

CEO Network Centrality and Merger Performance^{*}

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This draft: April 2, 2012

Abstract

We use director relational data from BoardEx to construct social networks of executives and directors of US public companies and calculate four measures of network centrality: Closeness, Degree, Betweenness and Eigenvector centrality for each individual connected into such network. CEOs with higher levels of network centrality may obtain more private information from their social contacts, which could translate to better decision-making on the job (private information hypothesis). On the other hand, more centrally positioned CEOs may derive influence and power from being well-connected and thus be more insulated from disciplinary actions brought about by the corporate control market and the executive labor market (managerial entrenchment hypothesis). By studying outcomes of M&A's, we introduce evidence that supports the managerial entrenchment hypothesis. More centrally positioned CEOs are more likely to bid for other publicly traded firms, and these deals carry greater value losses to the acquirer, and greater losses to the combined entity. Stronger corporate governance in the form of intensive board monitoring, non-CEO Chairman, and block ownership at the bidder company can partially mitigate such effects. Following the CEOs and their firms five years after their first value-destroying deals, we find that firms run by more centrally positioned CEOs withstand the external threat from market discipline. Moreover, the managerial labor market is less effective in disciplining centrally positioned CEOs because they are more likely to find alternative, well-paid jobs. Ultimately, we show that CEO personal networks can have their “darker side” – well-connected CEOs may become powerful enough to pursue any acquisitions, regardless of the impact on shareholder wealth.

JEL classifications: G34, D85

Keywords: Network Centrality, Mergers and Acquisitions, Corporate Governance, Corporate Control Market, and Managerial Labor Market

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1. Introduction

A new strand of research in corporate finance looks at the intensive web of social connections of corporate executives and board members of America's publicly traded companies, and asks whether such connections are economically relevant and significant in affecting firm governance, financial contracting, and firm values. The findings have been substantial. For example, studying within-firm connections, Fracassi and Tate (forthcoming) show that CEOs have the incentive to appoint directors with ties to the CEO and that the CEO-director connections weaken board monitoring and destroy corporate values. Hwang and Kim (2009) further show that firms with board members socially tied to the CEO award higher CEO compensations, and are associated with lower pay-performance sensitivity, as well as lower turnover-performance sensitivity. Coles et al. (2010) shows similarly lower turnover-performance sensitivity and higher pay for boards where more members come after the CEO's appointment, although they find board co-option to be value enhancing for high human capital intensity firms.

We find these results enlightening. On the other hand, we contend that the above studies may have missed an important intermediate step, which ties the observation that directors and CEOs are "socially connected" to the ultimate outcome that "connected" directors become submissive to CEOs' demands. This missing step should readily explain why social connections could generate costs of poor monitoring, firm value losses, or the implicit loss of CEO or directors' reputation as guardians of shareholders' interests.

We therefore take a different view at the social networks of CEOs and directors: instead of checking whether a CEO is connected to a director on the board, we study the overall connectedness of CEOs and directors and use measures of *network centrality* to capture the status, influence, and power of a CEO with respect to the *entire* network he or she is linked to. Similar to all prior studies, the social network is formed through shared past employment in executive and director positions, alumni educational network affiliation, or directorship in social clubs. We use four centrality measures commonly found in social network studies: degree, closeness, betweenness, and eigenvector centrality, to quantitatively gauge one's

position in a network, and argue that network centrality conveys power and influence, the key element driving the results in prior studies.

In this paper, we apply the CEO network centrality measures to mergers and acquisitions. M&As are some of the most crucial corporate events for bidding firms and their CEOs. In addition, M&A events set the stage for CEOs to showcase their network influence both internally, when they persuade directors to support CEO decisions in initiating possibly value-destroying deals, and externally, as well-networked CEOs may obtain and utilize private information from their network contacts to aid in bidding and negotiation. The broad, interdisciplinary literature on social network cannot distinguish “power and influence in bargaining and negotiation” and “power derived from better access to information” (Hanneman and Riddle, 2010, Chapter 10), and our approaches in focusing on M&A outcomes present convincing statistical evidence to separate the two hypotheses.

We investigate not only the role of bidder CEO’s personal network size (the number of direct links between the CEO and other individuals) but also the impact of “importance” of the CEO’s network (how short a path the CEO has to other individuals, how often the CEO lies on the shortest path between two individuals, and how “relevant” the individuals linked to the CEO are)¹. Social science research suggests that better-connected (i.e. more central) individuals are more influential and/or powerful (e.g. Mizruchi and Potts 1998). We strive to link the potential bidder CEO influence and power to M&A outcomes in order to answer the following two research questions: Are bidder firms with well-connected CEOs associated with higher/lower frequency of M&A deals? Are M&A deals involving bidder firms with well-connected CEOs characterized by higher/lower takeover gains (especially to bidder shareholders) and by higher/lower total takeover synergies? Ultimately, we want to examine the potential “darker side” of CEO

¹ The focus on CEOs’ *entire* social network and the centrality of network positions also differs our study from other M&A papers, such as Cai and Sevilir (forthcoming) who show that cross-firm social links can be valuable during mergers and acquisitions (M&A). Their study suggests that bidders and targets sharing a common board member negotiate deals with better merger performance, due to reduction in information asymmetry between the bidder and the target. Similarly, Schonlau and Singh (2009) find that better connected and networked boards are associated with superior post acquisition performance due to the easier access to information. On the other hand, Ishii and Xuan (2010) claim that social ties between the acquirer and the target could lead to poorer decision making resulting from weaker critical analysis, lower due diligence, and social conformity. Chikh and Filbien (2011) also show that French CEOs with sizable personal networks are more likely to complete acquisitions even if they are met with a negative market reaction upon the announcement.

personal networks – that is, whether personal networks can make the CEO powerful enough to withstand internal and external monitoring, and to pursue acquisitions regardless of the shareholder wealth impact.

The role of the CEO during merger negotiations is crucial, since M&A transactions can often lead to significant losses – both for the bidder shareholders and in terms of total takeover synergies (e.g. Andrade et al., 2001; Moeller et al., 2005, 2004). Equally importantly, personal networks are worth studying because it is not certain whether shareholders can benefit from the bidder CEO's overall connectedness. Deals initiated by well-connected bidder CEOs can still lead to shareholder gains thanks to lower information asymmetry during M&A process, as argued by Cai and Sevilir (forthcoming). On the other hand, it is possible that well-connected CEOs can utilize their higher influence and/or power to increase their entrenchment by insulating themselves from the market for corporate control and the managerial labor market. Since entrenched managers are more likely to pursue corporate activities that will benefit themselves at the expense of shareholders (e.g. Bebchuck et al., 2011; Masulis et al., 2007; Shleifer and Vishny, 1989), well-connected bidder CEOs may get engaged in value-destroying M&A deals.² We expect that if more central bidder CEOs can shield themselves from the market for corporate control, then value-destroying bidder firms will not face a high chance of being subsequently acquired.³ Liu (2010) shows that more central CEOs are also less likely to be disciplined by managerial labor market – even though such CEOs are associated with more frequent turnover, they are also more likely to be quickly re-employed (without a decline in compensation). In addition, we test whether more central CEOs are able to use their influence and power to decrease the likelihood of forced turnover following bad performance – we expect to find lower sensitivity of forced CEO turnover to previous negative bidder abnormal

² There are many reasons why bidder CEOs may benefit from value-destroying M&A deals. Most importantly, due to separation of ownership and control, CEOs are likely to accrue the full value of private benefits of the acquisition, while bearing only partial value of the losses associated with the deal. The examples of private benefits include, for example: higher post-merger managerial compensation due to the increase in firm's asset base (Jensen and Murphy, 1990), post-merger compensation packages insensitive to negative stock performance (Harford and Li, 2007) smoother post-merger earnings, leading to the lower likelihood of financial distress (especially in case of diversifying acquisitions – Berger and Ofek, 1996), and by pursuing mergers that involve manager-specific investments (making it costly for shareholders to replace the CEO – Shleifer and Vishny, 1989).

³ Our argument is based on results of Mitchell and Lehn (1990), who show that bidders involved in acquisitions destroying shareholder values are significantly more likely to be acquired during the five year following the completed M&A deal.

acquisition returns.⁴

We utilize BoardEx database to construct personal social networks of CEOs of US firms and find the following results describing the propensity of S&P1500 companies to acquire US public targets during the period from January 2000 to December 2009:

- Higher acquirer CEO centrality is associated with more frequent acquisitions. Increasing CEO centrality from the 25th to the 75th percentile of the sample increases the relative frequency of acquisitions by 25.3%, on average.
- Acquisition abnormal returns to bidder shareholders are negative in deals initiated by bidder CEOs with above-median centralities. In addition, increasing CEO centrality from the 25th to the 75th percentile of the sample decreases the acquirer cumulative abnormal returns, on average, by 3.38%.
- Total takeover synergies (measured by the weighted average of bidder and target shareholder abnormal returns) are negative in deals initiated by bidder CEOs with above-median centralities. The total synergies from the acquisitions are negative. In addition, increasing CEO centrality from the 25th to 75th percentile of the sample, decreases total synergies, on average, by 3.04%.
- Increasing bidder CEO centrality is positively associated with target shareholder abnormal returns. Increasing CEO centrality from the 25th to 75th percentile of the sample increases gains to the targets by 5.56%, on average.
- More efficient bidder corporate governance (intense monitoring boards, presence of large blockholders, higher CEO ownership, older CEO managing the firm) can partially mitigate the high frequency of acquisitions by bidders with more central CEOs.
- Whereas pursuing value-destroying deals increases the likelihood of the bidding firms being subsequently acquired within a 5 year period after the first value-destroying deal, high bidder CEO centrality significantly diminishes the strength of the link between past negative merger performance and subsequent bidder firm acquisition likelihood.
- The managerial turnover for more central bidder CEOs is higher, regardless of the performance. However, well-connected CEOs (compared to CEO's with low centrality) are more likely to be appointed into another CEO position. In addition, the magnitude of bidder shareholder losses is unrelated to the likelihood of forced turnover within 5 years of their first value-destroying deal for well-connected CEOs, while the forced turnover is more likely after value destroying deals for CEOs with below-median centrality.

Our findings are consistent with social science studies that view centrality as the source of influence and power (e.g. Mizruchi and Potts 1998; Brass and Burkhardt 1992). Well-connected bidder CEOs are able to insulate their firms from the market for corporate control and to withstand the external threat of being taken over. In addition, those CEOs are also unlikely to be disciplined by the managerial labor market. First, following their departure, they are more-likely to find another CEO position (our results are

⁴ Lehn and Zhao (2006) find evidence of the disciplining effect of the managerial labor market on bidder CEOs—they show that the likelihood of forced CEO turnover substantially increases following a deal destroying the bidder shareholder value.

consistent with Liu, 2010). Second, the likelihood of their forced turnover is not significantly related to potential value destruction during past M&A deals – that is, they are unlikely to be fired due to completing a bad merger deal. Ultimately, more central bidder CEOs can achieve greater managerial entrenchment, which may lead to poorer decision making (more specifically, decisions benefiting managers at the expense of shareholders) and value-destroying deals (e.g. Masulis et al. 2007, Bebchuck et al. 2011), especially if the governance of their own firm is weak. We believe that our study is among the first to document the “darker side” of personal networks. That is, CEOs who achieve substantial power and influence thanks to their personal networks may withstand both internal (board) and external (the market for corporate control) monitoring. This will allow them to pursue acquisitions benefitting bidder CEOs (possibly in terms of higher compensation insensitive to value losses – Jensen and Murphy, 1990; Harford and Li, 2007), while the acquisitions may not benefit bidder shareholders and may fail to deliver positive takeover synergies.⁵ This effect should be particularly strong in bidding firms characterized by weak corporate governance.

Our finding survives a battery of robustness checks. For example, it is possible that higher acquisition frequency combined with the losses to bidder shareholders can also be in part explained by overconfidence/hubris (Roll, 1986) possibly displayed by well-connected bidder CEOs. However, it should be noted that the impact of the CEO centrality in all of our key results (the likelihood of acquisitions, the acquisition gains, the likelihood of subsequent firm takeover and the likelihood of CEO turnover) is virtually identical when we specifically control for the measures of CEO (over)confidence (Malmendier and Tate, 2008; Campbell et al., 2011). Also, our findings of the absence of the link between bidder firm value destruction and the likelihood of subsequent acquisition or forced CEO turnover are all pointing to bidder CEO entrenchment as the primary explanation of value-destructive tendencies. Last, since well-connected CEOs are likely able to compare/discuss their decisions with social peers in their

⁵ We do not claim, though, that CEO personal networks are always facilitating value destruction. It is possible that for non-central CEOs, increases in CEO centrality may be beneficial. However, the results of our paper may be influenced by the fact that we focus on the CEOs of S&P 1500 firms. Our results show that the S&P 1500 CEOs are more central compared to the “typical” U.S. executive. Furthermore, we also document that the centrality of S&P 1500 bidder CEOs is even higher than the centrality of the other (non-acquiring) S&P 1500 CEOs.

personal networks⁶, the overconfidence/hubris tendencies (leading to overbidding or overpaying for the targets) may in fact be constrained for more central bidder CEOs.

The paper proceeds as follows: In Section 2 we discuss social network centrality measures and why they should matter in corporate M&A transactions and outcomes. We then present our key hypotheses. Section 3 describes the data and variable construction. Section 4 presents the empirical results and various attempts to check robustness. Section 5 investigates whether the strength of internal corporate governance metrics and the efficiency of external corporate control market and executive labor market could mitigate the effect of CEO centrality on merger performance. Section 6 concludes.

2. Network Centrality and M&A Outcomes

2.1. CEO Network Centrality

In social networks, individuals (nodes) form links to other individuals, and the links and nodes form the network (Jackson, 2010). The position of each node in the network is not random (Jackson and Roberts, 2007) and some positions assume power when they (1) link to more individuals; (2) are close to all other individuals; (3) are on the shortest path connecting any other pairs of individuals; and (4) are more linked to other highly-linked-to individuals (Padgett and Ansell, 1993). “Power” in a network carries at least two different dimensions (Hanneman and Riddle, 2005, Chapter 10): First, a network-powerful individual may be better positioned for information, as her position allows her to reach other individuals most efficiently. Second, a well-networked individual may assume advantage in bargaining and negotiation, as her network positions allows more opportunities or fewer constraints. These two dimensions are not easily distinguishable conceptually, as we are not able to pinpoint the nature of relationships in each link. However, by observing the outcome of how individuals exert power in major events, we may be using the outcome of events to distinguish these dimensions.

