Buying One Vote at a Time or Buying in Bulk? Politician Networks and Electoral Strategies

Cesi Cruz[*]
Assistant Professor
Department of Political Science
Institute of Asian Research
University of British Columbia

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Abstract.

In many consolidating democracies, poorly institutionalized political parties motivate politicians to rely on individually-targeted payoffs, such as vote buying and patronage, or on policies targeted to narrow groups, such as pork barrel politics. Although each of these strategies has been well-studied, relatively little is known about how politicians choose between them. This paper uses a survey of local politicians in the Philippines to demonstrate that the characteristics of politician networks are important determinants of this choice. In particular, vertical connections among politicians (among governors, mayors, and congressmen, e.g.) facilitate individually targeted policies because the overlapping constituencies encourage collusion to target the same individual voters. By contrast, horizontal connections among politicians (mayors of different towns, e.g.) promote cooperation and information sharing, making group-targeted strategies such as pork barrel funding more attractive. This suggests that even in political environments without a tradition of programmatic parties, political institutions that foster horizontal ties among politicians may contribute to improved development outcomes by encouraging group-targeted electoral strategies at the expense of individually-targeted patronage and vote buying.

Introduction

Electoral strategies in established democracies tend to focus on issues of campaigning and voter mobilization. By contrast, in consolidating democracies, the inability to make credible campaign promises means that politicians rely on political exchange–directly or indirectly providing benefits for votes. However, there are various forms of political exchange, each with potentially different implications for politics (Nichter, 2013). Some politicians target individual voters for political exchange, while other politicians target entire areas or constituencies using a group approach. Individually-targeted strategies include clientelism and vote buying. Clientelism is based on long-term individualized relationships of continued post-electoral payoffs to individual voters or small groups of voters (Stokes, 2005; Kitschelt and Wilkinson, 2007). Vote buying entails pre-electoral cash transfers to voters in exchange for their vote (Schaffer and Schedler, 2007). Group-targeted strategies include pork barrel politics, which refers to spending directed to groups of voters, usually in the form of specific infrastructure projects that can be targeted geographically (Drazen and Eslava, 2005; Keefer, 2005). While each of these strategies has been well-studied on their own, one question that has not been adequately addressed in the literature is what determines the choice of politicians to engage in one strategy or another.

This paper presents a theory linking politician social networks to the decision to engage in different types of political exchange. Politician networks refer to ties between politicians, which include formal ties such as party affiliations and political alliances to more informal ties such as family connections or friendships. Formal politician networks have often been used to explain differences in party structures across countries (Calvo and Murillo, 2004, 2009; Kitschelt and Wilkinson, 2007). However, I argue that politician networks, both informal and formal, can also influence the choice of electoral strategies within countries because these networks differentially affect the costs of monitoring, verifying, and enforcing each type of political exchange. Although the literature on social capital suggests that network ties positively influence democracy, network ties can also facilitate these types of illegal political strategies, especially in non-institutionalized democracies. The same network structures that encourage participation and cooperation in established democracies may make it easier for politicians in consolidating democracies to collude with one another and monitor voter behavior.

The literature on politician networks has focused almost exclusively on clientelist strategies (see, e.g., Fafchamps and Labonne, 2012; Hidalgo and Nichter, 2012; Calvo and Murillo, 2004, 2009). This paper extends the literature to show that the way politician networks are organized have important implications for the choice of electoral strategies pursued by politicians. In particular, whether network ties are horizontal (between politicians at the same level) or vertical (between

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politicians at different levels serving overlapping constituencies) affect the incentives of politicians to pursue different types of political exchange as an electoral strategy. Using data I collected from surveys of mayors in Isabela Province, Philippines, I find that vertical political ties facilitate collusion for vote buying and clientelism, while horizontal ties promote group-targeted projects and pork barrel politics by encouraging information-sharing and cooperation among politicians.

This project is the first to study the determinants of individual vs. group targeting for political exchange in consolidating democracies, and serves as a starting point for understanding the strategies of politicians in the absence of programmatic politics. In addition, this study is important for policymakers and development organizations because of the growing consensus that politician incentives are a key factor in the success of reform efforts. Identifying the social network determinants of political strategies can contribute to the design of programs and policies to promote formal and professional politician networks and allow for the targeting of aid projects to those areas where economic reform efforts are more in line with the electoral incentives of politicians.

The first section of this paper discusses the literature on politician networks and electoral strategies. The second section provides a framework for understanding how politician social networks differentially affect the choice to engage in one strategy vs. another. The third section presents the research design and describes the survey data used for the study, while the fourth section presents and discusses the empirical results.

1 Political Exchange in Consolidating Democracies

Politics in consolidating democracies is complicated by the inability of politicians to make credible policy commitments to voters (Kitschelt and Wilkinson, 2007; Keefer and Vlaicu, 2008). As a result, elections in these countries are dominated by various forms of contingent political exchange. These include direct contingent exchange targeted to individuals, such as clientelism and vote buying, as well as indirect contingent exchange targeted to groups, such as pork barrel politics.

1.1 Clientelism and Vote Buying

Keefer and Vlaicu (2007) identify the lack of institutionalized reputational mechanisms, such as parties, as the reason why new democracies tend to use patron-client networks as bases of political support instead of investing in long-term institutional development. In their framework, politicians have two options for building credibility: 1) establishing a reputation through parties; and 2) relying on intermediaries in a clientelist system. Clientelism refers to

long-standing relationships of contingent political exchange (Stokes, 2005; Kitschelt and Wilkinson, 2007). The costs and difficulty associated with establishing these institutional and reputation-based mechanisms for credibility motivate politicians in many new democracies to rely on clientelism (Keefer and Vlaicu, 2008). This creates a trade-off: new democracies choose the short run benefits associated with contingent political exchange to establish political credibility, but this occurs at the expense of long term development of institutional mechanisms, such as party systems (Keefer and Vlaicu, 2008).

As a result, many consolidating democracies tend to be characterized by clientelism. According to Kitschelt and Wilkinson, clientelism and programmatic politics are both ways of linking politicians and constituencies, but the difference is in how voters hold politicians accountable. The costs associated with programmatic politics are primarily internal organizational costs that require political entities that can speak with a single voice and allow voters to be confident that they will pursue policy objectives after the elections (Kitschelt and Wilkinson, 2007). This type of political competition encourages the provision of public goods instead of targeted benefits because elections can function as accountability mechanisms: political actors compete on platforms of policy goods, voters monitor their performance once they're in office, and can reward or punish them accordingly. By contrast, clientelistic political exchange requires dense, hierarchical networks for the identification of clients and the delivery of benefits and monitoring of voter behavior. Compared to the internal organizational problems inherent in programmatic parties, for clientelist politics, the problem is monitoring and controlling the political brokers at each level in the process (Kitschelt and Wilkinson, 2007). Such mechanisms require elaborate networks to monitor actors and manage exchange relations (Stokes, 2005). Kitschelt and Wilkinson (2007) describe these networks as necessary because of the need to monitor political actors at each level in the process.

In fact, recent research has confirmed that clientelist politics requires different types of political network structures than programmatic politics: clientelist countries have large, heterogeneous, vertically integrated parties, while programmatic countries have smaller, homogenous, horizontally integrated parties (Calvo and Murillo, 2009). The ability to monitor is a fundamental aspect of successful politician networks. Larreguy (2013) compares areas where electoral data overlaps with communal lands to show that the ability to monitor and incentivize political brokers at the ground level is associated with higher levels of electoral support.

