

## **Director Appointments – It is Who You Know**

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### **Abstract**

Using 9,923 director appointments during 2003-2014, we document the dramatic impact of connections - 69% of new directors have professional ties to incumbent boards, a group representing just 13% of all potential candidates. Consistent with facilitating coordination and fostering trust, connections help boards bring in new skills and diversity. More complex firms and firms in more competitive environments tend to appoint connected directors, experience better market reactions and higher shareholder votes. Connections to incumbent CEOs, however, result in lower announcement returns and shareholder votes. Educational or social ties have little effect. We use death (merger)-induced network loss (gain) as instruments.

**Keywords:** Director Appointments, Social Networks, Coordination, Trust, Homophily, Agency, Shareholder Vote

**JEL Classification:** G34

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‘The best way to get on a board, is to know someone on a board.’

(Old adage)

## 1. Introduction

Boards are the foundation of a firm’s governance structure. Shareholders, however, typically do not nominate the directors who represent them. Instead, the incumbent board nominates new directors, who are almost always subsequently elected. In contrast to other markets where supply and demand meet in open exchanges, the director labor market typically operates in opacity. Companies never advertise vacancies and candidates do not submit their applications, yet anecdotal evidence suggests that boards often recruit new members through personal connections, a controversial practice.<sup>1</sup> In this study, we aim to provide comprehensive evidence on this key aspect of director selection, the role of board networks in director appointments.

Using a sample of 9,923 director appointments during 2003-2014, we first document striking evidence on the prevalence of director selection from the professional network of the incumbent directors. Unconditionally, a typical board has a direct (first-degree) connection to just over 0.4% of all the directors listed in BoardEx, but 29% of all new directors appointed to a board have such a connection.<sup>2</sup> Unconditionally, an average board has a direct or indirect (second-degree) connection to about 13% of all directors tracked by BoardEx. In contrast, we find that nearly 69% of new director appointments are selected from the incumbent boards’ first- or second-degree network. For S&P 500 firms, 90.3% of the director nominees are selected from the pool of individuals with first- or second-degree connections to the

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<sup>1</sup> Many boards, particularly those of larger firms, use search firms to help recruit new directors, yet even here the use of personal connections seems prevalent. Our conversations with a senior executive at a prominent board search firm confirm that board networks and search firms complement each other. According to this executive, boards often use their network to validate or gain trust of the candidates that search firms propose. At the same time, search firms are also mindful of the board network when proposing candidates.

<sup>2</sup> A board is directly connected to an outside individual if at least one member of the board has worked with this individual (both in director or executive capacity) at the same firm. A board has an indirect connection with an individual if this person has a direct connection with one of the board’s direct contacts, hence a second-degree connection. For example, if at least one director from firm A also sits on the board of firm B, then firm A is directly connected to all the directors on firm B. A second-degree connection exists between firm A and all the other direct connections of firm B.

incumbent board, yet these directors represent only 21% of all directors tracked by BoardEx.<sup>3</sup> Interestingly, the professional network appears to play a dominant role in the recruitment of new directors, in comparison to education or social networks. While nearly 69% of the 9,923 appointees have employment or board based ties with the incumbent directors, only 7% (2%) have educational (social) ties.<sup>4</sup> Further, most of the educational and social ties overlap with professional ties; under 2% of the appointees have only educational or social ties, but not professional ties, to the incumbent board. We, therefore, focus on the professional ties for the rest of the paper.

The appointment of directors already connected to the board has potential benefits and risks. On one hand, selecting directors through board networks can be beneficial. First, frequent interactions foster trust (e.g., McAllister, 1995). From the incumbents' point of view, appointing colleagues they trust reduces uncertainty and risk and lowers coordination costs. From the candidate's point of view, she also wants to join a board that she feels comfortable with and trusts. Second, past association certifies the quality of the connected directors and reduces search costs. Even if a board is looking for a new director who can bring in different perspectives and challenge the incumbents' view, the director network may certify known candidates with such qualities. Finally, boards tend to act as a whole and seek consensus (Bainbridge, 2002). It is well known in the psychology literature that group cohesion is positively related to group performance. Coordination costs arise as teams struggle to make efficient decisions. Cooperation and coordination are essential to a well-functioning board. Adams, Akyol, and Verwijmeren (2018) report higher firm valuation when directors have more common skill sets. Appointing unknown directors requires a steeper learning curve as the new and the incumbent directors adapt to working with each other. The

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<sup>3</sup> The director experience data in BoardEx are self-reported and may be subject to selection bias, i.e. directors only report the more reputable experiences. If this is the case, the connection variables may be associated with director quality, which may influence announcement returns and shareholder votes. For example, elite networks such as those of the S&P 500 firms may be associated with certain qualities or brand recognition. In a robustness test, we exclude director appointments to S&P 500 firms and find similar results. To further address this issue, we control for the total number of connections of the appointed director in our regression analyses. In addition, our instrumental variable approach also addresses this potential bias. Finally, if some connections are not captured by BoardEx, the role of the board network in director appointments may be even greater than documented in this paper.

<sup>4</sup> BoardEx may have less complete coverage of social ties than of professional and educational ties because executives and directors are more likely to disclose their education and employment history than their membership at social clubs.

*coordination and trust hypothesis* argues that appointing a connected director increases firm value. We further argue that coordination is particularly important when a board has to deal with complex, fast-changing situations where agile decision making can be crucial.

On the other hand, adding a connected director to the incumbent board can reinforce the homogeneity of the board. Sociologists coined the term ‘homophily’ to describe the tendency for people to associate and form networks with others similar to themselves. For example, clients are more likely to follow financial advice if they are more similar to their advisors (Stolper and Walter, 2019). A downside of this tendency is that we associate with people who confirm, rather than challenge, our core beliefs. “Homophily limits people's social worlds in a way that has powerful implications for the information they receive, the attitudes they form, and the interactions they experience.” (McPherson, Smith-Lovin, and Cook, 2001). New directors selected from the board’s existing network, therefore, are likely to share a similar view to many issues as the incumbents. Arguably, the appointment of connected directors perpetuates existing board models since connected directors by definition share at least some elements of their background. These boards can become blindsided to certain risks or opportunities. To the extent that a board considers only candidates with existing connections, the appointment becomes a constrained choice. By appointing a connected director, the firm can miss an opportunity to bring in fresh perspectives and new skills that the incumbent board lacks or might not even know they are missing. The *homophily hypothesis*, therefore, argues that appointing a connected director reduces firm value.

Finally, the incumbent board often selects a new director with the possibility (and in some cases the likelihood) of influence by the CEO, the very person the board is supposed to monitor. Exacerbating the situation is the fact that individuals nominated to the board are almost always elected and thereafter are quite difficult to be involuntarily removed. A worst-case scenario is illustrated by the *agency hypothesis*: board appointment of connected directors, in particular those connected to the CEO, represents cronyism, perpetuating existing power in the boardroom at the expense of shareholders and reducing firm value.

While boards certainly need fresh ideas and diverse opinions, the perspectives and opinions do not necessarily have to come from directors. Boards can learn from experts outside of the decision-making

body. Both the negative and positive views of appointing connected directors are illustrated by a comment to one of the authors from a well-seasoned board member: “Board appointees can be dangerous. It is not just expertise I seek when appointing someone to the board. The board can always hire a consultant for the expertise it needs – and fire that expertise if it doesn’t work out. I don’t have that flexibility in appointing the same person to our board.” On the positive side, that quote speaks to the coordination and trust issue. On the negative side, it implies that appointing known candidates may exacerbate agency and homophily problems.

While the coordination/trust hypothesis and the homophily hypothesis have overall opposite predictions, the two hypotheses may be both at work in different cross-sections of firms. Similarly, the agency hypothesis is more likely to be supported when outside directors appointed to the board are connected to the CEO. In the context of director appointments, firms trade off between the better coordination with a connected director and the arguably fresher perspectives and more diverse ideas of an unconnected director. Both coordination and fresh perspectives are desirable qualities that undoubtedly exist in many candidates. The research question is to understand more about this choice of appointments of connected or unconnected directors and the resulting market reaction, and the situations where this choice is desirable and undesirable.

In testing our hypotheses, we seek to answer four questions: First, what roles do connections play in director appointments and consequently board composition? Second, what types of firms are more likely to appoint connected directors? Third, what is the price reaction to the appointment of connected directors and how does it vary with firm characteristics?<sup>5</sup> That is, how does the wealth impact of director appointees differ with agency characteristics and coordination needs of the firm? Finally, what is the shareholder vote reaction to connected appointees in director elections?

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<sup>5</sup> It is possible that director appointments are announced in a proxy statement, which contains a host of other information. This is, however, typically not the case because only about 15% of the appointments in our sample are announced between 60 and 40 days before shareholder meetings, when proxy statements are required to be filed by the SEC. In a robustness test, we exclude these cases. Our results are similar.

We document a dramatic role for board networks in director appointments. First, connected candidates are significantly more likely to be appointed. Using directors who are appointed to peer firm boards in the same MSA around the time of the sample appointments as the potential counterfactual candidates, we are able to control for any unobserved quality associated with a successful director candidate as well as a candidate's willingness to serve. With this empirical setup, we show that connection to the incumbent board increases a candidate's odds of being appointed by 64% (compared to those without connection). Further, connection facilitates appointments that improve board diversity. A prior work relationship between a candidate and the incumbent board increases the odds of appointing a female director to an all-male board by 32% and increases the odds of appointing a director with a skill that the incumbent board lacks (or with a different industry background) by 30% (56%).

We find support for both the agency and coordination/trust hypotheses, and some evidence for the homophily hypothesis. Boards needing greater coordination, such as those of complex firms and those in more competitive environments, are more likely to appoint connected directors. The price reaction to connected appointees is also significantly positive in these situations. These price reactions to appointments are confirmed by votes for connected directors in subsequent board elections. Conversely, firms with less growth opportunity appear to benefit from the appointment of an unconnected director. In addition, firms with weak internal controls are more likely to appoint directors connected to the incumbent CEOs. The price reaction for such appointments is significantly negative and shareholder votes for these directors are significantly lower.

It is conceivable that an appointment of a director with ties to the incumbent board is associated with certain unobserved governance or firm characteristics of the appointing firm and that shareholders react to the underlying issues rather than the board connection itself. The analysis of stock market reaction and shareholder votes, therefore, could be subject to potentially omitted variables. To address this endogeneity issue, we use two instrument variables that capture the exogenous variation in the availability of connected director candidates. The first variable is the network loss due to recent deaths of executives or directors in a firm's network, excluding the deaths of the firm's own directors. These death events

represent exogenous shocks to the availability of connected candidates. To the extent a network is diminished by these deaths, the probability of appointing a connected director is reduced. However, there is no obvious reason why the recent deaths of connected directors or executives should affect the market reaction and shareholder voting of subsequent director appointments. The second instrument measures the expansion of the appointing firm's board network as a result of recent mergers and acquisitions completed by their connected firms, but not involving the appointing firms themselves.<sup>6</sup> To the extent that the appointing firm's network is expanded because of these external mergers, the board is more likely to identify the needed expertise from within its network, thus increasing the probability of appointing connected directors. The relevance condition of the two instruments is verified in the first stage of 2SLS, with an F-stat of 31.5 (p-value < 0.0001). With two instruments, we are able to perform the overidentification test and fail to reject the exclusion condition.

Our research contributes to the literature in several ways. First, we provide comprehensive evidence of the importance of social connections in director appointments in a large sample study. We are unaware of prior research documenting similar statistics.<sup>7</sup> This evidence sheds new light on how boards select director nominees and establishes a benchmark against which the importance of other factors influencing director selection can be compared. Second, a number of recent papers have examined board diversity and its impact on firm policies and performance.<sup>8</sup> Our work adds to this literature by documenting how network connections facilitate boards appointing female directors, as well as directors with different skills and

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<sup>6</sup> For example, firm A is directly connected to all the directors on firm B if at least one director from firm A also sits on the board of firm B. If firm B acquires firm C and adds director X from firm C to its board, all the connections of director X become first degree connections to firm B and second degree connections to A, the firm of interest. Note, we exclude target and bidder executives and directors, e.g. director X in the above example, from the instrument because their subsequent board appointments may be related to the merger (Harford and Schonlau, 2013).

