., 2008:367), challengers self-finance campaign expenditures such as vote-buying. The only constraint on challenger self-financing is that vote-buying expenditures in the current period do not exceed the value of one-half (their ex ante probability of winning the election) of the discounted rents in the next period, or  $\frac{1}{2}\beta(R + \gamma r)$ . In the analysis that follows, we assume that this constraint never binds.<sup>9</sup>

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<sup>9</sup>It might seem implausible that challengers could ever finance vote-buying on the scale of the incumbent, given the magnitude of vote-buying noted earlier. However, two aspects of the problem moderate the financial difficulties of challengers. First, it is likely to be more difficult to turn government resources into electoral support than free cash. Second, precisely in settings with weak political parties, incumbent rulers are more likely to encounter challengers from within government. Challengers who come from within government can therefore themselves use government spending to finance vote-buying. Ockey (1994) reports, for example, that Thai parties typically use control of min-

Second, as in Keefer and Vlaicu (2008), politicians have no incentive to make promises to groups  $(n, N]$  that do not believe the promises. Since these groups do not believe politician promises, politician promises cannot influence their votes and politicians do not make them. Instead, politicians target promises only to those voters who believe them, those in groups  $[0, n)$ . This implies, among other things, that for all  $m \in (n, N]$ , promised transfers  $f(m)$  are zero. However, politicians do have the option of buying the votes of those who believe their promises; this option is reflected in the maximization problem below.

With these considerations in mind, we can derive the equilibrium conditions for vote-buying. Voter  $i$  in group  $m$  prefers party  $A$  if party  $A$ 's policy vector

$$\mathbf{q}_A = [\tau_{(A,t+1)}, f_{(A,t+1)}(m), k_{(A,t)}(m), k_{(A,t+1)}(m), g_{(A,t+1)}, r_{(A,t+1)}]$$

offers her greater welfare than  $B$ 's, after taking partisan bias into account. The welfare effects of policies promised for the next period are given by

$$W(m)(\mathbf{q}_i) = \beta [1 - \tau_{(i,t+1)} + I(f_{(i,t+1)}(m)) + H(g_{(i,t+1)})].$$

Party  $A$ 's share of the vote is therefore given by

$$\begin{aligned} \pi_A(\mathbf{q}_A, \mathbf{q}_B) &= \frac{1}{2} + \eta \int_0^N \phi(m) \{J(k_{(A,t)}(m)) - J(k_{(B,t)}(m))\} dm \\ &+ \int_0^n \phi(m) \beta [1 - \tau_{(A,t+1)} + I(f_{(A,t+1)}(m)) + H(g_{(A,t+1)}) - W(m)(\mathbf{q}_B)] dm. \end{aligned}$$

That is, Party  $A$ 's share of the vote is therefore a function of vote-buying  $k$ , which parties can use to capture the support of up to  $\eta$  voters in every group,  $[0, N]$ , and of future policies (taxes, post-election transfers, and public good provision), promises that politicians make to the members

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istries to finance vote-buying. In this case, coalition partners, who are also potential opponents, can use government spending to finance vote-buying.

of each group in  $[0, n)$ , who believe their promises. The politicians' problem reflects the fact that only voters who believe politician promises are sensitive to the tax consequences of vote-buying. This is because voters who do not believe politician promises, but are targeted with vote-buying, cannot trust politician promises to reduce taxes next period in exchange for lower vote-buying this period. Party  $B$ 's problem is symmetrical.

The vote share depends on the average, across groups, of the partisan preferences of each group's swing voter, taking into account both the competing policy offers of the two parties and the swing voters' partisan bias. The swing voter in each group  $m$  is that voter whose partisan bias towards party  $A$  is just equal to the difference between party  $A$ 's policy offer and the sum of party  $B$ 's policy offer and the shock to partisan bias:  $\hat{\sigma}(m) = W(m)(\mathbf{q}_A) - W(m)(\mathbf{q}_B) - \delta$ . Taking into account the distribution of the shock, the probability that party  $A$ 's vote share will exceed one-half is then given by

$$\mathbf{P} \left\{ \pi_A(\mathbf{q}_A, \mathbf{q}_B) > \frac{1}{2} \right\} = \frac{1}{2} + \frac{\psi}{\int_0^N \phi(m) dm} \left\{ \eta \int_0^N \phi(m) \{ J(k_{A,t}(m)) - J(k_{B,t}(m)) \} dm + \int_0^n \phi(m) \beta [1 - \tau_{A,t+1} + I(f_{A,t+1})(m) + H(g_{A,t+1}) - W(m)(\mathbf{q}_B)] dm \right\}$$

The term  $\frac{\psi}{\int_0^N \phi(m) dm}$  captures captures the influence of the party shock on voter behavior; the larger this is, the lower is the impact of policy on electoral outcomes.

