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

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This paper creates a unique map of the political and non-political networks of the main politicians of Lahore to analyze the degree of links between politicians. In Pakistan, a politician must be awarded a party ticket before running in the General Elections and this candidate is usually a prominent and well-connected politician chosen from a pool of local politicians. This study looks at such connections for the major politicians in Lahore by creating network maps of the political and non-political connections between these politicians. Using these networks, 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 winning in the General Elections. The results showed that politics in Pakistan is fairly sophisticated; parties tend to place their politically well-connected candidates in constituencies where previous elections were highly competitive to increase their odds of winning. Also, at the provincial level the results showed 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 are giving their ballots to the party rather than to individual candidates, since only within party connectedness matters. At the national level, the results revealed that tickets are given to candidates who are socially more connected within and across parties, but elections are won by candidates who are politically more 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.

I. INTRODUCTION

The choice of candidates in electoral politics can be a difficult and lengthy process as illustrated by the primary system that exists in countries like the United States. Typically in Pakistan, candidates must appeal to members of their own party before they are given party tickets and then must appeal to a majority of voters in order to win the seat. If one adds to this

the fact that parties want to 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 candidates that are strong within their own party and candidates that are considered to be more popular with the electorate. In our paper we aim to analyze exactly this at the provincial and national level.

Firstly, we establish that parties prefer to place their more central candidates at constituencies where previously elections got close as central candidates have a higher likelihood of securing a win. Our results show that at the National Assembly constituencies where in 2008 voter turnout was high and elections got close, parties placed their politically well connected candidates, both within and across parties, at those constituencies in 2013. For the Punjab Assembly constituencies no such efforts were made as at the provincial level the party matters more than the individual. Secondly, 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; good political connections within the party may ensure sufficient fund generation for campaigning while good political connections outside the party may ensure a greater 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 get campaign funding as well as solve local level problems. At the national level, on the other hand, 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 of these candidates will generate a high vote bank because of name recognition. Lastly, our results distinguish between the connections that help get the ticket and the connections that matter for winning. Our findings show that for winning at the provincial level, only within party political and social connectedness matters as votes are cast on the basis of the party not the individual. While at the national level, the opposite holds, individual's own political connections also matter along with within party political connections. Voters tend to choose politically connected and prominent politicians because they perceive them to be more dominant and resourceful than other candidates, hence better able to bring about policy changes and reforms as well as deliver goods to their constituencies.

In this paper, we use network analysis to analyze the electoral politics of the 2013 General Elections in Lahore. The case of Lahore is interesting because it is the largest and most visible

city in the largest province of Pakistan. Using politician level data, we create unique network maps of politicians in Lahore based on their political and social links (see Currarini, Jackson, and Pin, 2009) and then use these maps to identify the most centrally located candidates both within and across parties based on political and non-political factors. We then analyze how the centrality of a candidate within their own party and across parties affects the probability of being shortlisted for a party seat, winning the party seat and then winning the election from their constituency.

Literature shows that both political and non-political factors influence and determine political selection. Besley (2005) puts forward four ratios: attractiveness, success, opportunity cost and accountability as the basis on which a candidate will decide whether to put himself forward for election. Suresh and Ramesh (2011) find that family, friends, caste, religion, print and electronic media, familial political party affiliations, political activities in one's youth, and acquaintance with members of a legislative body, all influence political selection. The importance of schooling, education and family influence is also illustrated in Besley, Pande and Rao (2005). If one could separate the political and non-political connections that a politician has, one can see the relative importance of both in the electoral process.

The centrality measures we create for politicians in Lahore are divided into two categories, party-specific and non-party specific centrality, that is, the centrality of a candidate within their own party and the centrality of a candidate across all the parties respectively. These can have differing effects: a candidate's centrality within their own party may influence his or her chances of winning the party seat while the centrality across all parties may influence their chances of winning the majority of votes in an election. The idea behind voters' preferences for central politicians relates to the perception that more central politicians are better at garnering government resources and also better at solving local problems because of their contacts.

Within these two categories we then create two sub-categories, political and non-political centrality. These measure a politician's centrality in terms of political characteristics (including coming from a political family) and social characteristics (such as the schools they attended). Again these can have differing 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 and we call it a politician's complete centrality measure. So we

have five categories of centrality: party-specific political centrality, party-specific non-political centrality, overall political centrality, overall non-political centrality and complete centrality.

In our empirical analysis, we analyze 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 amongst the members of the Senate and the House. Banerjee, Chandrasekhar, Duflo, and Jackson (2013) also use eigenvector centrality and find that diffusion of information regarding microfinance is quicker if the initial people who are informed about the program have high eigenvector centrality scores.

The empirical literature on networks has found that the formation of links leads to certain advantages. Jackson, Rodriguez-Barraquer and Tan (2012) in a model of favor exchange find that connections result in social "quilts" that illustrate the generation of social capital by way of people's mutual support for one another. Similarly, Bala and Goyal (2000) show that individuals form networks taking into account the costs and benefits of forming such linkages. Bloch, Genicot, and Ray (2008), also, in a social network risk-sharing model, show that transfers only occur between agents who are directly linked. Likewise, Acemoglu, García-Jimeno and Robinson (2015) in their study, find affirmative spillovers from network formation, they construct a network of Colombian municipalities to compare the median fraction of the population above poverty in each municipality both with and without the equilibirium response of other municipalities, and find a dramatic shift due to network effects, showing that building state capacity has positive spillovers in a network. Our networks are also built on the underlying principle that greater connections lead to greater advantages by making a politician politically or socially more central.

The literature on network links in politics is sparse: Sinclair (2011) shows that good presidential candidates are the ones who are centrally located in a network. Using factors like education, personal attributes, publications, honors, political activities, electoral positions, positions in Congress and government, and membership in professional associations, social groups, international delegations and military commissions, he forms linkages amongst the politicians and identifies the central ones using the Gil-Schmidt power centrality index. Our paper too, forms linkages amongst politicians on the basis of political and non-political factors

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and identifies the central ones 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 at times have a downside; Fisman (2001) finds that in face of rumors about the Indonesian President's health, the returns on shares of politically well-connected firms were lower than those of firms with different degrees of political exposure. But, we believe in the framework of our networks, connections are beneficial for politicians. Banerjee, Chandrasekhar, Duflo and Jackson (2014) show that people can correctly identify the central participants of a community by comparing the rankings of people with the diffusion centrality measures generated through a social network. In the context of our paper, this shows that at the electorate too, people can identify the central politicians and make a choice to vote for them.

Much of the literature looking at electoral politics has analyzed how potential voters decide to cast their vote or which candidates tend to win. Holbrook (2009) studies the 2008 U.S. presidential elections and in comparison with prior years, finds that racial considerations may have crowded out the economic considerations. Gerber, Green, & Larimer (2008) find that people vote to fulfill their civic duties and to adhere to social norms. Abrams, Iversen and Soskice (2010) in the context of a social network of friends and family, also find that people vote to win the approval of network members not to influence the election outcome, while Delavande and Manski (2012) believe people are likely to vote only if they know they can influence the outcome in favor of their preference. Lee, Moretti and Butler (2004) believe that voters primarily "elect policies" rather than influencing them, and members of the U.S. House alter their positions in response to a large exogenous change in the probability of winning the election. On the other hand, Bharucha (2003) holds that re-election of parties depends on the ability of parties to incorporate the marginal voter into the political domain by allowing him to impact policy. Our paper contributes to this literature on electoral politics, while for most people voting may only be a civic duty; a well-connected politician has a higher likelihood of securing those votes for himself than a less connected and less central one. Greater connectivity translates into popularity and prominence. People are more likely to vote for politically connected leaders, if the electorate believes that they are more likely to be able to deliver on their electoral promises.

Our findings show that parties also prefer to place their central candidates at constituencies which in prior elections were highly competitive and amongst the pool of applicants they give

election tickets to the more central politicians in order to increase their odds of winning. By using political and non-political linkages amongst the politicians of Lahore we generate five different categories of networks and estimate the centrality of politicians within these networks. This type of work, to our knowledge, has not been done before. By this paper, we bridge the gap in literature between how parties determine candidates and how people vote and how centrality in a network affects votes and elections.

The next section establishes a background to Pakistan's political scenario to demonstrate the importance of the 2013 General Elections and is followed by sections on theoretical framework, measuring network centrality, empirical methodology, results and lastly the conclusion.

II.   BACKGROUND

The history of governance in Pakistan is marked by periods of democratic government separated by stretches of military rule. What stands out in the case of Pakistan is that before 2013, there has never been two consecutive periods of democratic rule; in other words, the country had not experienced two consecutive democratic elections. The 2008 elections were held after the country had experienced almost ten years of military government and were primarily a contest between the two largest parties in the country, the Pakistan Muslim League-Nawaz (PML-N, whose leader Nawaz Sharif had been removed from office in a military coup led by General Pervaiz Musharraf in 1999) and the Pakistan People's Party (PPP, which had been led by Benazir Bhutto, who was assassinated just before the 2008 elections).