<sup>7</sup> Cashman, Gillan, and Whitby (2013) find that more connected individuals are more likely to obtain board appointments. Their focus, however, is an individual's overall connections rather than specific connections to the incumbent board. Fahlenbrach, Kim, and Low (2018) find that directors belonging to more connected boards are more likely to gain outside board seats. In contrast, our focus is whether an appointed director is connected to the incumbent board rather than her overall connectedness. We control for the overall connections of director appointees and of the incumbent boards in appropriate regressions.

<sup>8</sup> See, for example, Adams and Ferreira (2009), Adams, Akyol, and Verwijmeren (2018), Adams and Kirchmaier (2016), Agarwal, Qian, Reeb, and Sing (2016), Ahern and Dittmar (2012), Anderson, Reeb, Upadhyay, and Zhao (2011), Baranchuk and Dybvig (2009), Bernile, Bhagwat, and Yonker (2018), Eckbo, Nygaard, and Thorburn (2019), Gul et al (2011), Huang and Kisgen (2013), Kim and Starks (2016), among others.



industry backgrounds. Finally, we illustrate the benefits and costs of appointing a connected director. Connections can enhance board coordination and trust, which benefits complex firms and firms facing a more competitive environment, but connections can also help entrenched management to perpetuate their control of boards. Market price reactions and subsequent shareholder votes in director elections are consistent with these arguments as they reward or punish such appointments accordingly. These results contribute to the broad literature of social networks and corporate governance, as well as the ongoing debate of shareholder access to director nomination.

## **2. Literature**

### ***2.1 The appointment (and removal) of directors***

Directors are the primary link between shareholders and the companies they own, yet most shareholders typically have little power to appoint directors or remove those that are underperforming. Nominations are controlled by the nominating or governance committee with the possible (if not likely) indirect influence of the CEO.<sup>9</sup> In a study of 13,384 director elections at 2,488 shareholder meetings, Cai, Garner, and Walkling (2009) find only four contested elections. In all other cases, directors nominated to the board are elected unopposed and typically receive over 90% of the votes. Exacerbating the problem is the reality that it is difficult for shareholders to remove directors, even those failing to garner 50% votes in director elections. The Wall Street Journal notes that in 2009, 93 board members at 50 companies received less than 50% of the votes cast but that none was removed.<sup>10</sup> These concerns are heightened for directors with connections to the CEO.

A substantial finance literature, beginning with the seminal work of Hermalin and Weisbach (1998), focuses on CEO involvement in the director nomination process and the consequent agency

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<sup>9</sup> Evidence on allowing shareholder access to the ballot of director nomination is mixed. On one hand, Cohn, Gillan and Hartzell (2016) document increased valuation around events related to the SEC proxy access rule in 2010 for firms where shareholder control is likely to increase. On the other hand, Akyol, Lim, and Verwijmeren (2012) find no evidence that empowering shareholders with proxy access creates value.

<sup>10</sup> "Directors Lose Elections, but Not Seats," by JoAnn S. Lublin, September 28, 2009, accessed at: <http://www.wsj.com/articles/SB125409320578444429>

implications. Shivdasani and Yermack (1999) find that CEO involvement in the selection of directors reduces firm value. Coles, Daniel, and Naveen (2014) report that as the fraction of co-opted directors (appointed after a CEO is in power) increases, monitoring intensity declines. Fracassi and Tate (2012) find that firms of powerful CEOs are more likely to appoint directors with ties to the CEO, resulting in reduced firm value and reduced monitoring. Nguyen (2012) finds that when the CEO and a number of directors belong to the same social networks, the CEO is less likely to be dismissed for poor performance. Levit and Malenko (2016) model director reputation in the labor market and develop an equilibrium where well (poorly)-governed firms appoint shareholder (management)-friendly directors.

## ***2.2 Director skills and board composition***

An individual director, like the board itself, represents a portfolio of skills and attributes. The literature linking director appointments to their performance and skills goes back at least as far as Fama and Jensen (1983) who argue for ex post settling up, that is, the director labor market rewards good director performance with additional board seats. This hypothesis finds empirical support in Agrawal and Walkling (1994), Ferris, Jagannathan, and Pritchard (2003), Yermack (2004), and Do, Nguyen, and Rau (2015), Lel and Miller (2019), among others. Further, directors who opt out of state takeover protections (Coles and Hoi, 2003), are more likely to gain additional board seats, while distracted directors (Masulis and Zhang, 2019), directors of hostile takeover targets (Harford, 2003), and directors of companies with financial restatements (Srinivasan, 2005) and fraud-related lawsuits (Fich and Shivdasani, 2007), are likely to lose board seats. The stock market also rewards firms that appoint certain types of directors. For example, Fich (2005) and Fahlenbrach, Low, and Stulz (2010) document higher announcement returns when the appointed outside director is a CEO of another firm.

Companies may seek a particular expertise to fulfill firm needs when appointing a new director. Becher, Walkling and Wilson (2019) find that the selection of directors for the post-merger board of an acquiring firm is consistent with firm need and the desire to upgrade the board, although agency motives are also evident. Güner, Malmendier, and Tate (2008) find that after the appointment of banker directors, firms increase debt financing, although not necessarily to the benefit of shareholders. Harford and Schonlau

(2013) document a significantly higher number of subsequent board seats for CEOs and directors who are involved in large acquisitions, regardless of whether such acquisition create or destroy value.

A growing literature examines the diversity of board composition and its impact on firm policies and performance. Gender diversity in management and boards has been studied in the context of monitoring intensity (Adams and Ferreira, 2009), board skill sets (Kim and Starks, 2016), acquisition decisions (Huang and Kisgen, 2013 and Levi, Li, and Zhang, 2014), risk taking (Adams and Funk, 2012, Adams and Raganathan, 2017, Faccio et al, 2016, Bernile, Bhagwat, and Yonker, 2018), layoff decisions (Matsa and Miller, 2011), information content of stock prices (Gul et al, 2011), and equity value (Ahern and Dittmar, 2012 and Eckbo et al, 2019). Two recent studies examine the potential channels of women director appointments, such as STEM and finance education (Adams and Kirchmaier, 2016) and golfing (Agarwal et al, 2016). Our study contributes to this literature by illustrating the important role that board networks play in recruiting women directors as well as directors who have different industry backgrounds and skills.

### ***2.3 Social network of the board of directors***

Anecdotal evidence suggests director appointments frequently result from the social network of incumbent boards. However, there are costs and benefits from the appointment of connected directors. With regard to the costs, appointing connected directors can potentially increase homophily in the boardroom. Individuals are biased towards choices consistent with their own comfort zone, and sometimes avoid better ones outside of this zone. Coles, Daniel, and Naveen (2015) argue that greater overlap and interaction among individuals lead to greater groupthink, defined as a desire for consensus and agreement that can potentially override critical thinking and judgment. Ferris, Jayaraman, and Zhang (2016) document greater CEO turnover and higher firm value when directors and CEOs have different cultural backgrounds. Bernile, Bhagwat, and Yonker (2018) document lower risk and better performance for firms with more diverse boards. Using policy shifts in China as exogenous shocks, Giannetti, Liao, and Yu (2015) document improved performance after firms hire directors with foreign experience. Thus, if the appointment of outside directors who are connected to the incumbent board exacerbates board homogeneity, shareholder value decreases.

In addition, social ties between outside directors and the CEO can compromise the monitoring function of boards. A growing literature in finance documents that social ties between management and the board of directors of a firm are often associated with governance failures, such as weak board monitoring (Fracassi and Tate (2012)), higher CEO compensation and lower pay-performance sensitivity (Larcker, Richardson, Seary, and Tuna (2005), Hwang and Kim (2009), and Lee, Lee, and Nagarajan (2014)), lower turnover-to-performance sensitivity (Nguyen (2012)), earnings management (Hwang and Kim (2012) and Bruynseels and Cardinaels (2014)), insider trading by independent directors (Cao, Dhaliwal, Li, and Yang (2014)), and a higher probability of financial frauds (Chidambaran, Kedia, and Prabhala (2012) and Khanna, Kim, and Lu (2015)). Ishii and Xuan (2014) find that social ties between target and acquirer firms result in higher retention rates of target CEOs and directors in the merged firm and lower abnormal returns to the acquirer and combined equity. In addition, the overall connectedness (network centrality) of management or boards has been shown to be associated with firm performance (Larcker, So, and Wang, 2013), CEO compensation (Engelberg, Gao, and Parsons, 2013), value-destroying mergers (El-Khatib, Fogel, and Jandik, 2015), innovation (Faleye, Kovacs, and Venkateswaran, 2014), informed trading (Akbas, Meschke, and Wintoki, 2016), and investment performance (Rossi, Blake, Timmermann, Tonks, and Wermers, 2018). Board networks also facilitate the spread of governance practices (Bouwman, 2011), earnings management (Chiu, Teoh, and Tian, 2013), tax avoidance (Brown and Drake, 2014), and option backdating (Bizjak, Lemmon, and Whitby, 2009).

However, there are other potential benefits to the appointment of connected directors. Social ties among board members, in particular those based on prior work environments, can facilitate information sharing and teamwork. It is well documented in the sociology and psychology literature that group cohesion improves performance.<sup>11</sup> Commonalities among directors and managers can help facilitate effective decision making and improve firm performance (Murray, 1989; Knight et al, 1999; Kang, Kim, and Lu, 2018). Adams, Akyol, and Verwijmeren (2018) document higher firm valuation when director skill sets

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<sup>11</sup> See Beal, et al. (2003) for a meta-analysis and literature review.

exhibit more commonality. Knyazeva, Knyazeva, and Raheja (2013) find that boards with more heterogeneous director stock holdings, outside board seats, and experience are associated with lower firm value. Using closed-end funds, Souther (2018), however, documents a negative relation between internal board networks and shareholder value. Friendship between the CEO and outside directors enhances the advising capability of the board (Adams and Ferreira, 2007). Schmidt (2015) finds that friendly boards, as measured with social ties between CEO and directors, are associated with superior (poor) merger announcement returns when advising (monitoring) needs are high. Duchin and Sosyura (2013) document that the social ties between CEOs and divisional managers increase (decrease) investment efficiency and firm value when information asymmetry is high (corporate governance is weak).

Trust is crucial in the CEO-board relationship and among board members. The board works as a team, making decisions as a whole but relying on the expertise, experience, and trust of its individual members. The importance of trust is well established in the financial literature. For example, Gennaioli, Shleifer, and Vishny (2015) model trust as a central element in the relationship between investors and financial advisors. Lins, Servaes, and Tamayo (2017) argue that trust of firms by outside stakeholders is critical during financial crisis. When trust is violated by corporate misconduct or fraud, stock market participation decreases (Giannetti and Wang (2016)). Similarly, Cornelli et al (2013) document the importance of “soft” information, in particular in avoiding firing a CEO for bad performance that is due to exogenous shocks. Increased trust among board members can reduce coordination costs, enabling increased efficiency within the boardroom.

Supporting these arguments, Fogel, Ma, and Morck (2015) find that powerful independent directors, defined as those with stronger social networks, increase shareholder value and promote accountability. Intintoli, Kahle and Zhao (2018) argue that directors with increased connections are less concerned about a particular board seat and have more incentive to monitor and better serve shareholder interests. Coles, Wang, and Zhu (2015) find that boards with well-connected directors experience more CEO turnovers, and that appointments of CEOs by well-connected directors receive more favorable market reaction. Kang, Liu, Low, and Zhang (2018) find that firms whose boards have higher CEO-director social

connections create more patents and patent citations, and are associated with higher firm value, particularly in firms where innovation or increased advisory needs are important.<sup>12</sup>

Subrahmanyam (2008) presents a model (and some empirical support) illustrating the benefits and costs of social ties. The benefits stem from the ability to identify highly performing CEOs (or in our case, directors) based on personal experience with the individual. The costs of these ties are in the form of reduced monitoring of the CEO or less peer pressure on other board members.

### **3. Data**

#### ***3.1 Summary statistics***

To test our hypotheses, we construct a sample of 9,923 appointments of outside directors from the BoardEx database during the time period of 2003-2014.<sup>13</sup> BoardEx obtains announcement dates from company press releases, news articles, and SEC filings (e.g. 8-K and proxy filings). In over 85% of the cases, the director appointments are announced before they first appear in the proxy statements.<sup>14</sup> We require the appointing firms to have available data from Compustat and the Center for Research in Security Prices (CRSP). A subset of our sample firms (6,030 appointments) also has information about shareholder votes on director elections from the RiskMetrics database. Appendix 2 describes our data selection in detail.