At the same time, clientelism is not the only form of political exchange targeted to individuals. Even when considering only individually-targeted contingent political exchange, Nichter (2013) distinguishes some forms of vote buying as fundamentally different. While it is certainly common for patrons to engage in a form of vote buying by giving money or in-kind gifts to their clients on election

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day in addition to the longstanding relationships of political exchange, this new and increasingly prominent form of vote buying is a simple one-time transaction between the politician and voter (Nichter, 2013).

1.2 Pork Barrel Politics

Both clientelism and vote buying are targeted to specific individuals or small groups. By contrast, there are also forms of political exchange that are targeted to broader constituencies, such as allocating discretionary funding to supporters. In developed countries, this type of spending is often termed "pork barrel" spending and refers to the targeting of public funds or projects to the politician's district as part of an electoral strategy. Although the specific types of policy goods varies across countries, they typically take the form of what are termed "club goods," or goods which are excludable and non-rival in the context of a specific group (Kitschelt and Wilkinson, 2007).

Pork barrel funding can be targeted either to supporters or to electorally competitive areas. Under Cox and McCubbins's (1986) "core voter" model, politicians target their supporting constituencies. For example, Diaz-Cayeros, Magaloni and Weingast (2003) find that dominant parties in Mexico sustain their position using the strategic disbursement of central government funds to supporting municipalities. Burgess et al. (2013) find that, in a non-democratic context, more funding for roads goes to districts that share the ethnicity of the president. Similarly, Barkan and Chege (1989) show that during the 1980s, funding for road construction in Kenya was targeted to areas that supported President Daniel Arap Moi.

By contrast, Lindbeck and Weibull (1987) argue that parties target "swing" voters, which rewards undecided or unmobilized voters. In India, for example, Khemani (2003) finds that central government resources are strategically targeted to areas where the party can potentially win additional seats rather than to their core bases of support. Schady (2000) also finds that allocations from the Peruvian Social Fund *FONCODES* were targeted to provinces where the increased funds were expected to have the greatest electoral effect.

2 Politician Networks and Political Exchange

Many studies explain the different strategies that politicians use to win elections. In established democracies, these studies tend to center around party ideologies, policies, and campaigns. By contrast, in political environments where campaign promises and party platforms are not credible, politicians must rely on intermediaries to monitor and enforce political exchange (Keefer and Vlaicu,

2008). This gives rise to alternative electoral strategies such as patronage, vote buying, and pork barrel politics.

In this context, I present a framework showing how politician networks can affect the choice of electoral strategies. Politician networks matter for building political credibility and ultimately affect the mechanisms of political control and survival. Politician ties include both formal and informal affiliations: party ties, professional or school ties, friendships, and family relationships.

This framework identifies the circumstances under which politicians choose to use individually-targeted (vote buying and patronage) vs. group-targeted (pork barrel funding) political exchange as an electoral strategy. The literature on clientelism already identifies politician networks as a way for politicians to monitor and enforce political exchange (Kitschelt and Wilkinson, 2007; Calvo and Murillo, 2009, 2004; Hidalgo and Nichter, 2012). In the absence of organized parties, cooperation among politicians is difficult to sustain without network ties. For example, poorly institutionalized parties are unable to discipline members. As a result, politicians in these systems tend not to rely on policy promises to voters, and face disincentives to undertake difficult economic or institutional reforms (Cruz and Keefer, 2013). Agreements between politicians are unenforceable because politicians have no formal recourse if one of them reneges. In this context, informal ties between politicians allow them to use reputational mechanisms to enforce agreements.

I extend this literature to show that even within countries, the *types* of politician ties have important implications for electoral strategies. In particular, whether politician networks are horizontal or vertical. Horizontal ties refer to links between politicians at the same level of government, with different constituencies. Examples include ties among mayors or ties among congressmen. Vertical ties refer to links between politicians at different levels of government that share the same constituency. Examples include ties between the mayor of a municipality, the congressman of the district, and the governor in the state or province. I argue that the structure of these ties affects the incentives of politicians to pursue different types of political exchange. Horizontal ties facilitate group-targeted political exchange, while vertical ties are associated with individually-targeted political exchange.

2.1 Individually-targeted Strategies

The link between vertical politician networks and clientelism is well-documented in the literature (see, e.g., Fafchamps and Labonne, 2012; Calvo and Murillo, 2004, 2009), but vertical networks also facilitate vote buying. Vertical networks are important because the logistical demands of individually-targeted political exchange require that political actors are able to monitor and enforce political

interactions at each level of the process (Kitschelt and Wilkinson, 2007). National level politicians cultivate relationships with local level politicians and power brokers in their constituencies and give them funding in exchange for political support. The local level politicians and power brokers have their own longstanding networks of voters that they are expected to deliver.

For patronage, relationships between politicians and voters are longstanding and continuous. The identification of clients and the delivery of benefits requires sophisticated networks to monitor actors and manage exchange relations (Kitschelt and Wilkinson, 2007). As a result, Calvo and Murillo (2009) find that clientelist countries have large, heterogeneous, vertically integrated parties, while programmatic countries have smaller, homogenous, horizontally integrated parties.

In contrast to clientelism, vote buying requires no such longstanding relationship between politicians and voters. However, in practice, vote buying imposes several logistical demands that are particularly suited to vertical politician networks. First, vote buying requires the ability to identify and make direct contact with voters. Second, vote buying requires reasonable certainty that voters will keep their end of the bargain once they are in the voting booth.

All of the different forms of vote buying require consideration of these logistical issues, even if the implications may differ across forms. At one extreme, the form of vote buying most similar to clientelism is Nichter's "turnout buying," which rewards unmobilized supporters for going to the polls, but does not require direct monitoring of vote choice. In these cases, monitoring is less of an issue, but politicians still need to be able to identify and target their supporters, which is facilitated using vertical political networks. Politicians at the top of the hierarchy rely on their ties to politicians at lower levels in order to access voters directly. In these cases, direct politician-citizen linkages are necessary, because the fact that this strategy targets supporters for mobilization limits the application of turnout buying to voters who are already part of politician networks. In this sense, turnout buying is much like an election-day incidence of the long-term relationships associated with clientelism.

Even the opposite example of vote buying can be facilitated using vertical networks. This type of vote buying requires no prior relationship between politicians and voters. Politicians offer a one-time payment in exchange for the voter's political support. This type of vote buying is fraught with uncertainty. In the context of a secret ballot, vote buying as a spot transaction is a puzzle–once voters accept the money or gifts, there is nothing preventing them from voting against the candidate once in the voting booth. Furthermore, because the transaction is illegal, there are no formal mechanisms for enforcement or recourse. Candidates can hardly complain to the authorities that voters have cheated them, for example. As a result, this type of vote buying is associated with a cost in terms of monitoring and verification. For example, consider vote buying using direct

verification, such as handing out pre-filled ballots or using carbon paper or cell phone pictures as proof that the recipient of the money voted accordingly. Politicians still need to monitor their personnel on the ground implementing the vote buying and monitoring processes, to ensure that the funding given from the politicians at the top of the hierarchy is not stolen or mis-directed by the politicians at lower levels.

As a result, in a political context where there are overlapping constituencies, politicians can reduce the costs associated with individual-targeted political exchange by pooling their efforts. Politicians at higher levels collude with lower level politicians and political brokers. The high level politicians provide funding and the lower level politicians provide the personnel and oversight for the implementation. A big part of the costs of vote buying involve logistics: identifying targets, sending personnel to conduct the transaction, as well as monitoring and enforcing the transaction. Once a system for monitoring or verification has been set up and the political broker has already been hired to hand out the envelope of money, the marginal cost of asking the voter to also vote for another politician on the same ballot is relatively small. The overlapping constituencies create incentives for such collusion among politicians organized through vertical networks.

