Why Social Networks Matter for Vote Choice:
Family Networks as Channels of Clientelism in the Philippines *

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Abstract

We show that social networks influence individual vote choice and provide an explanation consistent with clientelism. Exploiting local naming conventions, we build blood and marriage links between voters and local political candidates spanning one whole city in the Philippines. Analyzing survey data on pre-election candidate leanings and self-reported vote choice of 900 voters randomly drawn from these family networks, we then demonstrate that voter-candidate family ties predict who voters support at the polls. We present evidence that this is because clientelism is channeled through family networks, and that it is most effective in influencing the behavior of voters who are more proximate to political candidates.

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1 Introduction

Social networks influence voter behavior. For example, social networks shape how voters receive and interpret political information (Huckfeldt & Sprague, 1987, 1995; McClurg, 2006; Mutz, 2006). Social networks also influence voter turnout. A rich literature in American politics has demonstrated that turnout is highly correlated between friends, family, and co-workers.[1] In this article, we present one other way that social networks influence voter behavior – by affecting individual vote choice. Concretely, we show that the family and kinship ties between voters and political candidates influence who voters support at the polls. Consistent with theory of clientelism, we demonstrate that this is because family networks serve as channels for targeting clientelism.

Whether social networks influence vote choice is well-established empirically in many contexts beyond American politics. The proxy measure for social ties among voters and candidates within such networks has typically been based on some attribute common to nodes in the networks. For example, in many African countries, social ties based on ethnicity, or tribal– or clan-affiliation, explain who voters support at the polls. In Southeast Asian countries like Thailand and Indonesia, social ties based on region of origin explain local election outcomes. In a number of Latin American countries, social ties based on ethno-religious background explain vote choice.

The question of *why* voter-candidate social ties matter for individual vote choice, however, has received far less attention in the empirical literature, even as comparativists have articulated compelling theories. Scholar studying clientelism, for instance, have theorized that voter-candidate social ties – be they of families, clans, tribes, or ethnic groups – provide cues to voters about who is most likely to deliver on promises of clientelistic benefits, much in the same way that formal political networks (e.g. political parties) in developed democracies tell voters something about candidates' policy preferences and the credibility

[1] See, for example, Lazarsfeld et al 1944; Berelson et al 1954; Campbell et al 1954; Glaser 1959; Huckfeldt and Sprague 1995; Straits 1990; Knack 1992; Kenny 1992, 1993; Mutz and Mondak 1998; Beck et al 2002.

of their promises [cites]. Yet we have little systematic empirical evidence that demonstrates the validity of this theory at the micro-level.[2]

At least two obstacles make it difficult for scholars to provide convincing empirical evidence that social networks act as channels of clientelism, and this difficulty is best understoond from a networks analysis perspective. The first difficulty, common to research on social networks and political outcomes generally, is in accurately mapping the network. Incomplete social networks can bias findings in a variety of important ways and make it more difficult to rule out alternative explanations, including random clustering, homophily (selection), and contextual (or environmental) effects (Fowler et al, 2011, p. 446). The second hurdle is more specific to the outcome of interest: vote choice. Scholars tend to observe vote choice at a single moment in time, that is, after the election. Correlating this static outcome with egocentric network characteristics leads to all of the problems endemic to observational studies. In particular, ...

In this article, we seek to demonstrate that social networks matter for vote choice, and identify clientelism as an important mechanism underpinning the observed correlation. To overcome the aforementioned methodological challenges, first, we fully map the politically relevant social network, exploiting the unique institutional feature of our study context. Second, we show direct evidence that such networks strongly predict vote choice, and we demonstrate the robustness of this relationship in the aggregate as well as at the individual level. Lastly, we use an original voter-level survey and exploit the panel nature of our data to demonstrate how clientelism is a key mechanism underpinning why social networks predict vote-choice.

We employ a novel method for mapping an entire social network in the context of our study, the Philippines. This method, pioneered in (Querubin, 2011) and (Cruz, Labonne and Querubin, 2016), exploits a naming convention in the Philippines to map the entirety of local family and marital networks, the most important network to politics in Philippines

[2]But see ... for some early works.

(McCoy, 2009; Hutchcroft, 1991; Querubin, 2013). Briefly, ...

After mapping the networks, we then ...

To demonstrate how clientelism is a key mechanism linking social networks and vote choice, ...

We find that voter-candidate family ties predict candidate vote-shares in the aggregate even after controlling for voter- and candidate- fixed-effects. Focusing on our individual voter survey, we further find that the same voter-candidate network connectivity correlates highly with voter's pre-election candidate leanings as well as self-reported vote choice. Lastly, we demonstrate that clientelism is an important driver of the observed relationship between voter-candidate family ties and who voter support at the polls. Specifically, we find that the closer the voter is to a candidate, the more vote-buying is effective in *keeping* the support of the same voter if he favors the candidate to begin with, and in *winning* the support of the same voter if he does not initially favor the candidate.

The rest of the paper proceeds as follows. First, we present our theory connecting family networks with clientelism and voter behavior. We next discuss local politics in the Philippines, focusing on what families stand for. We then turn to a description of the data. We then present our estimation strategy and discuss the empirical results. The final section concludes.

2 Social Networks, Clientelism, and Voter Behavior

One area where social networks has been prominently associated with vote choice is in the literature on clientelism – the contingent exchange of money for votes. Networks have provided multiple explanations for why clientelism should work even when the ballot is secret, and there is no formal institution to enforce the exchange. For example, Stokes (2005) contends that candidates with networks of deeply embedded brokers can monitor voters and ensure that they vote how they vote how they should, even without physically

observing who support at the ballot box . Another solution to the "problem" of the secret ballot is that these same networks between candidates, their representatives, and voters facilitate deft targeting of material and monetary resources (Nichter et al 2013). The problem of untrustworthy brokers (Aspinall, 2014; Stokes et al., 2013), is also somewhat mitigated when they are better connected to the candidates they serve (Haim, Hicken and Ravanilla 2017).