Thus the general election in 2013 marked the first time a democratically elected government had completed its term and was to be followed by another democratically elected government. Besides the two major parties, a third party the Pakistan Tehreek-e-Insaaf (PTI, led by the former cricketer Imran Khan) also stood in the elections.

During the General Elections in Pakistan, votes are cast simultaneously for candidates in the National Assembly and the Provincial Assemblies, which are the federal body and the

subnational body respectively. The National Assembly of Pakistan 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, FATA with 12 seats and the Federal Capital with 2 seats. The (provincial) Punjab Assembly has a total of 371 seats, with 66 seats reserved for women and 8 seats reserved for the minorities. It is the largest provincial assembly in Pakistan.

In Pakistan, primary elections are not held so the selection of candidates for contesting in the General Elections is done by the leaders of each party. The process that parties tend to follow is that they first choose key party officials or "office holders" from each electoral area, called a constituency. Then they create a shortlist of potential candidates from this list of office holders for each constituency. Then the party leaders choose a candidate for each provincial level and federal level constituency from this list of potential candidates who then run for assembly seats in the general elections. The party has complete autonomy in choosing which politicians they choose for office holders, for the shortlist of potential candidates and the eventually chosen candidates for each provincial and national seat. The voters then vote for individual candidates (and not the entire party slate) in each constituency.

We hypothesize that candidates who are centrally located in a network are the ones who get the party seat because they are more connected. Voters in General Elections also take into account centrality of candidates when casting their votes, but there are different types of centrality important to party elite and voters.

We estimate a model which analyzes whether parties tend to choose their most central candidates for the most competitive constituencies and then test to see if this centrality also plays a role in the final candidate selected 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 in the 2013 General Elections in Lahore.

III. THEORETICAL FRAMEWORK

This study believes that the most central politicians in a network are the ones who get the party ticket to contest in the General Elections and subsequently win the elections as well. This is because they have the greatest amount of linkages and are well connected which adds to their popularity at the electorate as well, thereby ensuring a win. So parties in pursuit of a win prefer to give their tickets to such politicians.

Our model holds that getting nominated by the party depends upon a politician's centrality within a network and his personal characteristics. While winning the election depends upon centrality within a network, personal characteristics and the benefits the politician promises to bring to his constituency once elected. We use the eigenvector centrality measure, so in our networks, being connected to a more central politician, improves a given politician's centrality status as well.

Eigenvector centrality for the entire network is represented as $A^T X = \lambda X$ where A^T is the transpose of the adjacency matrix A whose elements a_{ij} take the value of 1 if i and j are connected and 0 otherwise. X is an n x n matrix, its columns are the eigenvectors of A and λ is a diagonal matrix of eigenvalues. For any given politician i in the network, the eigenvector centrality is $A^T x_i = \lambda_i x_i$. The requirement that all eigenvector values should be positive (by the Perron-Frobenius theorem) results in only the greatest eigenvalues as the centrality measure (Bonacich & Lloyd, 2001).

In this model, politicians' personal characteristics are represented by a vector z and include both political and non-political attributes, for instance a politician's leadership qualities, his charisma etc. Benefits that politicians promise to bring to their constituency once elected are denoted by a vector g. For individual politicians they will be represented as z_i and g_i respectively. Centrality in our model is endogenous to a politician's likelihood of getting the party nomination and winning the General Elections while his personal attributes and the benefits that he promises to bring to his constituency once elected are exogenous.

A. *Getting the Party Nomination*

Party nomination (PN_i) of a given politician i depends upon his status. The better the status of a given politician, the greater is his likelihood of getting nominated by the party to contest in the General Elections.

$$PN_i = f(x) = kx_i \qquad (1)$$

Here, k is a constant and x_i represents the eigenvectors. The status of a politician i in a network for getting nominated by the party depends upon his centrality in the network and his personal characteristics; the relative importance of these endogenous and exogenous factors is reflected by the parameter α as shown below:

$$kx_i = \alpha \lambda_i x_i + z_i \qquad (2)$$

Here, $\lambda_i x_i$ is the measure of a politician's centrality where x_i represents the eigenvectors and λ_i represents the eigenvalues associated with those eigenvectors. z_i in equation *(2)* above shows the personal characteristics of a given politician i and α is $> 0 < 1$.

Solving equation *(2)* above for x_i yields

$$x_i = \frac{z_i}{(k - \alpha \lambda_i)} \qquad (3)$$

Assuming that $\alpha \lambda_i < k$

$$\frac{\partial x_i}{\partial \lambda_i} = \alpha z_i (k - \alpha \lambda_i)^{-2} \qquad (4)$$

Here $\frac{\partial x_i}{\partial \lambda_i} > 0$ so as λ_i takes higher values and the centrality of a given politician is maximized, his likelihood of getting nominated by the party increases (Bonacich & Lloyd, 2001). Thus, the higher the eigenvalue λ_i, the higher is the probability that politician i will get nominated by his party to contest in the General Elections.

B. *Winning the Election*

Win in election (W_i) of a given politician i also depends upon his status. The better the status of a given politician, the greater is his likelihood of winning in the General Elections.

$$W_i = f(x) = kx_i \qquad (5)$$

Here, k is a constant and x_i represents the eigenvectors. The status of a politician i in a network depends upon his centrality, his personal characteristics and the benefits he promises to

bring to his constituency once elected; the relative importance of endogenous and exogenous factors to the electorate (as opposed to the party) is reflected by the parameter β as shown below:

$$kx_i = \beta \lambda_i x_i + z_i + g_i \qquad (6)$$

Here, $\lambda_i x_i$ is the measure of a politician's centrality where x_i represents the eigenvectors and λ_i represents the eigenvalues associated with those eigenvectors. z_i in equation *(6)* above shows the personal characteristics of a given politician i, g_i shows the benefits that a given politician i promises to bring to his constituency once elected and β is $> 0 < 1$.

Solving equation *(6)* above for x_i yields

$$x_i = \frac{z_i + g_i}{(k - \beta \lambda_i)} \qquad (7)$$

Assuming that $\beta \lambda_i < k$

$$\frac{\partial x_i}{\partial \lambda_i} = \beta(z_i + g_i)(k - \beta \lambda_i)^{-2} \qquad (8)$$

Here $\frac{\partial x_i}{\partial \lambda_i} > 0$ so as λ_i takes higher values and the centrality of a given politician is maximized, his likelihood of winning in the General Election increases (Bonacich & Lloyd, 2001). Thus, the higher the value of λ_i the higher is the probability that politician i will win in the General Elections.

IV.   MEASURING NETWORK CENTRALITY

A survey of 142 key politicians was undertaken to determine the political and non-political links. These politicians made up the core group of the politicians from the three major parties (Pakistan Muslim League-Nawaz, Pakistan People's Party and Pakistan Tehreek-e-Insaaf) from whom the parties selected the candidates to stand for Assembly seats in the 2013 elections. Once the linkages amongst the politicians sampled were established and network maps were generated, we calculated each politician's eigenvector centrality within each network and identified the central-most politicians of each category. In our empirical analysis, using centrality scores, we test the impact of centrality on which candidates are allotted competitive constituencies, which politicians are given party tickets, and which candidates eventually win.

A. Eigenvector Centrality and Descriptive Statistics

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 that given node is connected. This implies that being connected to a central agent in a network adds to one's own centrality as well. According to Bonacich and Lloyd (2001), for an adjacency matrix A, the eigenvector centrality measure will take a general form.

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

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

The matrix representation for equation *(9)* above will take 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 to be proportional to the weighted sum of all other nodes to which that given node is connected, so equation *(9)* can be expressed as below:

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

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

The matrix representation for the general equation for the calculation of eigenvector centrality would be $A^T X = X \lambda$. Here X is a n x 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 (by the Perron-Frobenius theorem) results in only the greatest eigenvalues as the centrality measure.

Five categories of eigenvector centrality were calculated: party-specific political centrality (a measure of how politically central a politician was in their own party), party specific non-political centrality (a measure of how central a politician was in their own party based on non-political characteristics), political centrality (a measure of how politically central a politician was across parties), non-political centrality (a measure of how central a politician was across parties based on non-political characteristics) and complete centrality (a measure of how central a politician was across parties based on overall characteristics).