Hypothesis 1. *Less vote buying and patronage are expected in municipalities where the mayor is well-connected to other mayors (horizontal connections).*

Hypothesis 2. *More vote buying and patronage are expected in municipalities where the mayor is well-connected to politicians at other levels, such as congressmen and governors (vertical connections).*

2.2   Group-targeted Strategies

Horizontal politician networks are commonly associated with party politics in more established democracies, where parties are meaningful and well-institutionalized (Calvo and Murillo, 2004, 2009). In these contexts, the primary organizational demands on politician networks involve the need to establish coherent and unified programs and platforms (Kitschelt and Wilkinson, 2007). Politicians organize in order to speak with a single voice and pursue specific policy objectives, and parties need mechanisms for enforcing discipline among members (Cox and McCubbins, 1993; Bowler et al., 1999).

However, in consolidating democracies with no tradition of programmatic political parties, horizontal politician networks operate differently. Without the presence of strong national parties with well-defined policy objectives, cooperation among politicians is limited to specific issues or projects. The increased cooperation and information-sharing among horizontally organized politicians facilitates group-targeted mechanisms of political exchange,

particularly pork barrel politics.

First, when pork barrel funds take the form of spending allocated to more than one municipality, mayors who are able to cooperate with each other can act collectively to demand pork barrel projects that benefit their municipalities. In these cases, the funding is typically controlled by politicians at the national level (such as governors or congressmen) or national government agencies. Very few local-level politicians are influential enough to lobby successfully for these types of funds on their own. However, groups of mayors acting collectively can successfully bid for large-scale projects affecting their areas. Examples of such projects include fisheries and shoreline support for coastal municipalities, irrigation systems for municipalities along a river, or construction and road projects that go through more than one locality.

Horizontal ties are important not only for the process of bidding for national or provincial-level projects, but also for ensuring that mayors can cooperate throughout the project implementation process. Mayors working together need to ensure that everyone participating will fulfill their obligations and no one will renege on their commitments. For example, many projects require that the localities undertake certain preparatory activities or even raise counterpart funding. Without strong horizontal ties that allow mayors to punish defectors, mayors will have incentives to free ride on the efforts of others.

Second, even when pork barrel projects are restricted to a single locality, horizontal ties can still matter. Mayors and local politicians learn about project opportunities from other mayors, and they can get ideas for projects by seeing what other mayors are doing. Friendly competition can encourage them to replicate the types of projects that they see succeeding in other places. Other mayors in the network are also an important source of information about funding sources, such as loans and grants available through the national or provincial government, NGOs, and even international development agencies such as the World Bank. Information sharing and cooperation across horizontal ties are easier because these mayors are not in direct competition with each other for votes or for funds.[1]

In addition, even more nefarious forms of cooperation among mayors can facilitate pork barrel projects. Mayors can collude on bids for projects sourced directly to municipalities. Even when projects are sourced to firms, mayors can still engage in collusion when they have business interests in the relevant sector. For example, some mayors own construction or transportation companies. The World Bank reports that collusion among bidding firms and fraud and corruption at the implementation stage are the most common forms of corruption in the roads sector (World Bank, 2011). Successful collusion requires that mayors are able to

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[1]Although national and international funding sources are technically limited, the amounts of project funds available is so large relative to the disbursements to any single municipality that one mayor receiving a project does not noticeably reduce the likelihood of another mayor receiving a project as well.

cooperate with each other and credibly punish defectors. Without strong ties among the colluding mayors, organizing an effort to raise or otherwise fix prices would be prohibitively difficult to accomplish.

As a result, whether mayor ties lead to cooperation or collusion, the end result facilitates a group-targeted approach to political exchange, focused on lobbying for external funding for projects in the localities.

Hypothesis 3. *Less pork barrel politics is expected in municipalities where the mayor is well-connected to politicians at other levels, such as congressmen and governors (vertical connections)*

Hypothesis 4. *More pork barrel politics is expected in municipalities where the mayor is well-connected to other mayors (horizontal connections).*

Philippine Context

In the Philippines, the Local Government Code enacted in 1991 devolved responsibility for many client-facing services to the municipalities, creating overlapping constituencies each with significant fiscal and regulatory functions. The move to decentralization in the existing context of clientelist politics further established the importance of linkages between politicians at different levels for understanding outcomes (Lande, 1996; Hasnain and Matsuda, 2011). Local politicians rely on national politicians for funding (Oribe, 2004; Teehankee, 2006), while national politicians depend on local politicians for mobilizing votes (Lande, 1964; Hasnain and Matsuda, 2011).

The relative weakness of political parties in the Philippines poses a stark contrast to the importance of family ties. The literature links the two: parties did not develop in the context of the elite families and their hold on power, and the resulting weak party institutions allowed the political dynasties to flourish unabated (Sidel, 1999; Querubin, 2010; Hutchcroft and Rocamora, 2003). Querubin (2010) finds that not only are political dynasties longstanding, but non-dynastic politicians who manage to win office are disproportionately more likely to establish their own dynasty.

The lack of structured party programs and platforms means that Philippine politics is dominated by direct and indirect forms of contingent political exchange. The contingent political exchange targeted to voters takes the form of clientelism and vote buying. In the Philippines, there is even a commonly used Tagalog phrase to refer to clientelism: *kasal, binyag, libing*, which literally means "weddings, baptisms, funerals." This well-known phrase refers to the fact that politicians are typically expected to support their constituents throughout their whole lives, including everything from serving as godfathers for baptisms and weddings, providing jobs and other assistance, and contributing towards funeral costs.

Previously, vote buying was a strategy that went hand-in-hand with clientelism, in that patrons would offer a small gift on election day, in addition to the long-term exchange relationships. However, vote buying has taken an increasingly different form in which politicians bypass power brokers and target voters directly with one-time payments or gifts at the time of the elections. This is in contrast to the long-term relationships that characterize traditional patron-client exchange (Stokes, 2005).

Contingent political exchange targeted to groups takes the form of pork barrel politics. The Philippines has even widely adopted the use of the term "pork barrel," following the example of the United States. The most common sources of pork barrel funds are discretionary funds allotted to congressmen and senators called the "Priority Development Assistance Funds" or PDAFs. The PDAFs are intended to support small-scale local infrastructure or development projects and fill in the gaps left by larger national initiatives. Each member of the House of Representatives is elected in a single district and allotted a P70 million PDAF, while senators have a single national constituency and are allotted P200 million each. There is evidence that politician networks largely determine the allocation of government funds in the Philippines. For example, a study conducted by the Philippine Center for Investigative Journalism found that many legislators allocated more than half of their discretionary funds to municipalities where their child, parent, or sibling was the mayor (Coronel et al., 2004). In some cases, these allocations to municipalities controlled by relatives comprised the entire share of the legislator's PDAF.

3   Research Design

3.1   Dependent Variables

The patronage variable is the proportion of respondents in the barangay who reported receiving direct assistance from the mayor. Forms of assistance include money, both as a gift and as a loan, non-monetary gifts, jobs, or other non-monetary assistance (endorsement letters, assistance with paperwork, etc.). This variable ranges from no respondents in the barangay reporting having received assistance to over 85% of respondents reporting having received at least some help from the mayor or municipal government. The most common form of assistance is receiving money, either as a gift or a loan.