In terms of whether social networks matter for individual vote-choice, there is a rich literature in comparative politics on how social networks connecting voters to political candidates (e.g. clan, tribe or ethnic group) provide cues about who is most likely to deliver on promises of programmatic or particularistic benefits. For example ... summarize Blaydes (2010); Ferree (2006); Kitschelt (2000); Wantchekon (2003). Following the same line of argument, we theorize that social networks provide voters information on which political candidates are more likely to favor them with clientelistic benefits in the run-up to elections. Why would voters think that social network credibly signal candidates' clientelistic targeting? If this is true, then we hypothesize that —

However, there are competing explanations ...

One alternative explanation is that —. If this is true, then we should see that ...

Another alternative explanation is that —. If this is true, then we should see that ...

3 Local Politics and Family Networks in the Philippines

We examine the family networks of voters in the Philippines to test our hypotheses. The Philippines is a germane context to test our hypotheses for a number of reasons. First, ... Second, ... Lastly, ... Of course, in principle, we could test our hypotheses in contexts like Indonesia, Thailand, and [other developing countries] elsewhere around the world, where informal social networks, including the family, are anecdotally regarded as important chan-

nels for clientelistic targeting. But as we describe in detail below, the Philippine context allows us to test our theory and rule-out competing explanations.

1. There is one type of social network that stands out as exceptionally important in Philippine politics – family and kinship networks (Hutchcroft, 2012).

2. Philippine politics is characterized by a chain of patron-broker-client relationships that is most pronounced at the local level.

3. The naming conventions in the Philippines allow us to completely map out the social network that is most salient in politics – families and kinships. Bring in here the part of data that talks about the leverage that studying family networks in the Philippines offer

4 Data

To create networks of familial relatedness between voters and politicians, we obtained the Certified Voters List (CVL) for Sorsogon City (as of May 2013) from the Philippine Commission on Elections (COMELEC). The CVL lists the complete name, birthday, gender, and barangay (village) of residence of 80,904 registered voters.[3]

Table 1 presents descriptive statistics for Sorsogon City. 48.7% of registered voters are male and the mean age of voters is 41 (Panel A). There are 14,491 unique family names (middle and last names combined) among voters in Sorsogon City and the average recurrence of a family name is 11 (Panel B), which suggest that the average family network is small and thus, might not matter much for local politics. However, simple tabulation of family name recurrences provide suggestive evidence of the importance of family relationships for local politics. Panel C, for example, presents the top 20 recurring family names in Sorsogon City as well as the number of incumbent city officials bearing these names. The incumbent mayor bears the 2nd most popular name in the city; the incumber vice-mayor the 3rd. Six out of the twelve incumbent city councilors bear one of these most popular family names.

[3]We do not have the CVL for Barangay Gimaloto which has an estimated 550 registered voters.

Table 1: Descriptive Statistics of Registered Voters of Sorsogon City

Panel A: Demographics

Variable	n	Mean	SD	Min	Max
Male = 1	81,202	.4865	0.50	0	1
Years of age	81,202	41	16	18	117

Panel B: Family name descriptive statistics

Number of unique family names:	14,491
Mean recurrence of family name:	11 (SD: 50 / Min: 1 / Max: 1751)
Herfindahl index:	99.85%

Panel C: Top 20 recurring family names

Family name	Frequency of voters bearing this name	Incumbent city official bearing this name*
DIAZ	1751	1 Councilor
DIONEDA	1569	Mayor / 1 Councilor
DICHOSO	1116	Vice-Mayor
DIVINA	1069	1 Councilor
DETERA	932	—
DELLOSA	888	—
JEBULAN	866	1 Councilor
DOCTOR	840	—
DIESTA	830	—
JERESANO	798	—
JASARENO	774	—
JALMASCO	730	—
DEOCAREZA	718	—
JANORAS	702	—
DIMAANO	688	—
DIOQUINO	686	—
JANABAN	673	—
DOMETITA	666	—
LASALA	631	—
JAMISOLA	620	2 Councilors

Notes: Election term 2013–2016. Elected city officials are composed of a mayor, a vice-mayor and 12 city councilors. All the other family names appearing in the top 20 are borne by as few as 14 and as many as 40 city or barangay candidates.

4.1 Familial Ties Between Voters and Politicians

We exploit characteristics of Philippine naming convention and the original assignment of surnames by Spanish colonial authorities to identify candidates' familial ties within localities with a high degree of accuracy. We construct three separate networks by connecting individuals in progressively larger areas. We start at the barangay (village) level. Barangays are the smallest administrative area in the Philippines where politicians are elected. The average barangay in our study area had 2,400 residents as of the 2010 National Census. Additionally, a considerable amount of Philippine associational life takes place within the barangay.

We then construct networks at the district and city-level. Districts are a unique administrative unit of cities, which are larger than municipalities. Increasing the area within which individuals can be linked makes it more likely that we capture the entirety of one's family network, but also increases the likelihood of falsely linking two unrelated people sharing similar family names. However, as we explain below, false familial linkages are less of a problem in the Philippines than elsewhere.

Naming convention in the Philippines are a product of the Spanish colonizers. To facilitate more efficient tax collection and as a part of conversion to Roman Catholicism, Filipinos were given Iberian surnames by colonial authorities or the Catholic Church. The process by which names were assigned is critical for avoiding the possibility of inaccurately identifying individuals as relatives. The colonial leadership of each province assigned a set of family names, drawn from the 'Catalogo Alfabetico de Apellidos' (the Alphabetical Catalogue of Surnames), to each barangay priest. The barangay priest then allowed the oldest male of each family to choose a surname. This process has resulted in an even distribution of surnames within each province.

While the Spanish method for assigning surnames in the Philippines makes it possible to identify many relatives from our list of names based on shared surnames, it is insufficient for identifying many ties to women, who adopt the surname of their husband. However, an added feature of Filipino naming convention makes it possible to overcome this limitation.

Rather than receiving two given names (first and middle), Filipinos generally have one given name and two surnames, one from their mother (her maiden surname) and one from their father.

We construct a network of family relationships between people on the CVL who share last names, middle names or who have a common middle-last name. Table 2 summarizes the types of relationships that are captured by these networks and Figure 1 depicts how one individual in a hypothetical Filipino family tree would be connected in this network.