Political competitors choose policies that maximize their expected rents – their probability of election times the rents at stake – given the policies of the other party. Party  $A$  therefore maximizes

$$\max_{\tau_{t+1}, f_{t+1}, k_{t+1}, k_t, g_{t+1}, r_{t+1}} \mathbf{P} \left\{ \pi_A(\mathbf{q}_A, \mathbf{q}_B) > \frac{1}{2} \right\} \beta (R_{t+1} + \gamma r_{t+1}) \quad (1)$$

$$s.t. \quad N\tau_{t+1} = \int_0^N f_{t+1}(m) + k_{t+1}(m) dm + g_{t+1} + r_{t+1} \quad (2)$$

The benefits of vote-buying depends on the fraction  $\eta$  of group members whose votes politicians can sway through vote-buying. Party  $B$ 's problem is symmetrical.

The party's problem is analogous to that in Keefer and Vlaicu (2008), but with two important and non-trivial additions: politicians can make either pre- or post-electoral transfers, and pre-electoral transfers prior to the election influence the promises politicians can make regarding policies after the elections. Put differently, policy promises in period  $t$  affect vote-buying in period  $t + 1$ , which in turn affect chances of election and policy promises at the end of period  $t + 1$ , etc. However, because the underlying dynamic programming problem is stationary and well-behaved (the maximand is continuous and concave and the budget constraint is compact and continuous), it is possible to rewrite the maximization problem as a Bellman equation, for which optimal conditions can be derived using Euler conditions (see, e.g., Acemoglu 2009, Chapter Six).

In particular, substituting the budget constraint for  $\tau_{A,t+1}$  in the objective function, we can set up the maximization problem in recursive form, where

$$\begin{aligned}
V(\mathbf{x}) = & \max_{k,f,g,r} \frac{1}{2} + \frac{\psi}{\eta \int_0^N \phi(m) dm} \left\{ \eta \int_0^N \phi(m) \{J(k_{A,t}(m)) - J(k_{B,t}(m))\} dm \right. & (3) \\
& + \int_0^n \phi(m) \beta \left[ 1 - \frac{1}{N} \left( \int_0^N f_{t+1}(m) + k_{t+1}(m) dm + g_{t+1} + r_{t+1} \right) \right. \\
& \left. \left. + I(f_{A,t+1})(m) + H(g_{A,t+1}) - W(m)(\mathbf{q}_B) \right] dm \right\} \beta(R + \gamma r_{t+1}) + \beta V(\mathbf{y})
\end{aligned}$$

Written in this way, optimal solutions can be found by solving the Euler equations  $D_y U(\mathbf{x}, \mathbf{y}^*) + \beta DV(\mathbf{y}^*) = 0$ , where  $D$  denotes derivatives of the functions  $U$  and  $V$  with respect to the vector of variables  $\mathbf{x}$  and  $\mathbf{y}$ , and the asterisks denote variables at their optimum. The variables  $\mathbf{x}$  are the choice variables  $k, f, g$  and  $r$  that are realized (paid out or received) in period  $t$  and  $\mathbf{y}$  are those realized in period  $t + 1$ . The Euler equations (equations 4–7 in the appendix) yield the main insights of this paper.



## Vote-buying and credible commitment

The analysis in this section focuses on which groups receive pre-electoral transfers and how those transfers vary with politician credibility. It demonstrates that politicians respond to lower credibility by increasing the vote-buying transfers they make to any group that receives such transfers (Proposition 1) and that they (generally) do not make vote-buying transfers to any group to which they could make pre-electoral promises to provide post-electoral transfers (Proposition 2). Proposition 3 yields three further conclusions about which groups are targeted with vote-buying. First, politicians buy votes from more groups when their credibility is lower. Second, they only buy votes from groups that would have been targeted with pre-electoral promises of post-electoral transfers if they had believed political promises. And, third, not all groups that would be targeted with pre-electoral promises if they believed political promises are targeted with vote-buying when they do not.

Whether vote-buying rises or falls with politician credibility depends on how credibility affects vote-buying transfers on the intensive margin – the size of transfers to those groups that receive transfers; and on the extensive margin – the fraction of groups that receive transfers. Proposition 1 examines the intensive margin: politicians pay more for the votes of any group targeted for vote-buying, the lower is the share of voters who believe their promises (proofs of all propositions are in the Technical Appendix).

**Proposition 1.** *Any group  $m$  that is targeted with vote-buying receives larger pre-electoral transfers the smaller is the fraction  $\frac{n}{N}$  of citizens to whom politicians can make credible pre-electoral commitments.*

The intuition behind Proposition 1 is straightforward: pre-electoral vote-buying comes at the expense of post-electoral public goods that politicians could use to appeal to voters who believe their promises. The electoral value of those appeals declines, however, when the fraction of groups

that believe their promises declines.<sup>10</sup>

Propositions 2 and 3 address the second question: which groups are targeted with vote-buying? Proposition 2 is concerned with the transfers that politicians direct towards groups that believe their promises: do they prefer post-electoral transfers, pre-electoral vote-buying, or a mix of some kind? The conclusion depends on the relative efficacy of pre- and post-electoral transfers in reaching voters. As long as politicians can reach a larger fraction of voters in a group through post-electoral transfers (e.g., those delivered through the government bureaucracy) than with pre-electoral vote-buying (e.g., by channeling funds through local patrons), they prefer to rely on post-electoral transfers. This requires, of course, that the groups believe politician promises regarding such transfers.