The vote buying variable is the most difficult to measure because of social desirability bias. Vote buying is illegal, even if the laws that forbid it are not always consistently enforced in the Philippines. As a result, I designed the survey to mitigate these problems, using list experiments to address sensitivity issues and multiple measures of the same concept (including measures at different levels) to

further reduce the sensitivity associated with asking these types of questions.

The main vote buying variable is the proportion of respondents in the barangay who reported being offered money for their vote. The average among the 30 municipalities is a vote buying rate of 20%, ranging from zero respondents reporting vote buying to 67% of respondents reporting vote buying. Again, although vote buying is a sensitive question, the structure of the question reduces the sensitivity (i.e. asking whether they were offered money for their vote vs. asking if they sold their vote). Results are robust to using the percentage of respondents reporting that there is vote buying in their barangay (a less sensitive formulation of the question) or the percentage of respondents reporting that they accepted money for their vote (a more sensitive formulation of the question).

In addition, I used an unmatched count technique to estimate the rate of under-reporting of vote buying at the barangay level. The unmatched count method presents respondents with a set of statements that could have potentially happened to them in the most recent 2007 municipal elections and respondents are asked only to report the number of items that happened to them, and not which items happened to them. Treatment and control groups are assigned randomly, and the control group receive a set of control statements that are largely neutral and infrequent, while the treatment group receives the same set of control statements, plus the additional statement: "Someone offered me money or gifts for my vote." Because the groups are randomly assigned, I can estimate the prevalence of vote buying in the barangay by merely comparing the means of the treatment and control groups, on the rationale that any additional increase in the average number of items reported can be attributed to vote buying. The results from the unmatched count technique indicate no significant under-reporting of vote buying at the barangay level.

The pork barrel variable is the percentage of barangays with road construction projects, taken from a survey of 30 municipal engineers in the province. These also include the construction of pathways and bridges, and maintenance and repaving activities. This variable ranges from no road construction projects in any barangay to municipalities in which every barangay has at least one project. The main results are robust to using barangay-level counts of projects using data from the accounting office, but these tend to be less accurate than the figures from the municipal engineering office.[2]

3.2   Independent Variables

The main independent variables for this analysis are vertical and horizontal political ties of mayors. The vertical ties variable is measured using a count of

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[2]For example, discrepancies could arise when money is allocated for a project, but no construction activity took place.

self-reported affiliations with other politicians holding office at different levels of government but sharing the same constituency. This includes both politicians at lower levels, such as the barangay captain (village head), and politicians at higher levels, such as the congressman of the district and the governor of the province. Counting affiliations as reported by the respondent mayors is important because party affiliations are an insufficient proxy for ties between politicians in the Philippines. Politicians at the local level switch party allegiances frequently and often fail to support their party's candidate for other offices. For example, when I asked one mayor about the discrepancy between a poster of his party's congressional candidate outside his compound and his lapel pin for another candidate, he explained that "my posters go to [the party candidate], but my money goes to my candidate."[3].
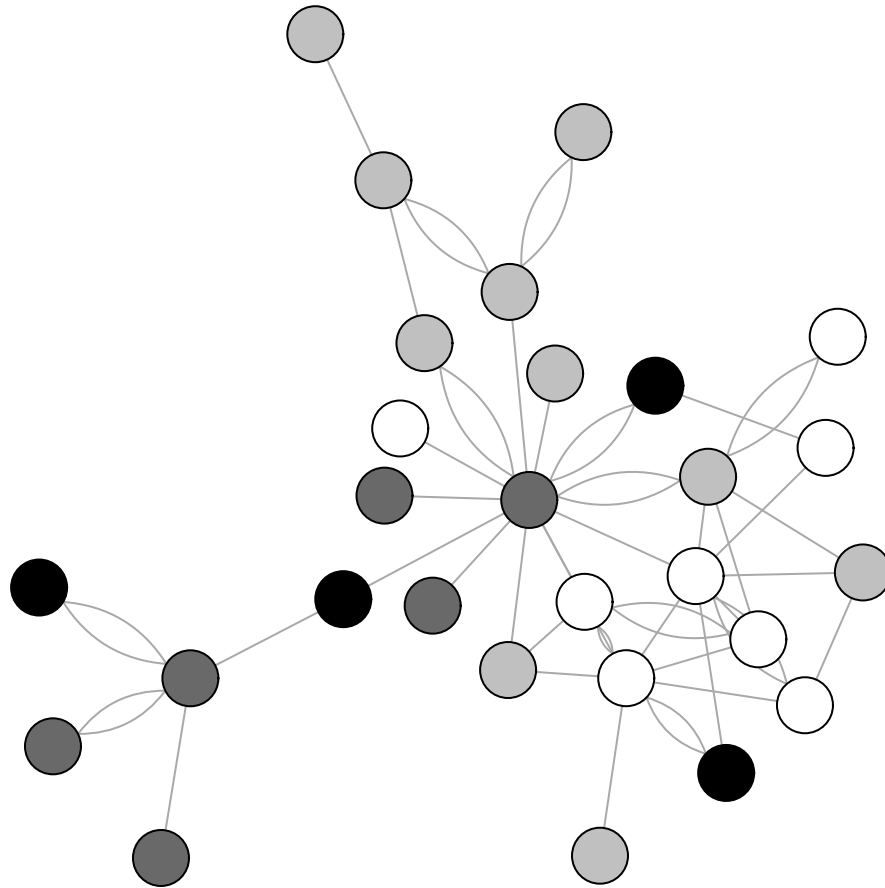
The horizontal ties variable assesses whether the mayor in the municipality is well-connected to other mayors. This analysis uses a simple in-degree measure. The survey interviewed mayors of all the municipalities in the household surveys and asked each one to name the other mayors in the province that they thought deserved recognition. The measure of horizontal ties counts the number of ties that the respondent mayor was named by other mayors participating in the survey. Figure 1 illustrates the network of mayors in the province.

Although this is an imperfect measure of ties, pilot surveys held in a different province indicate that this question was the best indicator of a mayor's allies and friends, yielding almost identical results from asking mayors directly who their friends and allies are. The direct question was not workable because many mayors would either decline to answer or become suspicious about the survey in a way that affects their willingness to participate in the rest of the study. In addition to the pilot surveys, follow up interviews were conducted with five mayors to ask them about their friends and allies, and their responses confirmed that they tended to name their friends when asked the question about which mayors deserved recognition.

Furthermore, with the exception of one mayor, there is no correlation between being named by other mayors as deserving recognition and actually having won an award (results in the appendix). There was only one mayor in the sample who was an actual award-winner and was also popular among the other mayors. Results are robust to excluding this mayor from the sample (tables available in the appendix).

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[3]Author interviews, April 2010

Figure 1: Mayor Network in Isabela

Districts: 1st (White), 2nd (Light Gray), 3rd (Dark Gray), 4th (Black)

3.3   Controls

Other potential control variables identified in the literature include the income
levels and electoral competitiveness of municipalities. The income indicator used
is a barangay-level average of whether respondent households experienced
hunger in the last three months and were unable to purchase food to eat.[4] Income
levels are important because poorer voters may be more receptive to direct forms
of contingent political exchange. Poorer voters may be more prone to clientelist
offers because they prefer to receive ongoing or pre-electoral benefits instead of
waiting for less certain policy benefits after the elections Desposato (2007); Brusco,
Nazareno and Stokes (2004). For example, when describing the targets for vote

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[4]Alternative measures of income used in the robustness checks include rates of child malnutrition
in the barangay, income class category of the municipality, or small area poverty estimates calculated
by the World Bank.

buying, one mayor mentioned that the municipality where the university was located was one area where neither side would buy votes, because the people there are wealthier, more educated and "can't be bought."[5] As a result, these areas may be more amenable to direct forms of contingent political exchange.