Table 2: Family relationship captured in our networks.

Common Last Names red in figure 1	Male Sibling Unmarried Female Sibling Spouses Parents to male or unmarried female children
Common Middle Name yellow in figure 1	Married female siblings Maternal male cousins or unmarried female cousins
Common Middle-Last Name cyan in figure 1	Married female to unmarried female or male sibling

The resulting graphs are unweighted and undirected, meaning that ties do not originate with one node and point towards another, but rather are bidirectional. The graphs are also large and dense relative to many social networks where ties are elicited orally. The barangay networks have a total of 1,957,294 edges (ties) between the 80,904 nodes (registered voters). The median number of ties is 29, with an average of 48. It is common for the distribution of ties (the degree distribution) in social networks to exhibit this strong right skew. Figure 2 visualizes the degree distribution, or the connectivity of individuals, in the barangay networks.

By expanding the area within which individuals maybe connected from the barangay to the municipality, the number of ties grows significantly to 18,862,542. While this makes it slightly more likely that we inaccurately link non-relatives in our network, constructing the network at this level captures a larger portion of an individual's true family tree. We use

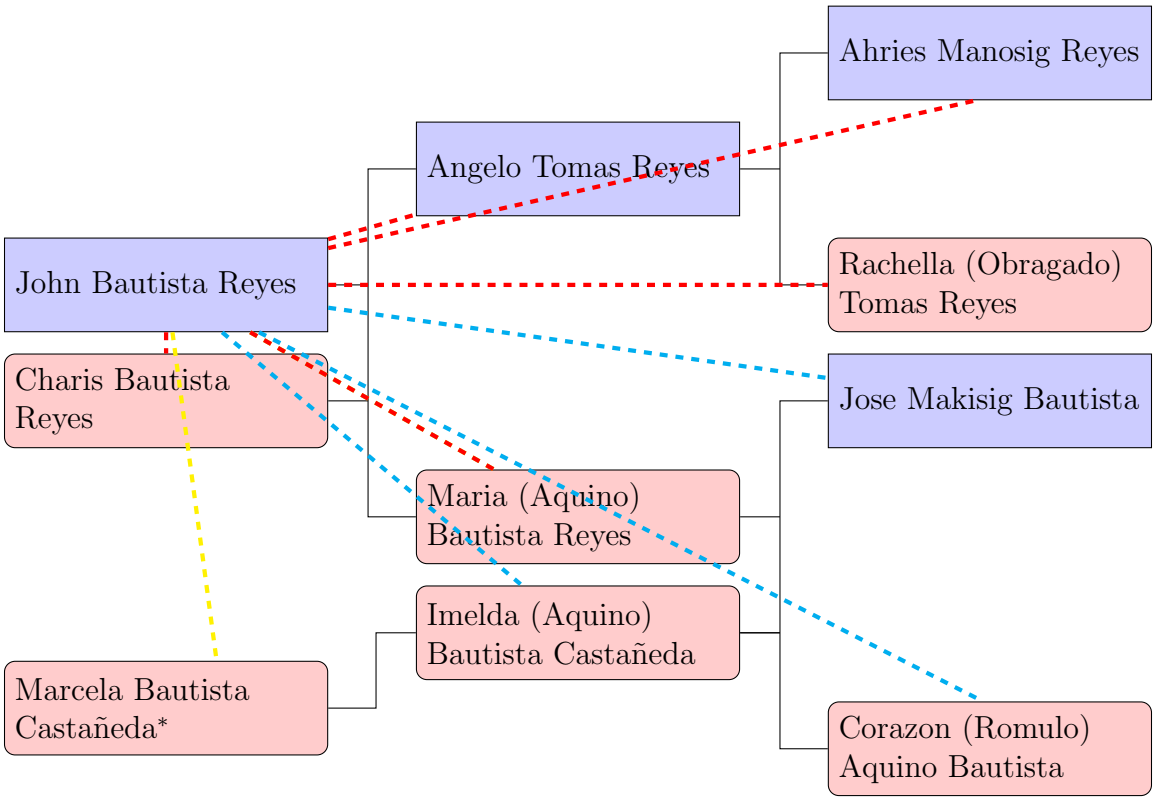

Figure 1: A hypothetical Filipino family tree. Square nodes are males (purple), rounded nodes are females (pink). Female names are presented as after marriage with maiden middle names in parentheses. Females are red, men purple. Ties between individuals are colored as follows: common last name (red), common middle name (yellow), commond middle-last name (cyan). Note: * indicates father not shown for simplicity of presentation. Ties are only shown if they connect to John Bautista Reyes.

the both the barangay and city-level networks in our analysis depending on the level of the race.