Table 1 reports firm and director characteristics. Panel A provides statistics of the connections between appointed directors and the incumbent board. Nearly 69% of the 9,923 appointees have professional ties with the incumbent directors. Only 7% (2%) of the appointees, however, have educational (social) ties with the board. In addition, education and social ties only marginally increase the number of

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<sup>12</sup> Other researchers examine the issue more broadly, studying the merits of appointing independent directors. Duchin, Matsusaka and Ozbas (2010), for example, argue that appointing directors external to the firm is beneficial if these directors can acquire relevant information at low cost, otherwise their appointment is harmful.

<sup>13</sup> We start the sample in 2003 due to availability of announcement dates for director appointments from BoardEx. In 12% of the cases, multiple director appointments are announced on the same date; in 15% of the cases, departure of incumbent directors are also announced on the same day. Just over 3% of director appointments in our sample are announced on the same dates as the announcement dates of CEO turnover, M&A events, or earnings releases. In addition, about 2% of appointments are added within three months of a completion of an acquisition in the acquiring firm. In a robustness test, we remove all of these cases and our results are similar.

<sup>14</sup> We manually verify the BoardEx announcement dates with news search for a random sample of 500 director appointments to S&P 500 firms. In 498 out of the 500 cases, the earliest announcement date we find from news articles is the same as the BoardEx announcement date.

connected appointments – from 69% to 70.5%. Therefore, we focus on professional connections in our subsequent analyses.

Panel B reveals that the typical appointee is a male, non-CEO, 56 years old, and holding 1.8 other board seats. The average abnormal return around the announcement of an outside director appointment is 0.25% which is statistically significant at the 1% level. The median return, however, is not statistically different from zero. Similar to Cai, Garner, and Walkling (2009), the average percentage of shareholder votes in director elections is over 96% for new appointees, with a positive Institutional Shareholder Services (hereafter ISS) recommendation in about 96% of the cases. We measure the excess shareholder vote for the newly appointed directors as the difference between shareholder votes for new directors and the average votes for all the other directors up for election at the same shareholder meeting. The excess shareholder vote for newly appointed directors is 4.64% on average and is significantly different from zero.

By construction, the firm and corporate governance characteristics (Panel C) are typical of literature studying BoardEx firms. The average (median) size of the firms in our sample is \$12 billion (\$1.1 billion) with a book to market ratio of 0.61 (0.48). The mean and median number of segments per firm is 2.2 and 1.0, respectively. The typical board has ten members. Seventy-four percent of directors are independent but about sixty percent are co-opted.<sup>15</sup>

### ***3.2 Instrumental Variables***

To control for endogeneity issues associated with the market reaction and shareholder votes for connected director appointments, we construct two instrumental variables. Both are exogenous shocks that decrease or increase the board's network. First, we use the fraction of the board's network reduced by deaths of outside executives or directors who had first- or second-degree connections to the incumbent board as exogenous shocks to the board's network. The director deaths and dates are also provided by BoardEx, which collects the data from public sources such as company announcements, press releases, SEC

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<sup>15</sup> The average (median) size of the firms in our sample is similar to \$14.4 billion (\$1.5 billion) in Fracassi and Tate (2012). At the mean (median), firms in our sample have 10.1 (10) board members, similar to 9.4 (9) in Fogel, Ma, and Morck (2015).

filings, news articles, and obituaries. Specifically, for each director appointment, we look back three years for deaths of executives or directors in the appointing firm board's *external* network. We then use the proportion of the board's network lost due to such deaths as an instrument for the firm's subsequent appointment of a connected director. These deaths remove not only the deceased directors from a firm's network, but also those second-degree connections through the deceased. An example is illustrated in Figure 1 (Appendix 3). Panel B of Table 1 reports an average of 294 deaths of directors connected to our sample firms during the last three years before each new director appointment, reducing the board network size by an average of 850, or about 1.7% of the network.

Second, we use mergers and acquisitions completed by firms directly connected to an appointing firm as a positive shock to the appointing firms' network. A merger expands the networks of an acquiring firm because it obtains the connections of the retained target directors and executives. Any firms connected to the acquiring firm also acquire a second-degree connection to the networks of the retained target directors and executives. We focus on the mergers that are completed by firms directly connected, but not involving an appointing firm, during the three-year period prior to the appointments. Further, we exclude any target or acquirer directors and executives from the network expansion because they are more likely to gain future board appointments (Harford and Schonlau, 2013) and their merger experience may affect the merger decisions and performance of their future employer (Field and Mkrtyan, 2017). As a result, we only include in the calculation of the instrument variable the second-degree connections gained by mergers completed by firms who have a direct connection with the appointing firms.<sup>16</sup> An example is illustrated in Figure 2 (Appendix 3). Panel B of Table 1 reports an average increase of networks due to recent M&As by firms connected to the appointing firm accounts for about 1.4% of the appointing firm's network.

These shocks to the boards' network, while small in magnitude, are significantly related to the appointments of connected directors, in both univariate and multivariate tests and lead to meaningful

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<sup>16</sup> We note that the appointing firm and the merging firm are unlikely to be in the same industry given that they share at least one director or senior executive. In our sample, the two firms share the same industry 6%, 15%, and 20% of the time when using 4 digit SICs, 3 digit SICs, and Fama-French 48-industry classifications, respectively.



predictions. The instruments, while imperfect, satisfy the relevance condition. We find that the extent of network damage due to deaths is associated with a lower probability of a firm appointing a connected director, while the network gain due to mergers by connected firms is associated with a higher probability. The first-stage F-statistic of our instrumental variables is 31.5 (p-value < 0.0001), suggesting that the instruments satisfy the relevance condition. For an appointing firm, the deaths of directors or officers in its network (or the expansion of its network through M&As at other firms) should have no effect on market reaction to a director appointment to its board except through the channel of connected appointees. These instruments, therefore, are consistent with the exclusion condition. Having two instruments further allows us to test the over-identification restriction. While not completely verifying that the exclusion condition is satisfied, the test provides a check on whether the condition is violated. The Sargan Chi-square statistic is 0.96 for the over-identification test, which cannot reject the null hypothesis that the exclusion condition is satisfied (p-value = 0.3271).

#### **4. Empirical Analyses**

We begin by documenting the prevalence of director appointments from board networks. To the best of our knowledge, ours is the first documentation of the importance of these connections in the literature. We then conduct four sets of empirical analyses to test the coordination/trust, homophily, and agency hypotheses. First, we examine how connections influence board composition. In particular, we test whether connections facilitate or inhibit appointments that increase diversity, skill sets, and industry experience of the board.

Second, we examine which firms are more likely to appoint a connected director. All firms can benefit from better board coordination facilitated by connected directors but also from new ‘outside the box’ ideas from unconnected directors. The marginal benefit from increased coordination or novel ideas depends on the firm’s situation. Arguably, firms with a greater need for board coordination (complex firms and those in fluid environments) are more likely to need connected directors. In contrast, the homophily hypothesis suggests appointments of unconnected directors when firms need different perspectives and backgrounds for their boards, (e.g. firms lacking growth options or firms in slow-growing industries). In

contrast to the focus on firm need, the agency hypothesis predicts that the desire to increase managerial entrenchment leads to the appointment of CEO-connected directors.

Third, we examine how the stock market reacts to the appointments of connected directors. The coordination/trust hypothesis predicts a more positive market reaction to appointing a connected director where board coordination is important. In contrast, the homophily hypothesis predicts a more negative market reaction to the extent a connected director limits a board's ability to attract diverse perspectives and experiences. The agency hypothesis also predicts a more negative market reaction if a connected director exacerbates managerial entrenchment.

Fourth, we look at shareholder votes for the newly appointed directors. Cai, Garner, and Walkling (2009) find that votes in director elections are significantly linked to director performance and corporate governance. Consequently, we also use shareholder voting to assess the degree to which connected director nominees are welcomed by shareholders.

#### ***4.1 Prevalence of director appointments from board networks***

Board connections are defined as overlap in work experiences prior to the sample director appointments. We focus on first- and second-degree connections in this study. Specifically, if the director nominee and an incumbent director of the appointing firm have worked together in executive or director capacities at a company, we classify the tie as a first-degree connection. If the director nominee has worked with or been on the same board with someone who has a first-degree connection to the appointing firm, but does not have a first-degree connection herself to the appointing firm, we classify the tie as a second-degree connection.

Table 2, Panel A, shows that nearly 29% of the director appointees have at least one first-degree connection to the appointing firm's board and an additional 40% of nominees have one or more second-degree ties. Thus, nearly 69% of director nominees have at least one first- or second-degree board connection with the appointing firm. This percentage is even higher for firms in the S&P 1,500 index (78%) and S&P 500 index (90%). For a simple comparison, we examine the unconditional percentage of

connections between a sample firm and all individuals who are ever listed as a director on BoardEx.<sup>17</sup> Panel B shows that the average percentage of all directors with whom an appointing firm has at least one first- or second-degree connection is only 13%, 16%, and 21% for all firms, S&P 1,500 firms, and S&P 500 firms, respectively. Thus, while a typical board is connected by a first- or second-degree connection with 13% of the director pool,<sup>18</sup> the person appointed to the board is connected 69% of the time. Another way we can interpret these figures is the fact that only 10% of the directors appointed to S&P 500 firms ( $100\% - 90\% = 10\%$ ) are selected from the pool of 79% non-connected potential candidates ( $100\% - 21\% = 79\%$ ).

As another benchmark, Panel B also looks at a few other characteristics we might associate with director appointments. For the sample of all firms, 13 percent of directors are appointed from the same BoardEx business sector,<sup>19</sup> 24% are appointed from the same state, and about 22% are appointed from similar sized firms. These numbers are quite small compared to the 69% of connected directors. Even if we sum the total of all three categories (and eliminate double counting) we only have 43%.<sup>20</sup> For the S&P 500 firms, we find that 51% of all the directors appointed are from the same sector, state, or similar size segment; this figure is remarkably smaller than the 90% of appointed directors who have connections to the incumbent board.

Panel C reveals that the majority (54%) of appointees have multiple links with the appointing firm. Nearly 33% of all new director nominees are connected to the incumbent CEO, while 35% are connected to one of the other (typically nine) directors but not to the CEO. About 31% of appointees have links with both the CEO and other directors on the board.

#### ***4.2 How do connections affect director appointments?***

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<sup>17</sup> The entire candidate pool, i.e. all individuals who are ever listed as a director by BoardEx, consists of 206,414 persons, out of which 26,044 have a first- or second-degree employment connection with the average incumbent board.

<sup>18</sup> The fraction increases to 15% if the director pool does not include individuals who have never been a director before, and is 17% and 16% if we further exclude individuals who are not current directors and directors older than 67 years old, respectively.

<sup>19</sup> We use BoardEx sectors rather than SIC codes because some directors' primary employers are private firms and no SIC codes are available.

<sup>20</sup> Even if we look at the number of directors appointed from larger firms (defined as those with total assets worth at least 20% more), we find only 44% of all directors come from any firms larger than the appointing firm. This number is still substantially lower than the 69% of directors appointed from board's network.

In Table 2, we examine the overall effect of connection to the incumbent board in director appointments using the full sample of BoardEx directors. Many directors, however, may appear to be unlikely candidates for a particular firm, e.g. those from firms of very different size or located far away. Further, there may be unobserved characteristics associated with being a successful director candidate, as well as one's willingness to serve.

In Table 3, we examine the role of connections using a pool of more likely potential counterfactual candidates. Specifically, for each of the 9,923 appointments in our sample, we identify other directors appointed within one year (i.e., [-1,+1]) to firms of similar size in the same MSA.<sup>21</sup> These directors are arguably potential candidates for the sample firm but were not appointed.<sup>22</sup> Firms of "similar size" are those with total assets value between 50% and 150% of the sample firms. Using these criteria, we are able to identify at least one other candidate for 7,344 out of the 9,923 appointments. This process results in a set of 102,686 candidates (including the appointed ones) for 7,344 appointments. This empirical design allows us to focus on the connection between an incumbent board and a potential candidate. Because the potential candidates are themselves appointed to the board of a similar-sized firm in the same areas around the same time, these candidates should also have any unobserved qualities and a demonstrated willingness to be a board member.

