Connections and Elections in Lahore: How Network Centrality Affects Electoral Politics in Pakistan

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First printing October 2016.

The views expressed in this document are those of the authors and do not necessarily reflect the views of the Centre for Research in Economics and Business or the Lahore School of Economics.

Preface

The Centre for Research in Economics and Business (CREB) was established in 2007 to conduct policy-oriented research with a rigorous academic perspective on key development issues facing Pakistan. In addition, CREB (i) facilitates and coordinates research by faculty at the Lahore School of Economics, (ii) hosts visiting international scholars undertaking research on Pakistan, and (iii) administers the Lahore School's postgraduate program leading to the MPhil and PhD degrees.

An important goal of CREB is to promote public debate on policy issues through conferences, seminars, and publications. In this connection, CREB organizes the Lahore School's Annual Conference on the Management of the Pakistan Economy, the proceedings of which are published in a special issue of the Lahore Journal of Economics.

The CREB Working Paper Series was initiated in 2008 to bring to a wider audience the research being carried out at the Centre. It is hoped that these papers will promote discussion on the subject and contribute to a better understanding of economic and business processes and development issues in Pakistan. Comments and feedback on these papers are welcome.

Abstract

This paper creates a unique map of Lahore's political and nonpolitical networks to gauge the degree to which the area's politicians are interconnected. In Pakistan, a politician must be awarded a party ticket before standing for election; the candidate is usually a prominent and well-connected politician chosen from a pool of local politicians. By mapping these political and nonpolitical connections, we identify the most centrally located politicians on the basis of their eigenvector centrality. We use data on the 2013 provincial (Punjab Assembly) and National Assembly elections to look at the relationship between centrality and the likelihood of securing a party ticket and, subsequently, of winning a seat in the general elections.

The results show that politics in Pakistan are fairly sophisticated; parties tend to field politically well-connected candidates from constituencies where previous elections were highly competitive to increase their odds of winning. At the provincial level, the results show that party tickets are awarded to candidates who are politically well-connected within and across parties, while elections are won by candidates who are politically and socially well connected within the party. This implies that, at the provincial level, voters give their ballots to the party rather than to individual candidates since only within-party connectedness matters.

At the national level, the results reveal that tickets are awarded to candidates who are socially better connected within and across parties, but that elections are won by candidates who are politically better connected within and across parties. This implies that, at the national level, people vote for candidates who are politically better connected, possibly reflecting the belief that these connections will translate into greater political influence on the national stage.

Acknowledgements

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1. Introduction

The choice of candidates in electoral politics can be a long, difficult process, as illustrated by the primary system that exists in countries such as the US. Typically, in Pakistan, candidates must appeal to members of their own party before they are given party tickets and then appeal to a majority of voters in order to win the seat. If one adds to this the argument that parties will field their strongest candidates in the most competitive electoral races, then the choice of candidate for a particular electoral constituency becomes a balancing act between those who are strong within their own party and those considered to be more popular with the electorate. We aim to analyze exactly this at the provincial and national level in Pakistan.

First, we establish that parties prefer to field more central candidates from constituencies where the previous election was a close contest because central candidates have a higher likelihood of securing a win. Our results show that, in National Assembly constituencies characterized by a high voter turnout and a close election in 2008, parties fielded candidates who were politically well connected both within and across parties in 2013. No such efforts were made for the Punjab Assembly constituencies where the party appeared to matter more than the individual at the provincial level.

Second, our results establish that parties give election tickets to more central politicians in order to increase their odds of winning. At the provincial level, tickets are given to candidates who are politically well connected both within and across parties; sound political connections within a party can ensure that sufficient campaign funds are generated, while strong political connections outside the party can determine a larger vote bank. The idea behind this is that political connections with party elites help candidates gain access to party leaders as well as key government officials, which makes it easier to obtain campaign funds and resolve local-level problems. At the national level, tickets are given to politicians who are socially well connected within their own party and across other parties; the party leadership presumes that strong social

connections will generate a larger vote bank because the electorate is more likely to be familiar with the candidate.

Finally, our results distinguish between those connections that improve the chances of being awarded a party ticket and those connections that increase the likelihood of winning a seat. The findings show that only within-party political and social connectedness matters in winning a provincial assembly seat because votes are cast on the basis of the party, not the individual. At the national level, the opposite holds: the individual's own political connections matter in addition to within-party political connections. Voters tend to choose prominent, politically connected politicians because they see them as being more dominant and resourceful than other candidates, and therefore better able to bring about policy changes and reforms as well as to deliver goods to their constituencies.

We carry out a network analysis of electoral politics in Lahore during the 2013 general elections. The case of Lahore is interesting because it is the largest, most visible city in Pakistan's second-largest province. Using politician-level data, we create a series of unique network maps tracing politicians' political and social links, drawing on Currarini, Jackson and Pin (2009). We use these maps to identify the most centrally located candidates both within and across parties based on political and nonpolitical factors. Finally, we analyze how the centrality of a candidate within his or her own party and across parties affects the probability of being shortlisted for a party ticket, winning the party ticket and then winning the election in the constituency.

2.   A Review of the Literature

The literature shows that both political and nonpolitical factors determine political selection. Besley (2005) puts forward four ratios – attractiveness, success, opportunity cost and accountability – on which basis a candidate decides whether to stand for office. Suresh and Ramesh (2011) find that a number of factors influence political selection, including family, friends, caste, religion, the print and electronic media, family political affiliations, political activities in one's youth and associations with members of a legislative body. The importance of schooling and family is also illustrated by Besley, Pande and Rao (2005). Separating a candidate's political and nonpolitical connections allows one to gauge their relative importance in the electoral process.

The centrality measures we create for the sample of politicians in Lahore are divided into two categories: (i) party-specific (the centrality of a candidate within his or her own party) and (ii) nonparty-specific (the centrality of a candidate across all parties). These can have different effects: a candidate's centrality within the party may influence his or her chances of winning a party seat, while centrality across all parties may determine the candidate's chances of winning the majority of votes in an election. The idea behind voters' preference for relatively central politicians is that they see such candidates as better situated to garner government resources and resolve local problems.

Within these two categories, we create two subcategories, political and nonpolitical centrality, that measure a politician's centrality in terms of political characteristics (such as whether he or she is from a political family) and social characteristics (such as the schools he or she attended). Again, these can have different impacts at different stages of the electoral process. We also consider a politician's overall centrality in terms of both political and social characteristics within a single, unified network; this is called complete centrality. This gives us five categories of centrality: (i) party-specific political centrality, (ii) party-specific nonpolitical centrality, (iii) overall political centrality, (iv) overall nonpolitical centrality and (v) complete centrality.

In our empirical analysis, we examine the impact of each politician's eigenvector centrality score on electoral outcomes. The eigenvector centrality assumes that the centrality of a given node in a network is an increasing function of the centrality of all other nodes of the network to which that given node is connected. Fowler (2006) uses eigenvector centrality to identify central legislators by constructing co-sponsorship networks among members of the US Senate and House. Banerjee, Chandrasekhar, Duflo and Jackson (2013) also use eigenvector centrality and find that information on microfinance is diffused more quickly if the initial people with information on the program have higher eigenvector centrality scores.

The empirical literature on networks finds that the formation of links has certain advantages. In a model of favor exchange, Jackson, Rodriguez-Barraquer and Tan (2012) find that connections result in social "quilts" that illustrate the generation of social capital by way of people's mutual support. Similarly, Bala and Goyal (2000) show that individuals form

networks, taking into account the costs and benefits of doing so. Bloch, Genicot and Ray (2008) construct a social network risk-sharing model to show that transfers occur only between agents who are directly linked with one another.

Acemoglu, García-Jimeno and Robinson (2015) find that network formation has positive spillovers. They construct a network of municipalities in Colombia to compare the median fraction of the population living above the poverty line in each municipality, both with and without the equilibrium response of other municipalities. The study finds that network effects produce a dramatic shift in this indicator, showing that building state capacity has positive spillovers in a network. The networks in our study are also built on the principle that greater connections have greater advantages by making a politician politically or socially more central.

While the literature on network links in politics is fairly sparse, several studies illustrate the impact of such connections. Sinclair (2011) shows that good presidential candidates in the US tend to be centrally located in a network. Using factors such as education, personal attributes, publications, honors, political activities, electoral positions, positions in Congress and government, and membership of professional associations, social groups, international delegations and military commissions, the study traces the links among US politicians and identifies central candidates using the Gil-Schmidt power centrality index. Our paper, too, links politicians on the basis of political and nonpolitical factors and identifies central candidates using the eigenvector centrality measure. Szwarcberg (2012) finds that strong political affiliation is not just a product of political networks but also depends on social networks.

Connections can also have a downside. Fisman (2001) finds that, in the face of rumors of the Indonesian President's ill health, politically well-connected firms earned lower share returns than those with less political exposure. However, our study framework suggests that connections benefit politicians. Banerjee, Chandrasekhar, Duflo and Jackson (2014) show that people can correctly identify the central participants of a community by ranking them according to the diffusion centrality measures generated through a social network. In the context of our paper, this shows that, at the electorate level, people can (and do) identify central politicians and choose to vote for them.