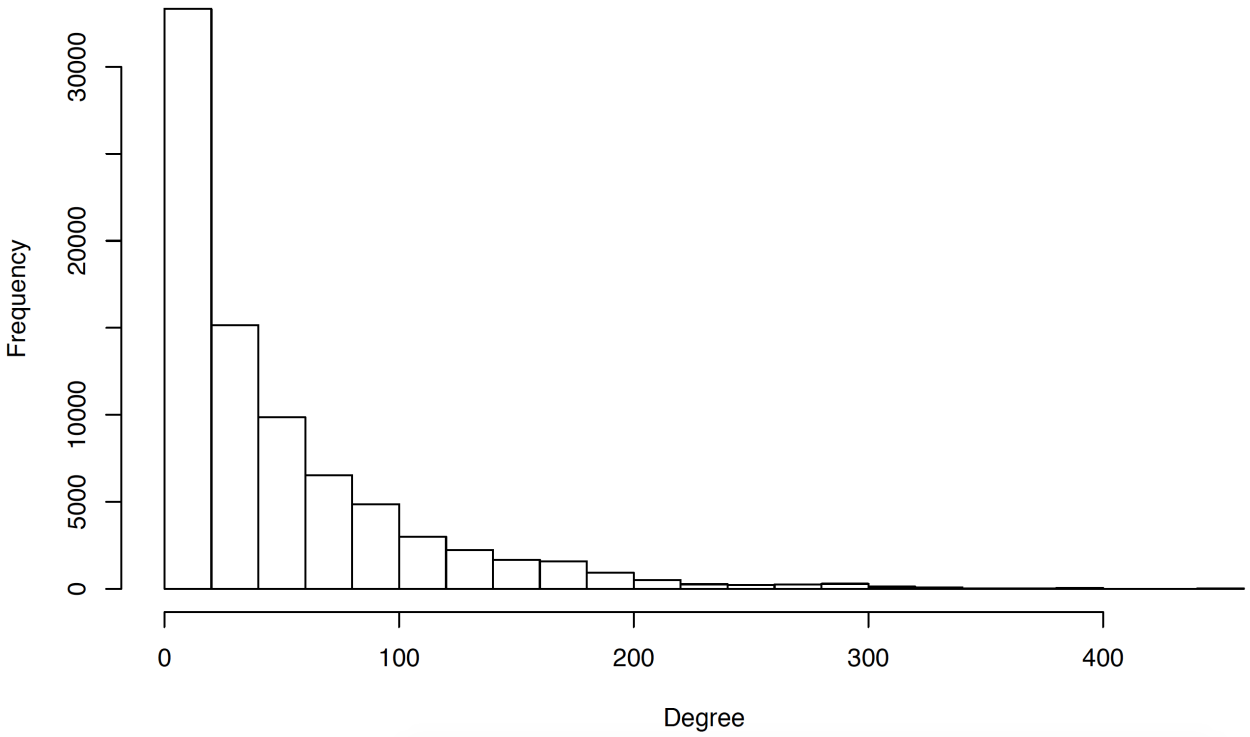

Figure 2: Degree distribution of individuals in the barangay-level networks.

4.2 Individual Voter Behavior

As part of a broader experimental field study on individual voting behavior in the Philippines, we surveyed 895 individuals randomly selected from the CVL of Sorsogon City at two time periods. We asked how each voter rated their favorability of candidates on a Likert scale in weeks leading up to the election. Immediately after the election we surveyed them again and asked who they supported at the polls. We also gathered data on voter-respondent demographics. Table 3 describes sample demographics.

Table 3: Descriptive statistics of sampled voters of Sorsogon City

Variable	n	Mean	SD	Min	Max
Male = 1	895	0.45	0.50	0	1
Years of age	895	42	16	18	95
Religion is Catholic = 1	895	0.92	0.27	0	1
Number of voting household members	895	3.55	1.94	1	20
Marital status					
Single	895	0.26	0.44	0	1
Married	895	0.53	0.50	0	1
Widowed	895	0.07	0.26	0	1
Domestic partnership	895	0.12	0.33	0	1
Separated	895	0.02	0.14	0	1
Employment status					
Choose not to work	895	0.24	0.43	0	1
Retired	895	0.05	0.21	0	1
Student	895	0.04	0.21	0	1
Unemployed and looking for a job	895	0.10	0.30	0	1
Working full time	895	0.32	0.47	0	1
Working part time	895	0.25	0.43	0	1
Education					
Some elementary to no schooling	895	0.12	0.32	0	1
Elementary	895	0.18	0.39	0	1
Some high school	895	0.19	0.39	0	1
High school	895	0.17	0.37	0	1
Some college	895	0.13	0.34	0	1
College up	895	0.15	0.36	0	1
Vocational	895	0.04	0.19	0	1
Migrant status					
Born here	895	0.73	0.45	0	1
Migrated as a child	895	0.11	0.31	0	1
Migrated as an adult	895	0.16	0.37	0	1

4.3 Aggregate Election Outcomes

Lastly, we obtained from COMELEC the names of all the candidates for the positions of Mayors, Vice-Mayors, City Councilors, Punong Barangays (Village Chairs), and Barangay Kagawads (Village Councilors) in the May 2013 City Elections and and October 2013 Barangay Elections in Sorsogon City. There are a combined total of 1,852 candidates for these offices; 41 are city-level candidates. We have collected information on basic demographics for all of these candidates: age, gender, incumbency status (or relation to incumbents), and position. We also have information on the number of votes and the outcome of the 2013 elections for all elected local offices, disaggregated at the barangay-level.

5 Results

Our main goal is to demonstrate that voter-candidate familial ties influence voter behavior. Further, we aim to show that this is because politicians exploit family ties to target vote-buying efforts, and that such targeting influences socially proximate individuals the most.

5.1 Do family networks explain voter behavior in the aggregate?

Before exploring how connectivity affects individual voting behavior, we first explore whether candidate connectivity correlates with candidate vote-shares in the aggregate. To do so, we consider what the world would look like if individuals followed a 'crude' voting rule when choosing candidates. That is, if they simply voted for the candidate who is closest to them in the familial network, what would the results of the elections look like? For the purposes of this exercise we split the vote equally among multiple candidates if the voter is equally close to them. After calculating the shortest distance in the network from every voter to every candidate, we tally the number of votes each candidate would receive if voters only voted according to this simple rule. Of course, in reality voters follow a much more complex voting rule when choosing which candidates to support even if they do use family ties as a hueristic. Nevertheless, if we can show that the tally of votes from this hypothetical election correlates with actual election outcomes, then this exercise would demonstrate the importance of family ties in explaining voter behavior in the aggregate.

More formally, we estimate the following model:

$$\begin{aligned} Ln\_Voteshare_{kj} = \alpha Ln\_Closest\_Voteshare_{kj} \\ + \gamma Ln\_BCent_{kj} + \delta Ln\_DCent_{kj} + \beta X_{kj} + v_j + u_{kj} \end{aligned} \tag{1}$$

where $Ln\_Voteshare_{kj}$ is the natural log of actual vote-share of village-candidate k in village j (city-candidate k in district j), $Ln\_Closest\_Voteshare_{kj}$ is the natural log of predicted vote-share based on the tallied number of voters closest to candidate k as a share of total

registered voters in village j. Ln_BCent_{kj} is the natural log of the betweenness centrality of candidate k and Ln_DCent_{kj} is the natural log of the degree centrality of candidate k.

X_{kj} is a vector of observable candidate characteristics, v_j is an unobservable affecting all candidates in village j and u_{kj} is an idiosyncratic error term. Vote-shares might be correlated within villages, hence, we cluster standard errors at the village level.