Political centrality was based on whether or not the politician's relatives were or had been members of a legislative body; the political party the politicians currently represent or had

represented at some given point in time i.e. if they were or had been members of PTI, PML-N, PPP or any other party and lastly the politician's years of representation i.e. whether they had been contesting for 5 years, 10 years or 15 years and more. Non-political centrality was based on the politicians' *baradari* (or caste), level of education, attending an elite educational institution, own profession, family profession, professional organization membership, and social club membership. Table I summarizes the basic characteristics of the politicians based on these centrality measures and other political and non-political factors.

Table I shows the mean eigenvector centrality scores for politicians in five specific networks: (i) each politician's party-specific political network, (ii) each politician's party-specific non-political network, (iii) each politician's overall political network, (iv) each politician's overall non-political network and (v) each politician's complete network. The scale of the eigenvector centrality values ranges between 0 and 1, where larger values signify higher centrality. The centrality characteristics show that most candidates were highly connected in the complete network and were socially and politically well-connected within their parties. Also, they were socially well-connected across other parties as well. However, their political connections across parties were not very strong.

Concerning the education characteristics, the data revealed that 47% of the politicians had undergraduate degrees and 35% had masters degrees or higher. However, only 13% were foreign educated. Amongst the elite educational institutions, Punjab University was the most commonly attended, with 49% of the politicians surveyed having studied there. In terms of professional characteristics, most of the politicians were businessmen or belonged to business families while the percentage of politicians who by profession were lawyers or agriculturalists were both 16%. Also, the share of politicians surveyed who belonged to lawyer or agriculturalist families was roughly the same too. 60% of the politicians surveyed were officeholders and 50% had five to nine years of representation while only 20% of the politicians surveyed had more than fifteen years of representation. This shows that relatively less experienced politicians participated in the General Elections 2013. The data did not point towards dynastic politics, in Lahore at least (contrary to popular belief), since only 30% of the politicians who took part in the General Elections 2013 had relatives who were members of a provincial or the National Assembly. Also, surprisingly only 20% of incumbents participated in these elections.

TABLE I

DESCRIPTIVE STATISTICS OF VARIABLES

Categories	Variables	Observations	Mean	Standard Deviation
Centrality Measures:	Party Specific Political Eigenvector Centrality	142	0.62	0.21
	Party Specific Non-Political Eigenvector Centrality	142	0.65	0.24
	Overall Political Eigenvector Centrality	142	0.41	0.26
	Overall Non-Political Eigenvector Centrality	142	0.62	0.22
	Complete Eigenvector Centrality	142	0.64	0.20
Education Level:	Highest Degree Matric (Secondary Education)	142	0.04	0.20
	Highest Degree Intermediate (High School)	142	0.08	0.27
	Highest Degree Graduation (Undergraduate Degree)	142	0.47	0.50
	Highest Degree Post Grad (Masters or Higher Degrees)	142	0.35	0.48
	Foreign Educated	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
	Punjab University	142	0.49	0.50
Own Profession:	Lawyer	142	0.16	0.37
	Businessman	142	0.61	0.49
	Agriculturalist	142	0.16	0.37
Family's Major Profession:	Lawyers Family	142	0.15	0.36
	Businessmen Family	142	0.53	0.50
	Agriculturalists Family	142	0.13	0.34
Political Characteristics:	Had/Have Relative Member of Parliament/Member of Assembly	142	0.30	0.46
	Switched Political Party	142	0.20	0.40
	Office Holder	142	0.60	0.49
	Five-Nine Years of Representation	142	0.50	0.50
	Ten-Fourteen Years of Representation	142	0.33	0.47
	More than Fifteen Years of Representation	142	0.20	0.40
	Won 2008 Elections	142	0.20	0.40
	Won Any Previous Elections	142	0.25	0.44

Notes. The table reports the mean and standard deviation of all the variables employed in empirical estimation for the 142 politicians of Lahore. Information on politician's education characteristics, educational institution characteristics, own profession characteristics, family profession characteristics and political characteristics was gathered through a survey. The eigenvector centrality measures have been derived from the networks generated for the politicians on the basis of that information.

In order to form a network, participants must have overlapping characteristics that lead to linkages and affiliations between them. For this purpose a wide variety of characteristics, both political and non-political were chosen to determine the network links between the politicians.

The data gathered on non-political linkages focused on the politician's *baradari* or caste (see Ibrahim, 2009), home town, academic institutions attended, profession apart from politics (see Fox & Lawless, 2005), sector of their business (if they are a businessman), dominant profession in their family (to capture whether they come from an agricultural or business background), whether they are a member of a professional or social organization (see Sinclair, 2007) and whether their father, grandfather, uncle or any other relative is/was a member of a provincial or the National Assembly (see Suresh & Ramesh, 2011).

Information on each politician's political characteristics was also gathered through a series of questions regarding their current and previous political party affiliations, the year they joined a political party, the positions they held in any party and the year they held that office, the number of times they contested and won in General Elections (see Black, 1972), the constituency they currently represent and those they previously represented, and the number of years of their political representation.

Using the data entered, matrices were generated and network plots were built to depict the linkages amongst the politicians. The centrality of politicians in each of these network plots was then calculated using the eigenvector centrality measure. The centrality scores generated for each network were then used in our empirical estimations looking at the impact of centrality on electoral outcomes.

In these network maps, the nodes represent the politicians and connections amongst these nodes arise on the basis of the factors that are common amongst the politicians. Such networks were generated for political and non-political factors together to construct the complete network, as well as separately, i.e. the political network and non-political network. Party-based political and non-political networks were also built. From each category of network, centrally located politicians were identified using the eigenvector centrality measure.

B. Political Network

The political networks were generated on the basis of a number of political factors including whether or not the politician's relatives were or had been members of a legislative body; the political party the politicians currently represent or had represented at some given point in time i.e. if they were or had been members of PTI, PML-N, PPP or any other party, and lastly the politician's years of representation i.e. whether they had been contesting for 5 years, 10 years or 15 years and more. All these factors together generated a group network with 8 nodes where each node represented one of these factors. The politicians' network consisted of 142 nodes.

FIGURE I

POLITICAL NETWORKS MAP
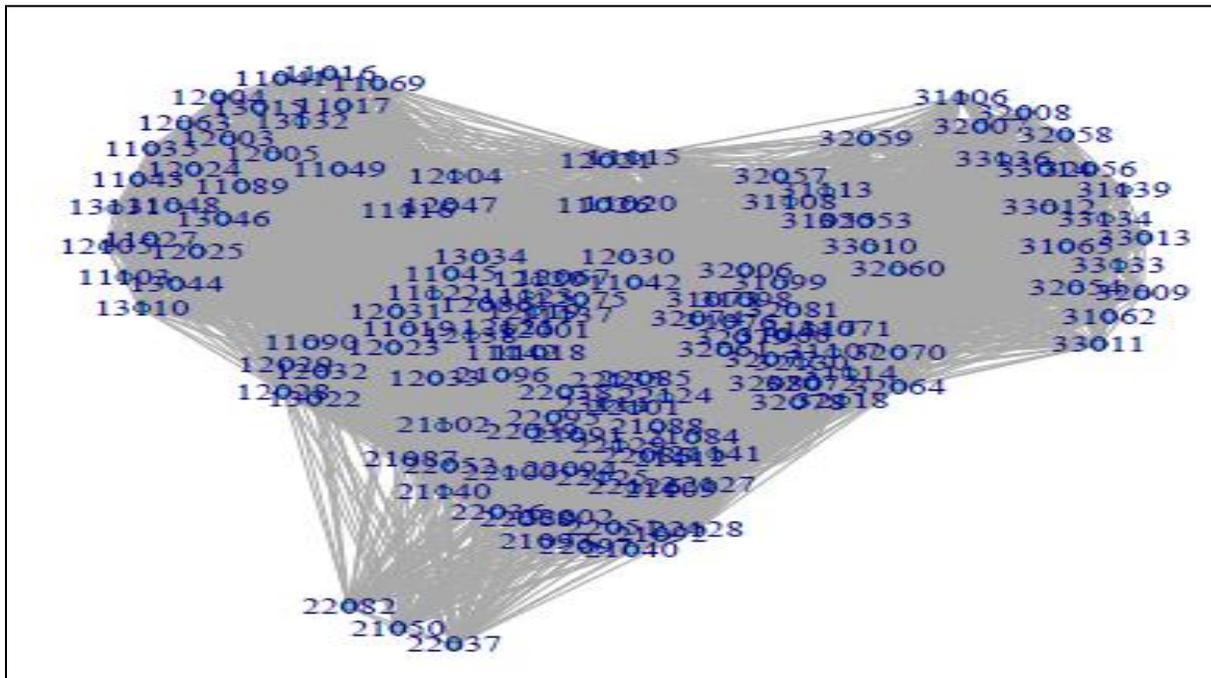
Notes. Figure shows linkages amongst all the politicians on the basis of the political factors alone. The small blue dots denote the politicians and the number on each dot denotes each politician's unique code. The gray lines establish the linkages amongst the politicians.