Much of the literature on electoral politics analyzes how potential voters decide to cast their vote or which candidates tend to win. Holbrook (2009) studies the 2008 US presidential election and, in comparison with prior years, finds that racial considerations may have crowded out economic ones. Gerber, Green and Larimer (2008) find that people vote to fulfill a civic duty and comply with social norms. In the context of a social network of friends and family, Abrams, Iversen and Soskice (2011) find that people vote to win the approval of network members, not to influence the election outcome, while Delavande and Manski (2012) suggest that people are more likely to vote if they know they can influence the outcome to their liking. Lee, Moretti and Butler (2004) argue that voters "elect policies" rather than influencing them and that members of the US House alter their positions in response to a large exogenous change in their probability of winning the election. Bharucha (2003) contends that the re-election of parties depends on their ability to incorporate marginal voters into the political domain by allowing them to influence policy.

Our paper contributes to the literature on electoral politics by showing that, while most people see voting as merely a civic duty, well-connected politicians have a higher likelihood of securing these votes than less connected, less central candidates. Greater connectivity translates into popularity and prominence. People are more likely to vote for politically connected leaders if they expect such candidates to be able to deliver on their electoral promises.

Our findings also show that parties prefer to field central candidates from constituencies where the previous election was highly competitive. Parties will give election tickets to the more central politicians to increase their odds of winning. Using political and nonpolitical links among politicians based in Lahore, we generate five different categories of networks and estimate the centrality of politicians within these networks. To our knowledge, this has not been done before. Accordingly, this paper bridges the gap in the literature on how parties determine which candidates to select and how people vote, and on how centrality in a network affects votes and elections.

Section 3 provides a background to Pakistan's politics to demonstrate the importance of the 2013 general elections. Section 4 presents a theoretical framework. Section 5 measures network centrality and Section 6

describes the empirical methodology. Section 7 presents the study's results, followed by the conclusion.

3.   Background

The history of governance in Pakistan is marked by periods of democratic government separated by stretches of military rule. What stands out in Pakistan's case is that, until 2013, there had been no two consecutive periods of democratic rule; in other words, the country had not experienced two consecutive democratic elections.

The 2008 elections were held after almost ten years of military government and were primarily a contest between the two largest parties: the Pakistan Muslim League (Nawaz) (PML-N), whose leader, Nawaz Sharif, was removed from office in a military coup led by General Pervez Musharraf in 1999; and the Pakistan People's Party (PPP), which had been led by Benazir Bhutto until she was assassinated in 2007. Thus, the general elections of 2013 marked the first time that a democratically elected government completed its term and was to be followed by another democratically elected government. Apart from these two parties, a third party, the Pakistan Tehreek-e-Insaaf (PTI), led by former cricketer Imran Khan, also stood for election.

During a general election in Pakistan, votes are cast simultaneously for candidates for the National Assembly and the four provincial assemblies (the federal and subnational legislative bodies, respectively). The National Assembly has a total of 342 seats, of which 272 are directly elected members and 70 are reserved seats for women (60 seats) and minorities (10 seats). Under the present allocation of seats, Punjab has the highest representation with 148 seats (of which 13 seats belong to Lahore), followed by Sindh with 61 seats, Khyber Pakhtunkhwa with 35 seats, Balochistan with 14 seats, the Federally Administered Tribal Areas with 12 seats and the federal capital with 2 seats. The Punjab Assembly – the country's largest provincial assembly – has a total of 371 seats, with 66 seats reserved for women and 8 seats reserved for minorities.

Since there are no primary elections in Pakistan, candidates for the general elections are chosen by the leaders of each party. This usually entails selecting key party officials or "office holders" from each electoral area or constituency and then shortlisting potential candidates for each constituency. Party leaders choose a candidate for each provincial and

federal constituency from this shortlist. These candidates compete for assembly seats in the general elections. The party has complete autonomy in selecting politicians as office holders, as shortlisted potential candidates and as the candidates eventually chosen to stand for provincial and national seats. Finally, voters in each constituency vote for individual candidates (and not the entire party slate).

We hypothesize that candidates who are centrally located in a network are more likely to get a party ticket because they are well connected. While voters also take into account the centrality of candidates when casting their votes, the type of centrality important to party elites and to voters is different.

We estimate a model that analyzes whether parties tend to choose their most central candidates for the most competitive constituencies and then test to see if this centrality also helps determine which candidates are chosen by each party to contest particular election seats in Lahore. Finally, we estimate a model that looks at the role of centrality in the election results for the 2013 elections in Lahore.

4. Theoretical Framework

Social networks imply that people connected to one another can influence each other's opinion and choices depending on the degree of their connection. This principle can be applied to the structure of a political network, which, like any other network, is created on the basis of similarity. However, similar characteristics become less dominant as we move outward from the first-degree neighbors of a given node i to other-degree neighbors within the same network. This shows that people have closer ties and interact more with their first-degree neighbors compared to those located at the second, third … k^{th} degree.

This phenomenon is illustrated by the DeGroot model (Jackson, 2011) in which the network is represented by a weighted, directed trust matrix; weights are assigned depending on the degree of connection a neighbor has with a given node i. The trust matrix T_{ab} is therefore calculated by normalizing the link between any two agents by the degree of their connection. This link between any two agents is represented by 1. Thus, T_{ab} is the weight that person a assigns to person b's opinion.

This matrix is denoted by

$$T_{ij} = \frac{g_{ij}}{d_i(g)}$$

When agents i and j are linked to one another, g_{ij} will be equal to 1. Here, $d_i(g)$ represents the proximity between the two agents according to which the weights are assigned. In this model, all agents initially hold an opinion or belief that is revised over time. As "high-belief" people interact with "low-belief" people, the former's beliefs fall and the latter's beliefs rise until a consensus is reached (Jackson, 2011). This consensus, within the structure of the political network employed in the study, represents the decision to give a party ticket to the most central politician.

Parties reach a consensus on the most central politicians based on those with the highest number of linkages. The likelihood of being nominated by a party depends on a politician's centrality within a network and his or her personal characteristics; winning the election depends on his or her centrality within a network and personal characteristics as well as the benefits he or she promises to bring to the constituency once elected.

In this model, the centrality measure is a combination of eigenvector centrality and the trust matrix discussed above. Eigenvector centrality is represented by $A^T X = \lambda X$ where X is an *n* x *n* matrix, its columns are the eigenvectors of *A* and λ is a diagonal of eigenvalues. The trust matrix is represented by $T_{ij} = \frac{g_{ij}}{d_i(g)}$. Replacing matrix X with matrix T, we obtain the centrality measure $A^T X = \lambda T$.

So, $T_{ij} \lambda = \frac{g_{ij}}{d_i(g)} . \lambda$

when nodes i and j are connected and g_{ij} = 1.

Therefore, $\frac{1}{d_i(g)} . \lambda = \frac{\lambda}{d_i(g)}$.

In this model, the politician's personal characteristics are represented by a matrix Z and include both political and nonpolitical attributes. The benefits a politician promises to bring to his or her constituency once elected are derived from Fleck (2001). People vote for politicians on the basis of their policies and the policies of the party they represent. Thus, they vote for politicians who will serve their constituency and who present policy agendas of working for its betterment.

According to Fleck (2001), the total value of benefits a politician brings to a constituency i is $U(b_i) = a[I^2 - (I - b_i)^2]$ and the marginal value of benefits to constituency i is $\frac{\partial U(b_i)}{\partial b_i} = 2a(I - b_i)$.

Here, b is the allocation of total benefits B across m constituencies, I is the ideal quantity of benefits and a is a constant that represents the slope of the marginal benefit curve. In this framework, there are two types of voters: loyal voters (v_{Li}) and swing voters (v_{Si}). Loyal voters are those who vote for a party or politician regardless of whether the latter delivered during their term and regardless of the policy they plan to pursue if they win. Swing voters are the exact opposite. Any shocks in the general election are represented by η_G where $\eta_G \sim u(-n, n)$ (Fleck, 2001).

For a constituency i, the expected number of votes is

$$v_{Li} + v_{si}U(b_i)(aI^2)^{-1}$$

while the actual number of votes is

$$v_{Li} + v_{si}U(b_i)(aI^2)^{-1} + \eta_G$$

When the probability is greater than 0 and less than 1, the likelihood of a win as a function of benefits alone is derived as follows:

$$W(b) = \frac{\frac{\left[v_{Li} + v_{Si}U(bi)(aI^2)^{-1}\right] + n - 0.5}{[v_{Li} + v_{Si}]}}{2n} \text{ (Fleck, 2001)}.$$

Being Nominated by the Party

Party nomination depends on a politician's centrality and his or her personal characteristics:

$$PN(g, Z) = \frac{\lambda}{d_i(g)} \cdot Z \tag{1}$$

Assuming that parties nominate their most central politicians, we differentiate with respect to centrality, such that

$$\frac{\partial PN(g, Z)}{\partial g} = \frac{d_i(g)\frac{d}{dx}[\lambda] - \lambda\frac{d}{dx}[d_i(g)]}{[d_i(g)]^2} \cdot Z \tag{2}$$

$$\cdots \ = \ \frac{d_i(g)\lambda' - \lambda d_i{}'(g)}{[d_i(g)]^2} \cdot Z \tag{3}$$

$$\cdots \ = \ \frac{-Z\lambda d_i{}'(g) + Z d_i(g)\lambda'}{[d_i(g)]^2} \tag{4}$$

Higher values of λ mean greater centrality, while higher values of $d_i(g)$ mean lower centrality. The more central a politician, the greater will be his or her probability of being nominated by the party to contest the general elections.