Panel A reports the proportion of appointed directors by whether she is connected to the incumbent board. About 8.2% of connected directors in the candidate pool are appointed, while only 4.9% of unconnected directors are appointed; the differences between the two proportions are statistically significant at the 1% level. The results are consistent with those in Table 2: connected directors are significantly more likely to be appointed to the board.

Panel B reports logistic regressions where the dependent variable equals one if a director is appointed and zero if she is not. The key variables of interest are various measures of a candidate's

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<sup>21</sup> In a sensitivity test, we further limit the candidate pool to those who are appointed to other firms in the same Fama-French 48 industry classification. We find similar results.

<sup>22</sup> Erel, Stern, Tan, and Weisbach (2018) use a similar approach to construct a candidate pool for training machine learning algorithms.

connection to the incumbent board. Year and industry fixed effects are included in all specifications, with industries being defined using the Fama and French (1997) 48-industry classification. Standard errors are clustered at the appointment level in all specifications to account for within-appointment correlations of residuals. We also control for the number of potential candidates for each particular appointment (pool size) since this number mechanically affects the chance of a candidate being selected. Ideally, we would like to include director fixed effects to control for director-specific characteristics. The non-linear nature of the logistic regressions, however, leads to the well-known incidental parameter problem when a large number of fixed effects are included (See Fernandez-Val and Weidner (2018) for a review.) Our empirical design of using directors appointed to peer firms in the same area around the same time as counterfactual candidates should also reduce the need for director fixed effects. We, nevertheless, control for a number of director characteristics that may be valued in the labor market, including indicators for Ivy League graduate, MBA degree, CEO, CFO, COO, IT, and M&A experiences.

To examine the role of diversity consideration in director appointment, we include an indicator variable that equals one if the candidate is female while all incumbent directors are male. In addition, we further define the “number of new experiences” variable as the sum of 27 indicator variables that each equals one if the candidate has certain experience that the incumbent board lacks.<sup>23</sup> This variable captures the level of new experience that a director candidate may add to the board and how much the candidate’s background is different from that of the incumbents.

Model (1) reports a positive and statistically significant coefficient for the connection indicator, which equals one if a candidate has a professional connection to the incumbent board. The coefficient of model (1) suggests that on average, a connected director has a 64% ( $e^{0.497}-1$ ) higher odds of being appointed than an unconnected director. In model (2), we separately measure a candidate’s connection to the CEO and her connection to the non-CEO directors. While the coefficients of both variables are positive and

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<sup>23</sup> Specifically, the 27 experiences include MBA degree, Ivy League education, government, military, foreign, CEO, CFO, COO, general manager, regulator, finance, human resources, marketing, operating, accounting, law, academic, IT, R&D, strategy, logistics, manufacturing, public relations, M&A, audit committee, compensation committee, and governance committee experience.

statistically significant, the coefficient of the CEO connection indicator suggests an odds ratio of 2.3 ( $e^{0.824}$ ), compared to the odds ratio of 1.3 ( $e^{0.267}$ ) associated with a the non-CEO director connection. In addition, a Wald test confirms that the two coefficients are statistically different from each other at the 1% level. This result suggests that while the SEC requires the director nomination committee to be composed entirely of independent directors, CEOs still have great influence on how directors are selected. This evidence is consistent with the agency hypothesis.

In the next four specifications, we define four sets of connection variables based on ex ante strength of the tie. If new directors are indeed recruited through board network, those with a stronger tie to the board should have a higher probability of being appointed. For example, in model (3), we separately measure first degree and second-degree connections. A first degree connection increases the odds of being appointed by over five times (odds ratio  $e^{1.71} = 5.5$ ) while a second degree connection has a significantly smaller effect (odds ratio of 1.2). The difference between the two coefficients is again statistically significant at the 1% level. In model (4), we separate candidates who are connected to multiple incumbent directors from those who are connected to one single incumbent. Having multiple connections with the incumbent board nearly doubles a candidate's odds (odds ratio of 1.8) of being appointed, while having a single connection only marginally improves the candidate's odds (odds ratio of 1.07). Again, the coefficient difference is significant at the 1% level. Next, we separate the candidates who have been connected to the incumbent board for over ten years from those who have shorter relationship. Model (5) reports a significantly higher coefficient for those with longer relationship than those with shorter ones. Finally, we separate the candidates who have a more recent relationship (within the last ten years) with the incumbent board from those whose relationship has ended over ten years ago. As expected, model (6) reports a greater coefficient for the candidate with a more recent relationship with the board. These results further corroborate with the critical role board network plays in director appointments.

Panel B of Table 3 reports a positive and statistically significant coefficient for the gender diversity variable in all seven specifications. For example, the coefficient in model (1) suggests that an all-male incumbent board is 24% (odds ratio of  $e^{0.212} = 1.24$ ) more likely to add a female director. This result suggests

that during our sample period boards on average seek gender diversity. This table, however, also reports a negative and statistically significant coefficient in all regressions for the measure of the experience that a director candidate has but the incumbent board lacks. According to model (1), a director with a new experience has 20% lower odds of being recruited than a director who has similar experiences as the incumbent directors. This result suggests that boards on average appoint directors whose background is similar to their own. This evidence is in line with the finding in Adams et al (2018) that firm performance is better when director skill sets exhibit more commonality.

We include in all regressions several measures of the director candidates' education credential and work experience, e.g. CEO, CFO, COO, M&A, and IT experiences, to control for candidate qualities. While such experiences are likely important considerations for board appointments, all seven variables have insignificant coefficients in each of the six regressions. The lack of significant coefficients suggests that our empirical design of using directors appointed to similar-sized firms in the same area around the same time as counterfactual candidates successfully controls for director ability and skills.

We next examine whether and how connections between candidates and the incumbent board affect board diversity. The homophily hypothesis asserts that recruiting candidates connected to an incumbent director may exacerbate homogeneity of the board. In contrast, the coordination/trust hypothesis asserts that the mutual trust between the board and a connected candidate may facilitate the recruiting of candidates who are different from the incumbents. We measure the potential diversity impact of a candidate with three variables: an indicator variable that equals one if the candidate comes from a different industry than the appointing firm, as well as the gender diversity variable and the new experience variable as described in Table 3.<sup>24</sup> We measure the connection between the candidate and the incumbent board with three variables: an indicator for the presence of a connection, the length of the connection, and the number of connections. Our main variables of interest are the interaction terms between the three diversity variables and these three

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<sup>24</sup> We do not include the variable of different industry background as an independent variable in the regressions in Panel B of Table 3 because this variable is correlated with the new experience variable. In an untabulated robustness test, we also find a negative and significant coefficient when we replace the new experience variable with the different industry variable in Table 3, Panel B.

measures of the connection between the candidate and the incumbent board. As in Panel B of Table 3, the dependent variable equals one if a candidate is appointed and zero otherwise.

Table 4 reports a positive and statistically significant coefficient for the interaction term between the connection indicator and the gender diversity variable in regressions (1) and (2). According to model (1), the odds of a female being appointed to an all-male board is 32% higher for a connected candidate than an unconnected one. In contrast, the gender diversity variable itself is statistically insignificant. This result suggests that an all-male board tends to add a female director only when the female director had previously worked with at least one of the incumbent directors. From the female candidate's point of view, she may feel more comfortable joining an all-male board if she has a trusted colleague on board. In regressions (3) to (6) where connection is measured with the number of ties or the length of the ties, we find similar results. That is, the more ties and the longer ties a female candidate has with the all-male incumbent board, the higher her probability to join the board. This evidence suggest that connections facilitate board efforts to improve gender diversity.

Model (1) of Table 4 also reports a positive coefficient for the interaction term between the connection indicator and the new experience variable but a negative coefficient for the new experience variable itself. Both coefficients are statistically significant at the 1% level. This result suggests that boards on average are more likely to appoint a director with similar experience to their own while connections help to alleviate this tendency. Model (1) suggests that conditional on a candidate having a new experience, the odds of being appointed are 30% higher for a connected candidate than an unconnected one.

Model (2) reports a positive coefficient for the interaction term between the connection indicator and the different industry variable but a negative coefficient for the different industry variable itself. Again, both coefficients are significant at the 1% level. This result suggests that boards on average are unlikely to recruit a director from outside of the appointing firm's broadly defined industry. Connections between incumbent directors and potential candidates, however, help boards to recruit directors from different industry backgrounds. According to the odds ratios in model (2), for candidates coming from a different industry, a connected candidate has 56% higher odds of being appointed than an unconnected candidate. In



regressions (3) to (6), we measure connections with the number of ties and length of ties, respectively, and find similar results. This result highlights the importance of network connections in recruiting directors who can bring in new knowledge and expertise.

The overall evidence in Table 4 suggests that networks alleviate boards' tendency to appoint directors similar to themselves and facilitate recruiting directors who add gender diversity, new skills and experience. The other control variables are similar to those in Panel B of Table 3. Our empirical design uses directors appointed to similar-sized firms in the same area around the same time as counterfactual to directly control for director ability and skills. Consistent with this design, all of the director-experience variables are statistically insignificant.

### ***4.3 Which firms appoint a connected director?***

#### ***4.3.1 Coordination/trust vs. Homophily hypotheses***

The coordination/trust hypothesis posits that appointing a new director who has worked with some of the incumbent directors helps to reduce coordination costs amongst board members. We argue that more complex firms are likely to need a greater degree of board coordination. Further, the importance of board coordination (and the cost of its absence) is likely to be greater in situations where boards need to make decisions quickly, e.g. firms facing fierce market competition. In contrast, the homophily hypothesis argues that such firms, as well as firms that need to break away from status quo, may benefit from the different perspectives an unconnected director may bring in. Consequently, we test whether more complex firms and firms facing more fluid markets are more or less likely to appoint a connected director.

Table 5 reports regressions where the dependent variable is an indicator variable that takes the value of one if the newly appointed director has a first or second degree connection with at least one of the incumbent directors.<sup>25</sup> Independent variables include firm, board, and CEO characteristics. We control for the fraction of directors from local firms (Knyazeva, Knyazeva, and Masulis, 2013), total network size of incumbent directors, and whether the firm has had acquisition activities or CEO turnover in the last year.

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<sup>25</sup> We also examine alternative measures for connections, such as the number and the duration of connections (reported in Table 8).

We control for the fractions of death- and M&A-induced network loss and gain in this regression since these two variables capture exogenous shocks to an incumbent board's network, hence affecting the chance of a director appointed from the board's connection pool. According to model (1), for one standard deviation increase in the network loss due to director deaths, the odds of a connected director being appointed decreases by 9.4%. Model (1) also suggests that for one standard deviation increase in the M&A-induced network gain, the odds of an appointment of a connected director increases by 20.3%. Other independent variables in Table 5 include firm characteristics related to the appointment of connected directors. We focus on the areas where connected directors are more likely to be beneficial (where coordination costs would be high) and problematic (where firms face higher homophily costs). We measure potential coordination costs with the log of board size and a complexity factor. Larger boards obviously have a greater coordination need. Following Coles, Daniel, and Naveen (2008) we measure the complexity factor by the score from a factor analysis where the components include the number of business segments, the natural logarithm of sales, and financial leverage.<sup>26</sup>

Measures of competitiveness of a firm's business environment include: average industry sales growth and a product market fluidity variable that measures the degree of competitive threat and product market change surrounding a firm (Hoberg, Phillips, and Prabhala, 2014). In general, a firm operating in a high growth industry and with great product market fluidity faces increased threats from rivals and needs to be agile in making decisions (Hoberg, Phillips, and Prabhala, 2014; Coles et al, 2015). A lack of board coordination is likely to be costlier for these firms. The coordination/trust hypothesis predicts that these firms are more likely to hire a director connected with the incumbent directors (or their colleagues) in order to reduce the uncertainty associated with a new board member.

More complex firms, however, can also benefit from a board with more diverse experiences and perspectives. In addition, firms in slow-growing industries and firms lacking growth options may also benefit from the fresh perspectives an unconnected director may bring in. The homophily hypothesis

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<sup>26</sup> In a robustness test, we use the Herfindahl index of a firm's industry segment assets in place of the complexity score and find similar results.

predicts that firms with these needs are more likely to appoint a new director outside of the existing board's network.

Models (1) to (4) show logistic regressions where the dependent variable equals one if a firm appoints a connected director and zero otherwise. As predicted by the coordination/trust hypothesis, model (1) shows a positive and significant coefficient for board size.<sup>27</sup> The coefficient indicates 26% greater odds of hiring a connected director than hiring an unconnected director for each additional member of an incumbent board.