Our CEO network is constructed to include all known connections of a CEO through common, past

⁶ Shue (2011) shows that CEOs catch up to peers on salaries and bonuses after attending Harvard MBA Alumni gathering events.

and current, education, employment, and social activities. Four common measures of centrality are constructed: Degree centrality, Closeness centrality, Betweenness centrality, and Eigenvector centrality (Proctor and Loomis 1951; Sabidussi 1966; Freeman 1977; Bonacich 1972). Degree centrality is the number of direct ties an individual has. It represents a count of the number of direct relations an individual has with other individuals in the network. The more connections the individual holds, the more popular this individual is in the network. Closeness centrality is the inverse of the sum of shortest distance between an individual and all other individuals in a network. Thus it presents how near an individual is from all other individuals and indicates how efficiently this individual can obtain information from everyone else in the network. Betweenness centrality measures how often an individual lies on the shortest path between any other members of the network. Hence, it indicates how much control an individual could have on the flow of information, because if an individual is between two other individuals, this person could either interrupt or facilitate the information flow between the other two individuals. Eigenvector centrality is a measure of the importance of an individual in the network. It takes into account the importance of the individuals that are connected in the network.

2.2. *Bidder CEO Centrality and the Likelihood of Acquisitions*

Mergers are one of crucial corporate events for bidding firms. The acquirers may gain, or lose, substantial value during and after the announcement of the merger (e.g. Andrade et al., 2001, Moeller et al., 2004, 2005). The bidder CEO skills, attributes, and personal traits play a key role during the M&A process (e.g. Malmendier and Tate, 2008; Masulis et al., 2007; Harford and Li, 2007; Lehn and Zhao, 2006). Consequently, the size and importance of bidder CEO personal networks should affect the course of acquisitions.

In the context of M&A, highly networked CEOs may either help or hurt the merger performance. On the one hand, Cai and Sevilir (forthcoming) show that cross-firm social links between the bidder and the target lead to better merger performance due to the reduction of information asymmetry. Similar

information asymmetry-reducing benefits due to well-connected boards have also been documented by Schonlau and Singh (2009). The benefits of cross-connections have been documented even for mutually independent entities (e.g. Fracassi, 2009). Engelberg et al. (2009) further show that CEOs command higher salaries if they are able to connect to executives or directors of other firms. Ultimately, since personal networks can be considered a union of all bilateral ties a person creates, well-connected CEOs can have better and easier access to valuable information about potential targets, leading to lower information asymmetry and more efficient acquisition decisions.

On the other hand, social science research has identified connectedness – that is, high centrality – as the source of influence and power (e.g. Mizuchi and Potts 1998).⁷ For M&A this may imply that well-connected CEOs can utilize their social ties to entrench themselves and to mitigate monitoring of their activities. Fracassi and Tate (forthcoming) and Hwang and Kim (2009) show that CEO social ties to their firm’s board members reduces the effectiveness of board monitoring. Studying the direct impact of CEO networks on M&A outcomes, Chikh and Filbien (2011) show that French CEOs with sizable personal networks are less likely to cancel acquisitions even if they are met with a negative market reaction upon the announcement. Ishii and Xuan (2010) also claim that cross-firm bidder-target social ties lead to value losses due to weaker critical analysis, lower due diligence, and social conformity. Ultimately, increased entrenchment and insulation from monitoring can allow well-connected bidder CEOs to pursue frequent acquisitions, even at the expense of bidder shareholders. This may happen due to a variety of reasons – e.g. higher post-merger compensation due to higher post-merger asset base (Jensen and Murphy, 1990), post-merger compensation insensitive to stock price declines (Harford and Li, 2007), lower chance of financial distress due to diminished earning fluctuation in case of diversifying acquisitions (Berger and Ofek, 1996), or increased costs of CEO replacement in case of mergers creating entities that require manager-specific investment (Shleifer and Vishny, 1989).

Last, more confident people are more likely to form additional social ties, so sizable and/or influential

⁷ Traditional research in network analysis document that centrality is a source of social power and define them as identical (see for example Brass and Burkhardt 1992).

CEO personal networks may proxy for CEO (over)confidence, optimism or hubris. Since financial research has documented that overconfident (or too optimistic) CEOs tend to pursue acquisitions more frequently (e.g. Malmendier and Tate, 2008; Roll, 1986), then well-connected CEOs (who built their personal networks thanks to their confidence and/or optimism) may indeed bid more frequently.

Ultimately, all the three above-discussed potential consequence of being well-connected – lower information asymmetry, increased entrenchment due to CEO’s influence or power, and CEO overconfidence – should lead to a higher incidence of acquisitions performed by more central bidder CEOs. Consequently, the first hypothesis tested in our study is:

H1: Greater bidder CEO centrality should be associated with the higher likelihood of completed acquisitions.

2.3. Bidder CEO Centrality and Acquisition Gains

Even though bidder CEO centrality should be positively associated with the frequency of completed acquisitions, the value impact of the acquisitions – especially for the bidder shareholders – should be different for the three consequences of CEO connectedness discussed in the previous section. Financial research has traditionally associated lower information asymmetry with value improvements and with better managerial decisions, implying that acquisitions completed by well-connected bidder CEOs may lead to greater gains to bidder shareholders and to greater total takeover synergies (measured as the combined gains to the bidder and the target shareholders). Sources of competitive advantage gained from central positions of acquirer CEOs include access to private information about targets that results in better evaluation of deals and hence acquiring “bargains”.⁸ In addition, social science and management research documents the importance of central positions in a network in gaining better access to information and knowledge transfer (e.g. Freeman 1979 ; Tsai 2001).

On the other hand, potential stronger bidder CEO entrenchment (due to strong CEO power and

⁸ Bruner (2004) documents that board networks lead to more efficient deals due to less costs of searching for and evaluating targets.

influence) generally leads to poor decision making and value losses (e.g. Masulis et al. 2007, Bebchuck et al. 2011). Similarly, bidder CEO overconfidence and hubris have been documented to destroy value (Malmendier and Tate, 2008), often leading to forced CEO turnover (Campbell et al., 2011). Ultimately, the impact of bidder CEO centrality on bidder shareholder and total synergy gains is an empirical issue, and the second hypothesis tested in our study is:

H2 [H2A]: Greater bidder CEO centrality should be associated with lower [higher] bidder shareholder acquisition gains (measured by abnormal acquisition returns) and with lower [higher] total takeover synergies (measured as the combined abnormal acquisition returns to the bidders and the targets). The bidder shareholder gains and the total takeover synergies should be negative [most positive] for the acquisitions completed by most-central bidder CEOs.

2.4. Bidder CEO Centrality and Internal Corporate Governance

Financial research has documented the power of corporate governance to monitor CEO performance and to limit potentially adverse impact of CEO actions. Faleye et al. (2011) show that boards where the majority of independent board members qualify as “intense monitors” (the members serve on at least two of the three principal monitoring committees) display superior monitoring performance. Yermack (1996) suggests that bigger boards are generally considered poorer monitors. Bebchuk et al. (2011) and Masulis et al. (2007) document that entrenched managers make more frequent acquisitions. Higher ownership concentration in the form of blockholdings (above 5%) or greater share of CEO ownership is generally associated with improved monitoring (Shleifer and Vishny, 1997), though high CEO ownership can also facilitate entrenchment (Morck et al., 1988). On the other hand, CEO-Chairman duality leads to greater extraction of rents from shareholders (Bebchuk and Cohen, 2005). CEO age can have both positive (Milbourn, 2003) or detrimental (Hermalin and Weisbach, 1998) effect on the quality of managerial decisions.

Strong corporate governance is not needed to mitigate the effects of CEO centrality if acquisitions initiated by more central CEOs lead to takeover gains. On the other hand, if greater bidder CEO centrality is associated with losses to bidder shareholders and lower takeover synergies, strong corporate

governance should constrain the CEO actions and to limit the acquisition losses. Consequently, the third hypothesis tested in our study is:

H3: Conditional on greater bidder CEO centrality being associated with lower bidder shareholder acquisition gains and with lower total takeover synergies, stronger internal corporate governance (intense monitoring and/or smaller board, concentrated share ownership, absence of CEO-Chairman duality, longer CEO tenure, absence of anti-takeover provisions in firm charter) should be associated with (a) lower likelihood of completed acquisitions and (b) less negative takeover gains in acquisitions initiated by bidding firms with more central CEOs.

2.5. *Bidder CEO Centrality and the Market for Corporate Control*

Mitchell and Lehn (1990) show that the market for corporate control can discipline poorly-performing bidder CEOs. That is, bidder companies involved in acquisitions destroying bidder shareholder values are more likely to be acquired during the five year following the completed M&A deal. Mitchell and Lehn (1990) document that the bidder abnormal acquisition return is a significantly negative determinant of bidding company's likelihood to be subsequently acquired (which means that negative bidder abnormal returns actually *increase* acquisition likelihood).

We expect that *if* the acquisitions completed by well-connected bidder CEOs destroy value and *if* the value losses are due to stronger bidder CEO entrenchment, then the bidder CEOs are likely to use their influence and power to insulate themselves from the market for corporate control. That means, we expect the sensitivity of bidder abnormal acquisition returns in models explaining the subsequent bidder firm acquisition likelihood to decline for the sample of well-connected bidder CEOs. Consequently, the fourth hypothesis tested in our study is:

H4: In the sample of bidders with more central CEOs (compared to the sample of bidders with less central CEOs), the bidder abnormal acquisition return should be a less positive determinant of the likelihood the bidder will be subsequently acquired.

2.6. *Bidder CEO Centrality and the Managerial Labor Market*

Lehn and Zhao (2006) find the disciplining effect of the managerial labor market on bidder CEOs. Their key model shows that the bidder acquisition abnormal return is a significantly negative determinant

forced bidder CEO turnover during the five years following the acquisition (which means that negative bidder abnormal returns actually *increase* the likelihood of forced turnover).

Once again, we expect that *if* the acquisitions completed by well-connected bidder CEOs destroy value and *if* the value losses are due to stronger bidder CEO entrenchment, then the bidder CEOs are likely to use their influence and power to insulate themselves from the managerial labor market and reduce the likelihood they will be fired “for a cause” (that is, due to a bad merger deal). Thus, for the well-connected bidder CEOs, the bidder abnormal acquisition return should be a less significant determinant of the likelihood of the forced CEO turnover after the completion of the merger.

On the other hand, the high CEO centrality may be either positively or negatively associated with the *overall* (i.e. not performance-related) probability of the CEO turnover. On the one hand, well-connected CEOs can simply utilize their influence and power to limit the board ability to fire them for any reason. On the other hand, Liu (2010) shows that terminated well-connected CEOs are more likely to find another well-paid, similarly reputable job, regardless the reason of their previous dismissal. Ultimately, the impact of bidder CEO centrality on the overall likelihood of forced CEO turnover is an empirical issue, and the fifth hypothesis tested in our study is:

H5 [H5A]: In the sample of bidders with more central CEOs (compared to the sample of bidders with less central CEOs), the bidder abnormal acquisition return should be a less positive determinant of the likelihood of the forced CEO turnover after the completion of the merger.

[H5B] Higher bidder CEO centrality should increase the likelihood of overall CEO turnover. If well-connected bidder CEOs are more likely to be replaced, then they should be more likely to find another CEO-equivalent (i.e. CEO or Chairman) job after their dismissal (compared to less central CEOs).

3. Data

3.1. CEO Centrality Data

Information about the educational background, prior employment, and other social memberships of directors and executives of US public companies is obtained from BoardEx. In our main analysis, we

construct network based on employment history only in listed firms. This information is the most reliable and can be cross-verified in other sources. In addition, we use the entire network built from overlaps in education, employment, and social activities to conduct robustness.

The network based on listed firms includes 12 million links formed between 1938 and 2010, and a maximum network of 314,416 individuals in 2010.⁹ We calculate four common measures of centrality in the social network literature: Degree centrality, Closeness centrality, Betweenness centrality, and Eigenvector centrality (Proctor and Loomis 1951; Sabidussi 1966; Freeman 1977; Bonacich 1972). Degree centrality is the sum of direct ties an individual has in each year. Closeness centrality is the inverse of the sum of shortest distance between an individual and all other individuals in a network. Betweenness centrality measures how often an individual lies on the shortest path between any other members of the network. Eigenvector centrality is a measure of the importance of an individual in the network. It takes into account the importance of the individuals that are connected in the network. The computation is daunting and requires storing information for each and every possible pairs of nodes (nearly 250,000 for year 2005 and nearly 300,000 for year 2008 and later) in computer memory, and the Matlab program for closeness, for example, takes about 7 days to process the graph of 2010, on supercomputers with at least 84G of memory¹⁰.

We then select the yearly measures of centrality for S&P1500 CEOs for the period spanning from 1999 to 2008. The centrality variables are available for 4006 CEOs in 16415 firm-year observations.

The summary statistics for all centrality measures for all S&P 1500 firms are presented in the Appendix. We calculate not only the raw centrality measure, but also the percentile rankings of the CEOs based on their position in the network of *all* (that is, not just S&P 1500) executives and directors of US public companies in the whole BoardEx database. The summary tables show a considerable differences in

⁹ We conduct robustness checks to alter the network by adding additional restrictions. One restriction is to ensure strength of connections, in which we only include links that last 3 years or longer. Another restriction is to drop inactive connections, in which any links that have not been active in the past 5 years out of the sample. Yet another robustness round combines the two restrictions. Our results are mostly unaffected by these restrictions.

¹⁰ This project would not have been possible without the “Star of Arkansas” supercomputer and the support from Arkansas High Performance Computing Center.

centrality measures for the S&P 1500 CEOs, ranging from extremely well-connected individuals (The maximum Degree centrality is 1,985) to CEO without any significant links (the minimum Degree centrality is 2, the minimum Betweenness and Eigenvector is 0). Not surprisingly, though, the typical S&P 1500 CEO is more central compared to the typical BoardEx executive. Based on medians of the four considered centrality measures, the S&P 1500 CEOs range from 73th (Closeness) to 84th (Betweenness) percentile of the overall distribution.

Table 1 presents the firm statistics for the S&P 1500 companies – both for the full sample first and divided into Below versus Above Median groups based on the four centrality measures (Closeness, Degree, Betweenness, Eigenvector) of the firm’s CEO. We define Size as the log of total assets, Tobin’s Q as the sum of market value of equity (end of year price per share * number of shares outstanding at the end of year), short term debt, long term debt and preferred stock, all divided by total value of assets. Profitability is measured as the return on total assets, leverage as the ratio of book value of debt to total assets and liquidity as the ratio of operating cash flow to total assets. Using all measures of centrality, we find that firms with highly central CEOs are significantly larger, have higher Tobin’s Q, are less profitable and are more leveraged. However, there is no statistical significant difference between firms with high or low CEO centrality with respect to liquidity.