Winning the Election

Winning depends on centrality, a politician's personal characteristics and the benefits he or she promises to bring the constituency once elected:

$$W(g, Z, b) \ = \ \frac{\lambda}{d_i(g)} \cdot Z \cdot \frac{\frac{\left[v_{Li} + v_{Si} U(bi)(aI^2)^{-1}\right] + n - 0.5}{[v_{Li} + v_{Si}]}}{2n} \tag{5}$$

Assuming that the most central politicians win elections, we differentiate with respect to centrality such that

$$\frac{\partial W(g,Z,b)}{\partial g} \ = \ \frac{d_i(g)\frac{d}{dx}[\lambda] - \lambda \frac{d}{dx}[d_i(g)]}{[d_i(g)]^2} \cdot Z \cdot \frac{\frac{\left[v_{Li} + v_{Si} U(bi)(aI^2)^{-1}\right] + n - 0.5}{[v_{Li} + v_{Si}]}}{2n} \tag{6}$$

$$= \ \frac{d_i(g)\lambda' - \lambda d_i{}'(g)}{[d_i(g)]^2} \cdot Z \cdot \frac{\frac{\left[v_{Li} + v_{Si} U(bi)(aI^2)^{-1}\right] + n - 0.5}{[v_{Li} + v_{Si}]}}{2n} \tag{7}$$

$$= \ \frac{-Z\lambda d_i{}'(g) + Z d_i(g)\lambda'}{[d_i(g)]^2} \cdot \frac{\frac{\left[v_{Li} + v_{Si} U(bi)(aI^2)^{-1}\right] + n - 0.5}{[v_{Li} + v_{Si}]}}{2n} \tag{8}$$

Higher values of λ mean greater centrality, while higher values of $d_i(g)$ mean lower centrality. The more central a politician, the greater will be his or her probability of winning an election.

5. Measuring Network Centrality

A survey of 142 key politicians in Lahore was undertaken to determine their political and nonpolitical links. These politicians constitute the core

group of people from Pakistan's three main parties – the PML-N, the PPP and PTI – from which candidates were selected to compete for assembly seats in the 2013 elections. Having established these links among the sample and generated network maps, we calculate each politician's eigenvector centrality within each network and identify the central-most politicians in each category. Using the centrality scores, we test the impact of centrality on the likelihood of (i) being allotted a competitive constituency, (ii) being nominated to stand for election by the party and (iii) eventually winning the election.

5.1. Eigenvector Centrality and Descriptive Statistics

The eigenvector centrality of a given node in a network is defined as an increasing function of the centrality of all other nodes of the network to which the given node is connected. This implies that being connected to a central agent in a network adds to one's own centrality. For an adjacency matrix A, the eigenvector centrality measure will take a general form (Bonacich & Lloyd, 2001).

The adjacency matrix is expressed as equation (9) below, where a_{ij} means that i contributes to j's status and x is a vector of centrality scores:

$$x_i = a_{1i}x_1 + a_{2i}x_2 + \ldots + a_{ni}x_n \tag{9}$$

The matrix representation for equation (9) above takes the form $A^T x = x$ where A^T is the transpose of A. Under eigenvector centrality, each node's centrality in a network is considered proportional to the weighted sum of all other nodes to which that given node is connected, so equation (9) can be expressed as

$$\lambda x_i = a_{1i}x_1 + a_{2i}x_2 + \ldots + a_{ni}x_n \tag{10}$$

The matrix representation for equation (10) is $A^T x = \lambda x$. If A is an $n \times n$ matrix, then equation (10) will have n different solutions corresponding to n values of λ.

The matrix representation for the general equation for calculating eigenvector centrality is $A^T X = X\lambda$. Here, X is an $n \times n$ matrix. Its columns are the eigenvectors of A and λ is the diagonal matrix of eigenvalues (Bonacich & Lloyd, 2001). The requirement that all eigenvector values

should be positive (based on the Perron–Frobenius theorem) means that only the largest eigenvalues will constitute the centrality measure.

Five categories of eigenvector centrality are calculated: (i) party-specific political centrality (how politically central is a politician in his or her own party?); (ii) party-specific nonpolitical centrality (how central is a politician in his or her own party, based on nonpolitical characteristics?); (iii) political centrality (how politically central is a politician across parties?); (iv) nonpolitical centrality (how central is a politician across parties, based on nonpolitical characteristics?); and (v) complete centrality (how central is a politician across parties, based on overall characteristics?).

Political centrality is based on two factors. The first is whether a politician has relatives who are or have been members of a legislative body or of the party he or she currently represents or has represented at a given point in time (in this case, PTI, the PML-N, the PPP or any other party. The second is the number of years the politician has represented his or her party and been contesting elections (whether 5, 10, 15 or more years). Nonpolitical centrality is based on the politician's *baradari* (caste), level of education, whether he or she attended an elite educational institution, own profession, family profession, membership of any professional organizations and membership of any social clubs.

Table 1 summarizes the basic characteristics of the sample based on these centrality measures and other political and nonpolitical factors. It gives the mean eigenvector centrality scores for politicians in five specific networks, that is, each politician's (i) party-specific political network, (ii) party-specific nonpolitical network, (iii) overall political network, (iv) overall nonpolitical network and (v) complete network. The eigenvector centrality values range between 0 and 1, where larger values signify higher centrality. The results show that most candidates are well connected in their complete network and are socially and politically well-connected within their parties. Although they are socially well-connected across other parties, their political connection across parties is not very strong.

Table 1: Descriptive statistics

Categories	Variables	Observations	Mean	SD
Centrality measures	Party-specific political eigenvector centrality	142	0.62	0.21
	Party-specific nonpolitical eigenvector centrality	142	0.65	0.24
	Overall political eigenvector centrality	142	0.41	0.26
	Overall nonpolitical eigenvector centrality	142	0.62	0.22
	Complete eigenvector centrality	142	0.64	0.20
Education level	Highest degree = matric (secondary school)	142	0.04	0.20
	Highest degree = intermediate (high school)	142	0.08	0.27
	Highest degree = undergraduate	142	0.47	0.50
	Highest degree = postgraduate or higher	142	0.35	0.48
	Foreign degree	142	0.13	0.33
Attended elite educational institution	Aitchison College	142	0.06	0.23
	Forman Christian College	142	0.15	0.36
	Government College University	142	0.13	0.34
	University of the Punjab	142	0.49	0.50
Own profession	Law	142	0.16	0.37
	Business	142	0.61	0.49
	Agriculture	142	0.16	0.37
Family's major profession	Law	142	0.15	0.36
	Business	142	0.53	0.50
	Agriculture	142	0.13	0.34
Political characteristics	Has/had relatives who are/were members of Parliament or assembly	142	0.30	0.46
	Switched political party	142	0.20	0.40
	Office holder	142	0.60	0.49
	5–9 years of representation	142	0.50	0.50
	10–14 years of representation	142	0.33	0.47
	More than 15 years of representation	142	0.20	0.40
	Won 2008 election	142	0.20	0.40
	Has won any previous election	142	0.25	0.44

Notes: The table reports the mean and standard deviation (SD) of all the variables employed in our empirical estimations for a sample of 142 politicians in Lahore. Information on each politician's schooling, educational institution attended, own profession, family profession and political characteristics was gathered through a survey. The eigenvector centrality measures were derived from the networks generated for the politicians based on this information.
Source: Authors' survey and calculations.

The data reveals that 47 percent of the sample have undergraduate degrees and 35 percent have postgraduate degrees or higher. Only 13 percent hold foreign degrees. The most commonly attended elite educational institution is Punjab University, accounting for 49 percent of the politicians surveyed. Most politicians are businesspersons or belong to a business family. About 16 percent each are lawyers and agriculturalists. The share of politicians surveyed who belong to families specializing in law or agriculture is roughly the same.

About 60 percent of the sample are officeholders: 50 percent have five to nine years' representation but only 20 percent have more than 15 years' representation. This shows that relatively less experienced politicians participated in the 2013 general elections. The data does not support the popular notion that Lahore is characterized by dynastic politics. Only 30 percent of the politicians who took part in the 2013 general elections have relatives who are or were provincial assembly or National Assembly members. Surprisingly, only 20 percent of incumbents participated in these elections.

In order to form a network, participants must have overlapping characteristics that engender common links and affiliations. For this purpose, we have chosen a wide variety of characteristics, both political and nonpolitical, to determine the network links between politicians.

The data gathered on nonpolitical links indicates the following characteristics for each politician: baradari (see Ibrahim, 2011), home town, academic institutions attended, profession apart from politics (see Fox & Lawless, 2005), business sector (for politicians who are also businesspersons), dominant family profession (to capture whether the politician is from an agricultural or business background), membership of any professional or social organizations (see Sinclair, 2007), and whether any male relative (father, grandfather, uncle or other) is or was a member of a provincial assembly or of the National Assembly (see Suresh & Ramesh, 2011).