Model (2) shows that firms with a greater complexity score are also more likely to appoint a director from the board's network. Note that in model (2), we do not include firm size and leverage since these two variables are components of the complexity factor. For each standard deviation in the complexity factor, the odds of appointing a connected director is 9.5% higher than that of appointing an unconnected one. Models (3) and (4) report a positive coefficient on industry sales growth and product market fluidity. Odds ratios of coefficients in models (3) and (4) show that a one standard deviation increase in industry sales growth or in market fluidity is associated with 25.3% or 7.2% higher odds of appointing a connected director, respectively. These results are consistent with the argument that firms with greater coordination need are more likely to appoint directors connected to the incumbent board. The results from model (3) can also be interpreted as consistent with the homophily hypothesis that firms in slow-growing industries benefit from the fresh perspectives of an unconnected director.

The negative and statistically significant coefficient of firm book-to-market ratio in all models can be interpreted as consistent with both the coordination/trust and the homophily hypotheses. On one hand, high growth firms that need better coordination are more likely to appoint a connected director. On the other hand, firms that lack growth options, measured with higher book-to-market ratios, are less likely to appoint a connected director. These firms may be more likely to benefit from the different perspective of

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<sup>27</sup> A bigger board also tends to have a larger director network, which can lead to higher probability of finding a suitable candidate within the network. We, therefore, separately control for the size of the incumbent director's network in the regressions in Table 5.

an unconnected director, consistent with the homophily hypothesis. These two indicators for recent mergers or CEO turnover are both positive and statistically significant in most regressions, suggesting that firms are more likely to appoint a connected director when board coordination facilitates reorganizations or management changes.

#### ***4.3.2 Agency hypothesis***

The agency hypothesis suggests that directors from the incumbent CEO's network may be appointed to benefit management rather than the shareholders. Model (5) of Table 5 presents logistic regressions where the dependent variable equals one if a firm appoints a director connected with the CEO, and zero otherwise. Our main independent variables of interest are measures for board monitoring and CEO entrenchment, such as the fractions of independent, coopted directors, institutional holdings, and the indicator for a busy board. Further, we use two instruments that capture the gain or loss in the CEO's network due to mergers by other companies or recent deaths in the network, respectively. As predicted, these two variables are significantly associated with the appointment of a director connected with the incumbent CEO.

Model (5) shows a positive and significant correlation between the proportion of coopted directors and the probability of hiring an individual from the incumbent CEO's network. One standard deviation in the fraction of coopted directors is associated with 8.6% higher odds of a firm appointing a director linked to the CEO. This result is in contrast to the negative coefficient of fraction of coopted directors in models (1) to (4) where the dependent variable equals one for appointing a director connected to any member of the incumbent board. That is, a more coopted board is more likely to appoint a new director connected to the CEO but not connected to other board members. Firms with more independent directors and higher institutional holdings are not more likely to appoint a new director connected to the CEO (model (5)), but are more likely to appoint a director connected to other members of the board, suggested by the positive and significant coefficients in models (1) to (4). As expected, the size of the CEO's network is positively

associated with the likelihood of adding a new director from their network. Overall, the evidence in model (5) supports the agency hypothesis.

#### ***4.4 Market reaction to director appointments***

We next examine the stock market reaction to the appointment of a director from the board's network. If a connected director helps to lower the coordination cost in complex firms and for firms in competitive industries, these types of firms should experience a more positive market reaction at the announcement of a connected appointment. In contrast, if the appointment of a connected director limits the board's exposure to different opinions and opportunities, such an appointment should be viewed negatively by the stock market.

It is conceivable that director appointments from a board's network could be driven by omitted variables. For example, more connected directors could have more experience and better skills/reputation. This quality could be associated with a larger pool of connections making it more likely that a connected director is chosen to fill a board vacancy. Alternatively, firms with certain governance characteristics may tend to appoint a connected director. As a result, when firms appoint a connected director, the stock market reaction may be driven by these omitted firm or director characteristics. To address this potential problem of endogeneity, we employ our two instrumental variables to capture exogenous variation in the probability of appointing a connected director. As mentioned previously, we use the fraction of network loss due to deaths of connected directors and the fraction of network gain due to mergers by connected firms to instrument for the connected director variable and for its interactions with variables measuring an increased need for board coordination (i.e., board size, complexity factor, industry sales growth, and market fluidity). The construction of these instruments is described in detail in the section 3.2.

Because the main variable of interest is an indicator variable, the conditional expectation function (CEF) associated with the first stage regression is likely nonlinear if we apply standard 2SLS method. To avoid problems due to an incorrect nonlinear first stage, we follow Angrist and Pischke (2008) and use the nonlinear fitted values as instruments instead of plugging in nonlinear fitted values. We employ a three-

step approach discussed in detail in Appendix 3.<sup>28</sup> We note that the coefficients of the instrumented variables should be interpreted as a local treatment effect. For example, the coefficient of the instrumented connection indicator in the market reaction regression measures the change in market reaction if the recent network gain (loss) due to mergers by connected firms (deaths of connected directors) changes the probability of appointing a connected director from 0 to 1.

Table 6 reports the results of the second stage IV regressions (the last step in the three-step approach) where the dependent variable is the appointing firm's market adjusted stock returns in the three-day window centered on the announcement date of an outside director appointment.<sup>29, 30</sup> The independent variables of interest include the instrumented probability of appointing a connected director and several instrumented interaction terms measuring the firm's coordination needs. Other control variables include those in the logistic regressions in Table 5 and characteristics of the new director nominee, such as her age, gender, network size, number of board seats, and whether she is a CEO of another public firm.

Model (1) of Table 6 shows an insignificant coefficient for the instrumented connected appointee variable, suggesting that the market on average does not view these appointments negatively. More interestingly, the instrumented interaction term between our variable for connected appointees and proxies for coordination need are all significantly positive in models (2) to (5). According to model (2), a one standard deviation increase in the instrumented interaction terms between (log) board size and the connected director variable is associated with 2.8% higher abnormal return. This effect is quite meaningful, given the standard deviation of abnormal return around the announcements of director appointments of 4.9% in our sample.

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<sup>28</sup> In Table 8, we measure connection by number and length of connections (instead of a dummy variable). These continuous variables allow us to use standard 2SLS method.

<sup>29</sup> Our results are robust to the use of market-model CARs(-1,+1) centered on announcement dates of director announcements. We use market adjusted returns instead of CARs in our analyses since we control for the previous year's stock return, which is mechanically correlated with CARs.

<sup>30</sup> It is possible that the appointment of a connected director by certain firms is anticipated by the market. In an unreported robustness test, we use the residuals from regressions in Table 5 as estimates of the surprise element and use these residuals as the main independent variables in the return regressions. Our results are similar.

Model (3) shows that a one standard deviation increase in the instrumented interaction between a firm's complexity factor score and the connected director variable is associated with an increase of abnormal announcement return by 2.7%. These findings are consistent with the market recognizing the benefits from the appointment of connected directors in more complex firms.

In models (4) and (5), we study the market reaction to the appointment of a connected director for firms in a more competitive business environment. The main independent variables are the instrumented interaction terms between our connected director variable and each of the competitiveness measures - industry sales growth (model (4)) and product market fluidity (model (5)). As predicted by the coordination/trust hypothesis, both interaction terms are positive and significant, indicating a favorable market reaction to the appointment of a connected director to firms in high sales growth industries and in more fluid markets. Models (4) and (5) indicate a 2.9% (4.3%) greater abnormal announcement return for one standard deviation increase in the instrumented interaction term between the connected director variable and industry sales growth (market fluidity).

In addition, the coefficient of the industry sales growth in model (4) is significantly negative, indicating lower abnormal returns to the appointment of connected directors in slow-growing industries. This result is consistent with the homophily hypothesis.

These results in Table 6 suggest that connected directors add value to shareholders of complex firms and firms in competitive industries, lending support to the coordination/trust hypothesis. These findings are also in line with the results from the regressions in Table 5 suggesting these types of firms are more likely to hire a director from their board's network.

The agency hypothesis conjectures that a CEO will seek to entrench herself by recruiting individuals from her personal network to the board. A negative market reaction to such an appointment is consistent with this hypothesis. Model (6) of Table 6 shows a negative and significant coefficient on the instrumented probability of appointing a director connected with the CEO, suggesting a market reaction of -1.3% to such appointment. This evidence is consistent with the agency hypothesis.

#### ***4.5 Shareholder votes for director appointments***

In addition to trading in the stock market, shareholders also evaluate corporate directors by voting in director elections. While the average votes directors receive in uncontested elections are typically over 90%, Cai, Garner, and Walkling (2009) document substantial cross-sectional variation in director votes and a significant association between votes and previous director and firm performance. Examination of the voting data, therefore, can provide us further insight on how shareholders view appointments of directors connected to the incumbent boards.

Specifically, we examine shareholder votes at the first director election on or after the date of director appointments.<sup>31</sup> Since director votes also capture firm level information, we follow Cai et al (2009) and measure excess director votes as the difference between the proportion of “for” votes the newly appointed director receives and the average votes for all other directors at the same shareholder meeting. This excess director vote variable, which abstracts away from firm/year-level performance and governance, is used as the dependent variable in Table 7. Table 7 reports the results from the second stage of the IV regressions (last step in the three step approach described in Appendix 3). The main independent variables of interest include the instrumented connection variable as well as the instrumented interactions between the connection variable and the board’s coordination needs, measured with several complexity and competition variables, as well as the instrumented CEO connection. Other control variables include those used in Table 6 and the variables shown in prior studies to affect shareholder votes, which include the ISS recommendation and indicator variables for whether the newly appointed director serves on the audit, nomination, and compensation committees.

Model (1) reports the baseline regression without any interaction terms, while in models (2) to (5), we interact the director connection variables with each complexity variable (board size and the complexity factor) and competitiveness measure (industry sales growth and market fluidity). Model (1) reports a coefficient of -3.4% on the instrumented connected director variable, with a t-statistic of -2.2. This

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<sup>31</sup> For directors appointed at a shareholder meeting, the first election is on the same day as the director appointment. Many directors, however, are appointed between shareholder meetings. In these cases, we use the first director election after appointments.



coefficient indicates a 3.4% lower shareholder support if the recent network gain or loss due to mergers by other firm or deaths of connected directors changes the probability of appointing a connected director from 0 to 1. This evidence supports the homophily hypothesis.

In models (2) and (3), both the direction and statistical significance of the interaction terms between the connected director variable and complexity variables are consistent with the results from announcement return regressions. That is, shareholders of the more complex firms (with a larger board or a greater complexity factor) are more likely to give significantly higher votes for the appointment of connected directors. The economic magnitude is also meaningful. For example, estimates from models (2) and (3) reveal that a one standard deviation increase in the instrumented interaction between the connected director variable and the log of board size (the complexity factor) is associated with 7.2% (4.4%) higher excess shareholder votes for the connected director candidate, respectively. These effects are non-trivial, compared to the unconditional average excess shareholder votes of 4.6% for the 6,030 newly appointed directors in our sample.

To test whether shareholders of firms in more competitive industries favor a director from the board's social network, we include instrumented interaction terms between the director connection variable and industry sales growth and product market fluidity, respectively, in regressions (4) and (5). Both instrumented interactions terms show positive coefficients that are statistically significant at the 5% and 1% levels, respectively. This result indicates higher shareholder votes for directors connected to the incumbent board if the firm is in a high growth industry or in a highly fluid market, supporting the coordination/ trust hypothesis.

We next test the agency hypothesis in the context of shareholder votes for a director connected to the CEO. Model (6) reports a coefficient of -3.9% for the instrumented probability of a director appointee connected to the CEO and a coefficient of -2.1% for the instrumented probability of connection to non-CEO directors. Results from a Wald test show that the two coefficients are statistically different from each other (p-value < 0.0001), supporting the agency hypothesis.

#### ***4.6 Additional analyses***

#### ***4.6.1 Alternative measures of director connections***

In Tables 6 and 7, we measure a newly appointed director's connection with the incumbent board with a 1/0 indicator variable. Tables 3 and 4 show that the strength of the ties also matter. First, an increased number of incumbents with whom a new director appointee has prior connections facilitates the assimilation of the newcomer. Second, the length of such shared experience can help to iron out frictions arising from different personalities, work styles, and approaches to problems. Indeed, people who do not ultimately coordinate well when both are in executive/director positions are unlikely to have a long relationship, nor are these connections likely to lead to additional director appointments. In this section, we use these two alternate measures of the ties as the main variables of interest and test the robustness of our findings.