**Proposition 2.** *If the welfare effects of vote-buying and post-electoral transfers are the same,  $J'(k(m)) = I'(f(m))$  for  $k = f$ , and if the fraction of the group with whom they can make vote-buying transactions is less than one ( $\eta < 1$ ), politicians never buy votes from groups to which they can make credible commitments.*

Naturally, to the extent that politicians can deliver pre-electoral transfers more efficiently to voters than post-electoral transfers, and to the extent that they can undertake vote-buying transactions with a larger fraction of group members, they shift from post- to pre-electoral transfers, even among groups that believe their promises. However, for vote-buying to be a more efficient way to increase voter welfare than post-electoral transfers, it generally must be the case that the public administration is less efficient and more prone to leakage than the politician-controlled systems for delivering pre-electoral transfers. Party machines, such as the Peronist machine, are likely to embody the most efficient systems for distributing such benefits, but as the earlier discussion makes clear, even in these cases politicians appear to target vote-buying to those voters who are most skeptical of their pre-electoral promises. Proposition 3 shows that the number of groups that

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<sup>10</sup>Keefer and Vlaicu (2008) reach a similar conclusion regarding post-electoral transfers, arguing that politicians trade off transfers to groups that believe their promises against the electoral benefits of providing public goods to these groups – benefits that decline with the fraction of groups that believe politician promises. While the mechanism is similar, however, the identity of voters receiving these transfers (pre- or post-electoral) is quite different, as Propositions 2 and 3 make clear.

receive pre-electoral transfers rises as the number of groups to which politicians can make credible commitments falls. Together with Proposition 1, Proposition 3 indicates that total vote-buying expenditures (expenditures per group times the number of groups that are targeted with vote-buying) rise as politician credibility falls. Proposition 3 also shows, however, that politicians do not buy votes from groups that they would not have targeted with post-electoral promises in a world of full political credibility.

**Proposition 3.** *(1) Politicians buy votes from more groups the smaller is the fraction  $\frac{n}{N}$  of groups to which politicians can make credible pre-electoral commitments. (2) Politicians only buy votes from groups that would have received post-electoral transfers had the groups believed their promises. (3) Not all groups that would be targeted with pre-electoral promises if they believed political promises are targeted with vote-buying when they do not believe those promises.*

Proposition 1 (on vote-buying expenditures per group) and the first statement in Proposition 3 (on the number of groups targeted with vote-buying) make clear that total vote-buying increases as political competitors become less credible. In addition, however, vote-buying replaces pre-electoral promises of post-electoral transfers as political credibility diminishes. The proof of Proposition 3 identifies the condition under which any vote-buying takes place: the number of groups,  $n$ , to which political competitors can make credible commitments falls below  $m_k$ , the largest number of groups that are ever targeted with vote-buying. As  $n$  continues to fall, however, the share of groups receiving vote-buying transfers  $(n, m_k)$  necessarily increases relative to the share receiving pre-electoral promises of post electoral transfers  $[0, n)$ .

These propositions use the assumption that the most persuadable groups, those with the highest density of voters around the unbiased median, believe political promises. It is easy to see that alternative assumptions regarding the distribution of partisan bias among credible and non-credible groups would not change the basic conclusions here. For example, we could instead follow Keefer and Vlaicu (2008) and assume that  $n$  is the endogenous outcome of political decisions to spend resources to build credibility with particular groups. As they argue, politicians will spend those

resources first on those groups who are most likely to be persuaded by pre-electoral promises; as here, therefore, some set of groups  $[0, n)$  believe politician promises. Expenditures to build credibility effectively increase the cost to politicians of making political promises, reducing the opportunity costs of vote-buying and exacerbating the tendencies identified in Propositions 1 – 3.

Other assumptions about the distribution of the preferences across “credible” and “non-credible” promises simply create a more complicated set of tradeoffs, but again do not affect the basic conclusions of Propositions 1 – 3. This is straightforward to see with the opposite assumption, that the least persuadable groups, those with the largest spread of partisan bias (that is, groups in the set  $(n, N]$ ), rather than the lowest (groups in the set  $[0, n)$ ), believe political promises. Politicians can make credible commitments to these less persuadable groups, but because larger commitments are needed to mobilize these groups, the political payoff to such promises is low. The effect of this alternative assumption is again to reduce the opportunity costs of vote-buying. The resources dedicated to vote-buying flow to the most persuadable voters (those who do not believe political promises) at the expense of post-electoral transfers to voters who are, in any case, less persuaded by them.