The information on each politician's political characteristics was gathered through a series of questions on their current and previous political party affiliations, the year they joined a political party, the positions they have held in any party and the year they held that office, the number of times they have contested and won a general election (see Black, 1972), the

constituency they currently represent and those they represented previously, and the number of years of political representation.

Based on the data entered, we generate matrices and plot corresponding networks to trace the links among the politicians surveyed. The centrality of politicians in each network is calculated using their eigenvector centrality measure. The centrality scores generated for each network are then used to estimate empirically the impact of centrality on electoral outcomes.

A series of network maps is developed, using the information on the links between politicians. In each map, the nodes represent the politicians and the connections among these nodes arise based on factors common to different politicians. These networks are generated for political and nonpolitical factors collectively as well as separately. Party-based political and nonpolitical networks are also developed. For each category of network, we then identify the most centrally located politicians, using their eigenvector centrality scores.

5.2. Political Networks

The political networks are generated on the basis of a number of political factors. These include: (i) whether the politician has relatives who are or were members of a legislative body; (ii) the political party the politician currently represents or has represented at some given point in time; and (iii) how long he or she has represented the party and contested a general election (whether 5, 10, 15 years or more). Together, these factors help generate a group network of eight nodes, where each node represents one of these factors. In all, this network consists of 142 nodes.

The political network in Figure 1 shows the connections among all the politicians surveyed, where those with the most links lie at the core of the network and those with fewer links lie on the periphery. Thus, as one moves outward from the center of the political network, the number of links associated with a given node falls and the thickness of the lines forming the connections also decreases. Therefore, in such a network map, the most important politicians are those located in the center. An interesting observation is that different groups of politicians have different political factors in common, resulting in clusters within the network. The central-most politicians are those with connections in each cluster.

Figure 1: Network map of political characteristics
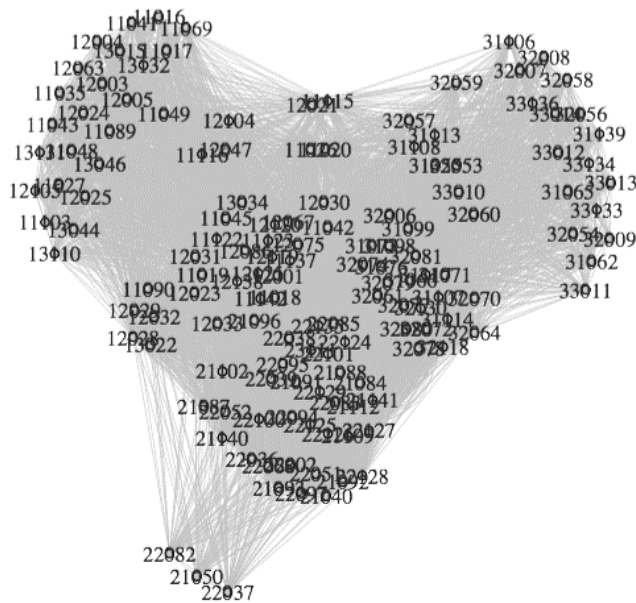
Note: The figure shows the links among all politicians based on **political** factors alone. The small blue dots denote the politicians and the number on each dot denotes each politician's unique code. The gray lines trace the links among the politicians.

Source: Authors' survey and calculations.

These clusters yield an interesting finding. It is generally believed that political power is concentrated in the hands of a small number of very similar politicians – which may have been the case in Pakistan's earlier political history. However, the network map above shows different regions of political clustering, which implies that a more diverse group of politicians is involved in Lahore's current electoral politics. Thus, there is significant heterogeneity in the political network.

5.3. Nonpolitical Networks

The nonpolitical networks are generated on the basis of nonpolitical factors: a politician's baradari, level of education, educational institutions attended, his or her own profession, family profession and membership of professional organizations and social clubs.

The nonpolitical network map in Figure 2 also consists of 142 nodes, where each node represents a politician. The links among these

politicians are established on the basis of 55 nonpolitical factors. Since each politician has at least one factor in common with the others, there are no independent nodes. The map also has a core-and-periphery structure where politicians with the most links lie in the center and those with the fewest are on the periphery. As one moves out from the center, the thickness of the lines forming the links also falls, showing that politicians on the periphery have fewer and fewer factors in common.

Figure 2: Network map of nonpolitical characteristics
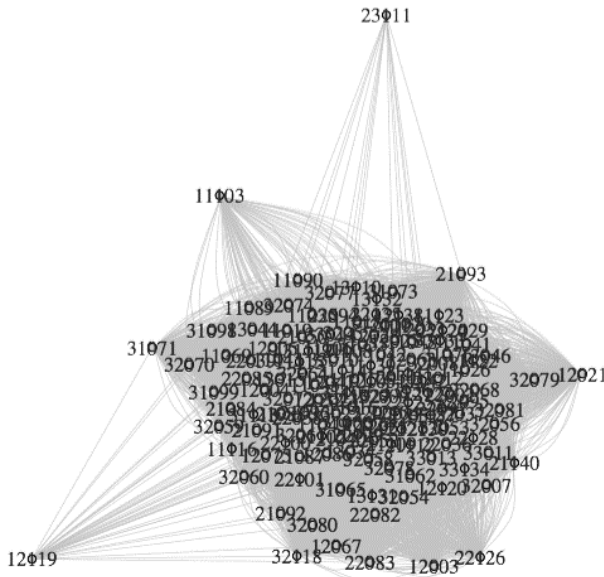
Note: The figure shows the links among all politicians based on **nonpolitical** factors alone. The small blue dots denote the politicians and the number on each dot denotes each politician's unique code. The gray lines trace the links among the politicians.

Source: Authors' survey and calculations.

Compared to the political network map in Figure 1, Figure 2 shows greater homogeneity (less diversity) in politicians' social connections. The tight cluster in the middle of the map shows that people have more nonpolitical factors in common. There are no subgroups within the network that distinguish one group from the other based on a few factors.

5.4. Complete Networks

Putting all the political and nonpolitical factors together (baradari, education, educational institutions attended, own profession, family

profession, membership of professional organizations and social clubs, party membership, years of representation as a politician and relatives who are or were legislative body members), we construct a group network map.

The complete network map in Figure 3 consists of 142 nodes, where each node represents a politician and the links among politicians arise based on the number of factors or characteristics they have in common. The complete network exhibits the greatest heterogeneity. The familiar core-and-periphery structure shows that politicians with the most links lie at the center of the network, while those on the periphery have the fewest links.

Figure 3: Network map of overall connections among politicians
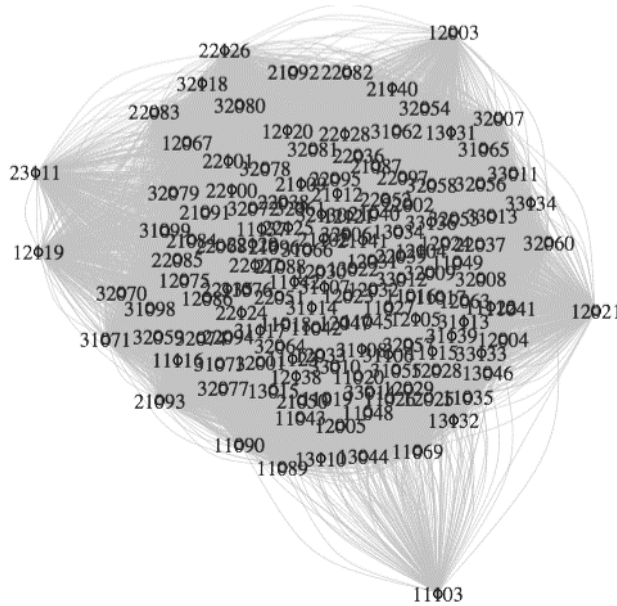
Note: The figure shows the links among all politicians based on **all sociopolitical** factors. The small blue dots denote the politicians and the number on each dot denotes each politician's unique code. The gray lines trace the links among the politicians.

Source: Authors' survey and calculations.

As one moves out from the center of the network and the network spreads, the number of links falls. Stronger connections among politicians are shown by thicker lines, implying that these politicians have more factors in common. Greater heterogeneity means that a variety of factors contribute to these connections and to the centrality of the politicians.

6. Empirical Methodology

This section describes the three models that are used to gauge the impact of centrality and connections on parties' political choices prior to the elections. This concerns which candidates are selected to represent which constituencies, and the impact of centrality on a politician's likelihood of getting a party ticket and winning an assembly seat in the elections.