We first measure connection strength with “number of connections,” which is equal to the natural logarithm of the number of incumbent directors that have at least one first- or second-degree connection with the appointee and is equal to zero if the appointee is not connected to any incumbent director. We next measure connection with “length of connections,” which is set to the natural logarithm of the total duration (in years) of all connections between incumbent directors and the appointee; and is set to zero if the appointee is not connected to any incumbent director. Next, we instrument these two measures of connections between the incumbent board and the appointed director with the board's network gain or loss due to mergers by other firms or deaths of connected directors. Panel A and Panel B of Table 8 summarize the main results when we repeat the analyses of abnormal returns and shareholder votes using the two alternative measures for connection. Since the measure of connections and its interactions with firm coordination needs are continuous variables, we use the standard 2SLS method in Table 8. Our main findings are robust to these alternate measures.

#### ***4.6.2 Education and social activity connections***

In additional analyses, we include shared education experience and social activities to define the connection between appointees and incumbent boards. Using BoardEx data, we define an education tie if two directors or executives have obtained the same major and/or degree in the same college within one year of each other. (BoardEx often does not report college majors of individuals. We use the majors when the

information is available and use only the degrees otherwise.) Social activity ties are defined when two directors are both officers of the same social or professional organization during the same time period. We find that the addition of education and social activities to professional ties only marginally increases the number of connected appointments – from 69% to 70.5%. Unreported tests show that the education and/or social activity tie variables do not produce significant results when they are included side-by-side with professional links. Moreover, additional education and/or social activity ties do not appear to strengthen or weaken the effects of professional ties. This evidence suggests that professional connections are the main channel through which boards recruit new directors, which is consistent with the coordination/trust hypothesis.

## **5. Summary and Conclusions**

Shareholder representation by the board of directors is at the center of corporate governance in U.S. public firms. Director appointments are critical to effective board oversight and advising. Shareholders typically have little say in which directors are nominated, yet these same directors are almost always elected and are subsequently difficult to remove. While anecdotes suggest the importance of social networks in director appointments, surprisingly little empirical research is available on this subject. In this paper, we examine the prevalence of director appointments from the network of incumbent boards and test hypotheses related to these appointments. Using 9,923 director appointments during the period of 2003-2014, we document that nearly 69% of the director nominees are selected from the board's networks, which on average comprise only 13% of the potential talent pool. This phenomenon is even more striking for the largest firms. More importantly, in the absence of a connection, incumbent directors tend to recruit candidates with characteristics similar to their own, limiting the diversity and skill set of the board. Connections, however, appear to play a critical role in recruiting candidates who have different gender, skills, and industry background from the incumbent board.

Whether appointments of connected directors are beneficial to shareholders is an empirical question. The coordination/trust hypothesis asserts the benefits from connected directors whose prior work relationship with the incumbent directors fosters trust, reduces risk, and facilitates better coordination, while

the homophily hypothesis views such appointments as concentrating homogeneous opinions and lack of creativity. In addition, the agency hypothesis views the director appointees connected to the CEO as perpetuating managerial cronyism.

We find evidence supporting all three hypotheses and that the market rewards or penalizes firms accordingly. First, complex firms and firms facing a more competitive environment, i.e. firms in greater need of board coordination, tend to appoint directors connected to the incumbent board. Such appointments also receive a more positive market reaction and higher shareholder votes. This evidence supports the coordination/trust hypothesis. However, firms with few growth opportunities appear to benefit from the appointment of an unconnected director, supporting the homophily hypothesis. Finally, we also find evidence for the agency hypothesis. For example, boards controlled by the CEO are more likely to appoint a director who has personal connection to the CEO. In addition, the market and shareholders react negatively to the appointments of these directors.

To address the potential endogeneity of connected director appointments, we use the damage to a firm's director network resulting from the deaths of connected directors and expansion of the network from connected firms' merger activities as two instruments in our empirical analysis. In addition, our evidence is also robust to alternate measures of connections between director nominees and the incumbent board.

This paper provides the first comprehensive evidence on the prevalent role of a board's network in recruiting new directors, as well as how such practice affects board composition and diversity. The evidence provided in the paper adds to the corporate governance literature by shedding new light on the director nomination process, a key component of shareholder representation by board of directors. These results also provide a benchmark for future research that examines the factors of the director selection process. Finally, our findings provide new information to the ongoing debate of proxy access and the strengths and weaknesses of corporate governance in America.

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**Table 1: Sample description**

The sample consists of 9,923 new outside director appointments from 2003 to 2014 from the BoardEx database. We require that firms in our sample have available data from Compustat and the Center for Research in Security Prices (CRSP). Shareholder vote data are from the ISS (Riskmetrics) database. Except where stated, this table reports characteristics of appointing firms and appointed directors from the year before the director appointment. All variables are defined in Appendix 1.

	<b>N</b>	<b>Mean</b>	<b>Median</b>	<b>Standard Deviation</b>
<b>Panel A: Director Connections</b>				
% of appointments where the incumbent board has at least one connection with appointed directors				
Connected professionally (1)	9,923	68.69%		
Connected through education (2)	9,923	7.49%		
Connected through social activities (3)	9,923	1.91%		
Either (1), (2), or (3)	9,923	70.49%		
<b>Panel B: Director Appointments</b>				
Appointee is a CEO (1/0)	9,923	0.112	0	0.315
Appointee's number of board seats	9,923	1.821	1	1.905
Appointee's age	9,923	56.102	57	7.866
Appointee is female (1/0)	9,923	0.161	0	0.368
Appointee's total networks	9,923	10,414	7,612	10,171
1 <sup>st</sup> degree networks	9,923	153	90	180
2 <sup>nd</sup> degree networks	9,923	10,261	7,509	10,002
Abnormal returns (-1,+1) at director appointment announcement (%)	9,923	0.254	0.009	4.853
M&A last 12 months (1/0)	9,923	0.094	0	0.292
CEO turnover last 12 months (1/0)	9,923	0.194	0	0.395
Number of connected directors' deaths last 3 years	9,923	293.95	256	238.45
Fraction of network loss due to director death	9,923	0.017	0.014	0.016
Fraction of network increase due to M&As	9,923	0.014	0.005	0.020
Shareholder vote for director appointment (%)	6,030	96.320	98.355	6.316
Excess shareholder vote for director appointment	6,030	4.640	3.293	9.287
ISS recommendation (1/0)	6,030	0.957	1	0.202
Appointed director will serve in audit committee (1/0)	6,030	0.377	0	0.485
Appointed director will serve in nomination committee (1/0)	6,030	0.227	0	0.419
Appointed director will serve in compensation committee (1/0)	6,030	0.292	0	0.455

**Panel C: Firm and Governance  
Characteristics**

Assets (\$ million)	9,923	12,069	1,115	44,089
Market cap (\$ million)	9,923	6,435	859	19,251
Sales (\$ million)	9,923	4,964	670	13,885
Leverage	9,923	0.209	0.163	0.206
Number of business segments	9,923	2.168	1	1.845
B/M	9,923	0.605	0.480	0.574
Product market fluidity	9,923	7.882	6.920	4.372
Sales growth (%)	9,923	9.367	7.209	27.622
Complexity factor	9,923	0.040	-0.050	0.986
Total incumbent directors' networks	9,923	26,044	24,530	15,600
1 <sup>st</sup> degree networks	9,923	807	599	720
2 <sup>nd</sup> degree networks	9,923	25,238	23,952	14,909
Local labor market	9,923	0.035	0.027	0.033
Board size	9,923	10.097	10	3.364
Expanding board (1/0)	9,923	0.323	0	0.467
Busy board (1/0)	9,923	0.135	0	0.342
Fraction of independent directors	9,923	0.738	0.750	0.128
Fraction of coopted directors	9,923	0.592	0.625	0.308
Institutional holding	9,923	0.612	0.677	0.293
CEO tenure	9,923	8.773	9	5.103
CEO chairman (1/0)	9,923	0.422	0	0.494

**Table 2: Directors appointed from social networks**

This table reports the connections that a newly appointed director has with incumbent directors at the appointing firm. Panel A reports connections that appointed directors have with appointing firms in our sample. For comparison, Panel B reports other benchmarks: the fraction of all BoardEx directors who have at least one first- or second-degree connection with the appointing firms and the fraction of appointed directors that are from the same sector as the appointing firms, from the same state as the appointing firm’s headquarter, and/or from firms of similar size to that of the appointing firm. To determine the percentage of all directors that the firm has connections with, we examine all available BoardEx directors at the time of the new director appointment. We then report the average proportion of directors that have at least one first- or second-degree connection with incumbent directors. “Same sector” is defined based on the business sectors in the BoardEx database. Firms of “similar size” are those with total assets within 50% of each other. Panel C reports different types of connections.

**Panel A: Summary statistics**

	All firms (N = 9,923)			S&P 1500 (N = 5,770)			S&P 500 (N = 2,547)		
	1st degree	2nd degree	Total	1st degree	2nd degree	Total	1st degree	2nd degree	Total
N of appointments where the firm has at least one connection with appointed directors	2,868	3,948	6,816	1,784	2,732	4,516	958	1,343	2,301
% of appointments where the firm has at least one connection with appointed directors	28.90%	39.79%	68.69%	30.92%	47.35%	78.27%	37.61%	52.73%	90.34%

**Panel B: Benchmarks**

% of ALL BoardEx directors that the firm has at least one 1 <sup>st</sup> or 2 <sup>nd</sup> degree connection with	0.39%	12.23%	12.62%	0.52%	15.22%	15.74%	0.79%	20.15%	20.94%
% of appointed directors from same sector as appointing firm (1)			12.74%			12.14%			11.15%
% of appointed directors from same state as appointing firm (2)			24.24%			25.89%			25.91%
% of appointed directors from firms of similar size to appointing firm (3)			22.36%			26.79%			30.39%
% of appointed directors from either (1), (2), or (3)			42.85%			47.54%			50.65%

**Panel C: Connection types**

	N of appointments	% of total appointments (N = 9,923)
Appointing firm has one connection with appointed director	1,414	14.25%
Appointing firm has multiple connections with appointed director	5,402	54.44%
Appointed director is connected with the CEO	3,295	33.21%
Appointed director is connected with non-CEO directors	3,521	35.48%
Appointed director is connected with both CEO and non-CEO directors	3,106	31.30%

### Table 3: Board connection and director appointments

For each of the 9,923 appointments in our sample, we identify other directors appointed within one year to firms of similar size in the same Metropolitan Statistical Area. We view these directors as potential, but unselected candidates for the sample firm. Firms of “similar size” are those with total assets value between 50% and 150% of the sample firms. Of the 9,923 appointments, we are able to identify at least one other candidate in 7,344 cases (with 102,686 candidates in total including the selected candidates). Panel A reports the proportion of appointed directors. Panel B reports logistic regressions where the dependent variable equals one if a candidate is appointed and zero if she is not. Year and industry fixed effects are included in all specifications, with industries being defined using the Fama and French (1997) 48-industry classification. All variables are defined in Appendix 1. Standard errors are clustered at the appointment level. The t values are reported in parentheses. In each of Models (2) to (6), we include two connection variables measuring the differential strength of the ties and report the Wald test p-value of the difference in coefficients. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

#### Panel A: Summary statistics

	N	% Appointed
Connected	69,732	8.22%
Unconnected	32,954	4.90%
T-stat of difference		(21.01)***