To make this point more formally, we can revisit the Euler equation (equation 7 in the technical appendix) that fixes the amount of vote-buying,

$$k_{t+1}(m) : J'(k_{A,t+1}(m)) = \frac{1}{\eta N \phi(m)} \int_0^n \phi(m) dm$$

The right hand side term is the opportunity cost of vote-buying when the most persuadable voters believe politician promises. These are the voters for whom  $\phi(m)$  is highest. If, instead, the least persuadable voters believe politician promises, the condition becomes

$$k_{t+1}(m) : J'(k_{A,t+1}(m)) = \frac{1}{\eta N \phi(m)} \int_n^N \phi(m) dm$$

and the opportunity costs of vote-buying are then  $\frac{1}{\eta N \phi(m)} \int_n^N \phi(m) dm$ . An increase in the fraction

of groups that believe politician promises now implies a lower  $n$  (a larger number of groups in  $(n, N]$ ). The lower is  $n$ , however, the larger is the right hand side and, as in Proposition 1, the lower must be vote-buying,  $k$ , in equilibrium.

Following the same logic, the proof of Proposition 3 identifies the last group to be targeted with vote-buying as  $\phi(m_k) = \frac{1}{\eta N} \int_0^n \phi(m) dm$ . When politicians can only make credible commitments to the least persuadable voters, this condition becomes  $\phi(m_k) = \frac{1}{\eta N} \int_n^N \phi(m) dm$ . Again, the right hand side increases with the fraction of groups that believe political promises. As in Proposition 3, therefore, an increase in the credibility of political promises reduces the number of groups to which politicians target vote-buying.

## **Vote-buying, welfare effects and corruption**

The model informs both the welfare effects of vote-buying and the relationship between vote-buying and corruption. In general, by (commonly-accepted) assumption, governments must spend more than a dollar on transfers in order to generate a dollar's worth of welfare benefits for citizens. Since citizens are homogeneous, political competition that yields positive transfers therefore reduces total (utilitarian) social welfare. This is true for both pre- and post-electoral transfers. This section is therefore concerned with the question of how vote-buying affects distribution and rent-seeking.

On the one hand, one might intuitively think that in settings where vote-buying is common, it delivers benefits to citizens that they would not otherwise receive. Kitschelt (2000), for example, argues that in weakly developed democracies, clientelist transactions – by which he means narrowly targeted transfers either before elections or after – may be the only vehicle for distributing public sector benefits to citizens. Propositions 2 and 3 provide support for this view: groups targeted with vote-buying would not otherwise receive any targeted benefits from government.

On the other hand, some previous analyses argue that vote-buying erodes social norms and is

driven by rent-seeking. Brusco, et al. (2004) see vote-buying as distinctly corrosive, for example. Hanusch and Keefer (2013) attribute political budget cycles to vote-buying and Shi and Svensson (2006) show that political budget cycles are more pronounced in countries with greater corruption. They explain the link between corruption and vote-buying as arising because politicians able to extract higher rents have greater incentives to persuade voters of their competence. The argument here, in contrast, is that politicians who are less able to make credible commitments to voters are both more likely to engage in more vote-buying and to extract higher rents. The corrosive factor in the analysis here is the inability of citizens to act collectively to hold politicians accountable for their promises. Pre-electoral payments are simply symptomatic of this rather than a direct cause of it. However, if such payments were somehow banned, the welfare of voters who previously received such payments would fall.

Proposition 4 addresses the link between vote-buying and corruption. Although vote-buying is often associated with corruption, in principle there is no reason why an increase in vote-buying should also lead to an increase in the amount of money politicians extract from the public sector for their private use. Nevertheless, there seems to be a correlation between the two. The argument here offers an explanation: just as lower political credibility leads to an increase in vote-buying, it also leads to an increase in rent-seeking.<sup>11</sup>

**Proposition 4.** *The larger is the fraction of voters  $\frac{n}{N}$  to whom politicians can make credible pre-electoral promises, the lower is rent-seeking,  $r$ .*

The intuition behind Proposition 4 is that, the smaller is the fraction of voters who believe politician promises, the more costly it is for politicians to influence their chances of election. Lack of credibility therefore attenuates the link between politician actions and election probabilities, effectively reducing the costs of rent-seeking behavior once politicians are in office.

Proposition 5 identifies the welfare consequences of vote-buying more precisely. The key insight is that, holding political credibility constant, the elimination of vote-buying leaves the ben-

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<sup>11</sup>Keefer and Vlaicu (2008) make the same point in a static model.

eficiaries of vote-buying strictly worse off, as long as vote-buying is not “too” inefficient, while improving the welfare of everyone else in society.

**Proposition 5.** *If vote-buying is banned, the welfare of recipients of vote-buying falls as long as the tax cost they bear for vote-buying does not exceed the vote-buying transfers they receive. The welfare of all other voters unambiguously rises.*

Propositions 2 and 3 show that the only groups that receive vote-buying transfers are those to which politicians cannot make credible commitments – groups that would not, in other words, receive any transfers from government in the event that vote-buying were banned. They could be better off if vote-buying were banned were it the case that political competitors reacted to restrictions on vote-buying by making sufficiently large increases in public good provision or reductions in taxes and rents. Proposition 5 indicates, however, that politician responses to a ban on vote-buying are unlikely to leave previous recipients of vote-buying better off than they were under vote-buying.