Electoral competitiveness can be measured by examining electoral results by municipality. Electoral competitiveness is an important factor for politicians, but generally tends to affect the intensity of politician efforts and not necessarily the choice of political strategy. For example, it is reasonable to expect that competitive elections will lead to higher price per vote or more pork barrel allocations, but might be less of a factor in the choice to engage in one strategy or the other.

Last, because this chapter focuses on determinants of the strategies of mayors, I control for several mayor characteristics that can potentially condition the relationship between mayor social ties and the choice of electoral strategy. One important characteristic is the mayor's education level. Higher levels of education may be associated with better performance in general. More educated mayors may be better able to navigate the complexities of applying for loans, grants, and projects, making them more inclined towards group-targeted political exchange.

In additional specifications, I also control for the mayor's number of relatives in politics. Mayor relatives in politics is expected to be positively related to the individual-targeted forms of political exchange, although primarily with patronage. Politicians that are members of political dynasties have long-standing ties to the community that function as reputational mechanisms for making credible commitments. In this sense, the family name has a similar "brand name" effect as a party, albeit with the goal of expanding influence and rewarding supporters rather than achieving particular policy goals.

3.4 Model Specification

I estimated two sets of models. The first are regressions for each political strategy using OLS with standard errors clustered by municipality.

$$STRATEGY = \alpha + \beta_1(NETWORKS) + \beta_2(Controls) + \epsilon \qquad (1)$$

Where *STRATEGY* is the set of individual and group-targeted political strategies: vote buying, patronage, and pork barrel politics, *NETWORKS* refers to the vector of networks variables indicating horizontal and vertical mayor networks, and *CONTROLS* is the vector of control variables.

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[5] Author interviews, Laguna, Philippines (November 2009)

In order to generate more applicable predicted values, I also used a generalized linear model (glm) with a logit link and binomial distribution family, following the recommendations of Papke and Wooldridge (1996). The data on political strategies are village proportions, aggregated from household surveys, which means that they range only from 0 to 1. Consequently, predicted values are more accurate and appropriate if they are also bounded by this range (McDowell and Cox, 2013).

In addition, following (Zellner, 1962), I use seemingly unrelated regressions to allow for the possibility that the errors are correlated across the different equations.

Last, I re-ran all of models at the municipal level. These regressions use the same variables, but measured at the municipal level, using municipal averages.

Table 1: Summary Statistics

	Mean	Std. Dev.	Min	Max
Vote Buying	.384	.242	0	.944
Patronage	.298	.200	0	.85
Pork Barrel	.785	.331	0	1
Horizontal Mayor Ties	.767	2.045	0	11
Vertical Ties	2.183	.948	0	4
Margin of Victory	.303	.260	.016	1
Mayor education	5.967	.843	3	7
Poverty estimate	36.822	12.966	13.77	72.58
Observations	60			

4 Results and Discussion

One implication of this framework is that politicians with no connections–vertical or horizontal–will be expected to get less of everything. While this is indeed the case, it also raises the issue that social ties may indicate performance in general. One difficulty with using social networks as an explanatory variable is that politicians freely choose to make connections and join networks, and it is reasonable to expect that politicians may want to be affiliated with successful politicians. At the same time, if the effects of social ties on types of political exchange were merely a spurious result, then we should expect that politicians with many connections will simply have more resources with which to pursue all types of political exchange. However, this is not the case. Instead, I show that the *types* of politician social ties matter: politicians with vertical connections pursue individually-targeted political exchange while the politicians with horizontal connections pursue group-targeted political exchange.

Table 2 shows that, following hypothesis 1a, horizontal mayor ties are negatively related to vote buying. The results from the GLM indicate that each additional

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mayor tie decreases the odds of vote buying by a factor of .84. In terms of probabilities, going from no horizontal ties to eleven horizontal ties decreases the predicted mean of vote buying from 41% to 9.5% (the marginal effects graph is available in figure 2 in the appendix). However, there is no significant relationship with vertical ties (hypothesis 1b). The only consistently significant result for the control variables is for mayor education levels. Highly educated mayors engage in significantly less vote buying than mayors with lower levels of education.

Table 2: Mayor Social Networks and Vote Buying

	(1)	(2)	(3)	(4)
Horizontal Mayor Ties	-0.0279**	-0.0321**	-0.144**	-0.173*
	(0.0123)	(0.0156)	(0.0694)	(0.0942)
Vertical Ties	0.0248	0.0538	0.108	0.235
	(0.0397)	(0.0511)	(0.165)	(0.214)
Margin of Victory		-0.0844		-0.370
		(0.109)		(0.458)
Mayor education		-0.103**		-0.436**
		(0.0455)		(0.194)
Poverty estimate		0.000446		0.00167
		(0.00278)		(0.0114)
Constant	0.351***	0.911***	-0.610*	1.766
	(0.0797)	(0.308)	(0.335)	(1.308)
Observations	60	58	60	58
R^2	0.050	0.182		

Models 1-2: OLS. Models 3-4: GLM with logit link.

Standard errors (in parentheses) clustered by municipality. * p < .1 ** p < .05 *** p < .01

Similarly, table 3 shows that horizontal mayor ties are negatively related to the use of patronage as an electoral strategy. The results from the GLM indicate that each additional horizontal mayor tie decreases the patronage by a factor of .88. In terms of probabilities, this corresponds to a decrease from 31% to 10% (the marginal effects graph is available in figure 3 in the appendix). The results also support hypothesis 1b in that vertical politician ties are significantly and positively related to patronage. Each additional vertical tie increases patronage by a factor of 1.4.

In terms of the control variables, the margin of victory is positively related to patronage. This suggests that mayors engage in significantly more patronage in areas where they win by larger margins. This suggests that mayors target patronage to areas where they enjoy the most support, in line with the literature on Cox and McCubbins (1986)'s "core voter" model (see also, e.g., Diaz-Cayeros, Magaloni and Weingast, 2003; Barkan and Chege, 1989). Also, much like the results for vote buying (table 2), mayor education is negatively related to patronage. Highly educated mayors engage in significantly less patronage than mayors with lower levels of education.

Table 3: Mayor Social Networks and Patronage

	(1)	(2)	(3)	(4)
Horizontal Mayor Ties	-0.0244***	-0.0225**	-0.134***	-0.124***
	(0.00730)	(0.00844)	(0.0466)	(0.0460)
Vertical Ties	0.0622*	0.0669*	0.301**	0.332*
	(0.0304)	(0.0360)	(0.149)	(0.182)
Margin of Victory		0.164**		0.761**
		(0.0792)		(0.334)
Mayor education		-0.0686**		-0.328**
		(0.0333)		(0.143)
Poverty estimate		0.00307		0.0141
		(0.00208)		(0.00957)
Constant	0.180**	0.416	-1.435***	-0.333
	(0.0675)	(0.273)	(0.355)	(1.221)
Observations	60	58	60	58
R^2	0.100	0.286		

Models 1-2: OLS. Models 3-4: GLM with logit link.