6.1. Competing in Competitive Constituencies

First, we estimate whether political parties in Pakistan field their most central candidates from constituencies that had a higher voter turnout in the previous election or those where the election was very close (where the margin of victory was less than 25 percent). We argue that parties will field well-connected candidates from such constituencies because they are more likely to ensure a win for the party. This is tested using the following linear model:

$$C_i = \beta_0 + \beta_1 V_i + \beta_2 P_i + \varepsilon_i \tag{11}$$

Here, C_i is a vector of the five categories of centrality (party-specific political centrality, party-specific nonpolitical centrality, overall political centrality, overall nonpolitical centrality and complete centrality). V_i represents the level of competitiveness in the constituency in the previous election. In one set of regressions, this is measured by the voter turnout (%) in 2008; in another set of regressions, it is measured by the winner's margin of victory in the 2008 elections. For this category, we consider only those constituencies where the margin of victory was less than 25 percent. P_i is a vector of political variables used as controls in estimating the margin of victory (less than 25 percent): these are dummy variables representing office holders and politicians' previous wins.

6.2. Being Nominated by the Party

We also determine the impact of centrality measures and sociopolitical factors on a politician's chances of securing a party ticket to contest the general elections at the provincial as well as national level. For this analysis, the following linear probability model is estimated:

$$GT_i = \beta_0 + \beta_1 C_i + \beta_2 Z_i + \varepsilon_i \tag{12}$$

Here, GT_i is the binary dependent variable measuring whether the politician was nominated by the party to contest the elections at the provincial or national level. C_i represents the five categories of the centrality measure (party-specific political and nonpolitical centrality, overall political and nonpolitical centrality and complete centrality). Z_i is a vector of the dummy variables representing political and nonpolitical factors that were used as controls.

The nonpolitical variables used include characteristics evaluating politicians' level of education, the educational institutions they attended, their own profession and their family profession. The political variables are dummy variables equal to 1 for a politician (i) with relatives who are or were members of a legislative assembly, (ii) who has switched political parties, (iii) is an office holder, (iv) has a certain number of years of representation (5–9, 10–14, more than 15), and (v) is an incumbent or has contested a previous election.

When estimating the impact of political centrality, only the nonpolitical factors are used as controls. When estimating the impact of nonpolitical centrality on the binary dependent variable, only the political factors are included. No control variables are used when estimating the impact of being connected within the complete network on a politician's likelihood of getting a party ticket.

6.3.   Winning the 2013 Elections

Finally, we estimate the effect of social and political connections via the centrality measures on a politician's likelihood of winning an assembly seat at the provincial or national level:

$$W_i = \beta_0 + \beta_1 C_i + \beta_2 Z_i + \varepsilon_i \tag{13}$$

Here, W_i is a binary dependent variable equal to 1 for politicians who won a provincial or national seat in the 2013 general elections. C_i is a vector of the five centrality measures (party-specific political and nonpolitical centrality, overall political and nonpolitical centrality and complete centrality). Z_i is a vector of the dummy variables representing political and nonpolitical factors that were used as controls.

The nonpolitical variables used include characteristics evaluating politicians' level of education, the educational institutions they attended,

their own profession and their family profession. The political variables are dummy variables equal to 1 for a politician (i) with relatives who are or were members of a legislative assembly, (ii) who has switched political parties, (iii) is an office holder, (iv) has a certain number of years of representation (5–9, 10–14, more than 15), and (v) is an incumbent or has contested a previous election.

When estimating the impact of political centrality, only the nonpolitical factors are used as controls. When estimating the impact of nonpolitical centrality on the binary dependent variable, only the political factors are included. No control variables are used when estimating the impact of being connected within the complete network.

7. Results

First, the role of the 2008 general elections in parties' decisions concerning the subsequent general elections in 2013 is analyzed by estimating whether parties fielded their most central and connected candidates from constituencies where the voter turnout was high and the previous elections were close. Second, the impact of centrality on a politician's likelihood of being awarded a party ticket is estimated. Third, we gauge how centrality influences a politician's likelihood of winning the election.

Five different types of centrality measures are used in this case: (i) party-specific political centrality (how politically central is a politician in his or her own party?); (ii) party-specific nonpolitical centrality (how central is a politician in his or her own party, based on nonpolitical characteristics?); (iii) political centrality (how politically central is a politician across parties?); (iv) nonpolitical centrality (how central is a politician across parties, based on nonpolitical characteristics?); and (v) complete centrality (how central is a politician across parties, based on overall characteristics?).

7.1. Do Parties Field Central Candidates from Competitive Constituencies?

This section estimates how parties decide which candidates to field, depending on the voter turnout in a constituency and on how close the previous election was.

7.1.1. Voter Turnout

We estimate whether, in 2013, parties fielded their most central candidates from constituencies where, in 2008, the voter turnout was high. Table 2 gives the combined results for the Punjab and National Assembly constituencies. The results show that parties shortlisted those candidates to stand for election in closely contested constituencies who were politically central not only in the overall political network, but also in their party-specific political networks.

Table 2: Centrality and voter turnout in Punjab and National Assembly constituencies, 2008

	Complete centrality	Political centrality	Nonpolitical centrality	Party-specific political centrality	Party-specific nonpolitical centrality
	(1)	(2)	(3)	(4)	(5)
Voter turnout (%)	-0.00127	0.00737**	-0.00319	0.00566**	-0.00301
	[0.00254]	[0.00328]	[0.00287]	[0.00273]	[0.00305]
Constant	0.702***	0.174	0.747***	0.440***	0.780***
	[0.0958]	[0.124]	[0.108]	[0.103]	[0.115]
Observations	106	106	106	106	106
R-squared	0.002	0.046	0.012	0.040	0.009

Notes: Each column represents the results of an OLS regression of the dependent variable listed in that column on voter turnout in 2008. None of the regressions include any control variables. The sample includes Punjab and National Assembly candidates who contested the 2013 election from constituencies where, in 2008, voter turnout was high.
Robust standard errors are given in brackets. Significantly different from 0 at *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.
Source: Authors' calculations.

Table 3 gives the results for National Assembly constituencies where, in 2008, the voter turnout was high. The results are analogous to those for the combined estimates for both assemblies. Table 4 gives the results for the Punjab Assembly constituencies where, in 2008, the voter turnout was significantly high. In this case, the results show that parties did not field their central-most or well-connected candidates from provincial constituencies where the previous voter turnout was high.

Table 3: Centrality and voter turnout in National Assembly constituencies, 2008

	Complete centrality	Political centrality	Nonpolitical centrality	Party-specific political centrality	Party-specific nonpolitical centrality
	(1)	(2)	(3)	(4)	(5)
Voter turnout (%)	-0.000283	0.0263***	-0.00654	0.0202***	-0.00474
	[0.00662]	[0.00893]	[0.00702]	[0.00727]	[0.00733]
Constant	0.707***	-0.566	0.928***	-0.129	0.899***
	[0.255]	[0.344]	[0.271]	[0.280]	[0.283]
Observations	36	36	36	36	70
R-squared	0.000	0.204	0.025	0.186	0.012

Notes: Each column represents the results of an OLS regression of the dependent variable listed in that column on voter turnout in 2008. None of the regressions include any control variables. The sample includes National Assembly candidates who contested the 2013 election from constituencies where, in 2008, voter turnout was high.
Robust standard errors are given in brackets. Significantly different from 0 at *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.
Source: Authors' calculations.

Table 4: Centrality and voter turnout in Punjab Assembly constituencies, 2008

	Complete centrality	Political centrality	Nonpolitical centrality	Party-specific political centrality	Party-specific nonpolitical centrality
	(1)	(2)	(3)	(4)	(5)
Voter turnout (%)	-0.00202	0.00464	-0.00340	0.00358	-0.00348
	[0.00280]	[0.00349]	[0.00324]	[0.00296]	[0.00348]
Constant	0.706***	0.280**	0.727***	0.522***	0.770***
	[0.105]	[0.130]	[0.121]	[0.110]	[0.130]
Observations	70	70	70	70	70
R-squared	0.008	0.025	0.016	0.021	0.015

Notes: Each column represents the results of an OLS regression of the dependent variable listed in that column on voter turnout in 2008. None of the regressions include any control variables. The sample includes Punjab Assembly candidates who contested the 2013 election from constituencies where, in 2008, voter turnout was high.
Robust standard errors are given in brackets. Significantly different from 0 at *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.1$.
Source: Authors' calculations.

The results seem to imply that parties choose candidates strategically for the National Assembly elections, but not necessarily for the provincial assembly elections. The insignificance of the centrality measures at this level could be explained by the argument that, at the provincial level,

parties matter more than the individual: thus, votes are cast on the basis of the party name rather than the significance of the individual candidate.

7.1.2.   *Close Elections*

To estimate whether parties fielded their best connected, central-most candidates from constituencies that witnessed a close election in 2008, we test the impact of close elections (where the margin of victory was less than 25 percent) on the centrality of the pool of candidates for each seat in 2013. Table 5 gives the combined results for those Punjab and National Assembly constituencies where the election was very close. The results show that, in 2013, parties fielded candidates who were more central in the overall political network from the more competitive constituencies.