3.2. M&A Data

Our M&A sample contains all completed mergers between S&P1500 acquirers and U.S. public targets for the period spanning January 1st 2000 to December 1st 2009 – a total of 464 acquirers in 776 deals. We choose deals with publicly listed targets and acquirers because our measures of takeover gains (cumulative acquisition abnormal returns) require the availability of market prices. The data comes from the Securities Data Company (SDC) database. In addition, we obtain prices from CRSP and financial data from COMPUSTAT.

3.3. Internal and External Governance Data

To get the governance data for the CEOs and the directors in our sample, we merge the BoardEx data

to Risk Metrics by using an algorithm that matches the names of the CEOs and firm's directors in BoardEx to the names available in Risk Metrics. We then search manually by hand for any non-matched names. In addition, we rely primarily on Risk Metrics in computing governance variables such as intense monitoring, board size, duality, age, block ownership and CEO ownership, but we also fill in any missing values from Execucomp. We also obtain the entrenchment index from Bebchuk, Cohen and Ferrell's entrenchment index¹¹. We have complete governance data available for 3283 CEOs in 13398 firm year observations.

4. Results

4.1. *Bidder CEO Centrality and the Likelihood of Acquisitions*

Table 2 presents the number of acquisitions of successfully acquired US public targets by the 464 bidders in the sample classified by year of acquisition announcement. The date of acquisition announcement is the original date of announcement as reported by SDC. Our data is presented for the full sample (panel A) as well as for the subsamples Below Median vs. Above Median based on the centrality of the acquirer's CEO in the year before the merger announcement (panels B-E, based on the four considered centrality variables). (Below/Above Median is defined as below/above sample median.) The results of Table 2 suggest that during the sample period, acquirers lead by CEOs with more central networks (based on all four measures) complete significantly more deals.

In Table 3, we present tests of the differences in centrality measures between S&P 1500 acquirer and non-acquirer CEOs. Our results show that means of centrality measures are significantly higher for acquirer CEOs. In terms of percentiles describing the whole BoardEx population, the acquirer centrality means for Closeness/Degree/Betweenness/Eigenvector are 75.69/83.66/84.10/82.61, while the mean centrality for non-acquirers are 67.54/71.08/75.70/73.43. These differences are significant at 1% level for

¹¹ We are grateful to Lucian Bebchuk who made the entrenchment index available at www.law.harvard.edu/faculty/bebchuk/data.shtml

all measures of centrality.¹² This means that among S&P 1500 firms, bidder CEO centrality is on average very high, exceeding the centrality of other S&P 1500 (non-acquiring) CEOs (who in turn are still more central than the median executives in BoardEx sample).

Previous financial research suggests merger outcomes are impacted by differences in variables such as firm size (for example Moeller et al. 2004), market to book value (e.g. Asquith et al. 1983), leverage (e.g. Palepu, 1986, Billet et al. 2004), profitability (e.g. Lang et al., 1991), or liquidity (e.g. Smith and Kim, 1994). Table 1 suggests that firms run by CEOs associated with different centrality levels may display significant differences in the above mentioned firm characteristics. So, to examine whether CEO centrality has an effect on the likelihood of acquisitions we control for other financial variables in the following Probit model:

$$P(\text{Deal}=1) = a_i + B_1 \text{Centrality}_{t-1} + B_2 \text{Tobin's } Q_{t-1} + B_3 \text{Liquidity}_{t-1} + B_4 \text{Profitability}_{t-1} + B_5 \text{Size}_{t-1} + B_6 \text{Leverage}_{t-1} + e_t \quad (1)$$

where Deal is a dummy variable that equals 1 if the acquirer announces an acquisition that is successfully completed and zero otherwise, Centrality is the percentile ranking of the acquirer's CEO centrality measured by Closeness, Degree, Betweenness and Eigenvector centrality as previously defined in section 3.1. All other variables are as previously defined. All variables in the model are lagged one year compared to the acquisition announcement year.

The results of our analysis are presented in Table 4. Model 1 shows the results of the estimation without including the centrality variable. CEO centrality is measured by Closeness in Model 2, Degree in Model 3, Betweenness in Model 4, and Eigenvector in Model 5. Model 1 suggests, consistently with previous research, that large firms with higher growth opportunities, more cash flows, and lower leverage are more likely to be the bidders in completed M&As.

Controlling for firm characteristics, CEO centrality measured by Closeness, Degree, Betweenness and

¹² Since the non-acquirers' group is larger than the acquirers' group, we conduct a test of unequal variances. The F-value for the test of unequal variances is significant when using Degree and Betweenness centrality, thus we conduct a Wilcoxon rank test and the Z-values of the test confirm the statistical significant difference between the high and low centrality groups.

Eigenvector is statistically significant and positive at the 1% level in models 2, 3, 4 and 5. Our results strongly support Hypothesis H1. Firms with more central CEOs have higher probability in conducting acquisitions than firms with less central CEOs. Increasing CEO centrality from the 25th to the 75th percentile of the sample increases the relative frequency of making acquisitions by 25.3% on average, when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality.

The likelihood of mergers and acquisition should also be related to the quality of governance in the bidding firm. Consequently, in models 6-9, we repeat the analysis of Models 2-5, but add in governance controls for intense monitoring, board size, duality, entrenchment index, CEO age, and block ownership and CEO ownership. Intense_Monitoring is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise. An intensive monitor is an independent director who serves on both the audit and compensation committee (Faleye et al., 2011). Board_Size is the size of the board of directors. Duality is a dummy variable that equals one if the CEO is also the chairman of the board and zero otherwise. Eindex is Bebchuk, Cohen and Ferrell's entrenchment index (2009)¹³. The E-index is constructed by adding 1 for the following six provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. Age is the CEO's age. Block_Ownership is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise. CEO_Ownership is the percentage of shares owned by the CEO.

Our results suggest that several mechanisms typically linked to improved governance (namely – Intense Monitoring, absence of CEO-Chairman duality, CEO age, and higher CEO ownership) all tend to be associated with lower likelihood of acquisitions. However, even after controlling for the governance determinants, the coefficient on Closeness, Degree, Betweenness and Eigenvector remains positive and is significant at the 1% level in models 7, 8, 9 and at the 10% level in model 6.

¹³ In unreported analysis, we also consider governance index (Gindex) as reported by Risk Metrics. Results remained virtually identical.

4.2. Bidder CEO Centrality and Acquisition Gains

To investigate the relation between CEO centrality and merger gains, we employ an event study to estimate daily cumulative abnormal returns (CARs) around the merger announcement using the standard market model.¹⁴ Table 5 reports the CARs over the (-3, +3) day event window for the acquirer (Panel A), the combined firm (Panel B) and the target (Panel C).¹⁵ We calculate CARs for the combined firm (that is, the estimate of total synergies generated by the takeover) as the market value weighted average of CARs for the acquirer and CARs for the target. The returns are shown for the full sample first then divided into three groups based on the centrality of the acquirer's CEO. Group1 contains observations with the acquirer's CEO centrality is below the sample 25th percentile. Group 2 contains observations with the acquirer's CEO centrality is between the 25th and 75th percentile. Group 3 contains observations with the acquirer's CEO centrality above the sample 75th percentile.

The mean [median] CARs for the full sample is significantly negative -1.87% [-1.41%] for the acquirers, positive 0.68% [0.33%] for the combined firm and significantly positive 27.39% [21.28%] for the target. Those figures are consistent with prior literature documenting significant positive abnormal returns to the target and combined firm and either negative or insignificant returns to the bidders (e.g. Andrade et al. 2001; Betton et al. 2008).

Even more importantly, Table 5 shows that that on average, bidding companies ran by well-connected CEOs (compared to companies with non-central CEOs) generate approximately 1.67% lower CARs for the bidder shareholders, approximately 2.71% lower combined CARs, and over 7.4% higher CARs for the target shareholders. Also, the combined CARs (i.e. the total takeover synergies) for the highly central CEOs are negative using all four measures of centrality. All differences in combined CARs between Group1 and Group3 are highly statistically significant.

The above results provide strong support for Hypothesis H2 – the high centrality of bidder CEOs appears to be value reducing (especially for the bidder shareholders), and potentially consistent with CEO

¹⁴ We use the returns to the CRSP equally weighted index as the market portfolio. The results utilizing CRSP value weighted index were virtually identical.

¹⁵ Using alternative windows such as (-1,+1) or (-5,+5) results in similar regression estimates.

entrenchment and/or overconfidence.

So far, we analyzed simple univariate differences in CARs for the sub-samples of bidding firms with high vs. low centrality of CEOs. In the following sections, we will analyze the CARs in the context of multivariate models to determine if the negative relation between acquirer CEO centrality and bidder or combined gains holds even after controlling for determinants of acquisition CARs identified by the previous finance research.

4.2.1. Bidder CEO Centrality and Bidder Acquisition Gains

To investigate whether bidder CEO centrality impacts bidder acquisition CARs, we estimate the following OLS model after controlling for firm and deal characteristics:¹⁶

$$\text{CAR } (-3,+3) = a_t + B_1\text{Centrality}_{t-1} + B_2\text{Size}_{t-1} + B_3\text{Profitability}_{t-1} + B_4\text{Tobin's}Q_{t-1} + B_5\text{Leverage}_{t-1} + B_6\text{Liquidity}_{t-1} + B_7\text{Deal_Value}_t + B_8\text{Same_Industry}_t + B_9\text{Stock_Deal}_t + e_t \quad (2)$$

where the dependent variable CAR (-3,+3) is the cumulative abnormal return for the acquirer over the (-3,+3) day event window, Deal_Value is the value of the acquisition as reported by SDC divided by the market value of the acquirer, Same_Industry is a dummy variable that equals one if the acquirer and the target are in related industries identified by similar 2 digit SIC code and zero otherwise, Stock_Deal is a dummy variable that equals 1 if the merger is entirely financed by stock and 0 otherwise. All other variables are as previously defined and are lagged one year. We also add fixed year effects and industry effects in all models.

The results of our analysis are presented in Table 6. Model 1 includes the typical variables that are known to impact the CARs of the acquirers (e.g. Moeller et al. 2004). Centrality of acquirer CEO is measured by Closeness in Model 2, Degree in Model 3, Betweenness in Model 4 and Eigenvector in Model 5. In Models 6-9, we add additional control variables to take into account the effect of firm's governance on CARs.

¹⁶ Controls for deal characteristics and fixed industry and year effects are included as previous literature document the impact of form of payment (see for example Fuller et al. 2002), industry relatedness (see for example Morck et al. 1990, and merger intensity of the industry (see for example, Schlingemann, 2002) on merger gains.

Most importantly, the coefficient on CEO centrality measures is negative in all models and statistically significant at the 1% level. Increasing CEO centrality from the 25th to the 75th percentile of the sample increases the losses to acquirers by -3.38% on average when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality in Models 2-5).¹⁷ Similarly to our univariate results, the findings in Table 6 provide support for the Hypothesis H2, which suggests that bidder CEO centrality is negatively associated with the gains to bidder shareholders.

4.2.2. Bidder CEO Centrality and Total Takeover Synergies

Losses to acquirers are not necessarily an evidence of negative impact of CEO centrality on total takeover synergies, acquirers may be giving up some of their gains in order to attract the targets based on bidder's expectation of large total synergies resulting from those deals (Hietala and Kaplan, 2003). Thus, to test if bidder CEO centrality is associated with the total takeover combined CARs, we analyze the following OLS model where we regress cumulative abnormal returns for the combined firm on measures of CEO centrality of the acquirer and other control variables identified by previous research to influence total takeover synergies:

$$\text{CAR } (-3,+3) = a_t + B_1\text{Centrality}_{t-1} + B_2\text{Combined_Size}_{t-1} + B_3\text{Combined_Profitability}_{t-1} + B_4\text{Combined_Tobin'sQ}_{t-1} + B_5\text{Combined_Leverage}_{t-1} + B_6\text{Combined_Liquidity}_{t-1} + B_7\text{Deal_Value}_t + B_8\text{Same_Industry}_t + B_9\text{Stock_Deal}_t + e_t \quad (3)$$

The dependent variable CAR (-3,+3) is the cumulative abnormal return over the (-3,+3) day event window for the combined firm, calculated as the market value weighted average of CARs for the acquirer and CARs for the target. Combined_Size is the log of total employees for the combined entity. Combined_Profitability, liquidity, leverage and Tobin's Q are asset weighted averages of the profitability, liquidity, leverage and Tobin's Q of the acquirer and the target. All variables are lagged one year and are

¹⁷ The other determinants of bidder acquisition CARs have mostly the expected signs. Most importantly, more profitable acquirers are associated with gains to bidder shareholders, while stock deals and acquisition of large targets lead to bidder shareholder losses. Once again, centrality stays a significantly negative determinant of bidder abnormal returns even when controlling for governance determinants in Models 6-9. Interestingly, none of the governance mechanisms with the exception of Block Ownership (positive determinant) and CEO Ownership (Negative Determinant) are significantly related to bidder abnormal returns.

as previously defined. We also include industry and year fixed effects in all of our models.

The results of our analysis are reported in Table 7. Model 1 includes traditional variables that are known to impact the CARs of the combined firm. Centrality of acquirer's CEO is measured by Closeness in Model 2, Degree in Model 3, Betweenness in Model 4 and Eigenvector in Model 5. Most importantly, the coefficients on measures of CEO centrality are negative and significant in all models at the 1% level. We add controls for governance in Models 6 to 9 and our centrality variables remain negative and significant at the 1% level in all models. Increasing CEO centrality from the 25th to the 75th sample percentile increases the losses to the combined firm by -3.04% on average, when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality. Similarly to our univariate results, the findings in Table 7 provide support for the Hypothesis H2, which suggests that bidder CEO centrality is negatively associated with total takeover synergies.

4.2.3. Bidder CEO Centrality and Target Acquisition Gains

To analyze whether bidder CEO centrality is associated with target CARs, we run an OLS model similar to equation (2) where the dependent variable is the cumulative abnormal returns for the target over the (-3, +3) day window, the explanatory variables are the acquirer CEO centrality, as well as all other control variables as previously defined, but calculated for the target.