**Panel B: Which directors are appointed?**

	Dependent variable = Appointed (1/0)					
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-1.272 (-35.83) <sup>***</sup>	-1.264 (-32.17) <sup>***</sup>	-1.384 (-28.12) <sup>***</sup>	-1.285 (-35.90) <sup>***</sup>	-1.294 (-35.74) <sup>***</sup>	-1.337 (-34.65) <sup>***</sup>
Connected (1/0)	0.497 (17.58) <sup>***</sup>					
Connected to CEO (1/0)		0.824 (26.14) <sup>***</sup>				
Connected to non-CEO (1/0)		0.267 (8.49) <sup>***</sup>				
1st degree connection (1/0)			1.710 (44.18) <sup>***</sup>			
2nd degree connection (1/0)			0.166 (5.57) <sup>***</sup>			
Multiple connection (1/0)				0.588 (20.50) <sup>***</sup>		
Single connection (1/0)				0.070 (1.91) <sup>*</sup>		
Long connection (1/0)					0.653 (22.36) <sup>***</sup>	
Short connection (1/0)					0.067 (1.69) <sup>*</sup>	
Recent connection (1/0)						1.444 (28.54) <sup>***</sup>
Past connection (1/0)						0.415 (14.35) <sup>***</sup>
Female added to an all-male board (1/0)	0.212 (4.18) <sup>***</sup>	0.231 (4.54) <sup>***</sup>	0.265 (5.16) <sup>***</sup>	0.221 (4.36) <sup>***</sup>	0.221 (4.36) <sup>***</sup>	0.239 (4.70) <sup>***</sup>
Number of new experiences	-0.2218 (-11.00) <sup>***</sup>	-0.2071 (-10.30) <sup>***</sup>	-0.1797 (-8.82) <sup>***</sup>	-0.2126 (-10.53) <sup>***</sup>	-0.2038 (-10.08) <sup>***</sup>	-0.1964 (-9.69) <sup>***</sup>
Candidate pool size	-0.077 (-101.72) <sup>***</sup>	-0.076 (-97.43) <sup>***</sup>	-0.073 (-91.11) <sup>***</sup>	-0.077 (-100.13) <sup>***</sup>	-0.076 (-99.48) <sup>***</sup>	-0.075 (-97.28) <sup>***</sup>
Ivy graduate (1/0)	0.025 (0.85)	0.017 (0.57)	0.037 (1.22)	0.014 (0.47)	0.016 (0.56)	0.026 (0.89)
MBA degree (1/0)	-0.004 (-0.15)	-0.009 (-0.34)	-0.004 (-0.14)	-0.007 (-0.27)	-0.002 (-0.09)	-0.012 (-0.44)
CEO experience (1/0)	0.007 (0.20)	-0.027 (-0.74)	-0.036 (-0.94)	-0.017 (-0.45)	-0.037 (-1.00)	-0.045 (-1.20)
CFO experience (1/0)	-0.073 (-1.41)	-0.088 (-1.60)	-0.093 (-1.58)	-0.091 (-1.57)	-0.092 (-1.58)	-0.091 (-1.65)
COO experience (1/0)	-0.018 (-0.46)	-0.038 (-0.95)	-0.040 (-0.98)	-0.028 (-0.71)	-0.039 (-0.99)	-0.036 (-0.89)
IT experience (1/0)	-0.034 (-0.55)	-0.089 (-1.41)	-0.085 (-1.31)	-0.070 (-1.13)	-0.076 (-1.21)	-0.094 (-1.48)
M&A experience (1/0)	0.005 (0.04)	-0.006 (-0.05)	-0.041 (-0.33)	-0.017 (-0.14)	-0.003 (-0.03)	-0.028 (-0.23)
N	102,686	102,686	102,686	102,686	102,686	102,686
Pseudo R-sq.	0.1322	0.1406	0.1803	0.1359	0.1388	0.1432
p-value of Wald test		(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)	(< 0.0001)

**Table 4: How does board connection affect board diversity?**

This table reports logistic regressions where the dependent variable equals one if a candidate is appointed and zero if she is not. The sample includes 102,686 candidates described in Table 3. Other variables are defined in Appendix 1. Year and industry fixed effects are included in all specifications, with industries being defined using the Fama and French (1997) 48-industry classification. Standard errors are clustered at the appointment level. The t values are reported in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent variable = Appointed (1/0)					
	Connection variable =					
	Connected (1/0)		Number of Connections		Length of connections	
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-1.203 (-32.42)***	-0.429 (-9.53)***	-1.271 (-37.94)***	-0.242 (-1.82)*	-1.158 (-26.55)***	-0.376 (-3.40)***
Connection variable	0.407 (12.55)***	0.438 (7.50)***	0.215 (20.51)***	0.064 (1.85)*	0.243 (29.51)***	0.165 (9.14)***
Female added to an all-male board (1/0)	0.011 (0.10)	-0.006 (-0.05)	0.002 (0.02)	-0.046 (-0.15)	0.174 (3.06)***	0.260 (1.47)
Connection variable x Female added to an all-male board (1/0)	0.275 (2.19)**	0.271 (2.17)**	0.175 (3.74)***	0.223 (1.98)**	0.121 (3.39)***	0.204 (2.08)**
Number of new experiences	-0.4313 (-8.61)***		-0.3586 (-10.52)***		-0.2395 (-10.54)***	
Connection variable x Number of new experiences	0.259 (4.84)***		0.1065 (6.59)***		0.0675 (6.51)***	
Different industry (1/0)		-1.424 (-26.22)***		-1.534 (-15.34)***		-1.133 (-18.54)***
Connection variable Connected (1/0) x Different Industry (1/0)		0.446 (6.30)***		0.250 (6.13)***		0.114 (5.14)***
Candidate pool size	-0.077 (-101.45)***	-0.076 (-101.20)***	-0.076 (-96.18)***	-0.077 (-27.49)***	-0.074 (-95.13)***	-0.075 (-26.88)***
Ivy graduate (1/0)	0.027 (0.94)	-0.003 (-0.12)	0.002 (0.07)	0.006 (0.10)	0.036 (1.22)	0.047 (0.81)
MBA degree (1/0)	0.000 (0.00)	0.038 (1.41)	-0.002 (-0.07)	0.052 (1.04)	0.009 (0.34)	0.045 (0.88)
CEO experience (1/0)	0.009 (0.25)	0.055 (1.46)	-0.059 (-1.57)	-0.071 (-1.40)	-0.057 (-1.49)	-0.080 (-1.56)
CFO experience (1/0)	-0.071 (-1.37)	-0.032 (-0.77)	-0.063 (-1.49)	-0.001 (-0.01)	-0.071 (-1.65)	-0.009 (-0.13)
COO experience (1/0)	-0.015 (-0.38)	0.003 (0.08)	-0.032 (-0.80)	-0.008 (-0.16)	-0.019 (-0.46)	0.006 (0.12)
IT experience (1/0)	-0.042 (-0.67)	-0.090 (-1.47)	-0.093 (-1.46)	-0.163 (-1.63)	-0.105 (-1.59)	-0.165 (-1.61)
M&A experience (1/0)	-0.003 (-0.03)	-0.060 (-0.51)	-0.087 (-0.73)	-0.155 (-0.69)	-0.031 (-0.25)	-0.138 (-0.62)
N	102,686	102,686	102,686	102,686	102,686	102,686
Pseudo R-sq.	0.1330	0.1526	0.1407	0.1773	0.1599	0.1978

**Table 5: Which firms appoint a connected director?**

Models (1) to (4) report logistic regressions where the dependent variable equals one if an appointed director in our sample has at least one connection with a board member of the appointing firm. Model (5) reports logistic regressions where the dependent variable equals one if an appointed director is connected with the incumbent CEO. Year and industry fixed effects are included, with industries being defined using Fama and French (1997) classification. All variables are defined in Appendix 1. The t values are reported in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent variable =				
	Connected (1/0)				Connected to CEO (1/0)
	(1)	(2)	(3)	(4)	(5)
Intercept	-5.622 (-0.39)	-5.683 (-0.37)	-5.183 (-0.36)	-5.050 (-0.35)	-4.961 (-1.56)
Fraction of network loss due to director death	-6.197 (-2.64)***	-5.724 (-1.99)**	-6.540 (-2.83)***	-6.033 (-2.54)**	-5.252 (-2.04)**
Fraction of network gain due to M&As	9.276 (6.24)***	11.420 (6.44)***	10.484 (7.25)***	10.010 (6.59)***	6.715 (5.35)***
Board size (log)	0.627 (5.13)***				0.037 (0.32)
Complexity Factor		0.092 (2.02)**			
Industry sale growth			0.008 (2.38)**		
Product market fluidity				0.016 (2.04)**	
Assets (log)	0.189 (7.69)***		0.103 (5.84)***	0.224 (9.47)***	0.142 (6.59)***
Leverage	-0.297 (-2.12)**		-0.235 (-1.85)*	-0.349 (-2.48)**	0.095 (0.73)
B/M	-0.174 (-3.56)***	-0.237 (-3.83)***	-0.257 (-5.45)***	-0.182 (-3.71)***	-0.100 (-2.02)**
ROA	-0.692 (-4.55)***	-0.533 (-3.31)***	-0.869 (-6.13)***	-0.671 (-4.36)***	-0.735 (-5.01)***
Stock return	0.035 (0.67)	0.064 (1.10)	0.049 (0.97)	0.043 (0.83)	0.090 (1.82)*
Expanding board (1/0)	0.340 (6.03)***	0.388 (5.84)***	0.335 (6.09)***	0.317 (5.60)***	0.253 (5.13)***
Fraction of independent directors	1.014 (4.68)***	1.361 (5.40)***	1.071 (5.19)***	1.166 (5.40)***	0.328 (1.52)
Busy board (1/0)	0.679 (5.92)***	0.719 (5.52)***	0.812 (7.24)***	0.688 (5.87)***	0.448 (6.32)***
Fraction of coopted directors	-0.199 (-1.77)*	-0.367 (-2.75)***	-0.235 (-2.15)**	-0.232 (-2.05)**	0.269 (2.53)**



Institutional holding	0.357 (3.31) <sup>***</sup>	0.672 (5.61) <sup>***</sup>	0.544 (5.70) <sup>***</sup>	0.315 (2.91) <sup>***</sup>	-0.123 (-1.23)
CEO tenure (log)	-0.040 (-0.73)	0.034 (0.53)	0.006 (0.12)	-0.028 (-0.50)	-0.069 (-1.26)
CEO chairman (1/0)	-0.035 (-0.66)	-0.059 (-0.93)	-0.056 (-1.10)	-0.049 (-0.92)	0.044 (0.88)
Total incumbent directors' network (log)	0.431 (10.55) <sup>***</sup>	0.687 (15.47) <sup>***</sup>	0.597 (16.28) <sup>***</sup>	0.494 (12.22) <sup>***</sup>	
Total CEO network (log)					0.274 (7.26) <sup>***</sup>
Local labor market	2.651 (3.26) <sup>***</sup>	3.000 (3.04) <sup>***</sup>	2.814 (3.63) <sup>***</sup>	2.282 (2.77) <sup>***</sup>	1.817 (2.47) <sup>**</sup>
M&A last 12 months (1/0)	0.222 (2.35) <sup>**</sup>	0.351 (2.93) <sup>***</sup>	0.223 (2.42) <sup>**</sup>	0.239 (2.49) <sup>**</sup>	0.068 (0.86)
CEO turnover last 12 months (1/0)	0.108 (1.62)	0.129 (1.69) <sup>*</sup>	0.149 (2.30) <sup>**</sup>	0.150 (2.23) <sup>**</sup>	0.139 (2.34) <sup>**</sup>
N	9,923	9,923	9,923	9,923	9,923
Pseudo R-sq	0.2845	0.2752	0.2590	0.2811	0.2512