Standard errors (in parentheses) clustered by municipality. * p < .1 ** p < .05 *** p < .01

By contrast, table 4 shows that horizontal mayor ties are positively associated with the use of pork barrel politics as an electoral strategy, following hypothesis 2b. Each additional horizontal mayor tie is increases pork barrel projects by a factor of 1.06. In terms of probabilities, this corresponds to an increase from around 78% to 100% (the marginal effects graph is available in figure 4 in the appendix). However, there is no significant relationship with vertical ties, as proposed in hypothesis 2a.

Table 5 reports the results for the seemingly unrelated regressions for vote buying, patronage, and pork barrel politics. Horizontal mayor social networks are negatively related to individual-targeted strategies of vote buying and patronage, and positively related to the group-targeted strategy of pork barrel politics. By contrast, vertical mayor ties are positively related to one of the individual-targeted strategies, patronage, and while the results for the other two are not significant, they are suggestive of a generally positive relationship with individual-targeted strategies and a negative relationship with group-targeted strategies. In fact, the vertical mayor ties variable is negative and significant in other specifications using alternative measures of pork barrel politics.

In terms of the control variables, mayor education is negatively related to both of the retail strategies, with no relationship to pork barrel politics. Margin of victory is negatively related to pork barrel politics, and not related to vote buying and patronage. In some specifications, margin of victory is negatively related to vote buying as well, but the result is not consistent.

Table 4: Mayor Social Networks and Pork Barrel Politics

	(1)	(2)	(3)	(4)
Horizontal Mayor Ties	0.00979***	0.0115***	0.0519***	0.0629***
	(0.00308)	(0.00360)	(0.0170)	(0.0196)
Vertical Ties	0.00637	0.00272	0.0409	0.0181
	(0.0153)	(0.0199)	(0.0936)	(0.117)
Margin of Victory		-0.0214		-0.141
		(0.0455)		(0.272)
Mayor education		0.00206		0.0128
		(0.0139)		(0.0821)
Poverty estimate		0.00102		0.00629
		(0.00105)		(0.00599)
Constant	0.183***	0.148	-1.491***	-1.708***
	(0.0321)	(0.0873)	(0.201)	(0.517)
Observations	60	58	60	58
R^2	0.044	0.054		

Models 1-2: OLS. Models 3-4: GLM with logit link.

Standard errors (in parentheses) clustered by municipality. * p < .1 ** p < .05 *** p < .01

Table 5: Mayor Social Networks and Strategies for Political Exchange

	Seemingly Unrelated Regressions		
	Vote Buying	Patronage	Pork Barrel
Horizontal Mayor Ties	-0.0286***	-0.0320***	0.0423**
	(0.0111)	(0.0117)	(0.0188)
Vertical Ties	0.0371	0.0707***	-0.0651
	(0.0238)	(0.0252)	(0.0404)
Margin of Victory	-0.0238	0.173**	-0.630***
	(0.0799)	(0.0846)	(0.135)
Mayor education	-0.0826***	-0.0774***	0.00279
	(0.0253)	(0.0267)	(0.0428)
Income Class	-0.00292	-0.0257	0.00906
	(0.0162)	(0.0172)	(0.0275)
Constant	0.633***	0.657***	1.041***
	(0.153)	(0.162)	(0.260)
Observations	60		
R^2	0.216	0.289	0.332

OLS with robust standard errors; standard errors in parentheses; * p < .1 ** p < .05 *** p < .01

The results suggest that the type of politician networks matters. In general, horizontal mayor social ties are associated with electoral strategies targeting benefits to individuals, while vertical mayor ties are associated with group-targeted strategies. Results are similar when re-running these specifications at the municipality level (see table 9 in the appendix). Results are also robust to alternative measures of the independent and dependent variables.

These findings are supported by information from interviews I conducted with mayors and political operatives. They explained that synchronized elections allow mayors with strong vertical ties to coordinate vote buying efforts by collecting money from congressional and gubernatorial candidates and purchasing a slate of votes for all candidates. At times, these efforts also include politicians running for municipal and provincial board.[6]

Politician interviews also confirm the informational value of horizontal ties. According to the mayors themselves, they get ideas for potential projects by seeing what types of projects are working well in other municipalities. They also cite that golf games and other informal interactions with fellow mayors are an excellent source of information about projects and development initiatives. One mayor mentioned that he was meeting with a fellow mayor in the province because he wanted to submit a funding proposal to the World Bank and the other mayor had previously received a World Bank project and was offering to give him some advice on his proposal.[7]

5   Conclusion

In consolidating democracies without a tradition of programmatic politics, informal networks of politicians are important for understanding broader electoral strategies. When parties are non-existent or poorly institutionalized, politicians rely on family, ceremonial, or friendship ties in order to facilitate cooperation. Where these ties are vertical, among politicians in overlapping constituencies, the linkages are associated with electoral strategies using individual targeting for political exchange, such as patronage and vote buying. By contrast, where these ties are horizontal, among politicians at the same level in different constituencies, the linkages are associated with group targeting for political exchange through pork barrel and other projects.

In terms of policy implications, institutions fostering horizontal ties among mayors may contribute towards more growth-friendly electoral strategies. For example, in the Philippines, the League of Mayors is a loosely organized grouping of mayors and local chief executives, providing an avenue for advocating for local issues. Empowering groups such as the League of Mayors may have the

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[6]Author interviews, April and May 2010
[7]Author interviews, April and May 2010

unintended benefit of encouraging horizontal ties and greater cooperation among mayors in pursuing project and policy objectives. In addition, the Department of the Interior and Local Governance has typically sponsored orientation workshops for newly elected mayors and local chief executives. One possibility is that in addition to transmitting information about rules and regulations, these types of workshops may also have the unintended positive benefit of laying a foundation for future networks of cooperation.

This research highlights the importance of a more nuanced approach to understanding political networks. Not all politician ties are created equal: vertical and horizontal politician networks have very different implications for electoral strategies, and ultimately, economic development outcomes.

6 Appendix

6.1 Marginal Effects Graphs

All marginal effects graphs represent predicted means of the dependent variables for each level of horizontal ties, holding all other variables at the means. Shaded areas indicate 95% confidence intervals.