Table 5: Centrality and close elections in Punjab and National Assembly constituencies, 2008

	Complete centrality	Political centrality	Nonpolitical centrality	Party-specific political centrality	Party-specific nonpolitical centrality
	(1)	(2)	(3)	(4)	(5)
Close elections	-0.0437	0.0954*	-0.0701	0.0600	-0.0674
	[0.0409]	[0.0513]	[0.0465]	[0.0427]	[0.0487]
Office holder	0.00849	-0.0311	0.0153	-0.0201	0.0134
	[0.0382]	[0.0479]	[0.0434]	[0.0399]	[0.0455]
Won previously	0.0622	0.174***	0.0359	0.151***	0.103**
	[0.0426]	[0.0535]	[0.0485]	[0.0445]	[0.0508]
Constant	0.647***	0.387***	0.632***	0.601***	0.654***
	[0.0325]	[0.0408]	[0.0370]	[0.0340]	[0.0387]
Observations	106	106	106	106	106
R-squared	0.031	0.127	0.028	0.121	0.056

Notes: Each column represents the results of an OLS regression of the dependent variable listed in that column on close elections ($<25\%$) in 2008. All regressions include dummy variables for office holders (1/0) and politicians who had won a previous election (1/0). The sample includes Punjab and National Assembly candidates who contested the 2013 election from constituencies where, in 2008, the election was close.
Robust standard errors are given in brackets. Significantly different from 0 at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.
Source: Authors' calculations.

Table 6 shows the impact of close elections (where the margin of victory was less than 25 percent) on centrality measures for National Assembly constituencies alone. Candidates who were politically well connected – not just in the overall political network, but also in their party-specific political networks – were fielded from constituencies that had witnessed a close election in 2008.

Table 6: Centrality and close elections in National Assembly constituencies, 2008

	Complete centrality	Political centrality	Nonpolitical centrality	Party-specific political centrality	Party-specific nonpolitical centrality
	(1)	(2)	(3)	(4)	(5)
Close elections	-0.0316	0.268***	-0.0981	0.199**	-0.0985
	[0.0716]	[0.0907]	[0.0751]	[0.0748]	[0.0772]
Office holder	0.0787	-0.0127	0.0866	-0.00602	0.0984
	[0.0634]	[0.0804]	[0.0665]	[0.0663]	[0.0684]
Won previously	0.00732	0.201**	-0.0306	0.159**	0.0334
	[0.0660]	[0.0836]	[0.0692]	[0.0690]	[0.0711]
Constant	0.658***	0.310***	0.665***	0.542***	0.676***
	[0.0517]	[0.0655]	[0.0542]	[0.0540]	[0.0557]
Observations	36	36	36	36	36
R-squared	0.055	0.337	0.100	0.303	0.116

Notes: Each column represents the results of an OLS regression of the dependent variable listed in that column on close elections ($<25\%$) in 2008. All regressions include dummy variables for office holders (1/0) and politicians who had won a previous election (1/0). The sample includes National Assembly candidates who contested the 2013 election from constituencies where, in 2008, the election was close.

Robust standard errors are given in brackets. Significantly different from 0 at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.

Source: Authors' calculations.

Table 7 shows the impact of close elections (where the margin of victory was less than 25 percent) on centrality measures for the Punjab Assembly constituencies alone. The outcomes reinforce the idea that, at the provincial level, party characteristics supersede individual characteristics. In the 2013 Punjab Assembly elections, parties did not respond to electoral competitiveness as revealed by the election results for 2008.

Table 7: Centrality and close elections in Punjab Assembly constituencies, 2008

	Complete centrality	Political centrality	Nonpolitical centrality	Party-specific political centrality	Party-specific nonpolitical centrality
	(1)	(2)	(3)	(4)	(5)
Close elections	-0.0417	0.0170	-0.0488	-0.00299	-0.0463
	[0.0504]	[0.0621]	[0.0589]	[0.0521]	[0.0622]
Office holder	-0.0228	-0.0473	-0.0146	-0.0313	-0.0231
	[0.0480]	[0.0591]	[0.0561]	[0.0496]	[0.0592]
Won previously	0.0760	0.151**	0.0561	0.144**	0.125*
	[0.0568]	[0.0701]	[0.0665]	[0.0588]	[0.0702]
Constant	0.642***	0.434***	0.615***	0.637***	0.643***
	[0.0417]	[0.0514]	[0.0488]	[0.0431]	[0.0515]
Observations	70	70	70	70	70
R-squared	0.037	0.075	0.021	0.087	0.053

Notes: Each column represents the results of an OLS regression of the dependent variable listed in that column on close elections (<25%) in 2008. All regressions include dummy variables for office holders (1/0) and politicians who had won a previous election (1/0). The sample includes Punjab Assembly candidates who contested the 2013 election from constituencies where, in 2008, the election was close.
Robust standard errors are given in brackets. Significantly different from 0 at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.
Source: Authors' calculations.

This analysis, based on the model illustrated by equation (11), shows that parties in Pakistan are now sophisticated enough to recognize that politicians' connections augment their own popularity and help create a stronger vote bank. Where parties anticipate greater competition (based on previous elections), they nominate politically well-connected candidates for those constituencies. In a study on the US, Sinclair (2011) shows that central politicians in a network are those who eventually become President. It is, therefore, interesting to see that, in a newly democratic state such as Pakistan, the centrality of politicians tends to determine the leadership.

The next section estimates the model developed earlier in equation (12) and shows how political and nonpolitical connections within and across parties influence politicians' likelihood of being nominated to contest the national or provincial elections.

7.2. Getting a Party Ticket to Contest the 2013 Elections

Once the party's leaders have created a pool of potential candidates to stand for constituency-level seats, they choose a final candidate before the elections. In order to determine which factors influence this selection, we test the impact of centrality as well as political and nonpolitical factors on the probability of a politician being awarded the party ticket to contest the 2013 elections.

7.2.1. Getting the Party Ticket for a Punjab Assembly Seat

Table 8 indicates the impact of various centrality measures on a politician's likelihood of being nominated to stand for a provincial seat in the 2013 elections. The political and nonpolitical factors listed in the table are used as control variables.

The results show that politicians who were politically more central in the overall political network or the party-specific political network had a higher likelihood of getting the party ticket to compete for a Punjab Assembly seat in the 2013 elections (specifications 2, 3, 5 and 7). These overall political and party-specific political eigenvector centrality measures are significant when used with nonpolitical centrality measures or nonpolitical factors. None of the other centrality measures are significant.

Looking at the control variables, the results reveal that party office holders were unlikely to get a party ticket to contest the Punjab Assembly elections (specifications 4 and 6). Politicians with five to nine years' representation had a higher probability of getting the party ticket (columns 4 and 6). This shows that younger politicians had a better chance of being nominated to compete for a Punjab Assembly seat.

Table 8: Getting a party ticket in 2013 for a Punjab assembly seat

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party-specific political eigenvector centrality			0.755*** [0.182]				0.674*** [0.217]
Party-specific nonpolitical eigenvector centrality			0.206 [0.163]			0.228 [0.179]	
Political eigenvector centrality		0.669*** [0.155]			0.596*** [0.184]		
Nonpolitical eigenvector centrality		0.191 [0.175]		0.162 [0.188]			
Complete centrality	0.265 [0.217]						
Own profession: law					0.178 [0.166]		0.200 [0.165]
Own profession: business					0.119 [0.140]		0.125 [0.140]
Own profession: agriculture					-0.0690 [0.162]		-0.0837 [0.164]
Family profession: law					-0.154 [0.160]		-0.164 [0.161]
Family profession: business					0.0804 [0.135]		0.0788 [0.136]
Family profession: agriculture					-0.0520 [0.184]		-0.0491 [0.185]
Relative who is/was member of Parliament or assembly				0.106 [0.0950]		0.108 [0.0943]	
Switched political party				0.132 [0.118]		0.135 [0.117]	
Office holder				-0.161* [0.0813]		-0.158* [0.0809]	

Table 8: Getting a party ticket in 2013 for a Punjab assembly seat (continued)

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
5–9 years of representation				0.264** [0.117]		0.252** [0.117]	
10–14 years of representation				0.0362 [0.157]		0.0607 [0.158]	
More than 15 years of representation				0.0447 [0.155]		0.0474 [0.154]	
Won 2008 election				-0.132 [0.254]		-0.147 [0.253]	
Has won any previous election				-0.00162 [0.246]		-0.00456 [0.245]	
Include education char.					Yes		Yes
Include educational institution characteristics					Yes		Yes
Constant	0.643*** [0.142]	0.426*** [0.138]	0.216 [0.168]	0.627*** [0.144]	0.366* [0.187]	0.578*** [0.145]	0.191 [0.227]
Observations	89	89	89	89	89	89	89
R-squared	0.017	0.179	0.170	0.235	0.286	0.243	0.279

Notes: Each column represents the results of an OLS regression where the binary dependent variable is getting a party ticket for a Punjab Assembly seat (1/0). The centrality measures used include complete eigenvector centrality, political eigenvector centrality, nonpolitical eigenvector centrality, party-specific political eigenvector centrality and party-specific nonpolitical eigenvector centrality. Except for columns (1), (2) and (3), which include only the centrality measures, all other regressions include political and/or nonpolitical factors.