The coefficient of interest is α, which is interpreted as the percentage change in actual vote-shares for every percentage change in predicted vote-shares based on the hypothetical election we described above. We expect α to be positive and statistically different from zero.

5.1.1 Results

Figure 3 illustrates how this simple voting rule would play out in the election for Punong Barangay (Village Chair) in Barangay Bon-Ot, one of the smaller barangays in Sorsogon City. Voters in this network are colored according to the candidate, denoted by colored squares, to whom they are closest. In this example, the blue candidate is closest to 238 voters; the green candidate to 25 voters; the purple candidate to 39 voters; and the red candidate to 16 voters. These numbers account for "white" voters that split votes equally between at least two closest candidates. In this particular case, the blue candidate won the actual election.

Figure 4 shows that there is systematic relationship between the predicted number of votes and the actual number of votes received by candidates running for barangay (left) and municipal office (right). The blue line is the observed relationship and the red is a perfect 1:1 prediction. Although not perfect, the correlation is strongly positive.

Table 4 shows the results of the OLS estimates of Eq. 1. The candidates' hypothetical vote-shares (if voters simply voted for candidates closest to them in the familial network) predict actual vote-shares. Column 1 indicates that a 1% increase in the share of voters closest to a candidate is, on average, associated with a 0.29% increase in that candidate's actual vote-share. The inclusion of barangay (village) fixed effects reduces the point estimate

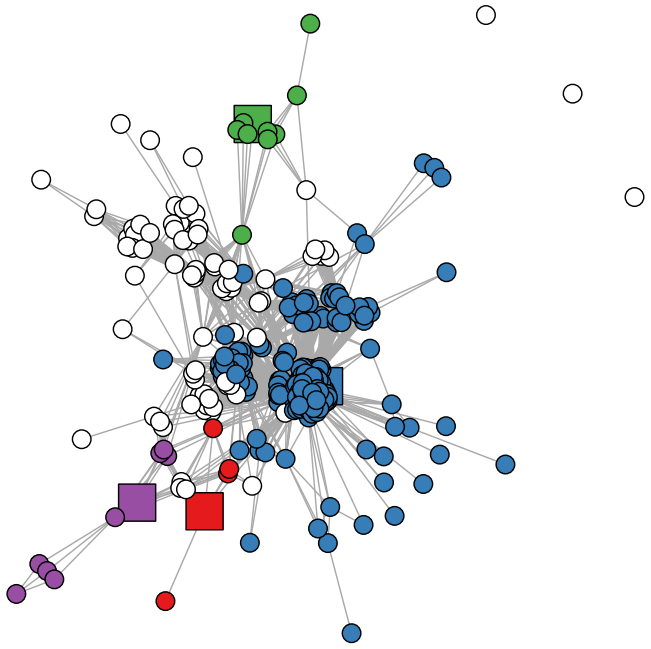

Figure 3: Barangay Bon-Ot Family Network. Candidates for Punong Barangay (Village Captain) are represented as squares of different colors; voters as small circles color-coded according to the candidate for Punong Barangay to whom they are closest. White nodes are voters who are equally close to two or more candidates. Note that the blue candidate is so central to the barangay network that he/she is hard to see amidst the other nodes.

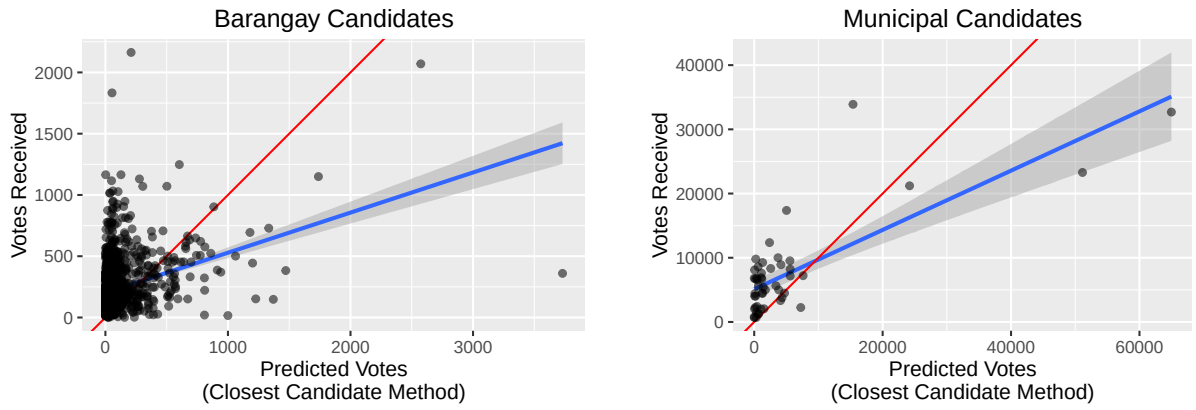

Figure 4: The relationship between the predicted number of votes and the actual number candidates running for barangay (left) and municipal office (right) received. The blue line is the observed relationship and the red is a perfect 1:1 prediction.

to 0.21% (column 2). However, once unobservable village characteristics affecting all candidates are accounted for, adding controls for observable candidate characteristics (namely, betweenness centrality, degree centrality, gender, age, incumbency status, relation to incumbent, and elective position) has only a marginal effect on the point estimate (columns 3–6). Column 7 indicates that a 1% increase in the share of voters closest to a candidate is, on average, associated with a 0.17% increase in that candidate's actual vote-share.

Table 4: Actual candidate vote-shares as predicted by the share of voters closest to candidate.