The politicians' political network (Figure I above), shows connections amongst all the politicians where politicians with the highest amount of linkages lie at the core of the network plot and those with fewer linkages lie on the periphery. Thus, as you move outwards from the center of the politicians' political network plot, the number of linkages that a given node has falls and the thickness of the lines forming the connections also decreases. Therefore, in such a network plot, the important politicians are the ones who lie at the center. An interesting observation about this plot are the various clusters of politicians showing that different groups of

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politicians had different types of political factors in common which resulted in clusters within the network. The central politicians were those who had connections within each cluster.

These clusters reveal an interesting fact about the current political scenario of Pakistan: 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 the early political history of Pakistan. However, the network map above shows different regions of political clustering which implies a more diverse group of politicians involved in Lahore's current electoral politics. Thus, there is significant heterogeneity in the political network.

C. Non-Political Network

The non-political networks were generated on the basis of non-political factors related to the politicians' *baradari*, level of education, educational institution, own profession, family profession, professional organization membership, and social club membership.

FIGURE II

NETWORK MAP OF NON POLITICAL CHARACTERISTICS
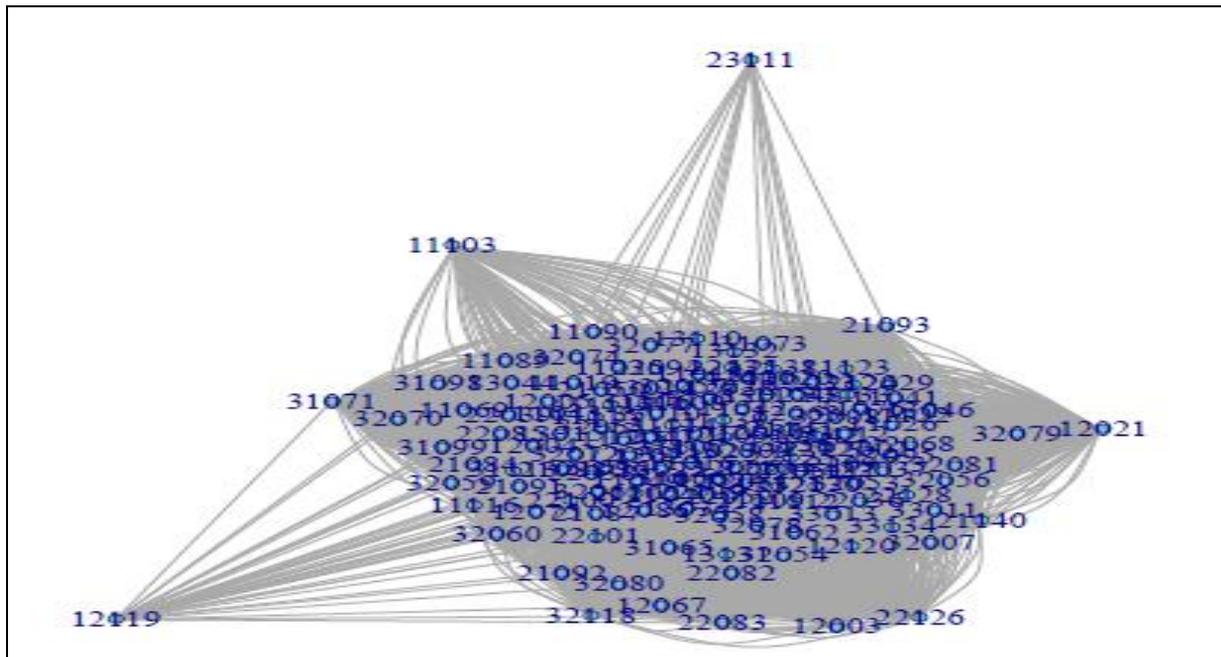
Notes. Figure shows linkages amongst all the politicians on the basis of the non-political factors alone. The small blue dots denote the politicians and the number on each dot denotes each politician's unique code. The gray lines establish the linkages amongst the politicians.

The politicians' non-political network plot (Figure II above) also consisted of 142 nodes where each node represented one politician. The linkages amongst politicians were established on the basis of the 55 non-political factors. Since each politician had at least one factor in

common with the other, no independent nodes were found in the plot. The plot also has a core-periphery structure where the politicians with the highest amount of linkages lie in the center and those with the least are on the periphery. As one moves out from the center, the thickness of the lines forming the linkages also falls, showing that fewer and fewer factors were common amongst the politicians who lay on the periphery.

As compared to the political network plot from Figure I, Figure II shows greater homogeneity and lesser diversity in the social connections of politicians. The tight cluster in the middle of the plot shows that people have similar non-political factors in common with each other and there are no sub-groups within the network that distinguish one group from the other on the basis of a few factors.

D. Complete Network

Using all the political and non-political factors together i.e. *baradari*, education, educational institution, own profession, family profession, professional organization membership, social club membership, political party membership, years of representation as a politician and having relatives who are/were legislative body members, a group network plot and politicians network plot was constructed.

FIGURE III

NETWORK MAP OF OVERALL CONNECTIONS BETWEEN POLITICIANS
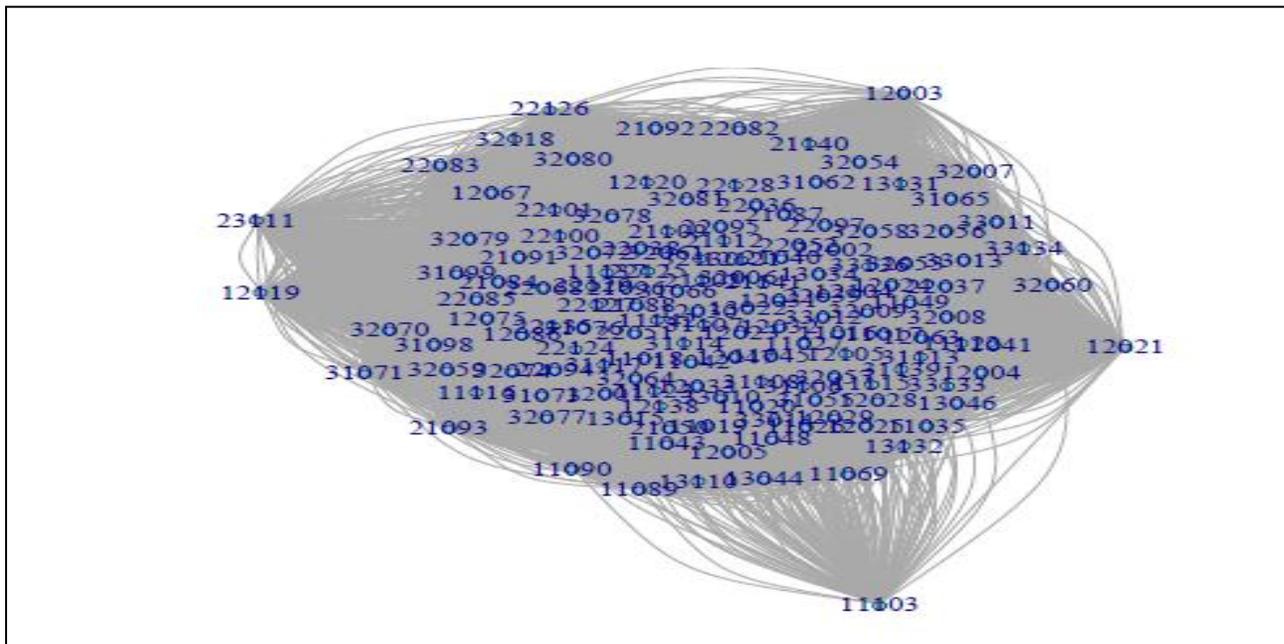
Notes. Figure shows linkages amongst all the politicians on the basis of all the socio-political factors. The small blue dots denote the politicians and the number on each dot denotes each politician's unique code. The gray lines establish the linkages amongst the politicians.

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The politicians' complete network (Figure III above) consisted of 142 nodes where each node represented one politician and the linkages amongst the politicians were made on the basis of the number of factors/characteristics they had in common. The politicians' complete network exhibited greatest heterogeneity and the familiar core-periphery structure showing that politicians with the largest number of linkages lie at the center of the network and those on the periphery of the network have the fewest linkages. So as one moves out from the center of the network and the network spreads, the number of linkages falls. Strong connections amongst politicians were shown by thicker lines which meant that the politicians being considered had a number of factors in common. Greater heterogeneity meant that there were a variety of factors contributing to the connections and centrality of politicians.

V. EMPIRICAL METHODOLOGY

This section explains the three models that were used to look at the impact of centrality and connections on parties' political choices prior to elections regarding the placement of candidates at constituencies and the impact of centrality on a politician's likelihood of getting the party ticket and winning the Assembly seat in the elections.