The nonpolitical factors include education (highest degree = matric 1/0, intermediate 1/0, undergraduate 1/0, postgraduate 1/0, foreign degree 1/0); educational institution (Aitchison College 1/0, Forman Christian College 1/0, Government College University 1/0, Punjab University 1/0); own profession (law 1/0, business 1/0, agriculture 1/0); family profession (law 1/0, business 1/0, agriculture 1/0). The political factors include: had or has a relative who was or is a member of a legislative body (1/0), switched political parties (1/0), is or was an office holder (1/0), years of representation = 5–9, 10–14, >15 (1/0), won 2008 elections (1/0), has won any previous elections (1/0). The sample includes party officeholders and politicians who contested the Punjab Assembly election in 2013.

Robust standard errors are given in brackets. Significantly different from 0 at *** p < 0.01, ** p < 0.05 and * p < 0.1.

Source: Authors' calculations.

7.2.2. Getting the Party Ticket for a National Assembly Seat

Next, we estimate the impact of centrality measures on a politician's likelihood of getting the party ticket to contest the National Assembly elections. The results in Table 9 show that politicians who were centrally located in the complete network had a higher likelihood of getting a party ticket to stand for the National Assembly elections (specification 1). Those who were centrally located in the overall nonpolitical network or party-specific nonpolitical network, all else equal, had a higher probability of being nominated to compete for a National Assembly seat in the 2013 elections.

The results also show that politicians with relatives who are or were members of the provincial assembly or Parliament had a better chance of getting a party ticket to contest the National Assembly elections (specifications 4 and 6). In terms of nonpolitical factors, National Assembly party tickets tend to be awarded to politicians who are businesspersons or belong to a family of lawyers (columns 5 and 7).

The analysis above reveals that different centrality measures matter at the national and provincial levels. At the provincial level, the chances of being awarded a party ticket are influenced by within-party and across-party political connections. This may be because politicians who are politically well connected within their party can raise campaign funds more easily.

At the national level, politicians need to be socially more connected to get a party ticket. In this case, overall and within-party social connections matter more, possibly because party leaders believe that socially well-connected candidates have higher odds of winning an election as their social connections generate a larger vote bank. Party tickets are also given to those politicians who are more centrally located in the complete network. This shows that the politicians chosen to contest elections at the national level are well connected overall and centrally located based on political as well as nonpolitical factors. Those chosen to contest at the provincial level are only politically well connected.

Table 9: Getting a party ticket in 2013 for a National Assembly seat

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party-specific political eigenvector centrality			0.125 [0.301]				-0.0640 [0.340]
Party-specific nonpolitical eigenvector centrality			0.495* [0.285]			0.616** [0.291]	
Political eigenvector centrality		0.148 [0.234]			-0.00513 [0.272]		
Nonpolitical eigenvector centrality		0.471 [0.299]		0.614* [0.312]			
Complete centrality	0.530* [0.309]						
Own profession: law					-0.195 [0.204]		-0.193 [0.204]
Own profession: business					0.564** [0.221]		0.573** [0.221]
Own profession: agriculture					0.480 [0.333]		0.479 [0.333]
Family profession: law					0.583** [0.262]		0.592** [0.261]
Family profession: business					-0.0250 [0.213]		-0.0217 [0.211]
Family profession: agriculture					-0.385 [0.362]		-0.368 [0.361]
Relative who is/was member of Parliament or assembly				0.225* [0.131]		0.226* [0.130]	
Switched political party				-0.233 [0.152]		-0.247 [0.152]	
Office holder				-0.169 [0.128]		-0.173 [0.127]	

Table 9: Getting a party ticket in 2013 for a National Assembly seat (continued)

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
5–9 years of representation				-0.322 [0.199]		-0.315 [0.198]	
10–14 years of representation				0.339 [0.241]		0.353 [0.237]	
More than 15 years of representation				-0.0874 [0.230]		-0.100 [0.228]	
Won 2008 election				0.220 [0.239]		0.190 [0.235]	
Has any previous election				-0.0146 [0.223]		-0.0269 [0.222]	
Include education characteristics					Yes		Yes
Include educational institution char.					Yes		Yes
Constant	0.370* [0.214]	0.356* [0.211]	0.305 [0.255]	0.408* [0.237]	0.0910 [0.346]	0.395* [0.229]	0.111 [0.363]
Observations	54	54	54	54	54	54	54
R-squared	0.054	0.061	0.064	0.242	0.371	0.252	0.371

Notes: Each column represents the results of an OLS regression where the binary dependent variable is getting a party ticket for a National Assembly seat (1/0). The centrality measures used include complete eigenvector centrality, political eigenvector centrality, nonpolitical eigenvector centrality, party-specific political eigenvector centrality and party-specific nonpolitical eigenvector centrality. Except for columns (1), (2) and (3), which include only the centrality measures, all other regressions include political and/or nonpolitical factors.
The nonpolitical factors include education (highest degree = matric 1/0, intermediate 1/0, undergraduate 1/0, postgraduate 1/0, foreign degree 1/0); educational institution (Aitchison College 1/0, Forman Christian College University 1/0, Government College University 1/0, Punjab University 1/0); own profession (law 1/0, business 1/0, agriculture 1/0); family profession (law 1/0, business 1/0, agriculture 1/0). The political factors include: had or has a relative who was or is a member of a legislative body (1/0), switched political parties (1/0), is or was an office holder (1/0), years of representation = 5–9, 10–14, >15 (1/0), won 2008 elections (1/0), has won any previous elections (1/0).
The sample includes politicians who applied for a party ticket and contested the National Assembly election in 2013.
Robust standard errors are given in brackets. Significantly different from 0 at *** p<0.01, ** p<0.05 and * p<0.1.
Source: Authors' calculations.

The next section estimates the model represented by equation (13). We test the importance of being connected and central in the complete, political and nonpolitical networks on a politician's chances of winning an assembly seat at the provincial and national levels.

7.3. Winning the 2013 Elections

Having been nominated by their respective parties to stand for election, candidates must now compete for the constituency seat at the final stage of the electoral process. We estimate the impact of sociopolitical factors and centrality measures on a politician's likelihood of winning a Punjab or National Assembly seat in the 2013 elections.

Black (1972) argues that any previous wins have a direct, positive impact on a politician's future wins: they are indicative of his or her public popularity, while the investment made in one election bears fruit in subsequent elections. Winning enables a delivering politician to serve his or her constituency and work for the country's betterment; this builds political recognition. Here, we include variables representing incumbency as well as any previous electoral wins along with other sociopolitical factors.

7.3.1. Winning a Punjab Assembly Seat in the 2013 Elections

We test whether central and connected politicians were more likely to win a provincial assembly seat for their party. The political and nonpolitical factors used in these estimations are control variables. The results in Table 10 show that politicians who were politically and socially well connected within their parties had a higher likelihood of winning a Punjab Assembly seat in the 2013 elections. The eigenvector centrality measures for party-specific political and party-specific nonpolitical centrality are the only significant measures (specification 3).

Table 10: Winning a Punjab Assembly seat in 2013

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party-specific political eigenvector centrality			0.519* [0.264]				0.314 [0.306]
Party-specific nonpolitical eigenvector centrality			0.409* [0.223]			0.116 [0.207]	
Political eigenvector centrality		0.342 [0.232]			0.185 [0.260]		
Nonpolitical eigenvector centrality		0.111 [0.249]		-0.0768 [0.214]			
Complete centrality	0.123 [0.285]						
Own profession: law					-0.0575 [0.231]		-0.0605 [0.229]
Own profession: business					-0.149 [0.206]		-0.152 [0.205]
Own profession: agriculture					0.426* [0.222]		0.407* [0.223]
Family profession: law					0.156 [0.257]		0.152 [0.256]
Family profession: business					0.158 [0.190]		0.160 [0.189]
Family profession: agriculture					-0.591** [0.251]		-0.593** [0.249]
Relative who is/was member of Parliament or assembly				-0.0123 [0.106]		-0.0189 [0.105]	
Switched political party				-0.177 [0.131]		-0.185 [0.131]	
Office holder				-0.0116 [0.0900]		-0.0106 [0.0899]	

Table 10: Winning a Punjab Assembly seat in 2013 (continued)

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
5–9 years of representation				0.0502 [0.128]		0.0421 [0.128]	
10–14 years of representation				0.170 [0.167]		0.208 [0.169]	
More than 15 years of representation				-0.318* [0.166]		-0.315* [0.166]	
Won 2008 election				0.125 [0.273]		0.0824 [0.274]	
Has won any previous election				0.546** [0.257]		0.560** [0.257]	
Include education char.					Yes		Yes
Include educational institution characteristics					Yes		Yes
Constant	0.255 [0.190]	0.112 [0.207]	-0.270 [0.246]	0.267 [0.164]	0.395 [0.270]	0.143 [0.167]	0.261 [0.324]
Observations	72	72	72	72	72	72	72
R-squared	0.003	0.031	0.084	0.445	0.270	0.447	0.277

Notes: Each column represents the results of an OLS regression where the binary dependent variable is winning a Punjab Assembly seat (1/0). The centrality measures used include complete eigenvector centrality, political eigenvector centrality, nonpolitical eigenvector centrality, party-specific political eigenvector centrality and party-specific nonpolitical eigenvector centrality. Except for columns (1), (2) and (3), which include only the centrality measures, all other regressions include political and/or nonpolitical factors.