The results of our analysis are presented in Table 8. Most importantly, the coefficients on acquirer's CEO centrality are positive and significant in 3 out of 4 of our models. Increasing CEO centrality from the 25th to the 75th sample percentile increases the gains to the target by 5.56% on average when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality. Furthermore, after including controls for the governance of the acquirers in models 6-9, two of our centrality measures remain significant and positive. Overall, our findings suggest that while the well-connected bidder CEOs are associated with value losses for bidder shareholders and with declining value of total takeover synergies, target shareholders actually benefit during the acquisitions (possibly due to overpayment).

4.3. Robustness Checks

4.3.1. Bidder size effect

Moeller et al. (2004) show that bidder acquisition CARs are significantly related to bidder size. Table 1 in our study documents that bidder CEO centrality is also related to bidder size (more central CEOs are likely to manage larger firms). To control for the possibility that our centrality measure pick the potentially non-linear size effect, in the unreported analysis (available upon request) we control for the non-linear size effect utilizing three different methods: (a) addition of extra dummy for large bidder sizes, (b) adding a quadratic size variable or (c) splitting the sample based on the size of the bidding firm. Regardless the adjustment, the centrality variables in Table 4 and Tables 6-8 stayed significant, with unchanged coefficient signs. Consequently, it is unlikely that our results regarding CEO centrality are due to the bidder size effect.

4.3.2. Entrenchment or overconfidence?

This behavior can be explained by managerial entrenchment. Well-connected CEOs can use their power and influence attained through personal network to insulate themselves from internal or external monitoring. Bidder CEOs may thus end up pursuing acquisitions benefiting them, but harming the shareholders. On the other hand, our results are also consistent with bidder CEO overconfidence. Previous finance research has identified CEO overconfidence as a source of M&A losses (e.g. Roll 1986, Malmendier and Tate, 2008). If large personal social networks are built by overconfident, optimistic individuals, then we can indeed observe a negative relation between centrality and M&A gains. In order to differentiate between the two potential explanations, in the unreported analysis (available upon request) we specifically add a measure of overconfidence to our models in Tables 4-8. The overconfidence is a dummy variable equal to one for highly confident CEOs identified by Malmendier and Tate's (2008) model.¹⁸ In none of the models on Tables 4-8, the inclusion of overconfidence measure changed the significance or sign of the centrality coefficients. The overconfidence variable dummy, on the other hand, failed to be significant in any of the models. Consequently, it is likely that our results regarding CEO

¹⁸ Malmendier and Tate (2008) study CEO's personal portfolio choices. Confident CEOs tend to hold (rather than optimally sell) their highly in-the-money vested options.

centrality are less likely due to CEO overconfidence.

We also studied the direct link between the measures of centrality and overconfidence – both in terms of univariate tests and regression analysis of centrality determinants. Our (unreported, but available upon request) results suggest that centrality is negatively related to overconfidence, further strengthening our argument that that higher likelihood of acquisition and lower acquisition gains are mainly due to connectedness, rather than overconfidence.

4.3.3. Strength of ties forming CEO centrality

We studied various alternative determinants of CEO centrality. For example, we considered the link between two people valid only if the relationship existed for at least three years, if the relationship was/was not based on a particular activity (education only, membership in social clubs), etc. Using all those alternative variable definitions lead to nearly identical results when compared to those presented in Tables 4-8.

4.3.4. CEO Centrality and CEO connection to Board Members Inside the Firm

Existing finance research has already documented the detrimental effect of direct ties between CEOs and board members of their firms – in the context of board monitoring (e.g. Fracassi and Tate, forthcoming, or Hwang and Kim, 2009) or even for the quality of M&A decisions (Cai and Sevilir, forthcoming). If well-connected CEOs are simply managers who have more ties to people – including their own board members, then our results may be the effect of bilateral ties rather than centrality per se. To address this possibility, we performed several robustness checks. First, we studied the incidence of CEO-board links for the subsamples of CEOs with high vs. low centrality where the existence of CEO-board links was measured by prior joint work experience in listed companies, board memberships, and common education experience. We found that the occurrence of CEO-board links was nearly identical between the two subsamples. That is – CEOs who are or are not well-connected have roughly the same chance to have ties to their own board members. This result implies that the higher likelihood of acquisitions combined with inferior bidder gains documented in Tables 4-8 is indeed primarily due to CEO centrality, and not CEO-board links. Second, we added the variable measuring the incidence of

CEO-board links directly to our Probit models analyzing acquisition likelihood (Table 4) and Abnormal returns (Tables 5-8). Addition of this variable left the significances of Centrality coefficients, as well as coefficients for other variables nearly identical to those presented in Tables 4-8.

5. The Mitigating Effect of Corporate Governance and Control on CEO

Centrality

So far, our results regarding the link between bidder CEO centrality, the likelihood of acquisitions, and acquisition gains suggest that well-connected acquirer CEOs are associated with frequent value-destroying (especially for bidder shareholders) acquisitions.¹⁹ In this section, we study whether strong internal governance at the bidder firms and efficient external markets for corporate control and executive labor market can mitigate the adverse effects of bidder CEO centrality.

5.1. Internal Corporate Governance on Bidding Likelihood and Acquisition

Gains

Results in prior tables show that CEO centrality is generally negatively related to merger performance, in that higher network CEOs initiated more acquisitions, paid more premiums to target shareholders, and results in higher discount to their own firms. In this section, we turn to measures of internal corporate governance to study whether such negative outcome can be mitigated through better internal corporate governance.

Table 9 contains the results of multiple Probit models of acquisition frequencies. Each model contains all determinants (unrelated to centralities) utilized in Model 1 of Table 4. The corresponding regression

¹⁹ Our results should not be interpreted to suggest that CEO personal social networks are always value destructive. It is possible that due to our sample formation – S&P 1500 CEOs have above-average centrality and the bidder CEOs among them have even higher centrality, on average (Table 3) – our results only reflect the impact of large (rather than smaller, potentially more optimal) personal networks. We repeated the regression analysis in Tables 4 and 6-8 where we replaced our measures of centrality by “excess centrality” – residuals from the regression of centrality on the selected determinants – size, growth opportunities (Tobin’s Q), profitability, and optimism (measured following Malmendier and Tate, 2008). Our results – namely the higher likelihood of acquisitions and lower acquisition gains – were nearly identical utilizing “excess centrality” compared to the results with centrality variables presented in Tables 4 and 6-8.

coefficients are not reported in Table 9. Instead, for each model, we report the following three coefficients: (i) High_Centrality dummy (equal to one if the CEO centrality is above the sample median); (ii) “Strong Governance” dummy equal to one if the governance factor typically associated with stronger governance - i.e. Intense Monitoring, Small Board, Absence of CEO-Chairman Duality, Low E-index, CEO Age, Block Ownership, and CEO Ownership - is present (or, in case of continuous variables, higher than the sample median) at the bidder company (see Table 4 discussion for the definitions of governance dummies); (iii) High Centrality*Strong Governance. We expect the sum of those three coefficients (which together measure the joint impact of High Centrality of the Bidder CEO in the environment of strong bidder governance to be significantly smaller than the coefficient for High Centrality (which measures the effect of highly-central CEO operating in the bidder company with weak governance).

Table 9 results weakly support our expectations for three governance mechanisms – intense monitoring, CEO-Chairman separation (the opposite of duality), and (high) CEO Age – appear to mitigate the high acquisition tendencies of well-connected CEOs. The economic significance for the results are large. For example, having intensive monitoring boards reduces the likelihood for takeovers for high-centrality CEOs by -14.7%, -16.8%, -11.8%, -12.5% using Closeness, Degree, Betweenness and Eigenvector centralities. The probability goes down by 2 to 6% if CEO is not the Chairman. However, we don’t find evidence of CEO or other block owners affecting the likelihood of takeovers. In addition, we find that small boards increase takeover likelihood by more than 15% (the most conservative estimates) if CEO has high network centrality.

In summary, our results suggest that after controlling for the effect of strong governance on reducing the overall acquisition likelihood (as we documented in Table 4), board members serving as intensive monitors and having non-CEO Chairmen further reduce the influence of powerful CEOs in their acquisition frequencies.

Table 10 contains the analysis of the impact of interaction between High Centrality and Strong Governance on Acquirer Cumulative Abnormal Returns. The design is very similar to that presented in Table 9: we analyze series of regression models explaining bidder gains utilizing determinants from

Model 1 in Table 6 (coefficients not reported) plus (i) High_Centrality; (ii) Strong Governance and (iii) High Centrality*Strong Governance. We expect that if strong governance mitigates the opportunistic behavior of more central CEOs, the sum of the coefficients measuring the joint effect of high centrality and strong governance should exceed the coefficient on High Centrality alone. Unfortunately, we only find one variable, Block Ownership of 5% or more, increases bidder CAR by about .50%. We do not see this result for any other of our considered governance factors. The results suggest that strong governance is unable to improve bidder returns on the activities of well-connected CEOs.

5.2. *Bidder CEO Centrality and the Market for Corporate Control*

In this and the next sections, we will examine whether our results suggesting the link between acquirer CEO centrality, acquisition likelihood, and acquisition gains may be due to CEO entrenchment. If well-connected CEOs have entrenchment power, we should observe that those CEOs can be immune from external (market for corporate control), as well as internal (board) monitoring.

Mitchell and Lehn (1990) provide evidence supporting the general disciplinary role of corporate takeovers. They show that acquirers that make value-destroying acquisitions measured by negative cumulative abnormal returns around merger announcement more likely end up as future takeover targets. More specifically, Mitchell and Lehn (1990) show that in the model predicting current bidders becoming future targets, the CAR to bidder shareholders becomes a significantly negative determinant of subsequent acquisition (i.e. positive CARs lower the likelihood, negative CARs increase the subsequent acquisition chances). Hence, if more central CEOs are more likely to be entrenched (as we expect in Hypothesis H4) and are thus insulated from the market for corporate control, we should expect the bidder CAR to be a less positive determinant of the likelihood the bidder will be subsequently acquired.

To test whether more central acquirer CEOs are insulated from the market for corporate control we follow Mitchell and Lehn's (1990) methodology and use a subsample of acquisitions announced from January 1st 2000 until December 31st 2005 so that we can have a 5 year window following the acquisition

announcement to witness if the firm ended subsequently acquired. Moreover, we follow their restriction in limiting the sample to include acquirers that acquire targets with at least 5% of acquirer's market value (i.e. to analyze acquisitions that were "material" for the bidder). Finally, if the acquirer has more than one acquisition, we use the sum of the abnormal cumulative returns associated with those deals. This led the models to include 222 observations. To test the likelihood that an acquirer becomes subsequently an acquired target, we run the following Probit model:

$$P(\text{Targeted}=1) = a_t + B_1\text{Centrality} + B_2\text{CAR} + B_3\text{Centrality}*\text{CAR} + B_4\text{Size}_{t-1} + B_5\text{CEO_Ownership}_{t-1} + e_t \quad (4)$$

where the dependent variable is a dummy variable that equals one if the acquirer was successfully acquired within five years of its first acquisition and zero otherwise, Centrality is the CEO centrality as defined previously, CAR is the acquirer shareholder cumulative abnormal returns computed at the (-3, +3) event window around the merger announcement, Centrality*CAR is an interaction term between Centrality and CAR. All other variables are as previously defined. All independent and control variables are calculated at the end of year 1999.

The results of our analysis are presented in Table 11. Centrality is measured using Closeness in model 1, Degree in model 2, Betweenness in model 3 and Eigenvector in model 4. Consistent with Mitchel and Lehn (1990), CARs are significantly negative (3 out of the 4 models). Bad bidders indeed have higher probability in becoming good targets. Most importantly, the interaction between Centrality and CAR is positive and statistically significant in all four models. The size of the interactive coefficient Centrality*CAR out-balances the negative coefficient on CAR, which implies that the likelihood of being acquired is unaffected by the bidder CAR for companies ran by well-connected CEO. Consequently, our findings support Hypothesis H3 that well-connected bidder CEOs are insulated from external monitoring by the market for corporate control.

5.3. *Bidder CEO Centrality and the Managerial Labor Market*

The executive labor market is an important dimension of corporate governance. It disciplines

managers and forces them not to deviate from value enhancing policies. Well-governed firms optimally fire poorly performing CEOs. Warner et al. (1988) and Weisbach (1988) find that the likelihood of a top executive turnover is negatively associated with the firm's stock returns. The forced turnover is a serious threat for a CEO, because his/her reputation, future employment opportunities and lifetime income stream are significantly adversely affected (Jensen and Murphy, 1990). However, for centrally positioned CEOs, the threat of forced turnover may not be effective, if they are able to utilize their influence and power gained from their personal networks to get insulated from the managerial labor market.

To determine whether more central acquirer CEOs who perform value-destroying acquisitions are insulated from the managerial labor market and can protect themselves from getting fired, we follow Lehn and Zhao (2006) in modeling the probability of a disciplinary CEO turnover in a five year window following the first merger announcement by the firm's CEO during the sample period. Lehn and Zhao (2006) show that in the model predicting CEO disciplinary (i.e. forced) turnover, the bidder CAR is a significantly negative determinant. Thus, CEOs responsible for poorly-performing acquisitions are more likely to get replaced.

We perform our analysis on a subsample of acquisitions that are announced from January 1st 2000 to December 31st 2005 to observe whether the CEO is replaced after 5 years from the date of the first merger announcement. In addition, following Lehn and Zhao (2006), if there is more than one acquisition in the sample, we only keep the first acquisition if all acquisitions are conducted by the same CEO. If they are conducted by different CEOs, then we keep the first acquisition for each different CEO. Finally, we restrict the sample to include only acquisitions where the target constitutes at least 10% of the acquirer's market value (in order to focus on mergers that are "material" for the bidder following Lehn and Zhao 2006). Our final sample includes 173 CEOs.