However, a ban on vote-buying does leave all others in society strictly better off. Those who are left better off include those to whom political competitors can make credible commitments, and who are therefore generally favored by policy. To the extent that equity drives public policy considerations, and these groups are considered better off than groups that were previously targeted with vote-buying, one might conclude that a ban on vote-buying would have positive effects on equity. However, this is not unambiguously the case since there is a third class of voters: those in groups that are targeted neither with pre-electoral promises of post-electoral benefits, nor with vote-buying. This group, the least well-off in the society (under a vote-buying equilibrium), also benefits from the elimination of vote-buying.

## Discussion and Conclusion

Though targeted transfers to individual or narrow groups of voters are prototypical manifestations of clientelism, the timing of these transfers and the differences between transfers prior to and after the election have received relatively little attention. We use a dynamic model of political competition that allows both pre- and post-electoral transfers to voters. In this dynamic setting, we show that the earlier finding of Keefer and Vlaicu (2008) – that targeted post-electoral transfers increase when politicians are less credible – extends as well to pre-electoral transfers, vote-buying. The analysis here also shows that in equilibrium, politicians use post-electoral promises where they can – where their promises are credible – and resort to vote-buying where their post-electoral promises are not credible. The analysis also indicates the limits of vote-buying: the only groups targeted with vote-buying are those that would have received post-electoral transfers in a setting with more credible political competitors; and some groups that would have received post-electoral transfers are not targeted with vote-buying in settings where they do not believe political promises.

Some conclusions of the analysis depend on the assumption that it is harder for politicians to use vote-buying to deliver transfers to all members of a group than it is to use post-electoral transfers (e.g., government systems). This need not be the case. Politicians might have very well-developed clientelist networks or party machines that reach a larger fraction of the groups they target than the government bureaucracy (that is, the assumption that  $\eta < 1$  applies to transfers to post-electoral transfers, not pre-electoral). Under these circumstances, it remains the case that vote-buying increases and more groups are targeted with vote-buying as political credibility declines (Propositions 1 and 3). However, contrary to Proposition 2, no groups would receive pre-electoral promises of transfers, including those that believe political promises, since vote-buying prior to the election delivers transfers to more voters than pre-electoral transfers. And contrary to statements 2 and 3 in Proposition 3, more groups would be targeted with vote-buying in the absence of credibility than would have been targeted with pre-electoral transfers in the presence



of political credibility. However, it is unlikely that politicians can distribute vote-buying transfers with fewer deadweight losses and to a sufficiently large fraction of voters in targeted groups to make pre-electoral transfers more efficient than post-electoral.

A politician preference for vote-buying can emerge if vote-buying technologies are very well-developed, but also if the government bureaucracy is particularly under-developed. In the long run, not analyzed here, both are choice variables of politicians, raising questions for further research. If political competitors have a greater capacity to make pre-electoral transfers than governments have to make post-electoral transfers, they are likely to be uninterested in reforms that improve the efficacy of government.

Political parties are a natural vehicle that politicians might develop to support political credibility. The analysis here therefore reinforces the research agenda, already present in the literature, to link party development to the clientelist strategies of politicians. It also points to the merits of distinguishing types of clientelism in future research. The underlying conditions that yield vote-buying, prior to the election, and transfers to targeted groups after the election are quite distinct. In particular, Keefer and Vlaicu (2008) demonstrate that politicians rely more on transfers relative to (more welfare-enhancing) public goods as their credibility drops. The analysis here shows that particularly low levels of credibility are needed to trigger vote-buying, which are likely to be accompanied by particularly high levels of rent-seeking. Hence, the political circumstances in which we observe vote-buying as the predominant mode of transfers are likely to be significantly different than those in which we observe pre-electoral promises of post-electoral transfers.

## Technical Appendix

The propositions in the text emerge directly from the solution to the Euler equations  $D_y U(\mathbf{x}, \mathbf{y}^*) + \beta DV(\mathbf{y}^*) = 0$ . The first part of the technical appendix therefore derives the Euler equations; proofs of the proposition follow. The equations are derived from the Bellman equation (equation 3 on page 15), after using the budget constraint (equation 2) to substitute for taxes in the objective function (equation 1).

$$\begin{aligned} V(\mathbf{x}) = \max_{k,f,g,r} & \left[ \frac{1}{2} + \frac{\psi}{\int_0^N \phi(m) dm} \left\{ \eta \int_0^N \phi(m) [J(k_{A,t}(m)) - J(k_{B,t}(m))] dm \right. \right. \\ & + \int_0^n \phi(m) \beta \left[ 1 - \frac{1}{N} \left( \int_0^N f_{t+1}(m) + k_{t+1}(m) dm + g_{t+1} + r_{t+1} \right) \right. \\ & \left. \left. + I(f_{A,t+1})(m) + H(g_{A,t+1}) - W(m)(\mathbf{q}_B) \right] dm \right\} (R + \gamma r_{t+1}) + \beta V(\mathbf{y}) \end{aligned}$$

Recall that  $D$  denotes derivatives of the functions  $U$  and  $V$  with respect to the vector of variables  $\mathbf{x}$  and  $\mathbf{y}$ , and the asterisks denote variables at their optimum. The variables  $\mathbf{x}$  are the choice variables  $k, f, g$  and  $r$  that are realized (paid out or received) in period  $t$  and  $\mathbf{y}$  are those realized in period  $t + 1$ . In fact, only vote-buying expenditures are realized in period  $t$ .