	Dependent Variable: Log Actual Vote-shares						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log Share of Voters Closest to Candidate	0.293***	0.209***	0.186***	0.182***	0.167***	0.170***	0.172***
	(0.032)	(0.025)	(0.027)	(0.027)	(0.027)	(0.027)	(0.026)
Log Betweenness Centrality			0.001	0.001*	0.001*	0.001*	0.001*
			(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Log Degree Centrality			0.004	0.003	0.002	0.001	−0.001
			(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male = 1				0.008	0.007*	0.008*	0.007
				(0.005)	(0.004)	(0.004)	(0.004)
Log Age				−0.018***	−0.017***	−0.017***	−0.016***
				(0.006)	(0.006)	(0.006)	(0.006)
Incumbent = 1					0.075***	0.077***	0.077***
					(0.005)	(0.005)	(0.005)
Relative of Incumbent = 1						0.024***	0.025***
						(0.008)	(0.007)
City-level Candidate = 1							0.057***
							(0.020)
Constant	0.144***	0.146***	0.129***	0.192***	0.189***	0.188***	0.190***
	(0.007)	(0.002)	(0.007)	(0.023)	(0.023)	(0.023)	(0.023)
Barangay Fixed Effects	NO	YES	YES	YES	YES	YES	YES
No. of Barangays (j)	63	63	63	63	63	63	63
No. of Candidates (k)	1,811	1,811	1,811	1,811	1,811	1,811	1,811
Adjusted R^2	0.084	0.388	0.391	0.394	0.471	0.474	0.481

Notes: Actual vote-shares are based on election returns from the May 2013 Municipal Elections for city-level candidates (41 of them), and from the October 2013 Barangay Elections for barangay-level candidates (1,770 of them). Predicted vote-share of a candidate is the total number of individuals voting for the candidate in a hypothetical election in which each voter chooses the candidate to whom they are most closely related, divided by the total number of voters. Huber/White robust standard errors clustered at the barangay (village) level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

This estimated effect is large given that the voting rule in our hypothetical election only accounts for which candidate is closest to a voter and ignores *how* close, the true effect of familial distance on electoral performance is likely much larger. Consider, for example, two voters, one who is immediately connected to a candidate and one who is distantly connected to that same candidate, but for whom the candidate in question is still the closest. Each voter would be tallied as one vote for the candidate according to our simple rule. While it is possible that voters conduct their own 'shortest-path' calculation, it is more likely that the effect of connectivity to a candidate diminishes with distance. Diminishing effects like this have been documented in regards to numerous types of behavioral contagion: smoking (Christakis and Fowler, 2008), obesity (Christakis and Fowler, 2007), happiness (Fowler et al., 2009), depression (Cacioppo, Fowler and Christakis, 2009) and more relatedly, the decision to vote (Nickerson, 2008; Bond et al., 2013).

5.2 Do family networks influence individual voter behavior?

Having shown evidence that family networks matter for voter behavior in the aggregate, we now explore whether the relationship holds at the individual level. Examining individual-level outcomes allows us to examine how clientelism might affect individual voter decisions within the family networks. Focusing on our individual voter survey, we estimate the following general model with different voter behavior related outcomes:

$$\begin{aligned} Y_{ikd} = {} & \alpha Familial\_Distance_{ikd} + \xi Familial\_Distance_{ikd}^2 \\ & + \gamma Ln\_BCent_{kd} + \delta Ln\_DCent_{kd} + \beta X_{ikd} + v_d + w_i + y_k + u_{ikd} \end{aligned} \tag{2}$$

$Familial\_Distance_{ikd}$ is the shortest distance between voter-respondent i and city-candidate k in district d. Higher values mean greater degrees of voter-candidate separation. We control for the square of $Familial\_Distance_{ikd}$ to account for potential nonlinearities.

We control for Ln_BCent_{kd}, which is the natural log of the betweenness centrality of candidate k, and Ln_DCent_{kd}, which is the natural log of the degree centrality of candidate

k. Degree centrality, or the number of of individual someone is connected to, captures the extent of a candidate's local connectedness. In their portion of the network, individuals with greater degree centrality are better connected because they have more immediate ties. In contrast, betweenness centrality captures the global connectedness of candidates. It is measured by dividing the number of shortest paths between people in the network that run through the candidate.

X_{ikd} is a vector of observable voter-respondent and candidate characteristics, v_d is an unobservable affecting all candidates in district j, w_i controls for voter-respondent fixed effects, y_k controls for candidate fixed effects, and u_{kid} is an idiosyncratic error term.

Y_{ikd} is the outcome of interest, and we examine two outcome variables: (1) $Favor_{ikd}$, and (2) $Vote_{ikd}$. The former is voter-respondent i's pre-election favorability rating of candidate k, and the latter is self-reported vote in the actual elections.

5.2.1 Results

Ordinary Least Squares (OLS) estimates of Eq. 2 with voter-respondent favorability ratings and reported vote as outcomes of interest are shown in Tables 5 and 6, respectively.

Tables 5 shows how voter-candidate familial distance relates to voters' pre-election favorability ratings. The association is negative and nonlinear. That is, voters are likely to favor the closer candidate. The statistically significant nonlinearity implies that the more socially distant the candidate is, the less family ties matter to voters' favorability ratings. Column 1 indicates that a change in voter-candidate familial distance from one degree of separation to two degrees is associated with a 0.67 percentage point reduction in the voter's favorability rating of the candidate (Favorability ratings are on a Likert scale on the interval $[-3; +3]$). This negative relationship is robust to controlling for voter demographics, candidate observable characteristics, district fixed effects, as well as voter and candidate fixed effects (columns 2–6).

This set of results provides evidence of the strong correlation between voter-candidate

family ties and voter behavior. However, such a correlation is easily attributable to a variety of potential explanations. Even so, there are explanations that we can rule-out at the onset. First, it is obvious that reverse-causation would not explain the correlation – voters' political preferences are unlikely the cause of the observed voter-candidate familial ties. Second, we can rule-out "name recognition" or candidate popularity, as the driver of the relationship between familial distance and favorability ratings of candidates. Even after controlling for candidate's degree centrality (i.e. number of candidate's namesake) and betweenness centrality (i.e. how well-positioned the candidate is to connect voters from disparate parts of the network), the effect of familial distance still holds (column 4).

That said, the results accommodate other substantive explanations. Familial distance might simply capture voter's personal affinity with a candidate. It might also proxy for policy alignment with the candidate's platform. It is also possible that voters know more the preferences of close relatives more than the policy preferences of other candidates, and that voters are more confident that candidates who are close relatives can commit to such policies.