A. Competing in Competitive Constituencies

First, we estimate whether the political parties of Pakistan place their most central politicians as candidates in constituencies which in the prior elections witnessed a higher voter turnout (%) or at constituencies where elections got pretty close and competitive (<25% margin of victory). We believe that parties desire to place their connected candidates at such constituencies because such candidates could ensure a win for them, and we test this through the following linear model:

$$C_i = \beta_0 + \beta_1 V_i + \beta_2 P_i + \varepsilon_i \qquad (11)$$

Here C_i represents a vector of the five categories of the centrality measures: party specific political centrality, party specific non-political centrality, overall political centrality, overall non-political centrality and complete centrality. V_i represents prior election's constituency level competitiveness, which in one set of regressions is measured by the voter turnout (%) in 2008 elections and in another set of regressions it is measured by the winner's margin of victory in the General Elections 2008. For this category only those constituencies were considered where margin of victory was less than 25%. P_i is the vector of political variables used as controls in the estimations for margin of victory (<25%). These political variables were dummy variables representing office holders and previous wins of politicians.

B. Getting the Party Ticket

We also test to see the impact of centrality measures and socio-political factors on a politician's chances of securing the party ticket to contest in the General Elections at the provincial as well as national level. To carry out this analysis, the following linear probability model was estimated:

$$GT_i = \beta_0 + \beta_1 C_i + \beta_2 Q_i + \varepsilon_i \qquad (12)$$

Here GT_i is the binary dependent variable measuring whether or not the politician got the party ticket to contest in the elections at the provincial or national level. C_i represents the five categories of the centrality measures which include party specific political and non-political centralities, overall political and non-political centralities and complete centrality. Q_i is a vector of the dummy variables representing political and non-political factors that were used as controls. The non-political variables used included politicians' education characteristics, educational institution characteristics, own profession characteristics and family profession characteristics. Whereas the political variables included dummy variables taking the value of one for politician's whose relatives were members of Parliament or Assembly, politician's who had switched political parties, were office holders, had various years of representation (five-nine, ten-fourteen, more than fifteen), were incumbents or had contested in any previous elections. When estimating the impact of political centrality measures, only non-political factors were used as controls and when estimating the impact of non-political centrality on the binary dependent variable, only political factors were included. No control variables were included when

estimating the impact of being connected in the complete network on a politician's likelihood of getting the party ticket.

C. Winning the 2013 Election

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

$$W_i = \beta_0 + \beta_1 C_i + \beta_2 Q_i + \varepsilon_i \qquad (13)$$

Here W_i is the binary dependent variable taking the value of one for politicians who won the provincial or National Assembly seat in the General Elections 2013. C_i is a vector of the five centrality measures which include party specific political and non-political centralities, overall political and non-political centralities and complete centrality. Q_i is a vector of the dummy variables representing political and non-political factors that were used as controls. The non-political variables used included politicians' education characteristics, educational institution characteristics, own profession characteristics and family profession characteristics. Whereas the political variables included dummy variables taking the value of one for politician's whose relatives were members of Parliament or Assembly, politician's who had switched political parties, were office holders, had various years of representation (five-nine, ten-fourteen, more than fifteen), were incumbents or had contested in any previous elections. When estimating the impact of political centrality measures, only non-political factors were used as controls and when estimating the impact of non-political centrality on the binary dependent variable, only political factors were included. No control variables were included when the impact of being connected in the complete network on a politician's likelihood of winning in the General Election was estimated.

VI. RESULTS

Firstly, the role of General Elections 2008 on parties decisions regarding General Elections 2013 was analyzed by estimating whether parties placed their most central and connected candidates at constituencies where voter turnout was high and elections were close in the previous (2008) General Elections. Secondly, the influence of centrality on a politician's likelihood of being awarded the party ticket by the party heads was estimated. Finally, it was seen how centrality influences a politician's likelihood of winning the election. For these estimations five different types of centrality measures were used: party specific political centrality (a measure of how politically central a politician was in their own party), party specific non-political centrality (a measure of how central a politician was in their own party based on non-political characteristics), political centrality (a measure of how politically central a politician was across parties), non-political centrality (a measure of how central a politician was across parties based on non-political characteristics) and complete centrality (a measure of how central a politician was across parties based on overall characteristics).

A. *Do Parties Put Central Candidates in Competitive Constituencies?*

(i) Voter Turnout. We first estimated whether parties placed their most central candidates at constituencies in 2013 where voter turnout (%) was high in 2008.

TABLE II

CENTRALITY & VOTER TURNOUT (%) 2008 IN PUNJAB AND NATIONAL ASSEMBLY CONSTITUENCIES

	Complete Centrality	Political Centrality	Non-Political Centrality	Party Specific Political Centrality	Party Specific Non-Political 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. This table reports the effects of voter turnout (%) in 2008 on politicians' centrality measures at both Punjab and National Assembly constituencies. Each column represents the results of an OLS regression of the dependant variable listed in that column on voter turnout (%) in 2008. None of the regressions include any control variables. The sample size included 2013 Punjab and National Assembly candidates who contested from constituencies where in 2008 voter turnout (%) was high. Robust standard errors are displayed in brackets. Significantly different from zero at *** p<0.01, ** p<0.05 and * p<0.1.

Table II shows the combined results for Punjab and National Assembly constituencies where voter turnout (%) was higher in 2008. The results show that in 2013, parties shortlisted those candidates to run for seats in closely contested constituencies who were not only politically

central in the overall political network but were also politically central in their party specific political networks.

Table III shows the results for National Assembly constituencies where in 2008 voter turnout (%) was higher. The results were analogous to those found for the combined estimations of both assemblies.

TABLE III

CENTRALITY & VOTER TURNOUT (%) 2008 IN NATIONAL ASSEMBLY CONSTITUENCIES

	Complete Centrality	Political Centrality	Non-Political Centrality	Party Specific Political Centrality	Party Specific Non-Political 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. This table reports the effects of voter turnout (%) in 2008 on politicians' centrality measures at National Assembly constituencies only. Each column represents the results of an OLS regression of the dependant variable listed in that column on voter turnout (%) in 2008. None of the regressions include any control variables. The sample size included 2013 National Assembly candidates who contested from constituencies where in 2008 voter turnout (%) was high. Robust standard errors are displayed in brackets. Significantly different from zero at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.

Parties at the time of General Elections 2013, placed candidates who were politically more connected in the overall political network and the party specific political network in National Assembly constituencies where voter turnout (%) was previously high.

Table IV shows the results for the Punjab Assembly constituencies where in 2008 voter turnout (%) was significantly high.

TABLE IV

CENTRALITY & VOTER TURNOUT (%) 2008 IN PUNJAB ASSEMBLY CONSTITUENCIES

	Complete Centrality	Political Centrality	Non-Political Centrality	Party Specific Political Centrality	Party Specific Non-Political 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. This table reports the effects of voter turnout (%) in 2008 on politicians' centrality measures at Punjab Assembly constituencies only. Each column represents the results of an OLS regression of the dependant variable listed in that column on voter turnout (%) in 2008. None of the regressions include any control variables. The sample size included 2013 Punjab Assembly candidates who contested from constituencies where in 2008 voter turnout (%) was high. Robust standard errors are displayed in brackets. Significantly different from zero at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.

The results show that parties did not place their central and connected candidates at Punjab Assembly constituencies where voter turnout (%) was high in the prior General Elections 2008.

The results seem to imply that parties choose candidates strategically in the National Assembly elections but not the provincial assembly elections. The insignificance of the centrality measures at this level may be due to the fact that at the provincial level parties matter more than

the individual and votes are cast on the basis of the party name rather than the significance of the individual candidate.

(ii) Close Elections. To estimate whether parties placed their most connected and central candidates in constituencies which were competitive in 2008, we also tested the impact of close elections (constituencies where the margin of victory was less than 25%) on the centrality of the 2013 pool of candidates for each seat. Table V shows the combined results for Punjab and National Assembly constituencies in which there were close elections (<25% margin of victory).

TABLE V

CENTRALITY & CLOSE ELECTIONS (<25%) 2008 IN PUNJAB AND NATIONAL ASSEMBLY CONSTITUENCIES

	Complete Centrality	Political Centrality	Non-Political Centrality	Party Specific Political Centrality (4)	Party Specific Non-Political Centrality (5)
	(1)	(2)	(3)		
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. This table reports the effects of close elections (<25%) in 2008 on politicians' centrality measures at both Punjab and National Assembly constituencies. Each column represents the results of an OLS regression of the dependant 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 in previous elections (1/0). The sample size included 2013 Punjab and National Assembly candidates who contested from constituencies where in 2008 elections were close (<25%). Robust standard errors are displayed in brackets. Significantly different from zero at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.