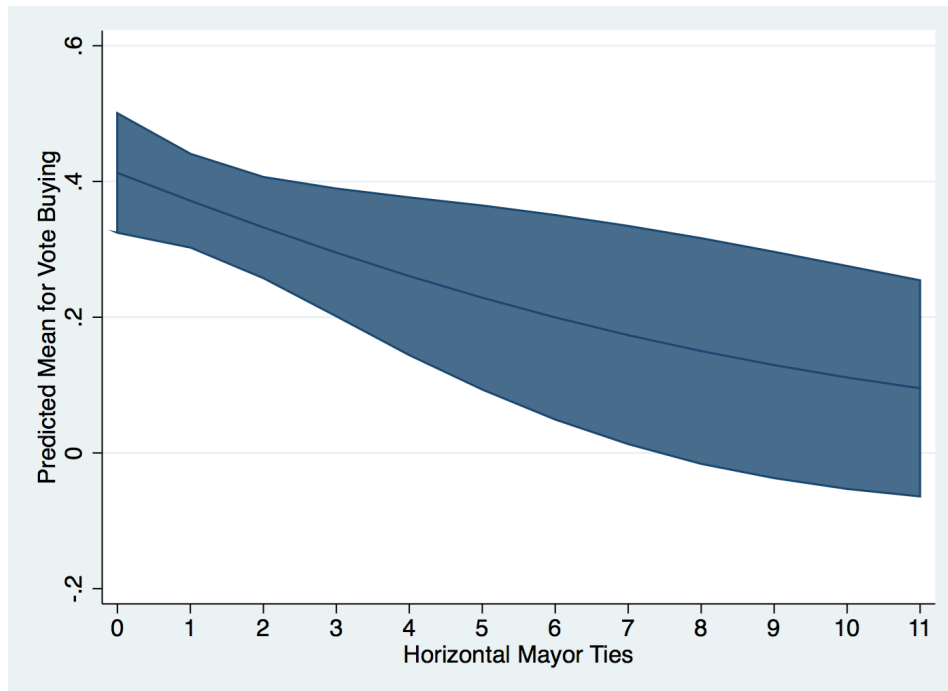Figure 2: Horizontal Ties and Vote Buying
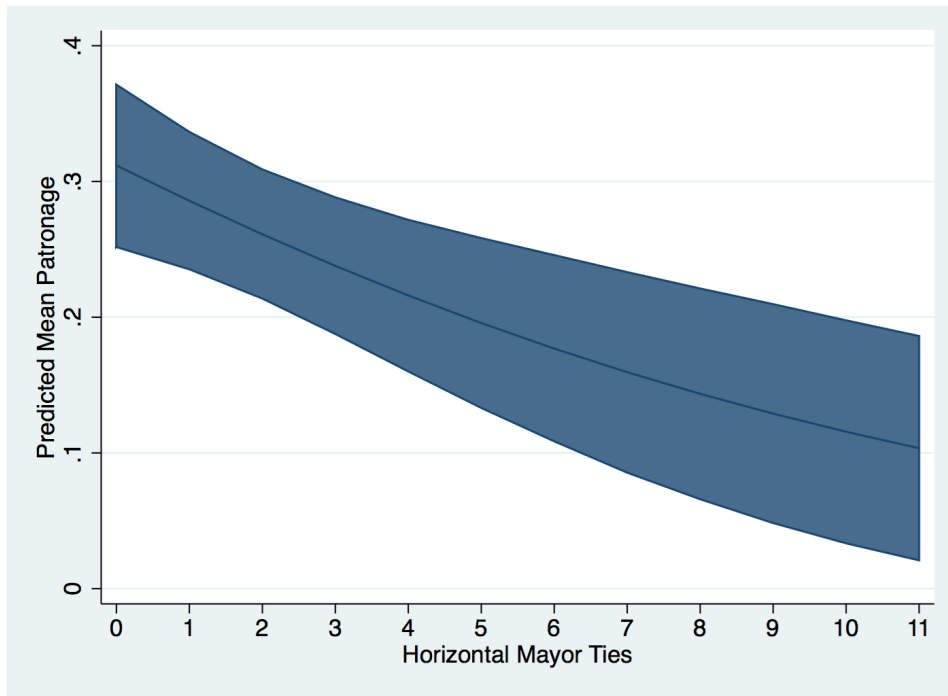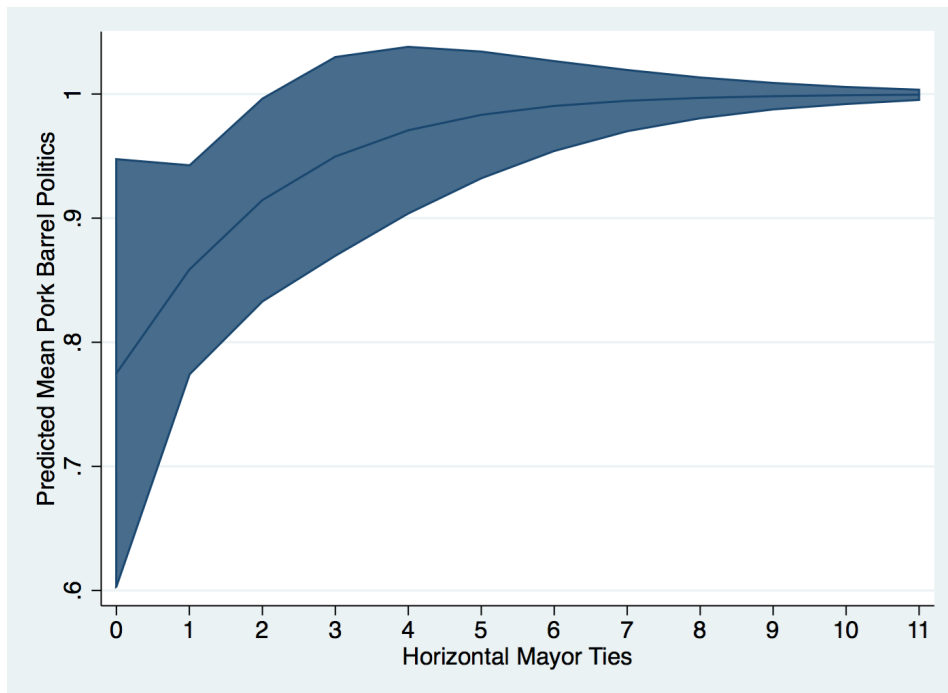
Figure 3: Horizontal Ties and Patronage

Figure 4: Horizontal Ties and Pork Barrel Politics

6.2 Municipal level regressions

Table 6: Mayor Social Networks and Vote Buying

	(1)	(2)	(3)	(4)
Horizontal Mayor Ties	-0.0221**	-0.0265***	-0.397*	-0.621***
	(0.00879)	(0.00896)	(0.222)	(0.237)
Vertical Mayor Ties	0.00294	0.0233	0.0339	0.185
	(0.0368)	(0.0421)	(0.230)	(0.264)
Avg. margin of victory		-0.0272		-0.290
		(0.0975)		(0.591)
Mayor education		-0.0792*		-0.506***
		(0.0384)		(0.182)
Income Class		-0.00271		-0.0983
		(0.0209)		(0.115)
Constant	0.195***	0.657**	-1.367***	1.853
	(0.0632)	(0.267)	(0.394)	(1.350)
Observations	30	30	30	30
R^2	0.069	0.220		

Models 1-2: OLS. Models 3-4: GLM with logit link.

Standard errors in parentheses. * $p < .1$ ** $p < .05$ *** $p < .01$

Table 7: Mayor Social Networks and Patronage

	(1)	(2)	(3)	(4)
Horizontal Mayor Ties	-0.0277***	-0.0342***	-0.148***	-0.190***
	(0.00886)	(0.00774)	(0.0502)	(0.0449)
Vertical Mayor Ties	0.0810**	0.0861**	0.390**	0.447**
	(0.0380)	(0.0388)	(0.181)	(0.184)
Avg. margin of victory		0.131		0.568*
		(0.0796)		(0.320)
Mayor education		-0.0801**		-0.389***
		(0.0349)		(0.144)
Income Class		-0.0231		-0.119
		(0.0266)		(0.112)
Constant	0.197***	0.704***	-1.357***	1.076
	(0.0501)	(0.208)	(0.270)	(0.840)
Observations	30	30	30	30
R^2	0.185	0.416		

Models 1-2: OLS. Models 3-4: GLM with logit link.

Standard errors in parentheses. * $p < .1$ ** $p < .05$ *** $p < .01$

Table 8: Mayor Social Networks and Pork Barrel Politics

	(1)	(2)	(3)	(4)
Horizontal Mayor Ties	0.0502***	0.0459***	0.817*	0.788*
	(0.0179)	(0.0121)	(0.484)	(0.430)
Vertical Mayor Ties	-0.139**	-0.0896	-0.895**	-0.659
	(0.0615)	(0.0611)	(0.426)	(0.429)
Avg. margin of victory		-0.583***		-2.824***
		(0.184)		(1.074)
Mayor education		0.00755		0.0541
		(0.0512)		(0.424)
Income Class		0.00606		0.146
		(0.0365)		(0.237)
Constant	0.955***	0.997***	2.402***	2.234
	(0.0771)	(0.305)	(0.751)	(2.352)
Observations	30	30	30	30
R^2	0.152	0.347		

Models 1-2: OLS. Models 3-4: GLM with logit link.