The expression  $U(\mathbf{x}, \mathbf{y}^*)$  is given by

$$\begin{aligned} & \left[ \frac{1}{2} + \frac{\psi}{\int_0^N \phi(m) dm} \left\{ \eta \int_0^N \phi(m) [J(k_{A,t}(m)) - J(k_{B,t}(m))] dm \right. \right. \\ & + \int_0^n \phi(m) \beta \left[ 1 - \frac{1}{N} \left( \int_0^n f_{t+1}(m) dm + \eta \int_0^N k_{t+1}(m) dm + g_{t+1} + r_{t+1} \right) \right. \\ & \left. \left. + I(f_{A,t+1})(m) + H(g_{A,t+1}) - W(m)(\mathbf{q}_B) \right] dm \right\} (R + \gamma r_{t+1}) \end{aligned}$$

To calculate  $D_y U(\mathbf{x}, \mathbf{y}^*)$ , we differentiate in turn for each of the choice variables in  $\mathbf{y}$ ,  $k_{t+1}$ ,  $f_{t+1}$ ,  $g_{t+1}$ ,

and  $r_{t+1}$ . This yields:

$$D_{k_{t+1}(m)}U(\mathbf{x}, \mathbf{y}^*) = \frac{-\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1}) \beta \frac{1}{N} \int_0^n \phi(m)dm :$$

If politicians anticipate more vote-buying after the election, they must raise taxes in the policy commitments they make prior to the election, suffering the corresponding drop in political support that this entails.

$$D_{f_{t+1}(m)}U(\mathbf{x}, \mathbf{y}^*) = \frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1}) \beta \left[ \phi(m)I'(f_{t+1}(m)) - \frac{1}{N} \int_0^n \phi(m)dm \right] :$$

Promises of greater transfers to group  $m$  in period  $t + 1$  increase the probability of group  $m$ 's support, offset by the loss of support from all the groups that believe politician promises and know their taxes will rise to pay for the transfers.

$$D_{g_{t+1}(m)}U(\mathbf{x}, \mathbf{y}^*) = \frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1}) \beta \int_0^n \phi(m)dm \left[ H'(g_{t+1}) \int_0^n \phi(m)dm - \frac{1}{N} \int_0^n \phi(m)dm \right] :$$

Promises of more public good spending increase the probability of election as long as the benefits of the public good spending to the voters who believe politician promises outweigh the costs to those voters of their share of the taxes needed to finance the public goods.

$$D_{r_{t+1}(m)}U(\mathbf{x}, \mathbf{y}^*) = \frac{-\psi}{\int_0^N \phi(m)dm} \beta \frac{1}{N} \int_0^n \phi(m)dm (R + \gamma r_{t+1}) + \frac{\gamma}{2} :$$

the first term captures the fact that higher rents in period  $t + 1$  crowd out spending that can be used to secure the support of voters who believe politician promises, reducing expected rents; the second term reflects the fact that, in equilibrium, candidate strategies are identical,  $W_i(m)(\mathbf{q}_A) = W_i(m)(\mathbf{q}_B)$ , each has a 50 percent chance of election, so an additional unit of rents earns, in expectation,  $\frac{\gamma}{2}$  for the candidate.

To calculate  $DV(\mathbf{y}^*)$ , we first find  $DV(\mathbf{x}^*)$ , taking advantage of the Envelope Theorem and the fact that  $DV(\mathbf{x}^*) = D_{\mathbf{x}}U(\mathbf{x}, \mathbf{y}^*)$ , and then substituting  $\mathbf{y}$  for  $\mathbf{x}$ . The only period  $t$  (that is,  $\mathbf{x}$ ) variable in  $U(\mathbf{x}, \mathbf{y}^*)$  is  $k_t(m)$ . Differentiating with respect to  $k_t(m)$  yields

$$D_{k_t}U(\mathbf{x}, \mathbf{y}^*) = \frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1}) \eta[\phi(m)'(k_t(m))].$$

Substituting for the next period values of  $k$  and  $r$  yields:

$$\beta DV(\mathbf{y}^*) = \beta D_{k_{t+1}}V(\mathbf{y}^*) = \beta \frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+2}) \eta[\phi(m)J'(k_{t+1}(m))] :$$

the increase in the probability of winning the election at the end of period  $t + 1$  times the rents from holding office after that election, which accrue in period  $t + 2$ . The Euler condition for  $k_{t+1}(m)$  is then

$$k_{t+1}(m) : \frac{-\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1}) \beta \frac{1}{N} \int_0^n \phi(m)dm + \beta \frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+2}) \eta[\phi(m)J'(k_{t+1}(m))] = 0$$

or

$$J'(k_{t+1}(m))(R + \gamma r_{t+2}) = \frac{1}{\eta} \frac{1}{N \phi(m)} (R + \gamma r_{t+1}) \int_0^n \phi(m)dm.$$