The results show that in 2013, parties placed candidates who were more central in the overall political network at more competitive constituencies.

Table VI shows the impact of close elections (margin of victory <25%) on centrality measures for National Assembly constituencies alone:

TABLE VI

CENTRALITY & CLOSE ELECTIONS (<25%) 2008 IN NATIONAL ASSEMBLY CONSTITUENCIES

	Complete Centrality	Political Centrality	Non-Political Centrality	Party Specific Political Centrality (4)	Party Specific Non-Political Centrality (5)
	(1)	(2)	(3)		
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. This table reports the effects of close elections (<25%) in 2008 on politicians' centrality measures at National Assembly constituencies only. Each column represents the results of an OLS regression of the dependant 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 in previous elections (1/0). The sample size included 2013 National Assembly candidates who contested from constituencies where in 2008 elections were close (<25%). Robust standard errors are displayed in brackets. Significantly different from zero at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.

Candidates who were politically well connected not just in the overall political network but the party specific political network as well were the ones that parties placed in 2013 at National Assembly constituencies where elections were close and competitive in the prior General Elections of 2008.

Table VII shows the impact of close elections (margin of victory <25%) on centrality measures for the Punjab Assembly constituencies alone:

TABLE VII

CENTRALITY & CLOSE ELECTIONS (<25%) 2008 IN PUNJAB ASSEMBLY CONSTITUENCIES

	Complete Centrality	Political Centrality	Non-Political Centrality	Party Specific Political Centrality	Party Specific Non-Political 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. This table reports the effects of close elections (<25%) in 2008 on politicians' centrality measures at Punjab Assembly constituencies only. Each column represents the results of an OLS regression of the dependant 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 in previous elections (1/0). The sample size included 2013 Punjab Assembly candidates who contested from constituencies where in 2008 elections were close (<25%). Robust standard errors are displayed in brackets. Significantly different from zero at *** $p<0.01$, ** $p<0.05$ and * $p<0.1$.

The above 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 election competitiveness as revealed by the results of elections 2008.

This analysis, based on the model illustrated by equation *(11)* shows that parties in Pakistan are now sophisticated enough to recognize that connections of politicians add to their popularity and aid in creating a stronger vote bank. So where parties anticipate they are going to face competition, based on prior elections, for those constituencies they nominate their politically well-connected candidates. Sinclair (2011), also showed that central politicians in a network are the ones that eventually become presidents, so it's interesting to see that in a newly democratic state like Pakistan, centrality of politicians is determining leadership.

The next section estimates the model discussed earlier in equation *(12)* and gives insight on how the political and non-political connections of politicians within and across parties influence their likelihood of getting the party ticket to contest at the national or provincial level.

B. Getting the Party Ticket to Contest in the 2013 General Elections

After the political leaders in a party create a pool of potential candidates to stand for constituency level seats, they then choose the final candidate before the elections. In order to see the factors that influence this selection, we tested the impact of centrality as well as political and non-political factors on the probability of a politician being awarded the party ticket to contest in the 2013 General Elections.

(i) Getting the Party Ticket for Punjab Assembly Seat. We first estimated the impact of the various centrality measures on a politician's likelihood of getting the party ticket to contest for the Punjab Assembly seat in the 2013 elections. In these estimations political and non-political factors were used as control variables:

TABLE VIII

GETTING THE PARTY TICKET IN 2013 FOR A PUNJAB ASSEMBLY SEAT

	Complete Centrality	Political and Non-Political Centrality	Party Specific Political and Party Specific Non-Political Centrality	Non-Political Centrality and Political Factors	Political Centrality and Non-Political Factors	Party Specific Non-Political Centrality and Political Factors	Party Specific Political Centrality and Non-Political Factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party Specific Political Eigenvector Centrality			0.755***				0.674***
			[0.182]				[0.217]
Party Specific Non-Political Eigenvector Centrality			0.206			0.228	
			[0.163]			[0.179]	
Political Eigenvector Centrality		0.669***			0.596***		
		[0.155]			[0.184]		
Non-Political Eigenvector Centrality		0.191		0.162			
		[0.175]		[0.188]			
Complete Centrality	0.265						
	[0.217]						
Lawyer					0.178		0.200
					[0.166]		[0.165]
Businessman					0.119		0.125
					[0.140]		[0.140]
Agriculturalist					-0.0690		-0.0837
					[0.162]		[0.164]
Lawyers Family					-0.154		-0.164
					[0.160]		[0.161]
Businessmen Family					0.0804		0.0788
					[0.135]		[0.136]
Agriculturalists Family					-0.0520		-0.0491
					[0.184]		[0.185]
Had/Have Relative Member of Parliament/Assembly				0.106		0.108	
				[0.0950]		[0.0943]	
Switched Political Party				0.132		0.135	
				[0.118]		[0.117]	
Office Holder				-0.161*		-0.158*	
				[0.0813]		[0.0809]	
Five-Nine Years of Representation				0.264**		0.252**	
				[0.117]		[0.117]	
Ten-Fourteen Years of Representation				0.0362		0.0607	
				[0.157]		[0.158]	
More than Fifteen Years of Representation				0.0447		0.0474	
				[0.155]		[0.154]	
Won 2008 Elections				-0.132		-0.147	
				[0.254]		[0.253]	
Won Any Previous Elections				-0.00162		-0.00456	
				[0.246]		[0.245]	
Include Education Characteristics					Yes		Yes
Include Educational Institution Characteristics					Yes		Yes
Constant	0.643***	0.426***	0.216	0.627***	0.366*	0.578***	0.191
	[0.142]	[0.138]	[0.168]	[0.144]	[0.187]	[0.145]	[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. This table reports the effects of centrality measures, political factors and non-political factors on a politician's probability of getting the party ticket to contest for the Punjab Assembly seat in the General Elections 2013. Each column represents the results of an OLS regression where the binary dependant variable is getting the party ticket for the Punjab Assembly seat (1/0). The centrality measures used include: complete eigenvector centrality, political eigenvector centrality, non-political eigenvector centrality, party specific political eigenvector centrality and party specific non-political eigenvector centrality. Except columns (2), (3) and (4) which only include the centrality measures, all other regressions include political and/or non-political factors. Column (1) includes both. The non-political factors include education characteristics: highest degree matric (1/0), highest degree intermediate (1/0), highest degree graduation (1/0), high degree post graduation (1/0), foreign educated (1/0); educational institution characteristics: Aitchison college (1/0), Forman Christian college (1/0), Government college university (1/0), Punjab university (1/0); own profession characteristics: lawyer (1/0), businessman (1/0), agriculturalist (1/0); family profession characteristics: lawyers family (1/0), businessmen family (1/0), agriculturalists family (1/0); the political factors include: had/have relative MoP/MoA (1/0), switched political party (1/0), office holder (1/0), years of representation (5-9, 10-14, >15) (1/0), won 2008 elections (1/0), won any previous elections (1/0). Column (1) shows results for socio-political factors, column (2) for complete centrality, column (3) for party specific political and party specific non-political centrality, column (4) for non-political centrality and political factors, column (5) for political centrality and non-political factors, column (6) for party specific non-political centrality and political factors, column (7) for party specific non-political centrality and political factors and column (8) for party specific political centrality and non-political factors. The sample size included party officeholders and politicians who contested for the Punjab Assembly seat in 2013. Robust standard errors are displayed in brackets. Significantly different from zero at *** p<0.01, ** p<0.05 and * p<0.1.

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

Looking at the control variables, the results revealed that party office holders are unlikely to get the party ticket to contest for the Punjab Assembly seat (specifications (4) and (6)). And politicians whose years of representation range between five to nine years have a higher probability of getting the party ticket (columns (4) and (6)). This shows that tickets for Punjab Assembly seat are given to relatively younger politicians.