Standard errors in parentheses. * p < .1 ** p < .05 *** p < .01

Table 9: Mayor Social Networks and Strategies for Political Exchange

	Seemingly Unrelated Regressions		
	Vote Buying	Patronage	Pork Barrel
Horizontal Mayor Ties	-0.0265*	-0.0342***	0.0459*
	(0.0149)	(0.0131)	(0.0266)
Vertical Mayor Ties	0.0233	0.0861***	-0.0896
	(0.0351)	(0.0309)	(0.0628)
Avg. margin of victory	-0.0272	0.131	-0.583***
	(0.109)	(0.0960)	(0.195)
Mayor education	-0.0792**	-0.0801***	0.00755
	(0.0336)	(0.0296)	(0.0601)
Income Class	-0.00271	-0.0231	0.00606
	(0.0216)	(0.0190)	(0.0386)
Constant	0.657***	0.704***	0.997***
	(0.202)	(0.178)	(0.362)
Observations	30		
R^2	0.220	0.416	0.347

OLS with robust standard errors; standard errors in parentheses; * p < .1 ** p < .05 *** p < .01

References

Barkan, Joel and Michael Chege. 1989. "Decentralising the State: District Focus and the Politics of Reallocation in Kenya." *The Journal of Modern African Studies* 27:431–453.

Bowler, S., D.M. Farrell, R.S. Katz and European Consortium for Political Research. 1999. *Party discipline and parliamentary government*. Parliaments and legislatures series Ohio State University Press.

Brusco, Valeria, Marcelo Nazareno and Susan C. Stokes. 2004. "Vote Buying in Argentina." *Latin American Research Review* 39(2):66–88.

Burgess, Robin, Remi Jedwab, Edward Miguel, Ameet Morjaria and Gerard Padro i Miguel. 2013. "The Value of Democracy: Evidence from Road Building in Kenya.".

Calvo, Ernesto and Maria Victoria Murillo. 2004. "Who Delivers? Partisan Clients in the Argentine Electoral Market." *American Journal of Political Science* 48(4):742–757.

Calvo, Ernesto and Maria Victoria Murillo. 2009. "Selecting Clients: Partisan Networks and Electoral Benefits of Targeted Distribution.".

Coronel, Sheila S., Yvonne T. Chua, Luz Rimban and Booma Cruz. 2004. *The Rulemakers: How the wealthy and well-born dominate Congress*. Manila: Philippine Center for Investigative Journalism.

Cox, Gary W. and Mathew D. McCubbins. 1986. "Electoral Politics as a Redistributive Game." *The Journal of Politics* 48(2):370–389.

Cox, G.W. and M.D. McCubbins. 1993. *Legislative Leviathan: Party Government in the House*. California series on social choice and political economy University of California Press.

Cruz, Cesi and Philip Keefer. 2013. "The Organization of Political Parties and the Politics of Bureaucratic Reform.".

Desposato, Scott. 2007. How does vote buying shape the legislative arena? In *Elections for Sale: The Causes and Consequences of Vote Buying*, ed. Frederic Schaffer. Boulder, Colorado: Lynn Rienner.

Diaz-Cayeros, Alberto, Beatriz Magaloni and Barry Weingast. 2003. "Tragic Brilliance: Equilibrium Hegemony and Democratization in Mexico.".

Drazen, Allan and Marcela Eslava. 2005. "Electoral Manipulation via Expenditure Composition: Theory and Evidence." NBER Working Paper No. W11085.

Fafchamps, Marcel and Julien Labonne. 2012. "Do Politicians' Relatives Get Better Jobs? Evidence from Municipal Elections in the Philippines.".

Hasnain, Zahid and Yasuhiko Matsuda. 2011. "The Politics of Power: The Political Economy of Rent-Seeking in Electric Cooperatives in the Philippines.".

Hidalgo, Daniel and Simeon Nichter. 2012. "Voter Buying: Shaping the Electorate through Clientelism.".

Hutchcroft, Paul and Joel Rocamora. 2003. "Strong Demands and Weak Institutions: The Origins and Evolution of the Democratic Deficit in the Philippines." *Journal of East Asian Studies* 3:259–292.

Keefer, P. and R. Vlaicu. 2008. "Democracy, Credibility, and Clientelism." *Journal of Law, Economics, and Organization* 24(2):371–406.

Keefer, Philip. 2005. "Democratization and Clientelism: Why are Young Democracies Badly Governed?".

Khemani, Stuti. 2003. "Partisan politics and intergovernmental transfers in India.".

Kitschelt, Herbert and Steven Wilkinson. 2007. *Patrons, Clients, and Policies*. Cambridge: Cambridge University Press.

Lande, Carl H. 1964. *Leaders, Factions, and Parties: the Structure of Philippine Politics*. New Haven: Yale University Press.

Lande, Carl H. 1996. *Post-Marcos Politics : A Geographical and Statistical Analysis of the 1992 Presidential Election*. Institute of Southeast Asian Studies New York: St. Martin's Press.

Lindbeck, Assar and Jorgen Weibull. 1987. "Balanced-budget Redistribution as the Outcome of Political Competition." *Public Choice* 52(3).

McDowell, Allen and Nicholas Cox. 2013. "Stata FAQ: How does one do regression when the dependent variable is a proportion?".
URL: *http://www.ats.ucla.edu/stat/stata/faq/proportion.htm*

Nichter, Simeon. 2013. "Conceptualizing Vote Buying.".

Oribe, Romel. 2004. "Election as Price War.".

Papke, L.E. and J. Wooldridge. 1996. "Econometric methods for fractional response variables with an application to 401(k) plan participation rates." *Journal of Applied Econometrics* 11:619–632.

Querubin, Pablo. 2010. "Family and Politics: Dynastic Persistence in the Philippines.".

Schady, Norbert. 2000. "The Political Economy of Expenditures by the Peruvian Social Fund (FONCODES), 1991-95." *The American Political Science Review* 94(2):289–304.

Schaffer, Frederic and Andreas Schedler. 2007. What is Vote Buying. In *Elections for Sale: The Causes and Consequences of Vote Buying*, ed. Frederic Schaffer. Boulder, Colorado: Lynn Rienner.

Sidel, J.T. 1999. *Capital, Coercion, and Crime: Bossism in the Philippines*. Contemporary issues in Asia and the Pacific Stanford University Press.
URL: *http://books.google.com/books?id=0it4S_WGapIC*

Stokes, Susan C. 2005. "Perverse Accountability: A Formal Model of Machine Politics with Evidence from Argentina." *The American Political Science Review* 99(3):315–325.

Teehankee, Julio. 2006. Electoral Campaigning in the Philippines. In *Election Campaigning in East and Southeast Asia: Globalization of Political Marketing*, ed. Christian Schafferer. Hampshire: Ashgate Publishing Limited.

World Bank. 2011. Curbing Fraud, Corruption, and Collusion in the Roads Sector. Technical report World Bank.

Zellner, Arnold. 1962. "An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias." *Journal of the American Statistical Association* 57(298):348–368.