To get data about CEO turnovers, we download the CEOs data from EXECUCOMP and use the annual CEO flag (CEOANN) to identify the firm's CEO right before the first merger announcement during the sample period and compare his/her name and ID number (EXEID) to the firm's CEO after 5 years. If they are not the same then we have to decide whether the CEO's replacement is due to a

disciplinary turnover. We follow Lehn and Zhao's (2006) definition for disciplinary turnover. Disciplinary turnovers are when CEOs are replaced by internal governance, takeovers or bankruptcy. We investigate the variable (REASON) in EXECUCOMP to check the reason behind the CEO's replacement. If the reason is missing or unknown we use age as a proxy for disciplinary turnovers. If the age of the CEO is less than 65 when replaced then we consider it a disciplinary turnover. If the firm is acquired or bankrupt during the 5 year window, we check to see if the CEO retains a position in the post merged entity, if not then we identify the turnover also as a disciplinary turnover. We estimate the following Probit model:²⁰

$$P(\text{CEO_Turnover}=1) = a_i + B_1\text{High_Centrality} + B_2\text{CAR} + B_3\text{High_Centrality} * \text{CAR} + B_4\text{Pre-ROA}(3) + B_5\text{Post_ROA}(3) + B_6\text{Age} + B_7\text{Tenure} + B_8\text{Stock_Deal} + B_9\text{Relative_Target_Size} + B_{10}\text{Firm_Got_Acquired} + e_i \quad (5)$$

where the dependent variable is a dummy variable that equals 1 if there is a disciplinary CEO turnover within a five year window of the first merger announcement and zero otherwise, High_Centrality is a dummy variable that equals 1 if the CEO centrality is above sample the median and zero otherwise, CAR is the acquirer shareholder cumulative abnormal returns computed at the (-3, +3) event window around the merger announcement, High_Centrality*CAR is an interaction term between High_Centrality and CAR, Pre_ROA(3) is the average of 3 year firm's return on assets prior to the merger announcement, Post_ROA(3) is the average of 3 year firm's return on assets after the merger announcement, Age is the age of the CEO, Tenure is the tenure of the CEO, Stock_Deal is a dummy that equals 1 if the deal is entirely financed by stock and zero otherwise, Relative_Target_Size is the market value of the target divided by the market value of the acquirer before the first merger announcement, and Firm_Got_Acquired is a dummy that equals 1 if the firm got acquired within a 5 year window and zero otherwise.

The results for this model are presented in Table 12. In models 1, 2, 3 and 4, we add in the

²⁰ Alternatively, we repeated the Probit model using Centrality as a continuous variable and the results are qualitatively similar but less significant.

High_Centrality to Lehn and Zhao's (2006) model and an interaction term between High_Centrality and CARs to show the incremental effect of centrality on disciplinary CEO replacements. Lehn and Zhao (2006) show that CARs are significantly negatively related to disciplinary turnovers, i.e. bad bidders end up fired, but if more central CEOs are insulated from the managerial labor market, then High_Centrality *CAR should be positive.

Our results show that the interactive coefficient High_Centrality *CAR indeed is positive in all models, and significant in three out of four considered centrality specifications. For all of our models the interactive coefficient reverses the negative coefficient on CAR. Thus, while for the less central bidder CEOs, the poor acquisition performance (resulting in a negative CAR) increases the likelihood of forced turnover (consistent with Lehn and Zhao, 2006), the likelihood of forced turnover for well-connected CEOs is unaffected by their previous merger performance. This result is consistent with Hypothesis H4 – well-connected CEOs are less likely to be fired “for a cause” (that is, because of creating a value-destructive merger deal). Consequently, well-connected CEOs appear to be less affected by managerial labor markets.

Equally importantly, the coefficient on High_Centrality is positive and significant in all models. That is, well-connected bidder CEOs are replaced more likely regardless of company's performance. This is consistent with Liu (2010) who finds (for the sample of CEOs not involved in M&A activities) that more central CEOs have higher likelihood of departure due to their valuable personal social networks that help them find alternative outside job opportunities. We now turn our attention to the analysis of new jobs acquired by replaced bidder CEOs to see whether similar supportive personal social networks play the role for CEOs involved in M&As as well.

Our results are presented in Table 13. We found the new job positions and titles for previously fired bidder CEOs in our sample utilizing Lexis Nexis database, as well as Internet searches. Our final sample contains 67 CEOs. Anytime a fired CEO is able to find a new position that carries a CEO or a Chairman title (including combinations such as CEO&Chairman or CEO&President), we classify this change as a “lateral shift.” Any other change to a new position – which includes titles of President, other Executives,

Directors, as well as no reported job – are classified as “demotions.” Panel A shows that there is a total of 21 (32%) of CEOs “lateral shifts” in our sample. Panel B documents that similarly to Liu (2010), well-connected bidder CEOs have a greater chance of the “lateral shift” (on average by more than 11%). Overall, the findings in Table 13 provide support for Hypothesis H4B. Even though more central CEOs are replaced more often, they have relatively richer opportunities to find a reputable, well-paid job after their dismissal. Consequently, they are less likely to be disciplined by the thread of dismissal.

6. Conclusion

Utilizing BoardEx database, we construct four measures of network centrality for CEOs from S&P 1500 companies: Closeness, Degree, Betweenness, and Eigenvector. Greater CEO centrality may help or hurt bidding companies during the acquisition process. On the one hand, well-connected CEOs can benefit from better access to information. On the other hand, central network position may allow CEOs to utilize their increasing influence and power to entrench themselves and withstand both external (market for corporate control) and internal (managerial labor market) monitoring. Our results suggest the latter effect to be the more prevalent.

We find that greater bidder CEO centrality is associated with greater likelihood of completing acquisitions, but also with greater losses to bidder shareholders, and declining (and ultimately negative) levels of total takeover synergies. Further supporting the connection between high centrality and managerial entrenchment, we also find that bidding companies ran by well-connected CEOs are less likely (compared to acquirers with less-central CEOs) to be taken over following a value-destroying acquisition. In addition, more central bidder CEOs are less likely to be dismissed due to previous acquisition generating shareholder losses, and, even if they are terminated, those CEOs are more likely to find another CEO-equivalent job. Our results are robust to various alternative model specifications, and they do not appear to be driven by potential CEO overconfidence.

Overall, we contend that our results provide an important intermediate step, which connects the two

major findings of previous finance research – the concept of “social connections” between any two people and the concept of eventual value losses and poor monitoring due to the existence of such network ties. Our findings suggest that well-connected CEOs may become powerful enough to be able to pursue any corporate activities, regardless of their potentially negative impact on shareholders.

Appendix: CEO Centrality Measures

Table A-1 presents summary statistics on the four measures of CEO centrality for the S&P 1500 CEOs in the sample in Panel A and on the percentile rankings of those CEOs based on their position in the network of all executives and directors of US public companies in Panel B. This table shows how different measures of centrality represent different aspects of social-connectedness. By looking at degree, we can simply know the number of relations a CEO has within this large network of all executives and directors. The minimum number of relations is 2. However, the minimum Betweenness and Eigenvector centrality measures is zero, which suggests that there are some CEOs who have general relations with other executives and directors but those relations do not control the flow of information between other CEOs or are relations not associated with other important CEOs in the network. By looking at percentile rankings, the mean (median) of the S&P 1500 CEO centrality lies in the 67.9 (73th), 71.62th (78th), 76.06th (84th) and 73.83th (78th) percentile rank of the network of all executives and directors when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality respectively. Overall, this suggests that the S&P1500 CEOs are central compared to the other directors and executives of US public companies.

Table A2 classifies the S&P 1500 firms in the sample into Fama and French 12 industry classifications. we present the full sample first in Panel A. The largest industry group is Business Equipment which represents 18.68% of the sample. It doesn't seem that there is any certain industry clustering in the sample. Then, we break the sample up into Below Median versus Above Median sub-groups in Panels B-E based on the centrality of the firm's CEO. Below Median is when the CEO centrality is below sample median. Above Median is when the CEO centrality is above sample median. Panels B, C, D and E present the number of observations when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality respectively.

Appendix

Table A-1: Summary Statistics for Centrality Measures

This table presents summary statistics on the four centrality measures for the CEOs in the sample. The sample covers S&P 1500 CEOs in the period spanning from January 1st 1999 to December 31st 2008. Centrality measures are as defined in section 3.1. The statistics are presented for the centrality measures in panel A and for the percentile ranks for the sample of CEOs based on the social network of all directors and executives of US public companies in panel B.

Panel A : Using Centrality Measures						
	N	Mean	Median	Std.	Min.	Max.
Closeness	16415	0.364	0.361	0.049	0.197	1
Degree	16415	153.85	76	205.870	2	1985
Betweenness	16415	0.0001	0.000	0.0001	0	0.0037
Eigenvector	16415	176.27	2.581	1162.986	0	14085.49
Panel B : Using Percentiles						
Closeness	16415	67.895 th	73 th	21.732	1 st	100 th
Degree	16415	71.620 th	78 th	24.235	2 nd	100 th
Betweenness	16415	76.063 th	84 th	24.495	1 st	100 th
Eigenvector	16415	73.826 th	78 th	21.258	1 st	100 th

Table A-2 : Classification by Industry

This table classifies the sample of S&P 1500 firms by industry. Industry classifications are based on Fama and French 12 industry classifications. The full sample is presented first in panel A and then broken up into Below Median vs. Above Median sub-groups in panels B-E based on the centrality of the firm's CEO. Below Median is when the CEO centrality is below the sample median. Above Median is when the CEO centrality is above sample median. Panels B, C, D and E present the numbers when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality respectively.

Full Sample	Panel A		Panel B :Closeness				Panel C: Degree				Panel D :Betweenness				Panel E : Eigen Vector			
	N		Below Median	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median	Below Median	Above Median		
Industry	N		N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Consumer Non-Durables	989		481	49%	508	51%	511	52%	478	48%	541	55%	448	45%	539	54%	450	46%
Consumer Durables	434		211	49%	223	51%	225	52%	209	48%	192	44%	242	56%	197	45%	237	55%
Manufacturing	2,022		932	46%	1,090	54%	915	45%	1,107	55%	912	45%	1,110	55%	1,012	50%	1,010	50%
Oil, Gas and Coal	650		396	61%	254	39%	367	56%	283	44%	312	48%	338	52%	457	70%	193	30%
Chemical Products	505		134	27%	371	73%	149	30%	356	70%	185	37%	320	63%	196	39%	309	61%
Business Equipment	3,067		1,261	41%	1,806	59%	1,330	43%	1,737	57%	1,512	49%	1,555	51%	866	28%	2,201	72%
Telephone and Television	348		159	46%	189	54%	165	47%	183	53%	154	44%	194	56%	167	48%	181	52%
Utilities	841		458	54%	383	46%	400	48%	441	52%	408	49%	433	51%	488	58%	353	42%
Wholesale and Retail	1,934		1,119	58%	815	42%	1,117	58%	817	42%	1,116	58%	818	42%	1,171	61%	763	39%
Healthcare	1,285		627	49%	658	51%	606	47%	679	53%	597	46%	688	54%	685	53%	600	47%
Finance	2,403		1,546	64%	857	36%	1,456	61%	947	39%	1,483	62%	920	38%	1,575	66%	828	34%
Other	1,937		1,054	54%	883	46%	1,078	56%	859	44%	1,025	53%	912	47%	1,084	56%	853	44%
Total	16,415		8,378	51%	8,037	49%	8,319	51%	8,096	49%	8,437	51%	7,978	49%	8,437	51%	7,978	49%

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Table 1: Summary Statistics for Firms' Financials

This table presents the summary statistics for the S&P 1500 firms and the bidder sample covered in the paper, in Panel A and B, respectively. The statistics are presented for the full sample first and then classified into Below vs. Above median. Below Median is when the CEO centrality is below the sample median. Above Median is when the CEO centrality is above sample median. Each subpanel contains the statistics when using Closeness, Degree, Betweenness and Eigenvector as measures of centrality respectively. Size is measured as the log of total assets. Tobin's Q is measured as the sum of market value of equity (end of year price per share * number of shares outstanding at the end of year), short term debt, long term debt and preferred stock divided by total value of assets. Profitability is measured as the return on total assets. Leverage is measured as the ratio of book value of debt to total assets. Liquidity is measured as the ratio of operating cash flow to total assets. * **, ** Denotes statistically significant difference between means of Below and Above centrality groups at the 1% and 5% levels respectively.

Panel A: S&P 1500 Sample**A1: Using Closeness Centrality**

	Full Sample				Below Median			Above Median			Difference
	N	Mean	Median	Std.	Mean	Median	Std.	Mean	Median	Std.	Below-Above
Size	16415	7.607	7.469	1.709	7.085	6.954	1.480	8.151	8.050	1.760	-1.066***
Tobin's Q	16415	1.667	1.168	2.086	1.609	1.153	1.912	1.727	1.184	2.251	-0.117***
Profitability	16415	0.034	0.041	0.109	0.037	0.041	0.106	0.030	0.041	0.111	0.007***
Leverage	16415	0.229	0.211	0.191	0.220	0.193	0.195	0.239	0.227	0.186	-0.019***
Liquidity	16415	0.090	0.086	0.101	0.090	0.085	0.104	0.090	0.088	0.098	-0.001

A2: Using Degree Centrality

Size	16415	7.607	7.469	1.709	7.025	6.893	1.457	8.205	8.122	1.741	-1.180***
Tobin's Q	16415	1.667	1.168	2.086	1.634	1.171	1.936	1.700	1.167	2.230	-0.066**
Profitability	16415	0.034	0.041	0.109	0.037	0.042	0.109	0.030	0.041	0.108	0.007***
Leverage	16415	0.229	0.211	0.191	0.217	0.193	0.194	0.242	0.228	0.187	-0.025***
Liquidity	16415	0.090	0.086	0.101	0.091	0.086	0.105	0.089	0.087	0.097	0.001

A3: Using Betweenness Centrality

Size	16415	7.607	7.469	1.709	7.215	7.040	1.584	8.021	7.920	1.737	-0.806***
Tobin's Q	16415	1.667	1.168	2.086	1.680	1.178	2.116	1.653	1.158	2.054	0.027
Profitability	16415	0.034	0.041	0.109	0.036	0.042	0.110	0.031	0.041	0.107	0.005***
Leverage	16415	0.229	0.211	0.191	0.216	0.190	0.195	0.243	0.231	0.186	-0.027***
Liquidity	16415	0.090	0.086	0.101	0.090	0.085	0.105	0.090	0.087	0.097	-0.000

A4: Using Eigenvector Centrality

Size	16415	7.607	7.469	1.709	7.267	7.133	1.544	7.966	7.863	1.798	-0.700***
Tobin's Q	16415	1.667	1.168	2.086	1.549	1.128	1.764	1.791	1.223	2.373	-0.242***
Profitability	16415	0.034	0.041	0.109	0.039	0.042	0.100	0.029	0.041	0.117	0.010***
Leverage	16415	0.229	0.211	0.191	0.231	0.209	0.194	0.227	0.214	0.188	0.003
Liquidity	16415	0.090	0.086	0.101	0.090	0.084	0.100	0.090	0.088	0.102	0.001