The panel nature of our data gives us leverage to test the importance of clientelistic mechanism in explaining the observed effect of family distance on voter behavior. To do this, we regress $Vote_{ikd}$, individual i's vote choice, on their distance from the candidate while controlling for initial leanings, as captured by the variable $Favor_{ikd}$. If we believe that voters' pre-election favorability ratings capture personality affinity, policy alignment or platform identification – and if we find that voters who are proximate to a candidate are more likely to support them even after controlling for such initial leanings – then it is suggestive that clientelistic targeting in the run up to elections occurs along family networks.

Table 6 shows the results. Voter-candidate familial distance is negatively correlated with voter support and the association is nonlinear. Column 1 indicates that a change in voter-candidate familial distance from one degree of separation to two degrees is associated with a 0.20 percentage point reduction in the probability that the voter will vote for the candidate.

As above, this negative relationship is robust to controlling for voter demographics, candidate betweenness centrality and degree centrality, candidate observable characteristics, district fixed effects, as well as voter and candidate fixed effects (columns 2–6).

Table 5: The effect of familial distance on candidate favorability ratings.

Dependent Variable: Favorability Rating of a Candidate						
	(1)	(2)	(3)	(4)	(5)	(6)
Familial Distance	-0.67***	-0.62***	-0.69***	-0.54***	-0.58***	-0.69***
	(0.14)	(0.14)	(0.14)	(0.14)	(0.14)	(0.15)
Familial Distance^2	p 0.088***	0.078***	0.087***	0.077***	0.083***	0.10***
	(0.024)	(0.023)	(0.024)	(0.024)	(0.025)	(0.026)
Log Betweenness Centrality				-0.0032		
(of candidate)				(0.0059)		
Log Degree Centrality				0.015		
(of candidate)				(0.015)		
Constant	1.36***	1.63***	1.68***	1.20***	0.94***	0.82***
	(0.20)	(0.24)	(0.24)	(0.27)	(0.27)	(0.23)
Voter-respondent Controls	NO	YES	YES	YES	YES	.
District Fixed Effects	NO	NO	YES	YES	YES	YES
Candidate Controls	NO	NO	NO	YES	.	.
Candidate Fixed Effects	NO	NO	NO	NO	YES	YES
Voter-respondent Fixed Effects	NO	NO	NO	NO	NO	YES
No. of Observations	14,156	14,156	14,156	14,156	14,156	14,156
No. of Voter-respondents (i)	895	895	895	895	895	895
No. of Candidates (k)	41	41	41	41	41	41
R-squared	0.006	0.016	0.018	0.045	0.088	0.249

Notes: Voter-respondents' favorability ratings of candidates are on a Likert scale $[-3, +3]$. Familial distance is the number of degrees between voter-respondent and candidate in the familial network. Voter-respondent controls are listed in Table 3. Candidate controls are age, gender, incumbency status (relation to incumbent), and position. Huber/White robust standard errors clustered at the respondent level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 6: The effect of familial distance on the probability of supporting a candidate at the polls.

Dependent Variable: Vote = 1 if voter-respondent reported voting for a candidate.						
	(1)	(2)	(3)	(4)	(5)	(6)
Familial Distance	-0.20***	-0.20***	-0.20***	-0.16***	-0.20***	-0.20***
	(0.036)	(0.036)	(0.038)	(0.038)	(0.039)	(0.048)
Familial Distance^2	0.027***	0.027***	0.027***	0.026***	0.031***	0.032***
	(0.0062)	(0.0062)	(0.0063)	(0.0063)	(0.0065)	(0.0083)
Favorability Rating	0.10***	0.10***	0.10***	0.095***	0.085***	0.10***
	(0.0027)	(0.0028)	(0.0028)	(0.0028)	(0.0029)	(0.0035)
Log Betweenness Centrality (of candidate)				-0.0054***		
				(0.0019)		
Log Degree Centrality (of candidate)				0.015***		
				(0.0049)		
Constant	0.64***	0.62***	0.62***	0.66***	0.35***	0.37***
	(0.052)	(0.057)	(0.057)	(0.071)	(0.061)	(0.071)
Voter-respondent Controls	NO	YES	YES	YES	YES	.
District Fixed Effects	NO	NO	YES	YES	YES	YES
Candidate Controls	NO	NO	NO	YES	.	.
Candidate Fixed Effects	NO	NO	NO	NO	YES	YES
Voter-respondent Fixed Effects	NO	NO	NO	NO	NO	YES
No. of Observations	12,494	12,494	12,494	12,494	12,494	12,494
No. of Voter-respondents (i)	895	895	895	895	895	895
No. of Candidates (k)	41	41	41	41	41	41
R-squared	0.137	0.138	0.139	0.183	0.236	0.264

Notes: Familial distance is the number of degrees between voter-respondent and candidate in the familial network. Voter-respondent controls are listed in Table 3. Candidate controls are age, gender, incumbency status (relation to incumbent), and position. Huber/White robust standard errors clustered at the respondent level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

5.3 Does clientelism explain why family networks influence voter behavior?

The set of results presented in Table 6 above, although compelling, is still only suggestive that clientelism is the driver of the observed relationship between voter-candidate family ties and who voter support at the polls. Even if pre-election candidate leanings are controlled for, the observed relationship would still accommodate alternative explanations. For example, in the run-up to elections, voters tend to seek more information about candidates closest to them, subsequently learn more about these candidates, and thus end up voting for the same candidates.

We now explore the data for direct evidence that family ties influence voter behavior because politicians target vote-buying efforts to socially proximate individuals in their family networks. Our goal is to show that, the closer the voter is to a vote-buying candidate, the more vote-buying is effective in *keeping* the support of the same voter if he favors the candidate to begin with, and in *winning* the support of the same voter if he does not initially favor the candidate. Put differently, the closer the voter is to the candidate, the more likely vote-buying would result in *vote-switching* to the same candidate (and conversely, the less likely vote-buying would result in vote-switching *away* from the same candidate).