(ii) Getting the Party Ticket for National Assembly Seat. We then estimated the impact of centrality measures and political and non-political factors on a politician's likelihood of getting the party ticket to contest for the National Assembly seat in the 2013 elections:

TABLE IX

GETTING THE PARTY TICKET IN 2013 FOR A NATIONAL ASSEMBLY SEAT

	Complete Centrality	Political and Non-Political Centrality	Party Specific Political and Party Specific Non-Political Centrality	Non-Political Centrality and Political Factors	Political Centrality and Non-Political Factors	Party Specific Non-Political Centrality and Political Factors	Party Specific Political Centrality and Non-Political Factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party Specific Political Eigenvector Centrality			0.125 [0.301]				-0.0640 [0.340]
Party Specific Non-Political Eigenvector Centrality			0.495* [0.285]			0.616** [0.291]	
Political Eigenvector Centrality		0.148 [0.234]			-0.00513 [0.272]		
Non-Political Eigenvector Centrality		0.471 [0.299]		0.614* [0.312]			
Complete Centrality	0.530* [0.309]						
Lawyer					-0.195 [0.204]		-0.193 [0.204]
Businessman					0.564** [0.221]		0.573** [0.221]
Agriculturalist					0.480 [0.333]		0.479 [0.333]
Lawyers Family					0.583** [0.262]		0.592** [0.261]
Businessmen Family					-0.0250 [0.213]		-0.0217 [0.211]
Agriculturalists Family					-0.385 [0.362]		-0.368 [0.361]
Had/Have Relative Member of Parliament/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]	
Five-Nine Years of Representation				-0.322 [0.199]		-0.315 [0.198]	
Ten-Fourteen Years of Representation				0.339 [0.241]		0.353 [0.237]	
More than Fifteen Years of Representation				-0.0874 [0.230]		-0.100 [0.228]	
Won 2008 Elections				0.220 [0.239]		0.190 [0.235]	
Won Any Previous Elections				-0.0146 [0.223]		-0.0269 [0.222]	
Include Education Characteristics					Yes		Yes
Include Educational Institution Characteristics					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. This table reports the effects of centrality measures, political factors and non-political factors on a politician's probability of getting the party ticket to contest for the National Assembly seat in the General Elections 2013. Each column represents the results of an OLS regression where the binary dependant variable is getting the party ticket for the National Assembly seat (1/0). The centrality measures used include: complete eigenvector centrality, political eigenvector centrality, non-political eigenvector centrality, party specific political eigenvector centrality and party specific non-political eigenvector centrality. Except columns (2), (3) and (4) which only include the centrality measures, all other regressions include political and/or non-political factors. Column (1) includes both. The non-political factors include education characteristics: highest degree matric (1/0), highest degree intermediate (1/0), highest degree graduation (1/0), high degree post graduation (1/0), foreign educated (1/0); educational institution characteristics: Aitchison college (1/0), Forman Christian college (1/0), Government college university (1/0), Punjab university (1/0); own profession characteristics: lawyer (1/0), businessman (1/0), agriculturalist (1/0); family profession characteristics: lawyers family (1/0), businessmen family (1/0), agriculturalists family (1/0); the political factors include: had/have relative MoP/MoA (1/0), switched political party (1/0), office holder (1/0), years of representation (5-9, 10-14, >15) (1/0), won 2008 elections (1/0), won any previous elections (1/0). Column (1) shows results for socio-political factors, column (2) for complete centrality, column (3) for political and non-political centrality, column (4) for party specific political and party specific non-political centrality, column (5) for non-political centrality and political factors, column (6) for political centrality and non-political factors, column (7) for party specific non-political centrality and political factors and column (8) for party specific political centrality and non-political factors. The sample size included politicians who applied and who contested for the National Assembly seat in 2013. Robust standard errors are displayed in brackets. Significantly different from zero at *** p<0.01, ** p<0.05 and * p<0.1.

The results show that politicians who are central in the complete network have a higher likelihood of getting the party ticket to contest for the National Assembly seat (specification (1)). Also, politicians who are central in the overall non-political network or the party specific non-political network, all else equal, had a higher probability of getting the party to contest for the National Assembly seat in the 2013 elections.

The results also showed that politicians whose relatives are or were members of Assembly or Parliament have a higher likelihood of getting the party ticket to contest for the National Assembly seat (specifications (4) and (6)). In terms of non-political factors, the results illustrate that National Assembly party tickets are given to politicians who are businessmen or belong to a family of lawyers (columns (5) and (7)).

The above analysis reveals that different centrality measures matter at the national and provincial levels. At the provincial level in order to get the party ticket, within and across party political connections of a politician matter. This may be because politicians who are politically well connected within their party can easily raise funds for election campaigns. While at the national level, to get the party ticket, politicians need to be socially more connected as here the overall and within party social connections matter more which may be because leaders believe that socially well connected candidates have higher odds of winning in the elections as their social connections generate a larger vote bank. Also, at the national level, tickets are given to those politicians who are more central in the complete network. This shows that politician's chosen to contest at the national level are overall well connected and central on the basis of both, political and non-political factors while those chosen to contest at the provincial level are only politically well connected.

The next section estimates the model represented by equation *(13)* in which we test the importance of being connected and central in the complete, political and non-political networks on a politician's probability of winning the Assembly seat at the provincial and national levels.

C. Winning in the 2013 Elections

After a political party creates a list of potential candidates for each seat and then finally selects a candidate, the voters decide between the chosen party candidates. So we also look at the final stage in the electoral process by estimating the impact of the socio-political factors and

centrality measures on a politician's likelihood of winning a Punjab or National Assembly seat in the 2013 elections. The literature (see Black, 1972) states that previous wins of a politician have a direct positive impact on his future wins as well, since they aid to his popularity among the masses and also the investments made in one election reap off in all future elections. Winning enables a delivering politician to serve his constituency and work for the betterment of his nation and this adds to a politician's recognition. So we also included variables representing incumbency as well as any previous electoral victories along with other socio-political factors.

(i) Winning the Punjab Assembly Seat in the 2013 Elections. We first tested to see whether or not central and connected politicians are the ones who win the Punjab Assembly seat for their party. Political and non-political factors were used in these estimations as control variables:

TABLE X

WINNING A PUNJAB ASSEMBLY ELECTION IN 2013

	Complete Centrality	Political and Non-Political Centrality	Party Specific Political and Party Specific Non-Political Centrality	Non-Political Centrality and Political Factors	Political Centrality and Non-Political Factors	Party Specific Non-Political Centrality and Political Factors	Party Specific Political Centrality and Non-Political Factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party Specific Political Eigenvector Centrality			0.519* [0.264]				0.314 [0.306]
Party Specific Non-Political Eigenvector Centrality			0.409* [0.223]			0.116 [0.207]	
Political Eigenvector Centrality		0.342 [0.232]			0.185 [0.260]		
Non-Political Eigenvector Centrality		0.111 [0.249]		-0.0768 [0.214]			
Complete Centrality	0.123 [0.285]						
Lawyer					-0.0575 [0.231]		-0.0605 [0.229]
Businessman					-0.149 [0.206]		-0.152 [0.205]
Agriculturalist					0.426* [0.222]		0.407* [0.223]
Lawyers Family					0.156 [0.257]		0.152 [0.256]
Businessmen Family					0.158 [0.190]		0.160 [0.189]
Agriculturalists Family					-0.591** [0.251]		-0.593** [0.249]
Had/Have Relative Member of Parliament/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]	
Five-Nine Years of Representation				0.0502 [0.128]		0.0421 [0.128]	
Ten-Fourteen Years of Representation				0.170 [0.167]		0.208 [0.169]	
More than Fifteen Years of Representation				-0.318* [0.166]		-0.315* [0.166]	
Won 2008 Elections				0.125 [0.273]		0.0824 [0.274]	
Won Any Previous Elections				0.546** [0.257]		0.560** [0.257]	
Include Education Characteristics					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. This table reports the effects of centrality measures, political factors and non-political factors on a politician's probability of winning the Punjab Assembly seat in the General Elections 2013. Each column represents the results of an OLS regression where the binary dependant variable is winning the Punjab Assembly seat (1/0). The centrality measures used include: complete eigenvector centrality, political eigenvector centrality, non-political eigenvector centrality, party specific political eigenvector centrality and party specific non-political eigenvector centrality. Except columns (2), (3) and (4) which only include the centrality measures, all other regressions include political and/or non-political factors. Column (1) includes both. The non-political factors include education characteristics: highest degree matric (1/0), highest degree intermediate (1/0), highest degree graduation (1/0), high degree post graduation (1/0), foreign educated (1/0); educational institution characteristics: Aitchison college (1/0), Forman Christian college (1/0), Government college university (1/0), Punjab university (1/0); own profession characteristics: lawyer (1/0), businessman (1/0), agriculturalist (1/0); family profession characteristics: lawyers family (1/0), businessmen family (1/0), agriculturalists family (1/0); the political factors include: had/have relative MoP/MoA (1/0), switched political party (1/0), office holder (1/0), years of representation (5-9, 10-14, >15) (1/0), won 2008 elections (1/0), won any previous elections (1/0). Column (1) shows results for socio-political factors, column (2) for complete centrality, column (3) for political and non-political centrality, column (4) for party specific political and party specific non-political centrality, column (5) for non-political centrality and political factors, column (6) for political centrality and non-political factors, column (7) for party specific non-political centrality and political factors and column (8) for party specific political centrality and non-political factors. The sample size included politicians who contested for the Punjab Assembly seat in 2013. Robust standard errors are displayed in brackets. Significantly different from zero at *** p<0.01, ** p<0.05 and * p<0.1.