Panel B: Bidder Sample

B1: Using Closeness Centrality

	Full Sample				Below Median			Above Median			Difference Below- Above
	N	Mean	Median	Std.	Mean	Median	Std.	Mean	Median	Std.	
Size	776	8.754	8.686	1.741	8.138	8.013	1.564	9.010	9.088	1.748	-0.872***
Tobin's Q	776	1.935	1.348	2.354	1.412	0.985	1.893	2.152	1.495	2.490	-0.741***
Profitability	776	0.052	0.050	0.080	0.043	0.028	0.061	0.055	0.057	0.087	-0.013*
Leverage	776	0.201	0.189	0.153	0.228	0.232	0.165	0.190	0.178	0.147	0.038***
Liquidity	776	0.101	0.096	0.082	0.081	0.058	0.078	0.109	0.113	0.083	-0.028***

B2: Using Degree Centrality

Size	776	8.754	8.686	1.741	7.797	7.722	1.468	9.129	9.253	1.697	1.332***
Tobin's Q	776	1.935	1.348	2.354	1.622	1.097	2.140	2.058	1.449	2.424	-0.436**
Profitability	776	0.052	0.050	0.080	0.040	0.032	0.088	0.056	0.055	0.077	-0.016**
Leverage	776	0.201	0.189	0.153	0.232	0.238	0.178	0.189	0.179	0.141	0.043***
Liquidity	776	0.101	0.096	0.082	0.085	0.067	0.088	0.107	0.108	0.079	-0.022***

B3: Using Betweenness Centrality

Size	776	8.754	8.686	1.741	8.346	8.325	1.647	8.990	8.987	1.752	-0.644***
Tobin's Q	776	1.935	1.348	2.354	1.808	1.133	2.913	2.009	1.456	1.960	-0.201
Profitability	776	0.052	0.050	0.080	0.049	0.035	0.076	0.053	0.056	0.083	-0.004
Leverage	776	0.201	0.189	0.153	0.215	0.205	0.168	0.193	0.182	0.144	0.022*
Liquidity	776	0.101	0.096	0.082	0.088	0.074	0.080	0.108	0.110	0.083	-0.020***

B4: Using Eigenvector Centrality

Size	776	8.754	8.686	1.741	8.426	8.398	1.546	8.901	8.973	1.804	-0.475***
Tobin's Q	776	1.935	1.348	2.354	1.409	1.024	1.899	2.171	1.559	2.498	-0.762***
Profitability	776	0.052	0.050	0.080	0.045	0.031	0.058	0.055	0.057	0.088	-0.009
Leverage	776	0.201	0.189	0.153	0.238	0.233	0.164	0.184	0.175	0.145	0.054***
Liquidity	776	0.101	0.096	0.082	0.084	0.065	0.078	0.108	0.109	0.083	-0.024***

Table 2: Number of Acquisitions Classified by Year of Merger Announcement

This table presents the number of acquisitions in the sample classified by year of merger announcement. Date of merger announcement is the original date of announcement as reported by SDC. The acquirers are members of S&P 1500 and the targets are U.S. public companies. All acquisitions are successfully completed acquisitions. Panel A presents the number of acquisitions for the full sample. Panels B-E divides the number of acquisitions into two groups based on the centrality of the acquirer's CEO. Below Median is when the CEO centrality is below sample median. Above Median is when the CEO centrality is above sample median. Panels B, C, D and E presents the number of acquisitions when using Closeness, Degree, Betweenness and Eigenvector as measures of CEO centrality respectively.

Panel A		Panel B : Closeness				Panel C : Degree				Panel D : Betweenness				Panel E : Eigenvector			
Full Sample		Below Median		Above Median		Below Median		Above Median		Below Median		Above Median		Below Median		Above Median	
Year	N	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2000	114	28	25%	86	75%	31	27%	83	73%	43	38%	71	62%	31	27%	83	73%
2001	108	25	23%	83	77%	25	23%	83	77%	36	33%	72	67%	30	28%	78	72%
2002	62	22	35%	40	65%	20	32%	42	68%	21	34%	41	66%	22	35%	40	65%
2003	69	23	33%	46	67%	23	33%	46	67%	28	41%	41	59%	25	36%	44	64%
2004	77	27	35%	50	65%	22	31%	55	71%	25	32%	52	68%	29	38%	48	62%
2005	79	21	27%	58	73%	18	23%	61	77%	29	37%	50	63%	27	34%	52	66%
2006	82	26	32%	56	68%	24	29%	58	71%	31	38%	51	62%	22	27%	60	73%
2007	78	21	27%	57	73%	21	27%	57	73%	25	32%	53	68%	23	29%	55	71%
2008	50	12	24%	38	76%	12	24%	38	76%	19	38%	31	62%	10	20%	40	80%
2009	57	15	26%	42	74%	16	28%	41	72%	15	26%	42	74%	13	23%	44	77%
Total	776	220	28%	556	72%	212	27%	564	73%	272	35%	504	65%	232	30%	544	70%

Table 3: Difference in CEO Centrality between Acquirers and Non-Acquirers

This table presents the univariate tests for difference between centrality of acquirer CEOs versus non-acquirer CEOs. Acquirers are members of S&P 1500 firms that successfully completed acquisitions of public US targets. The results of the tests are presented using centrality measures in panel A and using centrality percentiles in panel B. *** Denotes statistical significance at the 1% level.

Panel A : Using Centrality Measures

Centrality	Full sample				Acquirers			Non-Acquirers			T-Test	Wilcoxn-Test		
	N	Mean	Median	Std.	N	Mean	Median	Std.	N	Mean	Median	Std.	T-Value	Z- Value
Closeness	16415	0.364	0.361	0.049	776	0.386	0.387	0.047	15639	0.363	0.360	0.049	-12.86***	-13.16***
Degree	16415	153.85	76	153.85	776	266.99	151	288.38	15639	148.74	75	199.85	-10.81***	-14.58***
Betweenness	16415	0.0001	0.0000	0.0001	776	0.0001	0.0001	0.0002	15639	0.0001	0.0000	0.0001	-7.73***	-11.99***
Eigenvector	16415	176.269	2.581	1163.0	776	436.088	17.644	1862.092	15639	164.523	2.285	1119.8	-3.86***	-12.48***

Panel B: Using Centrality Percentiles

Closeness	16415	73.00	67.90	21.73	776	75.69	82.00	19.89	15639	67.54	73.00	21.75	-10.63***	-11.11***
Degree	16415	71.62	78.00	24.23	776	83.66	91.00	18.42	15639	71.08	78.00	24.33	-17.52***	-15.03***
Betweenness	16415	76.06	84.00	24.50	776	84.10	91.00	21.00	15639	75.70	84.00	24.58	-10.34	-11.97***
Eigenvector	16415	73.83	78.00	21.26	776	82.61	89.00	18.98	15639	73.43	78.00	21.27	-12.54***	-13.17***

Table 4: Probit Model of Acquisitions

This table presents the results of Probit estimation based on the entire sample of S&P 1500 firms from the period spanning January 1st 2000-December 31st 2009. The dependent variable is the probability that the firm announced a successfully completed acquisition of a US public target. Centrality is the CEO's centrality measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8 and Eigenvector in models 5 and 9. Intense_Monitoring is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise, Board_Size is the size of the board of directors, Duality is a dummy variable that equals one if the CEO is also the chairman of the board and zero otherwise, Eindex is Bebchuk, Cohen and Ferrell's entrenchment index, age is the CEO's age, Block_Ownership is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise, CEO_Ownership is the percentage of shares owned by the CEO, and all other variables are as previously defined. All independent variables and controls are lagged one year. P-values are in parentheses.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Centrality		0.3156*** (0.001)	0.6755*** (0.000)	0.4168*** (0.000)	0.6162*** (0.000)	0.2073* (0.056)	0.5920*** (0.000)	0.3723*** (0.000)	0.5004*** (0.000)
Tobin's Q	0.0385*** (0.000)	0.0362*** (0.000)	0.0326*** (0.000)	0.0361*** (0.000)	0.0323*** (0.000)	0.0338*** (0.000)	0.0300*** (0.000)	0.0330*** (0.000)	0.0305*** (0.000)
Liquidity	0.3903 (0.164)	0.2654 (0.348)	0.1504 (0.596)	0.2648 (0.348)	0.1900 (0.502)	0.3581 (0.261)	0.2201 (0.491)	0.3281 (0.302)	0.2710 (0.395)
Profitability	0.2698 (0.312)	0.3513 (0.190)	0.4491* (0.096)	0.3472 (0.196)	0.4523* (0.092)	0.4232 (0.173)	0.5111 (0.102)	0.4420 (0.156)	0.5028 (0.106)
Size	0.2147*** (0.000)	0.2000*** (0.000)	0.1775*** (0.000)	0.1999*** (0.000)	0.1929*** (0.000)	0.1840*** (0.000)	0.1636*** (0.000)	0.1815*** (0.000)	0.1760*** (0.000)
Leverage	-0.7684*** (0.000)	-0.7653*** (0.000)	-0.7635*** (0.000)	-0.7844*** (0.000)	-0.7360*** (0.000)	-0.8187*** (0.000)	-0.8155*** (0.000)	-0.8304*** (0.000)	-0.7957*** (0.000)
Intense_Monitoring						-0.1956*** (0.000)	-0.1902*** (0.000)	-0.1979*** (0.000)	-0.1883*** (0.000)
Board_Size						0.0106 (0.237)	0.0102 (0.258)	0.0105 (0.240)	0.0120 (0.181)

Table 4 : Probit Model of Acquisitions

(contd.)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Duality						0.0887**	0.0756*	0.0798*	0.0830*
						(0.043)	(0.087)	(0.070)	(0.059)
Eindex						-0.0126	-0.0122	-0.0119	-0.0094
						(0.400)	(0.418)	(0.429)	(0.535)
Age						-0.0122***	-0.0121***	-0.0128***	-0.0115***
						(0.000)	(0.000)	(0.000)	(0.000)
Block_Ownership						0.0328	0.0432	0.0376	0.0397
						(0.561)	(0.446)	(0.506)	(0.482)
CEO_Ownership						-1.0826**	-0.8714*	-1.0550**	-0.9596*
						(0.036)	(0.091)	(0.042)	(0.063)
Constant	-3.3949***	-3.4891***	-3.5908***	-3.5908***	-3.6820***	-2.6182***	-2.7513***	-2.7060***	-2.8540***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	16,415	16,415	16,415	16,415	16,415	13,398	13,398	13,398	13,398
Pseudo R ²	7.49%	7.68%	8.33%	7.87%	8.16%	8.42%	8.93%	8.62%	8.75%

***, **, * Denotes statistical significance at the 1%, 5% and 10% respectively.

Table 5: Cumulative Abnormal Returns Around Merger Announcement

This table presents the cumulative abnormal returns around the merger announcement over the three day event window (-3, +3) for the acquirer, the combined firm and the target in panels A, B and C respectively. In each panel, numbers are presented first for the full sample and then divided into three groups based on the centrality of the acquirer's CEO. Group 1 is when the acquirer's CEO centrality is below the 25th percentile of the sample, Group2 is when the acquirer's CEO centrality is between 25th and 75th percentile of the sample, and Group3 is when CEO Centrality is above the 75th percentile of the sample. In each panel, the four measures of centrality, Closeness, Degree, Betweenness and Eigenvector are used to classify the sample into those groups of centrality. The CAR for the combined firm is calculated as the market value weighted average of CAR for the acquirer and CAR for the target. ***, **, * Denotes statistically different from zero at the 1%, 5%, and 10% respectively. (a),(b),(c) denotes that the difference between Group1 and Group3 is statistically significant at the 1%, 5% and 10% respectively.

Panel A: Acquirer CARs		Full Sample		Group1		Group2		Group3		Group1-3			
CAR (-3,+3)	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	Diff
Using Close	776	-1.866%***	-1.413%***	202	-0.689%	-0.839%	405	-2.234%***	-1.774%***	169	-2.392%***	-1.254%***	1.703%(b)
Using Degree	776	-1.866%***	-1.413%***	206	-0.514%	-1.165%	410	-2.255%***	-1.423%***	160	-2.612%***	-1.474%***	2.097%(b)
Using Betweenness	776	-1.866%***	-1.413%***	206	-1.294%***	-1.119%**	411	-2.038%***	-1.766%***	159	-2.165%***	-1.264%***	0.870%
Using Eigenvector	776	-1.866%***	-1.413%***	207	-0.476%	-0.324%	403	-2.327%***	-1.835%***	166	-2.483%***	-1.413%***	2.007%(b)
Panel B: Combined CARs													
Using Close	776	0.682%**	0.330%**	202	2.254%***	1.615%***	405	0.392%	0.065%	169	-0.502%	-0.201%	2.757%(a)
Using Degree	776	0.682%**	0.330%**	206	2.683%***	1.610%***	410	0.265%	0.208%	160	-0.824%*	-0.482%	3.507%(a)
Using Betweenness	776	0.682%**	0.330%**	206	1.683%***	1.218%***	411	0.617%	0.227%	159	-0.445%	-0.201%	2.129%(a)
Using Eigenvector	776	0.682%**	0.330%**	207	2.109%***	1.637%***	403	0.375%	0.181%	166	-0.350%	-0.303%	2.460%(a)
Panel C : Target CARs													
Using Close	776	27.394%***	21.282%***	202	22.203%***	19.275%***	405	28.589%***	22.094%***	169	30.735%***	23.693%***	-8.531%(a)
Using Degree	776	27.394%***	21.282%***	206	23.589%***	19.714%***	410	28.593%***	22.582%***	160	29.222%***	23.274%***	-5.633%(c)
Using Betweenness	776	27.394%***	21.282%***	206	23.219%***	19.904%***	411	28.165%***	21.346%***	159	30.810%***	24.072%***	-7.591%(b)
Using Eigenvector	776	27.394%***	21.282%***	207	21.566%***	19.000%***	403	29.492%***	22.677%***	166	29.570%***	21.865%***	-8.004%(a)

Table 6 : Effect of Acquirer's CEO centrality on Acquirer Cumulative Abnormal Returns