Since none of the other choice variables  $f_{t+1}, g_{t+1}$ , or  $r_{t+1}$  appears in  $U$ ,  $D_{(f_t)}U(\mathbf{x}, \mathbf{y}^*) = D_{(g_t)}U(\mathbf{x}, \mathbf{y}^*) = D_{(r_t)}U(\mathbf{x}, \mathbf{y}^*) = 0$ , and the remaining Euler conditions (after cancelling and

rearranging) are:

$$g_{t+1} : H'(g_{t+1}) = \frac{1}{N} \quad (4)$$

$$f_{t+1}(m) : I'(f_{t+1}(m)) = \frac{1}{N\phi(m)} \int_0^n \phi(m)dm \quad (5)$$

$$r_{t+1} : \frac{-\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1}) \beta \frac{1}{N} \int_0^n \phi(m)dm + \frac{\gamma}{2} = 0 \quad (6)$$

Note that the Euler conditions for  $g$ ,  $f$  and  $r$  depend only on parameters, all of which are constant over time, implying that these variables are also constant over time. This means, however, that  $r_{t+1} = r_{t+2}$  and the Euler condition for  $k$  can be rewritten as

$$k_{t+1}(m) : J'(k_{t+1}(m)) = \frac{1}{\eta} \frac{1}{N\phi(m)} \int_0^n \phi(m)dm. \quad (7)$$

Optimal vote-buying in period  $t + 1$  then also depends only on parameters; vote buying is therefore invariant over time, so, in equilibrium,  $k_{A,t+1}(m) = k_{A,t}(m) = k(m)$ . Propositions 1 and 2 follow immediately.

**Proposition 1.** *Any group  $m$  that is targeted with vote-buying receives larger transfers the smaller is the fraction  $\frac{n}{N}$  of groups to which politicians can make credible pre-electoral commitments.*

*Proof.* The Euler condition for  $r_{t+1}$  reveals that  $r$  depends only on parameters that are invariant over time, so that  $r_{t+1} = r(t + 2)$ . This allows equation 7, The Euler condition for  $k_{t+1}$ , to be rewritten as  $J'(k_{t+1}(m)) = \frac{1}{\eta} \frac{1}{N\phi(m)} \int_0^n \phi(m)dm$ . Differentiating both sides with respect to  $n$  yields  $\frac{\partial}{\partial n} J'(k(m)) = \frac{1}{\eta} \frac{\phi(n)}{N\phi(m)} > 0$ . As the fraction of voters who believe credible promises declines ( $n$  drops),  $J'$  must also drop. Since  $J$  is concave, pre-electoral transfers  $k$  must rise when the fraction  $\frac{n}{N}$  of groups to which politicians can make credible pre-electoral commitments is smaller.  $\square$

**Proposition 2.** *If the welfare effects of vote-buying and post-electoral transfers are the same,  $J'(k(m)) = I'(f(m))$  for  $k = f$ , and if the fraction of the group with whom they can make vote-*

buying transactions is less than one ( $\eta < 1$ ), politicians never buy votes from groups to which they can make credible commitments.

*Proof.* Among the groups to which politicians can make credible commitments, the equilibrium electoral cost of pre-electoral and post-electoral transfers is identical and given by  $\frac{1}{N\phi(m)} \int_0^n \phi(m)dm$ : the lost support among groups that believe politician promises as a consequence of higher taxes to pay for transfers. However, the equilibrium electoral payoff to additional pre-electoral transfers,  $\eta \frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1})[\phi(m)]$ , is less than the payoff to post-electoral transfers,  $\frac{\psi}{\int_0^N \phi(m)dm} (R + \gamma r_{t+1})[\phi(m)]$  when  $\eta < 1$ : pre-electoral transfers move group support for a politician less than post-electoral transfers to the group. When politicians can buy votes from all group members,  $\eta = 1$ , they are indifferent between vote-buying and post-electoral transfers.  $\square$

**Proposition 3.** (1) Politicians buy votes from more groups the smaller is the fraction  $n/N$  of groups to which politicians can make credible pre-electoral commitments. (2) Politicians only buy votes from groups that would have received post-electoral transfers had the groups believed their promises. (3) Not all groups that would be targeted with pre-electoral promises if they believed political promises are targeted with vote-buying when they do not believe those promises.

*Proof.* To prove the first statement, we first characterize the “last” group to be targeted with vote-buying. Substituting from equation 4 the Euler condition for public goods,  $g$ , into equation 7 the condition for vote-buying,  $k$ , note that

$$J'(k_t(m))\phi(m) = \frac{1}{\eta N} \int_0^n \phi(m)dm$$

Given the assumption that  $J'(k_t(m)) < 1$ , it follows immediately that no group is targeted with vote-buying if its ideological density  $\phi(m)$  is less than  $\frac{1}{\eta N} \int_0^n \phi(m)dm$ , since for all  $\phi(m) < \frac{1}{\eta N} \int_0^n \phi(m)dm$ ,  $J'(k_t(m)) > 1$ , violating the assumption. Define  $\phi(m_k) = \frac{1}{\eta N} \int_0^n \phi(m)dm$ , the last group targeted for vote-buying. Differentiating both sides by  $n$ , the number of groups to which politicians can make credible promises, yields  $\frac{\partial}{\partial n} \phi(m_k) = \frac{1}{\eta N} \frac{\phi(n)}{\phi(m)} > 0$ , proving the first statement.