Given concerns about social desirability bias in reporting personal experiences of vote-buying, we opted to simply ask voters about their perception of the extent of vote-buying in their village. Specifically, we asked them, "In your own perception, approximately what fraction of the voting population of your barangay was offered money by politicians this last election?"[4] We argue, however, that perceptions capture not only what voters observe around them but also their own personal exposure to vote-buying. If perceptions of vote-buying only captured the vote-buying that other voters experienced but that the respondents only observed, then such perceptions should not vary with incidence of respondents' vote-

[4]The possible answers are 0, 0.2, 0.4, 0.6, 0.8, or 1.

switching. If, however, perceptions of vote-buying *did* capture respondents' exposure to vote-buying, and that such exposure causes voters to change their initial leanings, then perceptions of vote-buying should explain vote-switching in the run-up to elections, in ways hypothesized above.

To formally test our argument, we estimate the following model:

$$
\begin{aligned}
&Switched_{ikd} = \\
&\phi Perceived\_Vote\text{-}Buying_{id} + \alpha_0 Familial\_Distance_{ikd} + \xi_0 Familial\_Distance^2_{ikd} + \\
&\qquad \alpha_1\ Perceived\_Vote\text{-}Buying_{id} * Familial\_Distance_{ikd} + \\
&\qquad \xi_1 Perceived\_Vote\text{-}Buying_{id} * Familial\_Distance^2_{ikd} \\
&\qquad + \gamma Ln\_BCent_{kd} + \delta Ln\_DCent_{kd} + \beta X_{ikd} + v_d + y_k + u_{ikd}
\end{aligned}
\tag{3}
$$

where $Perceived\_Vote\text{-}Buying_{id}$ is the response to the survey question stated above. As before, $Familial\_Distance_{ikd}$ is the shortest distance in the network between voter-respondent i and city-candidate k in district d. Higher values mean greater degrees of separation between the voter and the candidate. We again control for the square of $Familial\_Distance_{ikd}$ to account for potential nonlinearities.

We control for Ln_BCent_{kd}, which is the natural log of the betweenness centrality of candidate k, and Ln_DCent_{kd}, which is the natural log of the degree centrality of candidate k. X_{ikd} is a vector of observable voter-respondent and candidate characteristics, v_d is an unobservable affecting all candidates in district j, y_k controls for candidate fixed effects, and u_{kid} is an idiosyncratic error term.

We look at two types of switching, and hence two outcomes: $Switched\_Away_{ikd}$, which is a binary indicator that takes the value of 1 if voter i did not support candidate k given that candidate k was the initial favorite, and 0 otherwise, and $Switched\_To_{ikd}$, which is a binary variable that takes the value of 1 if voter i did support candidate k even if candidate

k was not the initial favorite, and 0 otherwise.[5]

5.3.1 Results

Table 7 shows the results of the OLS estimates of Eq. 3. Columns (1) - (3) show results when the outcome of interest is $Switched\_Away_{ikd}$, while columns (4) - (6) show the results when the outcome of interest is $Switched\_To_{ikd}$.

The first thing to note is that perceived vote-buying (PVB) is negatively correlated with $Switched\_Away_{ikd}$ but has no significant relationship with $Switched\_To_{ikd}$. This implies that voters who report higher incidence of vote-buying are much less likely to switch away from an initially favored candidate. The strong relationship between PVB and vote-switching indicates how PVB is a good proxy for voters' personal experience with vote-buying. It corroborates the finding by (Hicken et al., 2015; Hicken and Ravanilla, 2015) that demonstrate that vote-selling is predictive of who voters support at the polls in this particular context.

Importantly, family ties and PVB interact in ways we expect it would. Specifically, the interaction between PVB and social distance is positive as it relates to switching away from a given candidate (column 3). So, the less filially connected a voter is to a candidate, the more likely vote-buying would result in switching away from the same candidate. Put differently, the closer the voter is to the candidate, the less likely vote-buying would result in switching away from the same candidate.

Model 3 also illustrates how when PVB is added to the model, it absorbs much of the effect that familial distance has on switching away in model 2. This suggests to us that being targeted *and* being close to the candidate is what makes proximity such a strong predictor of electoral support. Put differently, vote-buying is most effective in influencing the behavior of voters with close ties to candidates.

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[5]When there are only 2 candidates for an elective position, $Switched\_Away_{ikd}$ and $Switched\_To_{ikd}$ is the converse of each other. The same is not true for more than 2 candidates.

Table 7: The effect of familial distance and vote-buying perceptions on vote-switching in the run-up to elections.

	Switched Away			Switched To		
	(1)	(2)	(3)	(4)	(5)	(6)
Perception of vote-buying (PVB)	-0.040*		-0.78***	0.0026		-0.40
	(0.021)		(0.28)	(0.014)		(0.25)
Familial Distance (SD)		0.23***	-0.094		-0.11**	-0.26**
		(0.063)	(0.15)		(0.053)	(0.12)
Familial Distance^2 (SD2)		-0.039***	0.016		0.017*	0.039*
		(0.012)	(0.028)		(0.0087)	(0.020)
PVB*SD			0.53**			0.26
			(0.21)			(0.17)
PVB*SD2			-0.090**			-0.038
			(0.039)			(0.029)
District Fixed Effects	YES	YES	YES	YES	YES	YES
Candidate Fixed Effects	YES	YES	YES	YES	YES	YES
Voter-respondent Controls	YES	YES	YES	YES	YES	YES
No. of Observations	4,605	4,389	4,389	5,865	5,660	5,660
No. of Voter-respondents (i)	895	895	895	895	895	895
No. of Candidates (k)	41	41	41	41	41	41
R-squared	0.189	0.188	0.190	0.130	0.133	0.134

Notes: *Switched Away*=1 voter-respondent reported *not* voting for an initially favored candidate. *Switched To*=1 voter-respondent reported voting for a candidate who is *not* an initial favorite. Perceived vote-buying in the village is a value between 0 and 1, and is the respondents' answer to the question, "In your own perception, approximately what fraction of the voting population of your barangay was offered money by politicians this last election?" and the possible answers are 0, 0.2, 0.4, 0.6, 0.8 or 1. Familial distance is the number of degrees between voter-respondent and candidate in the familial network. Huber/White robust standard errors clustered at the respondent level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

6 Conclusion

*Include here insights from "what have we learned" discussions with Jamie Davidson and Jacod Ricks.

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