This table presents the estimates of OLS regression for acquirer cumulative abnormal returns on measures of centrality for acquirer CEO and other control variables. The dependent variable is the acquirer CAR over the three day window surrounding the merger announcement. Centrality of acquirer CEO is measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8 and Eigenvector in models 5 and 9. Deal Value is the deal value as reported by SDC divided by the market value of the acquirer. Same_Industry is a dummy variable that equals one if the acquirer and target have the same 2 digit SIC code and zero otherwise. Stock_Deal is a dummy variable that equals one if the transaction is financed entirely by stock and zero otherwise. All other variables are as previously defined. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P values are in parentheses.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Centrality		-0.0763*** (0.000)	-0.0682*** (0.000)	-0.0458*** (0.003)	-0.0798*** (0.000)	-0.0816*** (0.000)	-0.0771*** (0.000)	-0.0548*** (0.001)	-0.0857*** (0.000)
Size	-0.0006 (0.779)	0.0034 (0.131)	0.0036 (0.130)	0.0014 (0.534)	0.0029 (0.189)	0.0030 (0.284)	0.0030 (0.292)	0.0008 (0.764)	0.0023 (0.408)
Profitability	0.1629*** (0.001)	0.1484*** (0.002)	0.1499*** (0.002)	0.1567*** (0.001)	0.1494*** (0.002)	0.1439*** (0.006)	0.1440*** (0.006)	0.1502*** (0.004)	0.1445*** (0.006)
Tobin's Q	-0.0031** (0.038)	-0.0027* (0.072)	-0.0029* (0.051)	-0.0033** (0.027)	-0.0025* (0.097)	-0.0035** (0.020)	-0.0036** (0.019)	-0.0042*** (0.006)	-0.0033** (0.029)
Leverage	0.0679*** (0.002)	0.0628*** (0.003)	0.0585*** (0.007)	0.0646*** (0.003)	0.0620*** (0.004)	0.0656*** (0.004)	0.0621*** (0.006)	0.0687*** (0.003)	0.0649*** (0.004)
Liquidity	0.0326 (0.523)	0.0504 (0.319)	0.0477 (0.348)	0.0430 (0.398)	0.0471 (0.351)	0.0185 (0.723)	0.0187 (0.721)	0.0145 (0.782)	0.0155 (0.766)
Deal_Value	-0.0328*** (0.000)	-0.0343*** (0.000)	-0.0345*** (0.000)	-0.0356*** (0.000)	-0.0339*** (0.000)	-0.0398*** (0.000)	-0.0392*** (0.000)	-0.0412*** (0.000)	-0.0391*** (0.000)
Same_Industry	0.0034 (0.598)	-0.0004 (0.950)	0.0013 (0.844)	0.0029 (0.649)	-0.0001 (0.982)	-0.0009 (0.888)	0.0007 (0.911)	0.0024 (0.714)	-0.0010 (0.881)

Table 6 : Effect of Acquirer's CEO centrality on Acquirer Cumulative Abnormal Returns (contd.)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Stock_Deal	-0.0174**	-0.0194***	-0.0173**	-0.0170**	-0.0182**	-0.0141*	-0.0123	-0.0120	-0.0132*
	(0.018)	(0.008)	(0.018)	(0.021)	(0.012)	(0.060)	(0.101)	(0.110)	(0.077)
Intense_Monitoring						-0.0058	-0.0044	-0.0043	-0.0058
						(0.425)	(0.548)	(0.561)	(0.420)
Board_Size						0.0004	0.0009	0.0007	0.0005
						(0.772)	(0.479)	(0.562)	(0.676)
Duality						0.0077	0.0083	0.0078	0.0077
						(0.252)	(0.221)	(0.249)	(0.254)
Eindex						0.0016	0.0023	0.0023	0.0015
						(0.518)	(0.359)	(0.349)	(0.537)
Age						0.0001	0.0001	0.0002	0.0001
						(0.822)	(0.827)	(0.682)	(0.854)
Block_Ownership						0.0149*	0.0148*	0.0160*	0.0144
						(0.095)	(0.099)	(0.074)	(0.105)
CEO_Ownership						-0.1770**	-0.1799**	-0.1588**	-0.1698**
						(0.027)	(0.025)	(0.048)	(0.033)
Constant	-0.0480*	-0.0194	-0.0265	-0.0244	-0.0101	-0.0398	-0.0496	-0.0528	-0.0287
	(0.061)	(0.459)	(0.309)	(0.360)	(0.705)	(0.321)	(0.216)	(0.188)	(0.480)
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	776	776	776	776	776	685	685	685	685
Adjusted R ²	7.38%	9.52%	8.79%	8.35%	9.50%	10.48%	9.71%	9.31%	10.50%

***, **, * Denotes statistical significance at the 1%, 5% and 10% respectively.

Table 7 : Effect of Acquirer’s CEO Centrality on Combined Cumulative Abnormal Returns

This table presents the estimates of OLS regression for combined cumulative abnormal returns on measures of centrality for acquirer CEO and other control variables. The dependent variable is the combined CAR over the three day window surrounding the merger announcement calculated as the weighted market value of acquirer CAR and target CAR. Centrality of acquirer CEO is measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8, and Eigenvector in models 5 and 9. Combined_Size is the total number of employees of both target and acquirer, Combined_Profitability is the asset weighted average of acquirer and target return on assets, Combined_Tobin’s Q is the asset weighted average of the acquirer and target Tobin’s Q, Combined_Leverage is the asset weighted average of acquirer and target debt to assets ratio and Combined_Liquidity is the asset weighted average of ratio of operating cash flow to assets of acquirer and target. Deal Value is the deal value as reported by SDC divided by the market value of the combined entity. Same_Industry is a dummy variable that equals one if the acquirer and target have the same 2 digit SIC code and zero otherwise. Stock_Deal is a dummy variable that equals one if the transaction is financed entirely by stock and zero otherwise. All other variables are as previously defined. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P values are in parentheses.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Centrality		-0.0696*** (0.000)	-0.0641*** (0.000)	-0.0400*** (0.007)	-0.0696*** (0.000)	-0.0690*** (0.000)	-0.0667*** (0.001)	-0.0444*** (0.006)	-0.0707*** (0.000)
Combined_Size	-0.0013 (0.508)	0.0022 (0.312)	0.0019 (0.383)	0.0002 (0.908)	0.0017 (0.411)	0.0012 (0.654)	0.0008 (0.774)	-0.0006 (0.822)	0.0007 (0.792)
Combined_Profitability	0.0000 (0.474)	0.0000 (0.414)	0.0000 (0.436)	0.0000 (0.396)	0.0000 (0.375)	0.0000 (0.295)	0.0000 (0.311)	0.0000 (0.292)	0.0000 (0.283)
Combined_Tobin's Q	-0.0028* (0.072)	-0.0022 (0.162)	-0.0025 (0.107)	-0.0029* (0.061)	-0.0020 (0.194)	-0.0034** (0.045)	-0.0034** (0.041)	-0.0041** (0.016)	-0.0032* (0.055)
Combined_Leverage	0.0502** (0.023)	0.0456** (0.037)	0.0420* (0.057)	0.0470** (0.033)	0.0440** (0.045)	0.0548** (0.021)	0.0515** (0.031)	0.0563** (0.018)	0.0532** (0.025)
Combined_liquidity	0.1191*** (0.005)	0.1178*** (0.005)	0.1174*** (0.006)	0.1206*** (0.005)	0.1159*** (0.006)	0.1232*** (0.008)	0.1250*** (0.007)	0.1254*** (0.007)	0.1214*** (0.009)
Same_Industry	0.0072 (0.248)	0.0042 (0.495)	0.0059 (0.341)	0.0070 (0.256)	0.0045 (0.469)	0.0026 (0.692)	0.0040 (0.551)	0.0052 (0.431)	0.0026 (0.701)
Deal_Value	0.0374*** (0.005)	0.0335** (0.012)	0.0313** (0.020)	0.0320** (0.018)	0.0349*** (0.009)	0.0230 (0.121)	0.0232 (0.120)	0.0223 (0.140)	0.0247* (0.096)
Stock_Deal	-0.0163** (0.022)	-0.0183*** (0.009)	-0.0160** (0.023)	-0.0161** (0.023)	-0.0173** (0.014)	-0.0158** (0.036)	-0.0142* (0.060)	-0.0140* (0.065)	-0.0151** (0.045)
Intense_Monitoring						0.0000 (0.999)	0.0011 (0.883)	0.0011 (0.8800)	0.0000 (0.995)
Board_Size						0.0004 (0.741)	0.0010 (0.397)	0.0006 (0.594)	0.0004 (0.704)

**Table 7 : Effect of Acquirer's CEO Centrality on Combined Cumulative Abnormal Returns
(contd.)**

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Duality						0.0060 (0.377)	0.0068 (0.321)	0.0060 (0.379)	0.0059 (0.385)
Eindex						0.0021 (0.385)	0.0026 (0.289)	0.0028 (0.253)	0.0021 (0.386)
Age						-0.0002 (0.667)	-0.0002 (0.682)	-0.0001 (0.806)	-0.0002 (0.640)
Block_Ownership						0.0046 (0.606)	0.0043 (0.633)	0.006 (0.529)	0.0044 (0.621)
CEO_Ownership						-0.1554* (0.054)	-0.1586* (0.050)	-0.1371* (0.090)	-0.1481* (0.066)
Constant	-0.0268* (0.075)	0.0167 (0.360)	0.0180 (0.357)	0.0022 (0.904)	0.0194 (0.311)	0.0061 (0.871)	0.0005 (0.989)	-0.01510 (0.663)	0.0102 (0.788)
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	776	776	776	776	776	685	685	685	685
Adjusted R ²	4.78%	6.76%	6.25%	5.57%	6.54%	7.55%	7.14%	7.58%	7.45%

***, **, * Denotes statistical significance at the 1%, 5% and 10% respectively.

Table 8 : Effect of Acquirer's CEO Centrality on Target Cumulative Abnormal Returns

This table presents the estimates of OLS regression for target cumulative abnormal returns on measures of centrality for acquirer CEO and control variables. The dependent variable is the target CAR over the three day window surrounding the merger announcement. Centrality of the acquirer CEO is measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8, and Eigenvector in models 5 and 9. All other variables are as previously defined. The size, profitability, Tobin's Q, leverage and liquidity are calculated for the target firm. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P values are in parentheses.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Centrality		0.1120*	0.1376**	0.0646	0.1306**	0.1063	0.1263*	0.0550	0.1279*
		(0.068)	(0.035)	(0.244)	(0.047)	(0.110)	(0.082)	(0.365)	(0.072)
Size	-0.0192**	-0.0220***	-0.0232***	-0.0203***	-0.0218***	-0.0210**	-0.0212**	-0.0195**	-0.0209**
	(0.011)	(0.004)	(0.003)	(0.008)	(0.004)	(0.022)	(0.021)	(0.033)	(0.023)
Profitability	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000
	(0.991)	(0.943)	(0.950)	(0.952)	(0.917)	(0.921)	(0.903)	(0.877)	(0.951)
Tobin's Q	-0.0099*	-0.0125**	-0.0126**	-0.0108*	-0.0126**	-0.0130**	-0.0131**	-0.0115*	-0.0131**
	(0.098)	(0.043)	(0.039)	(0.075)	(0.041)	(0.046)	(0.044)	(0.072)	(0.042)
Leverage	0.0051	0.0144	0.0212	0.0093	0.0169	0.0474	0.0534	0.0418	0.0499
	(0.930)	(0.804)	(0.715)	(0.872)	(0.771)	(0.447)	(0.394)	(0.502)	(0.424)
Liquidity	-0.2784***	-0.2598***	-0.2592***	-0.2732***	-0.2598***	-0.1957***	-0.1956***	-0.2068***	-0.1943***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.010)	(0.010)	(0.006)	(0.010)
Deal_Value	-0.0754**	-0.0656**	-0.0604**	-0.0682**	-0.0668**	-0.0514	-0.0500	-0.0555	-0.0523
	(0.012)	(0.031)	(0.050)	(0.026)	(0.027)	(0.164)	(0.176)	(0.136)	(0.155)
Same_Industry	0.0076	0.0154	0.0146	0.0092	0.0157	0.0090	0.0073	0.0031	0.0099
	(0.751)	(0.527)	(0.545)	(0.702)	(0.517)	(0.733)	(0.781)	(0.906)	(0.709)
Stock_Deal	-0.0802***	-0.0723***	-0.0752***	-0.0785***	-0.0739***	-0.0884***	-0.0905***	-0.0942***	-0.0894***
	(0.004)	(0.009)	(0.006)	(0.004)	(0.008)	(0.004)	(0.003)	(0.002)	(0.003)
Intense_Monitoring						0.0050	0.0023	0.0024	0.0051
						(0.865)	(0.937)	(0.934)	(0.862)
Board_Size						0.0019	0.0007	0.0016	0.0018
						(0.670)	(0.877)	(0.726)	(0.679)
Duality						-0.0272	-0.0293	-0.0265	-0.0271
						(0.311)	(0.277)	(0.326)	(0.313)
Eindex						-0.0048	-0.0054	-0.0065	-0.0045
						(0.616)	(0.571)	(0.494)	(0.639)

**Table 8 : Effect of Acquirer's CEO Centrality on Target Cumulative Abnormal Returns
(contd.)**

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Age						0.0011 (0.583)	0.0011 (0.577)	0.0009 (0.633)	0.0012 (0.545)
Block_Ownership						-0.0654* (0.068)	-0.0647* (0.071)	-0.0669* (0.062)	-0.0649* (0.070)
CEO_Ownership						0.1523 (0.636)	0.1631 (0.613)	0.1257 (0.696)	0.1388 (0.666)
Constant	0.5045*** (0.000)	0.4277*** (0.000)	0.4073*** (0.000)	0.4542*** (0.000)	0.4103*** (0.000)	0.3527** (0.016)	0.3469** (0.017)	0.4032*** (0.004)	0.3270** (0.028)
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	776	776	776	776	776	685	685	685	685
Adjusted R ²	9.05%	9.34%	9.47%	9.10%	9.41%	7.72%	7.79%	7.48%	7.82%

***, **, * Denotes statistical significance at the 1%, 5% and 10% levels respectively.

Table 9: Effect of Board Constraints and CEO Characteristics on Likelihood of Acquisition

This table summarizes the coefficients of the explanatory variables of the Probit model of acquisitions while considering the effect of board constraints and CEO characteristics. The dependent variable is the probability that the firm announced a successfully completed acquisition of a US public target. High_Centrality is a dummy variable that equals one if the CEO centrality is above the sample median and zero otherwise. The centrality is measured using Closeness in column 1, Degree in column 2, Betweenness in column 3 and Eigenvector in column 4. Intense_Monitoring is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise, High_Centrality * Intense_Monitoring is an interaction term between High_Centrality and Intense_Monitoring, Small_Board is a dummy variable that equals 1 if the board size is less than eight and zero otherwise, High_Centrality * Small_Board is an interaction term between High_Centrality and Small_Board, CEO_not_Chair is a dummy that equals one if the CEO is not the chairman of the board and zero otherwise, High_Centrality * CEO_not_Chair is an interaction term between High_Centrality and CEO_not_Chair, Low_Eindex is a dummy variable that equals 1 if Bebchuk, Cohen and Ferrell's entrenchment index is lower than the sample median and zero otherwise, High_Centrality * Low_Eindex is an interaction term between High_Centrality and Low_Eindex, Older_CEO is a dummy variable that equals 1 if the CEO's age is above the sample median and zero otherwise, High_Centrality * Older_CEO is an interaction term between High_Centrality and Older_CEO, Block_Ownership is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise, High_Centrality * Block_Ownership is an interaction term between High_Centrality and Block_Ownership, High_CEO_Ownership is a dummy variable that equals one if the CEO's percentage ownership of firm's common stock is higher than the sample median and zero otherwise, High_Centrality * High_CEO_Ownership is an interaction term between High_Centrality and High_CEO_Ownership. The models include controls for size, profitability, Tobin's q, leverage and liquidity. All independent variables and controls are lagged one year. P-values are in parentheses.