The second statement follows immediately after characterizing the last group to be targeted with post-electoral transfers. Keefer and Vlaicu (2007) do this, using the same logic as for vote-buying above, noting first that:

$$I'(f_{t+1}(m))\phi(m) = \frac{1}{N} \int_0^n \phi(m)dm$$

Again, given the assumption that  $I'(f_t(m)) < 1$ , it follows immediately that the last group to receive post-electoral transfers can be defined as  $\phi(m_f) = \frac{1}{N} \int_0^n \phi(m)dm$ .

The second statement is proved by observing that  $\phi(m_f) < \phi(m_k)$ , implying that  $m_f > m_k$ : the last group targeted with pre-electoral transfers has a higher index number than the last group targeted with vote-buying, implying that more groups are targeted for post-electoral than pre-electoral transfers.

The third statement follows immediately from the second. Only those voters in the group  $(n, m_k)$ ,  $n < m_k$ , are targeted with vote-buying. Since  $m_f > m_k > n$ , therefore, no group in  $(m_f, m_k)$  receives transfers when  $n < m_k$ . All of these groups, however, would have received transfers had politicians been more credible (i.e.,  $n \geq m_f$ ).

□

**Proposition 4.** *The larger is the fraction of voters  $\frac{n}{N}$  to whom politicians can make credible pre-electoral promises, the lower is rent-seeking,  $r$ .*

*Proof.* Both parts of the proposition follow immediately from equation 6 the Euler condition for rents,

$$r_{t+1} : r = \frac{N}{2\psi\beta} \frac{\int_0^N \phi(m)}{\int_0^n \phi(m)} - \frac{R}{\gamma}.$$

Rents are independent of vote-buying. However, The proposition follows immediately from the equilibrium expression for rents,  $r = \frac{N}{2\psi\beta} \frac{\int_0^N \phi(m)}{\int_0^n \phi(m)} - \frac{R}{\gamma}$ . The larger is  $n$ , the larger is the denominator of the first term, and the lower are rents.

□

**Proposition 5.** *If vote-buying is banned, the welfare of recipients of vote-buying falls as long as the tax cost they bear for vote-buying does not exceed the vote-buying transfers they receive. The welfare of all other voters unambiguously rises.*

*Proof.* The proposition follows immediately after showing that a ban on vote-buying affects only taxes and vote-buying, with no effect on other policies. If vote-buying is banned, politicians can only rely on post-electoral policies to seek the support of voters. Note that three of these – public goods, post-electoral transfers, and rents – remain unchanged. To see this, recall the Euler conditions for 4 public goods and 6 for rents:

$$g_{t+1} : H'(g_{t+1}) = \frac{1}{N}$$

$$r_{t+1} : r = \frac{N}{2\psi\beta} \frac{\int_0^N \phi(m)}{\int_0^n \phi(m)} - \frac{R}{\gamma}$$

Neither of these depend on which groups receive transfers, whether pre- or post-electoral. The Euler condition for post-electoral transfers similarly is independent of pre-electoral transfers: any group that received post-electoral transfers in the presence of vote-buying also receives them in its absence.

$$f_{t+1}(m) : I'(f_{t+1}(m)) = \frac{1}{N\phi(m)} \int_0^N \phi(m) dm$$

From Proposition 2, further, any group that receives post-electoral transfers does not receive pre-electoral transfers and the equilibrium condition for the last group that receives post-electoral transfers similarly remains unaffected by the presence or absence of vote-buying. If vote-buying is banned, therefore, voters in groups  $(n, m_k]$ , defined in Proposition 3, lose equilibrium vote-buying expenditures given by  $\int_n^{m_k} k^*(m) dm$ , recalling that vote-buying expenditures are only made to non-credible groups, the last of which is  $m_k$ , from Proposition 3. For each group in  $(n, m_k]$ ,



this implies a welfare loss equal to  $J(k^*)$ . Taxes are the sum of expenditures on pre- and post-electoral transfers, public goods and rents. Since all of these remain the same, except for vote-buying, taxes on each must fall by  $\frac{1}{N} \int_n^{m_k} k^*(m) dm$ . The net effect on the welfare of groups targeted with vote-buying is  $\frac{m_k-n}{N} \int_n^{m_k} k^*(m) dm - \int_n^{m_k} J(k^*(m)) dm$ . This is less than zero unless vote-buying is so inefficient that  $J(k^*(m)) < \frac{m_k-n}{N} k^*(m)$ : vote-buying delivers less welfare to groups than the tax cost to these groups of the vote-buying. Credible groups,  $[0, n]$  and all non-credible groups that were not targeted with vote-buying,  $[m_k, N]$  by the amount that their taxes fall:  $\frac{N-m_k-n}{N} \int_n^{m_k} k^*(m) dm$ , the amount that previously they contributed to pay for vote-buying.  $\square$

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