Appendix for "Vote Buying with Multiple Distributive Goods"

There are two parts to this appendix. The first is a formal model of multi-good voter targeting. The second is a table of summary statistics of the variables used in the empirical analyses in the paper.

A Model of Multi-Good Voter Targeting

In what follows I formally illustrate the effect different particularistic goods have on the choices incumbent political parties make regarding what groups to target. The incumbent party seeks to buy votes from the electorate by distributing land and rural inputs. If the incumbent chooses to distribute particularistic benefits (Bribe) to some members of the electorate, it expends b and receives a payoff of v in votes, where $v > b$.[1] The generalized incumbent payoff for voter targeting is:

$$U = v - b + \delta(v - b) + \delta^2(v - b) + ... = \frac{v - b}{1 - \delta},$$

which indicates that the party discounts the value of future elections at a rate δ. Which voter groups will be targeted by incumbent parties is determined by the electoral return v and the differential costs b to targeting those different groups.

I assume, following Cox and McCubbins (1986), that an incumbent party is more certain about how some groups will respond to particularistic rewards than about others. The expected value of a swing voter who receives a reward from the party can be expressed as $s < 1$, where 1 is the normalized, certain payoff to targeting a core voter. I assume that whether swing voters are targeted with land or investment in agricultural inputs, their one-time payoff to the party is s. However, an incumbent that delivers land to a swing voter and nothing in the future yields an additional payoff of $s_1 < s$ in each future period, even if this voter does not receive a payment in future periods. This captures the unique nature of land in that it in essence pays its recipient in every future period without the party having to pay

[1] The incumbent would not bribe voters if the payoffs were less than the value of the votes received.

that recipient again. As a result, the swing voter may vote for the party even if they do not receive additional inputs from them. On the other hand, an incumbent that targets swing voters with both land and agricultural inputs cannot change the expected value s of their vote, but the network built to deliver land to the swing voter in period one enables them to buy the swing voter at a less expensive rate $\hat{p}$ in the future, where $\underline{p} < \hat{p} < \overline{p}$.

The return to the incumbent party from voter targeting is modeled in two stages in order to capture the difference between land and investment in inputs. In the first stage, the party chooses to give land to either a core or a swing voter. Because land is treated as finite, this is the only period in which it can be used as a distributive good. The incumbent's cost of paying a voter with land is $\underline{p_l}$ for a core voter and $\overline{p_l}$ for a swing voter, where $\overline{p_l} > \underline{p_l}$. Here I again follow Cox and McCubbins (1986), who argue that it is less costly to buy core voters because they are more responsive to transfers, and because party brokers know them better than unconnected swing voters. For subsequent rounds, the incumbent chooses to target either the swing or core voter with investment in agricultural inputs. The cost of a payment to the core voter in inputs can be represented by $\underline{p_i}$, and the payment to the swing voter $\overline{p_i}$, where $\overline{p_i} > \underline{p_i}$. The party cares about future elections at a discounted rate δ.

In order to simplify the model, I assume that voters retain their party affiliations (or lack thereof). In round one, a party chooses to distribute land to either swing or core voters. In the subsequent round, the party chooses to distribute inputs to either swing or core voters, and maintains this strategy in future periods. The party's utility for targeting swing or core voters can be written as follows, subscripted according to their strategies first for land and then for input distribution:

$$\begin{aligned} U_{cc} &= 1 - \underline{p_l} + \delta(1 - \underline{p_i}) + \delta^2(1 - \underline{p_i}) + \ldots \\ U_{cs} &= 1 - \underline{p_l} + \delta(s - \overline{p_i}) + \delta^2(s - \overline{p_i}) + \ldots \\ U_{ss} &= s - \overline{p_l} + \delta(s - \hat{p}_i) + \delta^2(s - \hat{p}_i) + \ldots \\ U_{sc} &= s - \overline{p_l} + \delta(1 + s_1 - \underline{p_i}) + \delta^2(1 + s_1 - \underline{p_i}) + \ldots \end{aligned} \qquad (1)$$

Comparing the utility of different voter targeting strategies yields predictions about likely incumbent behavior in this regard.

Proposition 1. *An incumbent party may simultaneously target swing voters with land and core voters with rural inputs, even if it has a core constituency for both goods.*

Proof. Regardless of the expected value of the swing voter and the cost of payments to core and swing voters, both U_{ss} and U_{cs} are strictly dominated by other strategies. Whether parties choose U_{sc} or U_{cc} depends on the likelihood that a swing voter will vote for the party upon receiving land as well as the party's cost differential in providing land to a swing voter over a core voter. In particular, the party will distribute land to swing voters and inputs to the core if:

$$s + \frac{\delta}{1-\delta} s_1 - (\overline{p_l} - \underline{p_l}) > 1. \qquad (2) \qquad \square$$

In words, a party distributes land to swing voters and inputs to core voters if the expected value of a swing voter today in addition to the stream of expected votes from a swing voter who receives land but no inputs, minus the cost differential of targeting a swing voter over the core, outweighs the value of a core voter today.

Inequality (2), explored empirically in Section 4 of the manuscript, indicates that parties are more likely to distribute land to swing voters and inputs to core voters as they value the future more, and as swing voters are more likely to vote for the incumbent if they have received land from them, even if that is not complemented by inputs. It is also more likely as a party improves its ability to deliver land to swing voters relative to core voters.

Table 1: Summary Statistics

Panel A: States					
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Land Area Redistributed (ha)	10083.12	50196.84	0	955600	759
IAN Investment (Th. 1970 Bs.)	1813.82	11953.21	0	259693.34	713
Population (Th.)	475.82	477.31	5.67	2235.3	759
Rural Population (Th.)	112.48	75.3	2.94	261.3	759
Agricultural Prod. (Th. 1970 Bs.)	206561.04	187422.3	50.07	1374000.75	759
Agricultural Unions	22.8	34.52	0	254	759
Win Margin	0.22	0.17	0	0.72	759
Effective # Competitive Parties	2.80	0.90	1.63	5.71	759
Winning Party Support	0.47	0.15	0.04	0.77	759
Panel B: Rural Municipalities					
Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Land Area Redistributed (ha)	1288.61	13861.17	0	497680.69	4805
Population (Th.)	33.37	24.59	3.44	187.49	4805
Win Margin	0.26	0.18	0	0.83	4800
Effective # Competitive Parties	2.67	0.75	1.25	4.95	4800
Winning Party Support	0.48	0.17	0.05	0.89	4800

Rural municipalities are those with average populations of less than 100,000 from 1958-1988. Municipalities in states with little agriculture (Amazonas, Delta Amacuro, the Federal District, and Nueva Esparta are also excluded.