	(1) Closeness	(2) Degree	(3) Betweenness	(4) Eigenvector
High_Centrality	0.1813*** (0.000)	0.1948*** (0.000)	0.0856** (0.041)	0.1855*** (0.000)
Intense_Monitoring	-0.2889*** (0.000)	-0.2507*** (0.000)	-0.3610*** (0.000)	-0.3181*** (0.000)
High_Centrality * Intense_Monitoring	0.1422* (0.090)	0.0827 (0.323)	0.2583*** (0.001)	0.1927** (0.010)
High_Centrality	0.1078** (0.031)	0.1490*** (0.004)	0.0612 (0.194)	0.1440*** (0.003)
Small_Board	-0.1461** (0.031)	-0.0588 (0.377)	-0.0477 (0.453)	-0.1142* (0.093)
High_Centrality * Small_Board	0.3572*** (0.000)	0.2050** (0.012)	0.1986** (0.012)	0.2886*** (0.001)
High_Centrality	0.2427*** (0.000)	0.2866*** (0.000)	0.1044** (0.011)	0.2353*** (0.000)
CEO_Not_Chair	0.0220 (0.716)	0.0912 (0.135)	-0.0773 (0.152)	-0.0321 (0.551)
High_Centrality * CEO_Not_Chair	-0.0420 (0.586)	-0.1503* (0.053)	0.1245* (0.053)	0.0395 (0.545)

High_Centrality	0.1713**	0.1983***	0.0329	0.1800***
	(0.017)	(0.006)	(0.463)	(0.000)
Low_Eindex	0.0232	0.0558	-0.0632	-0.0120
	(0.731)	(0.416)	(0.244)	(0.826)
High_Centrality *	0.0891	0.0369	0.2354***	0.1374**
Low_Eindex	(0.298)	(0.668)	(0.000)	(0.018)
High_Centrality	0.1833***	0.1748***	0.0911**	0.2043***
	(0.000)	(0.001)	(0.029)	(0.000)
Older_CEO	-0.1991***	-0.2237***	-0.2784***	-0.2214***
	(0.001)	(0.000)	(0.000)	(0.000)
High_Centrality *	0.1035	0.1297*	0.2185***	0.1419**
Older_CEO	(0.183)	(0.099)	(0.001)	(0.035)
High_Centrality	0.1990***	0.1933***	0.0890**	0.2096***
	(0.000)	(0.000)	(0.027)	(0.000)
Block_Ownership	-0.1195*	-0.1041	-0.1980***	-0.1386**
	(0.082)	(0.126)	(0.002)	(0.036)
High_Centrality *	0.1400	0.1151	0.2699***	0.1843**
Block_Ownership	(0.119)	(0.200)	(0.001)	(0.028)
High_Centrality	0.2293***	0.2173***	0.0829*	0.2108***
	(0.000)	(0.000)	(0.057)	(0.000)
High_	-0.0360	-0.0458	-0.1451***	-0.0868
CEO_Ownership	(0.576)	(0.478)	(0.008)	(0.123)
High_Centrality *	0.0282	0.0343	0.1960***	0.1169*
High_CEO_Ownership	(0.729)	(0.674)	(0.003)	(0.079)

Table 10: Effect of Board Constraints and CEO Characteristics on Acquirer Cumulative Abnormal Returns

This table summarizes the coefficients of the explanatory variables in the OLS regression for acquirer cumulative abnormal returns on measures of centrality for acquirer CEO, board constraints, CEO characteristics and other control variables. The dependent variable is the acquirer CAR over the three day window surrounding the merger announcement. All models include controls for bidder's size, profitability, Tobin's q, leverage and liquidity. The centrality is measured using Closeness in column 1, Degree in column2, Betweenness in column3, and Eigenvector in column 4. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P values are in parentheses.

	(1) Closeness	(2) Degree	(3) Betweenness	(4) Eigenvector
High_Centrality	-0.0108 (0.109)	-0.0189*** (0.006)	-0.0051 (0.427)	-0.0143** (0.035)
Intense_Monitoring	0.0017 (0.884)	-0.0029 (0.801)	-0.0111 (0.312)	0.0043 (0.694)
High_Centrality * Intense_Monitoring	-0.0116 (0.369)	-0.0027 (0.832)	0.0059 (0.647)	-0.0161 (0.211)
High_Centrality	-0.0197*** (0.010)	-0.0147* (0.054)	-0.0104 (0.132)	-0.0167** (0.027)
Small_Board	-0.0190** (0.043)	-0.0008 (0.930)	-0.0176* (0.064)	-0.0050 (0.602)
High_Centrality * Small_Board	0.0270** (0.039)	-0.0132 (0.308)	0.0216* (0.091)	-0.0026 (0.844)
High_Centrality	-0.0125 (0.119)	-0.0136* -0.09	-0.0017 (0.822)	-0.0182** (0.022)
CEO_Not_Chair	0.0022 (0.791)	0.0053 (0.520)	0.0027 (0.751)	0.0025 (0.771)
High_Centrality * CEO_Not_Chair	-0.0092 (0.443)	-0.0174 (0.149)	-0.0087 (0.473)	-0.0079 (0.509)
High_Centrality	-0.0137 (0.161)	-0.0072 (0.466)	-0.0013 (0.893)	-0.0119 (0.219)
Low_Eindex	-0.0128 (0.118)	-0.0022 (0.786)	-0.0094 (0.254)	-0.0067 (0.406)
High_Centrality * Low_Eindex	0.0034 (0.778)	-0.0191 (0.113)	-0.0048 (0.687)	-0.0107 (0.367)
High_Centrality	-0.0136 (0.119)	-0.0181** (0.041)	0.0013 (0.881)	-0.0234*** (0.009)
Older_CEO	0.0067 (0.417)	0.0072 (0.390)	-0.0050 (0.563)	0.0016 (0.842)
High_Centrality * Older_CEO	-0.0041 (0.731)	-0.0032 (0.785)	0.0116 (0.174)	0.0052 (0.662)

High_Centrality	-0.0137*	-0.0220***	-0.0059	-0.0195***
	(0.053)	(0.002)	(0.363)	(0.006)
Block_Ownership	-0.0036	-0.0062	-0.0018	-0.0035
	(0.703)	(0.517)	(0.861)	(0.720)
High_Centrality *				
Block_Ownership	0.0098	0.0154	0.0063	0.0085
	(0.485)	(0.271)	(0.652)	(0.547)
High_Centrality	-0.0134	-0.0193**	-0.0136	-0.0101
	(0.152)	(0.039)	(0.262)	(0.269)
High_	0.0016	-0.0007	-0.0006	0.0105
CEO_Ownership	(0.858)	(0.935)	(0.944)	(0.221)
High_Centrality *	-0.0054	-0.0011	0.0009	-0.0237*
High_CEO_Ownership	(0.659)	(0.930)	(0.940)	(0.052)

Table 11: Effect of Acquirer's CEO Centrality on Probability of the Bidder Being Subsequently Acquired

This table presents the estimates of the Probit model of likelihood of bidder becoming a successfully acquired target. The model is conducted on a subsample of successfully completed acquisitions by S&P 1500 bidders of US public targets within the first six years of the sample (January 1st 2000- December 31st 2005) . Deals are restricted to include acquisitions where targets represent at least 5% of the market value of the bidders. The dependent variable is a dummy variable that equals one if the bidder becomes a successfully acquired target within a five year window of the date of merger announcement and zero otherwise. Centrality of the acquirer's CEO is measured by Closeness, Degree, Betweenness and Eigenvector in columns 1, 2, 3 and 4 respectively. CAR is the Cumulative abnormal returns for the acquirer surrounding a three day window of the merger announcement. If the bidder has more than one deal during this subsample, then CAR represents the sum of the CARs of those deals. Centrality * CAR is an interaction term between the acquirer CEO Centrality and CAR. Relative_Target_Size is the market value of the target divided by the market value of the bidder. All other variables are as previously defined. All independent variables and controls are calculated at one year before the beginning of the sample. P-values are in parentheses.

Model	(1)	(2)	(3)	(4)
	Closeness	Degree	Betweenness	Eigenvector
Centrality	0.6777 (0.174)	0.3231 (0.511)	0.5380 (0.168)	0.3462 (0.488)
CAR	-6.6713** (0.042)	-7.4001* (0.066)	-6.5628 (0.121)	-7.4226* (0.059)
Centrality * CAR	10.4878** (0.030)	9.9764** (0.049)	8.2805* (0.092)	9.7070** (0.048)
Size	-0.1521*** (0.009)	-0.1393** (0.021)	-0.1388** (0.016)	-0.1419** (0.013)
Profitability	-2.7693** (0.021)	-2.5605** (0.030)	-2.6226** (0.027)	-2.9475** (0.015)
Tobin's Q	-0.0096 (0.601)	-0.0087 (0.636)	-0.0097 (0.598)	-0.0086 (0.636)
Leverage	0.1183 (0.842)	0.0876 (0.883)	0.0992 (0.866)	0.0428 (0.942)
Relative_Target_Size	-1.2930** (0.014)	-1.4130*** (0.009)	-1.2432** (0.018)	-1.2286** (0.018)
Constant	0.7087 (0.195)	0.8259 (0.129)	0.5938 (0.290)	0.8153 (0.178)
N	222	222	222	222
Pseudo R ²	7.63%	7.57%	7.55%	7.07%

***, **, * Denotes statistically significant at 1%, 5% and 10% levels

Table 12 : CEO Turnover Analysis

This table presents the results of Probit estimation applied on the subsample of acquirers that announced completed acquisitions of US public targets between January 1st 2000 and December 30th 2005. This sample is also restricted to include targets that represent at least 10% of the market value of acquirer. The dependent variable is a dummy variable that equals 1 if there is a disciplinary CEO turnover within a 5 year window from the date of first merger announcement and zero otherwise. Disciplinary turnover is as defined in section 5.3. High_Centrality is a dummy variable that equals 1 if the centrality is above the sample median and zero otherwise. Centrality is measured using Closeness in model 1, Degree in model 2, Betweenness in model 3, and Eigenvector in model 4. CAR is the 3 day cumulative abnormal returns around the first merger announcement. High_Centrality * CAR is an interaction term between High_Centrality and CAR. Pre_ROA (3) is the average of 3 year firm's return on assets prior to the merger announcement. Post_ROA (3) is the average of 3 year firm's return on assets after the merger announcement. Age is the age of the CEO. Tenure is the tenure of the CEO. Stock_Deal is a dummy that equals 1 if the deal is entirely financed by stock and zero otherwise. Relative_Target_Size is the market value of the target divided by the market value of the acquirer before the first merger announcement. Firm_Got_Acquired is a dummy variable that equals 1 if the firm got acquired within a 5 years window and zero otherwise. P-values are included in parentheses.

Model	(1)	(2)	(3)	(4)
	Closeness	Degree	Betweenness	Eigenvector
High_Centrality	0.7738*** (0.001)	0.7284*** (0.002)	0.4477* (0.051)	0.3387 (0.122)
CAR	-2.4099 (0.206)	-2.2915 (0.215)	-2.7514* (0.099)	-0.5192 (0.750)
High_Centrality * CAR	4.4347* (0.071)	4.3782* (0.073)	5.3283** (0.023)	0.9627 (0.666)
Pre_ROA(3)	-1.5726 (0.258)	-1.7082 (0.221)	-1.1153 (0.412)	-1.1217 (0.401)
Post_ROA(3)	-0.5763 (0.220)	-0.4995 (0.291)	-0.5244 (0.281)	-0.4807 (0.312)
Age	0.0052 (0.732)	0.0057 (0.705)	0.0052 (0.731)	0.0099 (0.508)
Tenure	0.0215 (0.227)	0.0188 (0.288)	0.0150 (0.396)	0.0160 (0.360)
Stock_Deal	-0.2928 (0.208)	-0.2354 (0.304)	-0.2272 (0.317)	-0.1870 (0.405)
Relative_Target_Size	0.0588 (0.917)	0.1752 (0.760)	0.0536 (0.925)	0.1065 (0.847)
Firm_Got_Acquired	0.7772*** (0.001)	0.7548*** (0.001)	0.6857*** (0.003)	0.7980*** (0.000)
Constant	-1.2551 (0.133)	-1.2648 (0.132)	-1.0697 (0.189)	-1.3201 (0.111)
N	173	173	173	173
Pseudo R ²	13.58%	13.16%	11.38%	9.51%

*, **, *** Denotes statistically significant at the 10%, 5%, and 1% levels respectively.

Table 13: Departed CEOs New Jobs

This table presents statistics on the jobs of the departed CEOs. Those CEOs constitute a subsample of bidders that announced completed acquisitions of US public targets between January 1st 2000 and December 30th 2005 and whose targets represent 10% of the market value of the bidder. Matching the bidder sample to ExecuComp results in 173 CEOs out of which 67 CEOs were forced to leave their position. Panel A classifies those CEOs based on their position in the new firm. Panel B compares the lateral shift in the new position of the CEO based on his centrality. Low Centrality is when the CEO's centrality is below the median's sample and High Centrality is when the CEO's centrality is above the sample's median.

Panel A : Distribution of CEOs new jobs

New position	Number of CEOs	% of Total departed CEOs
CEO	6	9%
CEO & Chairman	3	5%
CEO & President	4	6%
Chairman	8	12%
President	2	3%
Other in same company	7	10%
Executive in other companies	11	16%
Director in other companies	16	24%
No future job	10	15%
Total departed CEOs	67	100%

Panel B : Lateral shift in CEO's new position based on CEO centrality

	Low Centrality	High Centrality
	<i>% of CEOs that had lateral shift in position</i>	
Closeness	24%	35%
Degree	26%	33%
Betweenness	26%	34%
Eigenvector	19%	37%