The results showed that politicians who were politically and socially well connected within their parties had a higher likelihood of winning the Punjab Assembly seat in the 2013 elections. The eigenvector centrality measures for party specific political and party specific non-political centrality were the only measures that were significant (specification (3)).

The results also showed that politicians who were agriculturalists themselves had a higher probability of winning the Punjab Assembly seat, while those whose family profession was agriculture, all else fixed, had a lower probability of winning the Punjab Assembly seat in 2013 (columns (5) and (7)). This might be because politicians who are agriculturalists themselves have their own vote bank that ensures their win but politicians whose relatives are agriculturalists fail to secure a win because voters prefer to vote for their leader rather than the relatives of that leader, so loyalties of the voters lie with agriculturalists who themselves are politicians rather than their relatives who are politicians.

In terms of political factors, the regressions showed that politicians who have more than fifteen years of representation have a lower likelihood of securing a seat in the Punjab Assembly (specifications (4) and (6)). Similar to the results in the literature, winning any previous elections (specifications (4) and (6)), increased the probability of winning the Punjab Assembly seat even though the impact of incumbency was insignificant.

(ii) Winning the National Assembly Seat in the 2013 Elections. We also estimated the impact of centrality measures and political and non-political factors on a politician's likelihood of winning the National Assembly seat:

TABLE XI

WINNING A NATIONAL ASSEMBLY ELECTION IN 2013

	Complete Centrality	Political and Non-Political Centrality	Party Specific Political and Party Specific Non-Political Centrality	Non-Political Centrality and Political Factors	Political Centrality and Non-Political Factors	Party Specific Non-Political Centrality and Political Factors	Party Specific Political Centrality and Non-Political Factors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Party Specific Political Eigenvector Centrality			0.189 [0.350]				0.638* [0.371]
Party Specific Non-Political Eigenvector Centrality			0.526 [0.373]			0.430 [0.314]	
Political Eigenvector Centrality		0.281 [0.287]			0.590* [0.301]		
Non-Political Eigenvector Centrality		0.0538 [0.400]		0.249 [0.332]			
Complete Centrality	0.162 [0.425]						
Lawyer					-0.201 [0.224]		-0.194 [0.228]
Businessman					-0.367 [0.286]		-0.396 [0.296]
Agriculturalist					0.728** [0.322]		0.745** [0.327]
Lawyers Family					-0.450 [0.291]		-0.447 [0.298]
Businessmen Family					0.364 [0.225]		0.414* [0.226]
Agriculturalists Family					-1.321*** [0.374]		-1.284*** [0.379]
Had/Have Relative Member of Parliament/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]	
Five-Nine Years of Representation				-0.0159 [0.237]		-0.0317 [0.232]	
Ten-Fourteen Years of Representation				-0.395 [0.260]		-0.372 [0.254]	
More than Fifteen Years of Representation				0.290 [0.212]		0.283 [0.208]	
Won 2008 Elections				0.592** [0.265]		0.564** [0.261]	
Won Any Previous Elections				0.219 [0.241]		0.217 [0.235]	
Include Education Characteristics					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 non-political factors on a politician's probability of winning the National Assembly seat in the General Elections 2013. Each column represents the results of an OLS regression where the binary dependant variable is winning the National Assembly seat (1/0). The centrality measures used include: complete eigenvector centrality, political eigenvector centrality, non-political eigenvector centrality, party specific political eigenvector centrality and party specific non-political eigenvector centrality. Except columns (2), (3) and (4) which only include the centrality measures, all other regressions include political and/or non-political factors. Column (1) includes both. The non-political factors include education characteristics: highest degree matric (1/0), highest degree intermediate (1/0), highest degree graduation (1/0), high degree post graduation (1/0), foreign educated (1/0); educational institution characteristics: Aitchison college (1/0), Forman Christian college (1/0), Government college university (1/0), Punjab university (1/0); own profession characteristics: lawyer (1/0), businessman (1/0), agriculturalist (1/0); family profession characteristics: lawyers family (1/0), businessmen family (1/0), agriculturalists family (1/0); the political factors include: had/have relative MoP/MoA (1/0), switched political party (1/0), office holder (1/0), years of representation (5-9, 10-14, >15) (1/0), won 2008 elections (1/0), won any previous elections (1/0). Column (1) shows results for socio-political factors, column (2) for complete centrality, column (3) for political and non-political centrality, column (4) for party specific political and party specific non-political centrality, column (5) for non-political centrality and political factors, column (6) for political centrality and non-political factors, column (7) for party specific non-political centrality and political factors and column (8) for party specific political centrality and non-political factors. The sample size included politicians who contested for the National Assembly seat in 2013. Robust standard errors are displayed in brackets. Significantly different from zero at *** p<0.01, ** p<0.05 and * p<0.1.

According to the findings, National Assembly seats are won by politicians who are politically more central and connected not only in the overall political network but in the party specific political network as well. The political eigenvector centrality measure (specification (5)) and the party specific political eigenvector centrality measure (specification (7)) were significant when estimated with non-political factors only.

Contrary to the result found for winning Punjab Assembly seat, the national level estimations showed that incumbency had a positive and significant impact on wining the seat. We also found that the probability of winning a National Assembly seat is higher for agriculturalists.

Our results show an interesting contrast between winning a Punjab Assembly seat and a National Assembly seat. For the Punjab Assembly analysis, the results showed that only connections within the party mattered, whether they were political or social. This might be due to the fact that close social and political ties within the party enable politicians to raise more funds for campaigning which then influences their chances of winning. At the national level, the results showed that for winning the National Assembly seat, only political connections matter, whether they are within or across parties, people vote for politicians who appear to be politically well connected. This might be due to the fact that politically prominent politicians appear to be more resourceful and dominant and hence better able to have a greater impact on the transfer of funds to a constituency or starting developmental projects in a constituency. These findings also show that only politically well-established leaders win at the national level while at the provincial level social connectedness plays a role. It also reinforces the idea that at the provincial level votes are casted on the basis of party characteristics while at the national level, individual candidates garner votes based on their reputations.

VII.   CONCLUSIONS

The study looked into how networks are created and how they influence political choices in Pakistan. Even though the study of social networks is well-established, the analysis if political networks on electoral outcomes is relatively new. The aim of the study was to map networks

based on the ties of politicians and observe their role in the political representation of the country. The idea was to build networks on the basis of the factors that politicians have in common and identify the central most politicians of these networks. We focused our analysis on the politicians and electoral outcomes in Lahore, which contains some of the most prominent politicians of Pakistan as well as some of the most visible voting constituencies.

The categories of networks created included: complete network, political network, non-political network, party specific political network and party specific non-political network. In all these networks, each politician was represented by a node. It was hypothesized that the most central politicians within a network are the ones that parties place in the most important and competitive constituencies (based on the previous elections outcomes); they are the ones who get the party ticket to contest in the General Elections and subsequently win the elections.

The findings showed that in the 2013 elections, parties chose to place their politically connected politicians at constituencies with previously higher voter turnout (%) and closer margins of victory (<25% margin of victory). In constituencies where voter turnout was higher, parties placed politicians who were not only central in the overall political network but also central in the party specific political network. While in constituencies where prior elections were closer, parties placed politicians who were central in the overall political network.

As far as getting the party ticket and winning the Assembly seat was concerned, the results at the provincial level showed that party tickets to contest for the Punjab Assembly seat are given to politicians who are politically well connected, both overall and within the party. Also, Punjab Assembly seats are won by those politicians who are socially and politically better connected within their parties, perhaps because these well-connected politicians can leverage their political connections to gather more party funds for their election campaign. This shows that in order to win at the provincial level, party matters more than the individual.

At the national level, the results revealed that party tickets to contest for the National Assembly seat are given to politicians who are central in the complete network. Also, they are given to politicians who are socially well connected, both overall and within their party i.e. they are central in the overall non-political network and the party specific non-political network as well. This might be because parties believe these socially well connected politicians have higher vote banks. However, to win the National Assembly seat, the results revealed, political connections are more important, both within the party and across parties. This may be because

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voters believe that politically well-connected politicians will be able to garner more resources for their constituencies.

This study is important because it gives an insight on the political nomination of politicians and their subsequent wins. In Pakistan, primary elections are not held for candidate selection, so this study helps understand how consensus within parties is reached to give the party ticket to a given politician to contest in the General Elections amongst a pool of politicians and how centrality affects this selection. The study also helps draw a comparison between the centrality of a politician within a network and the voting behavior of the electorate.

We also show that the dynamics in Pakistan may have changed over time: it is not the small group of well-connected political families that are standing out, but rather political power is becoming more decentralized perhaps because of a growing middle class. This study establishes links amongst politicians purely on relational terms but for future analyses the costs and benefits to politicians of forming linkages with each other can also be investigated.

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