The nonpolitical factors include education (highest degree = matric 1/0, intermediate 1/0, undergraduate 1/0, postgraduate 1/0, foreign degree 1/0); educational institution (Aitchison College 1/0, Forman Christian College 1/0, Government College University 1/0, Punjab University 1/0); own profession (law 1/0, business 1/0, agriculture 1/0); family profession (law 1/0, business 1/0, agriculture 1/0), years of representation = 5–9, 10–14, >15 (1/0); had or has a relative who was or is a member of a legislative body (1/0), switched political parties (1/0), is or was an office holder (1/0), won 2008 elections (1/0), has won any previous elections (1/0).

The sample includes politicians who contested the Punjab Assembly election in 2013.

Robust standard errors are given in brackets. Significantly different from 0 at *** p<0.01, ** p<0.05 and * p<0.1.

Source: Authors' calculations.

The results also show that politicians who were agriculturalists themselves had a higher probability of winning a Punjab Assembly seat, while those whose family profession was agriculture, all else fixed, had a lower probability of winning a Punjab Assembly seat in 2013 (columns 5 and 7). This may be because politicians who are agriculturalists themselves have their own vote bank, which ensures their win. Those with relatives who are agriculturalists do not necessarily command the same level of loyalty among voters, who would rather vote for their leader than for the leader's relative, i.e., the political candidate.

In terms of political factors, the regressions show that politicians with more than 15 years' representation had less chance of securing a seat in the Punjab Assembly (specifications 4 and 6). Similar to the results in the literature, having won a previous election (specifications 4 and 6) increased the probability of winning a Punjab Assembly seat, even though the impact of incumbency was insignificant.

7.3.2. *Winning a National Assembly Seat in the 2013 Elections*

Finally, we estimate the impact of centrality measures and political and nonpolitical factors on a politician's likelihood of winning a National Assembly seat. According to the results in Table 11, politicians who were politically more central and well connected – not only in the overall political network, but also in the party-specific political network – were more likely to secure a National Assembly seat. The political eigenvector centrality measure (specification 5) and the party-specific political eigenvector centrality measure (specification 7) are significant when estimated with nonpolitical factors only.

Contrary to the result for winning a Punjab Assembly seat, incumbency had a positive and significant impact on winning a National Assembly seat. We also find that the probability of winning a national seat was higher for agriculturalists.

Table 11: Winning a National Assembly seat in 2013

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party-specific political eigenvector centrality			0.189 [0.350]				0.638* [0.371]
Party-specific nonpolitical eigenvector centrality			0.526 [0.373]			0.430 [0.314]	
Political eigenvector centrality		0.281 [0.287]			0.590* [0.301]		
Nonpolitical eigenvector centrality		0.0538 [0.400]		0.249 [0.332]			
Complete centrality	0.162 [0.425]						
Own profession: law					-0.201 [0.224]		-0.194 [0.228]
Own profession: business					-0.367 [0.286]		-0.396 [0.296]
Own profession: agriculture					0.728** [0.322]		0.745** [0.327]
Family profession: law					-0.450 [0.291]		-0.447 [0.298]
Family profession: business					0.364 [0.225]		0.414* [0.226]
Family profession: agriculture					-1.321*** [0.374]		-1.284*** [0.379]
Relative who is/was member of Parliament or assembly				-0.0700 [0.130]		-0.0505 [0.127]	
Switched political party				0.115 [0.159]		0.0806 [0.158]	
Office holder				-0.107 [0.133]		-0.130 [0.131]	

Table 11: Winning a National Assembly seat in 2013 (continued)

	Complete centrality	Political and nonpolitical centrality	Party-specific political and nonpolitical centrality	Nonpolitical centrality and political factors	Political centrality and nonpolitical factors	Party-specific nonpolitical centrality and political factors	Party-specific political centrality and nonpolitical factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
5–9 years of representation				-0.0159 [0.237]		-0.0317 [0.232]	
10–14 years of representation				-0.395 [0.260]		-0.372 [0.254]	
More than 15 years of representation				0.290 [0.212]		0.283 [0.208]	
Won 2008 election				0.592** [0.265]		0.564** [0.261]	
Has won any previous election				0.219 [0.241]		0.217 [0.235]	
Include education char.					Yes		Yes
Include educational institution characteristics					Yes		Yes
Constant	0.221 [0.305]	0.177 [0.299]	-0.165 [0.339]	0.0718 [0.247]	0.838* [0.430]	-0.0479 [0.237]	0.689 [0.445]
Observations	39	39	39	39	39	39	39
R-squared	0.004	0.027	0.064	0.547	0.618	0.567	0.605

Notes: This table reports the effects of centrality measures, political factors and nonpolitical factors on a politician's probability of winning a National Assembly seat in the 2013 election. Each column represents the results of an OLS regression where the binary dependent variable is winning a National Assembly seat (1/0). The centrality measures used include complete eigenvector centrality, political eigenvector centrality, nonpolitical eigenvector centrality, party-specific political eigenvector centrality and party-specific nonpolitical eigenvector centrality. Except for columns (1), (2) and (3), which include only the centrality measures, all other regressions include political and/or nonpolitical factors. The nonpolitical factors include education (highest degree = matric 1/0, intermediate 1/0, undergraduate 1/0, postgraduate 1/0, foreign degree 1/0); educational institution (Aitchison College 1/0, Forman Christian College 1/0, Government College University 1/0, Punjab University 1/0); own profession (law 1/0, business 1/0, agriculture 1/0); family profession (law 1/0, business 1/0, agriculture 1/0). The political factors include: had or has a relative who was or is a member of a legislative body (1/0), switched political parties (1/0), is or was an office holder (1/0), years of representation = 5–9, 10–14, >15 (1/0), won 2008 elections (1/0), has won any previous elections (1/0). The sample includes politicians who contested the National Assembly election in 2013.
Robust standard errors are given in brackets. Significantly different from 0 at *** p<0.01, ** p<0.05 and * p<0.1.
Source: Authors' calculations.

Our results show an interesting contrast between winning a Punjab Assembly seat and a National Assembly seat. In the provincial analysis, the results show that only connections within the party mattered, whether they were political or social. This may be tied to the fact that close social and political ties within a party enable politicians to raise more campaign funds, which in turn gives them a better chance of winning.

At the national level, the results show that winning a National Assembly seat is determined by political connections alone, whether these are within or across parties. People will vote for politicians who are politically well connected because they appear to be more resourceful and better able to direct funds or development projects to their own constituency.

These findings show that only politically well-established leaders win at the national level, while social connectedness plays a role at the provincial level. It also reinforces the idea that, at the provincial level, votes are cast on the basis of party characteristics, while at the national level, individual candidates garner votes based on their social and political reputation.

8.   Conclusion

This study looks at how networks are created and how they influence political choices in Pakistan. While studies of social networks are well established, the analysis of how political networks determine electoral outcomes is relatively new. Our aim was to map networks based on the ties among politicians and observe the role of these networks in the political representation of the country. The idea was to build a series of networks based on factors that politicians have in common and identify the central-most politicians within these networks. We have focused on politicians and electoral outcomes in Lahore, which includes some of the most prominent politicians of Pakistan as well as some of the most visible voting constituencies.

The network categories include complete networks, political networks, nonpolitical networks, party-specific political networks and party-specific nonpolitical networks. In all these networks, each politician is represented by a node. The study's hypothesis is that the most central politicians in a network are most likely to be fielded as political candidates from highly competitive constituencies (based on the previous election outcome) and, subsequently, to win the election.

Our findings show that, in the 2013 elections, parties chose to field their most politically connected candidates from constituencies with a high voter turnout in the last election (where the margin of victory was less than 25 percent). Moreover, these candidates were centrally located in the overall political network as well as the party-specific political network.

At the provincial level, politicians who were politically well-connected – both overall and within the party – were more likely to be awarded a party ticket to compete for a Punjab Assembly seat. Additionally, politicians who were both socially and politically well-connected within their own party – and thus perhaps better able to leverage their political connections in raising campaign funds – were more likely to win a provincial seat. At this level, therefore, the party appears to matter more than the individual.

At the national level, the chances of being awarded a party ticket to compete for a National Assembly seat were higher among politicians who were centrally located in the complete network and those who were socially well connected both overall and within their party, i.e., central in the overall nonpolitical network and the party-specific nonpolitical network. This may be because parties believe that socially well connected politicians have larger vote banks. However, to win a National Assembly seat, political connections were more important, both within the party and across parties. This may be because voters believe that politically well-connected politicians are better able to garner more resources for their constituencies.

This study is important because it gives an insight into how political candidates are nominated by their party and what determines their chances of subsequently winning an election. Since Pakistan does not hold primary elections to select candidates for the general elections, the study helps us understand how parties reach a consensus on which candidates will be awarded a party ticket to contest the general elections and how centrality affects this selection. The study also draws a comparison between the centrality of a politician within a network and the voting behavior of the electorate.

Finally, we show that political dynamics in Pakistan may have changed over time. Rather than small groups of well-connected political families standing out, political power is becoming more decentralized, perhaps as a result of the growing middle class. This study establishes links among politicians purely on relational terms, but future analyses could take into account the costs and benefits to politicians of forming links with each other.

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