**Table 6: Abnormal returns at director appointment announcements**

Because our main variable of interest is binary, we follow Angrist and Pischke (2008) and employ a three-step approach using the fraction of network loss due to deaths of connected directors and fraction of network gain due to M&As by connected firms as instrumental variables. The three-step approach is discussed in detail in Appendix 3. This table reports the results from the third step (2<sup>nd</sup> stage regressions of 2SLS) where the dependent variable is the abnormal returns in the three days centered on a director appointment announcement date. Year and industry fixed effects are included, with industries being defined using Fama and French (1997) classification. All variables are defined in Appendix 1. The t values are reported in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent variable = Abnormal returns (-1,+1) at director appointment announcement					
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.839 (0.44)	9.159 (1.23)	1.398 (0.59)	2.634 (1.24)	7.821 (1.68)*	2.198 (0.55)
Connected	-0.792 (-1.44)	-8.299 (-1.06)	1.753 (1.42)	-4.563 (-2.27)**	-10.082 (-1.57)	
Connected to CEO						-1.343 (-2.02)**
Connected to non-CEO						-0.401 (-0.95)
<i>Coordination need variable</i>		<i>Board size (log)</i>	<i>Complexity factor</i>	<i>Ind. Sales growth</i>	<i>Product market fluidity</i>	
Connected x Coordination need		4.431 (2.04)**	3.837 (2.38)**	0.481 (2.89)***	1.424 (1.97)**	
Coordination need		-3.137 (-1.15)	-2.274 (-1.83)*	-0.337 (-2.98)***	-0.925 (-1.64)	
Board size (log)	-0.020 (-0.07)			-0.103 (-0.34)	0.161 (0.47)	-0.078 (-0.13)
Assets (log)	-0.043 (-0.84)	-0.125 (-1.42)		-0.023 (-0.41)	-0.051 (-0.84)	-0.071 (-0.99)
Leverage	0.497 (1.65)	0.543 (1.76)*		0.643 (1.96)*	0.249 (0.68)	0.513 (1.42)
B/M	0.310 (2.73)***	0.333 (2.85)***	0.101 (0.65)	0.293 (2.39)**	0.078 (0.42)	0.332 (2.31)**
ROA	0.355 (0.99)	0.585 (1.41)	0.552 (1.39)	0.336 (0.87)	0.806 (1.54)	0.566 (0.91)
Stock return	-0.126 (-1.09)	-0.137 (-1.16)	-0.189 (-1.41)	-0.113 (-0.91)	-0.300 (-1.66)*	-0.156 (-1.22)
Expanding board (1/0)	-0.233 (-1.93)*	-0.296 (-2.21)**	-0.301 (-1.90)*	-0.187 (-1.42)	-0.097 (-0.59)	-0.311 (-1.40)
Fraction of independent directors	0.443 (0.89)	0.219 (0.41)	0.284 (0.45)	0.524 (0.98)	0.373 (0.65)	0.310 (0.39)
Busy board (1/0)	0.285 (1.66)*	0.124 (0.56)	-0.117 (-0.38)	0.135 (0.70)	0.281 (1.39)	0.142 (0.59)

Fraction of coopted directors	0.089 (0.37)	0.053 (0.22)	0.021 (0.07)	0.037 (0.14)	0.051 (0.18)	0.048 (0.16)
Institutional holding	-0.284 (-1.17)	-0.144 (-0.52)	0.065 (0.19)	-0.388 (-1.48)	-0.179 (-0.62)	-0.285 (-0.49)
CEO tenure (log)	-0.092 (-0.76)	-0.066 (-0.53)	-0.065 (-0.44)	-0.089 (-0.68)	-0.119 (-0.80)	-0.072 (-0.57)
CEO chairman (1/0)	0.135 (1.20)	0.121 (1.05)	0.003 (0.02)	0.164 (1.35)	0.249 (1.75)*	0.135 (1.06)
Total incumbent directors' network (log)	-0.087 (-0.87)	-0.146 (-1.29)	-0.255 (-1.82)*	0.019 (0.17)	-0.125 (-1.02)	-0.173 (-0.61)
Local labor market	1.279 (0.75)	0.555 (0.30)	0.416 (0.18)	0.910 (0.50)	2.146 (1.06)	0.854 (0.47)
M&A last 12 months (1/0)	0.034 (0.19)	0.015 (0.08)	0.230 (0.98)	0.132 (0.66)	-0.342 (-1.23)	0.017 (0.09)
CEO turnover last 12 months (1/0)	-0.115 (-0.83)	-0.154 (-1.07)	0.052 (0.32)	-0.171 (-1.14)	-0.272 (-1.45)	-0.140 (-0.94)
Appointee is a CEO (1/0)	-0.233 (-1.33)	-0.341 (-1.70)*	-0.326 (-1.40)	-0.221 (-1.17)	0.014 (0.06)	-0.300 (-1.19)
Appointee has M&A experience (1/0)	-0.135 (-0.28)	-0.225 (-0.45)	-0.386 (-0.61)	-0.010 (-0.02)	0.117 (0.20)	-0.118 (-0.21)
Appointee's number of board seats	-0.042 (-1.03)	-0.091 (-1.55)	-0.078 (-1.38)	-0.026 (-0.58)	-0.081 (-1.61)	-0.097 (-0.65)
Appointee's age (log)	-0.044 (-0.11)	-0.236 (-0.56)	-0.103 (-0.22)	0.013 (0.03)	-0.136 (-0.31)	-0.184 (-0.40)
Appointee is female (1/0)	-0.033 (-0.23)	-0.014 (-0.09)	0.083 (0.45)	-0.133 (-0.82)	0.023 (0.13)	-0.020 (-0.14)
Appointee's total networks (log)	0.026 (0.68)	-0.017 (-0.31)	-0.014 (-0.25)	0.048 (1.14)	0.050 (1.02)	-0.011 (-0.09)
N	9,923	9,923	9,923	9,923	9,923	9,923
Adj R-sq	0.0186	0.0188	0.0226	0.0187	0.0187	0.0188

**Table 7: Shareholder votes after director appointments**

Because our main variable of interest is binary, we follow Angrist and Pischke (2008) and employ a three-step approach using the fraction of network loss due to deaths of connected directors and fraction of network gain due to M&As by connected firms as instrumental variables. The three-step approach is discussed in detail in Appendix 3. This table reports the results from the third step (2<sup>nd</sup> stage regressions of 2SLS) where the dependent variable is the excess shareholder votes for the appointment of the directors in our sample. Year and industry fixed effects are included, with industries being defined using Fama and French (1997) classification. All variables are defined in Appendix 1. The t values are reported in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

	Dependent variable = Excess shareholder vote					
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-38.203 (-8.77)***	6.625 (0.38)	-23.118 (-3.77)***	-36.292 (-7.53)***	-26.892 (-3.87)***	-28.082 (-5.18)***
Connected	-3.422 (-2.21)***	-16.490 (-1.89)*	1.389 (0.82)	-16.310 (-3.84)***	-15.654 (-1.73)*	
Connected to CEO						-3.852 (-1.87)*
Connected to non-CEO						-2.056 (-1.34)
<i>Coordination need variable</i>		<i>Board size (log)</i>	<i>Complexity factor</i>	<i>Ind. Sales growth</i>	<i>Product market fluidity</i>	
Connected x Coordination need		12.482 (2.22)**	5.928 (2.13)**	0.751 (2.24)**	3.340 (2.81)***	
Coordination need		-15.450 (-2.33)**	0.484 (0.21)	-0.585 (-2.36)**	-1.777 (-2.05)**	
Board size (log)	1.809 (3.40)***				2.358 (3.54)***	1.920 (3.06)***
Assets (log)	1.941 (21.72)***	1.588 (9.85)***		1.962 (19.77)***	1.834 (14.91)***	1.624 (14.20)***
Leverage	-1.696 (-2.96)***	-1.413 (-2.45)**		-1.523 (-2.40)**	-1.502 (-2.30)**	-1.243 (-1.96)**
BM	-1.310 (-4.61)***	-1.006 (-3.31)***	-1.027 (-2.92)***	-1.211 (-3.83)***	-1.791 (-4.60)***	-0.842 (-2.64)***
ROA	-1.861 (-2.16)**	-1.051 (-1.16)	1.274 (1.39)	-2.138 (-2.20)**	-0.852 (-0.68)	-0.445 (-0.46)
Stock return	0.157 (0.66)	0.237 (1.00)	-0.168 (-0.64)	0.256 (0.96)	-0.132 (-0.42)	-0.052 (-0.20)
Expanding board (1/0)	0.107 (0.51)	-0.012 (-0.06)	-0.080 (-0.33)	0.129 (0.55)	0.294 (1.11)	-0.212 (-0.90)
Fraction of independent directors	1.215 (1.24)	0.354 (0.35)	0.746 (0.66)	0.724 (0.66)	0.542 (0.47)	-0.513 (-0.46)
Busy board (1/0)	0.614 (2.10)**	0.145 (0.43)	1.315 (3.25)***	0.357 (1.05)	0.481 (1.40)	-0.362 (-0.98)
Fraction of coopted directors	-0.096 (-0.22)	-0.508 (-1.09)	-0.731 (-1.42)	-0.171 (-0.35)	0.150 (0.30)	-0.327 (-0.66)

Institutional holding	-1.384 (-3.01)***	-1.040 (-2.19)**	-0.793 (-1.40)	-1.639 (-3.17)***	-1.464 (-2.74)***	-0.839 (-1.54)
CEO tenure (log)	-0.794 (-3.28)***	-0.487 (-1.83)*	-0.243 (-0.86)	-0.924 (-3.40)***	-1.118 (-3.81)***	-0.917 (-3.44)***
CEO chairman (1/0)	0.134 (0.65)	0.080 (0.39)	0.862 (3.51)***	0.164 (0.72)	0.362 (1.40)	0.234 (1.04)
Total incumbent directors' network (log)	0.406 (1.68)*	0.563 (2.26)**	0.605 (1.53)	0.733 (2.34)**	0.517 (1.77)*	0.113 (0.36)
Local labor market	6.628 (2.14)**	4.221 (1.32)	5.227 (1.37)	5.258 (1.52)	8.778 (2.44)**	2.398 (0.68)
M&A last 12 months (1/0)	-0.445 (-1.39)	-0.405 (-1.28)	0.286 (0.75)	-0.309 (-0.86)	-0.697 (-1.74)*	-0.628 (-1.79)*
CEO turnover last 12 months (1/0)	-0.410 (-1.63)	-0.596 (-2.31)**	-0.778 (-2.72)***	-0.614 (-2.11)**	-0.569 (-1.93)*	-0.633 (-2.29)**
Appointee is a CEO (1/0)	-0.085 (-0.29)	-0.343 (-1.11)	-0.033 (-0.10)	-0.099 (-0.30)	0.115 (0.33)	-0.250 (-0.76)
Appointee has M&A experience (1/0)	0.206 (0.24)	0.242 (0.28)	-1.711 (-1.66)*	-0.010 (-0.01)	0.769 (0.75)	0.570 (0.60)
Appointee's number of board seats	0.084 (1.46)	0.045 (0.77)	0.019 (0.30)	0.091 (1.42)	0.036 (0.53)	-0.168 (-2.24)**
Appointee's age (log)	1.155 (1.54)	0.417 (0.52)	0.159 (0.18)	1.090 (1.31)	1.284 (1.48)	0.556 (0.67)
Appointee is female (1/0)	-0.288 (-1.11)	-0.184 (-0.71)	0.166 (0.54)	-0.464 (-1.56)	-0.209 (-0.68)	0.036 (0.12)
Appointee's total networks (log)	0.748 (5.24)***	0.245 (1.05)	-0.155 (-0.80)	0.883 (5.02)***	0.764 (4.72)***	0.257 (1.14)
ISS recommendation (1/0)	17.764 (37.21)***	17.691 (37.41)***	17.352 (32.04)***	18.070 (33.06)***	17.721 (32.34)***	17.045 (31.92)***
Appointee will serve in audit committee (1/0)	0.291 (1.43)	0.113 (0.53)	0.250 (1.04)	0.199 (0.87)	0.437 (1.75)*	0.217 (0.97)
Appointee will serve in nomination committee (1/0)	-0.202 (-0.85)	-0.054 (-0.23)	-0.332 (-1.21)	-0.140 (-0.54)	-0.272 (-1.01)	-0.217 (-0.84)
Appointee will serve in compensation committee (1/0)	-0.086 (-0.40)	-0.165 (-0.76)	-0.369 (-1.44)	-0.247 (-0.99)	-0.044 (-0.18)	-0.230 (-0.97)
N	6,030	6,030	6,030	6,030	6,030	6,030
Adj R-sq	0.3531	0.3556	0.2990	0.3538	0.3534	0.3531

**Table 8: Alternative measures for “connection”**

This table summarizes the results of the 2<sup>nd</sup> stage of 2SLS where the dependent variables are the abnormal returns (-1,+1) at director appointment announcement and the excess shareholder vote after the director appointment, using the fraction of network loss due to deaths of connected directors and fraction of network gain due to M&As by connected firms as instrumental variables. In Panel A, “number of connections” is equal to the natural logarithm of (the number of incumbent directors that are connected with the appointee, plus one). “Number of connections with non-CEO” are estimated similarly. “CEO connection” takes value of one if an appointee is connected to the incumbent CEO and zero otherwise. In Panel B, “length of connections” is set to the natural logarithm of (the total length (in years) of all connections between incumbent directors and the appointee, plus one). “Length of connections with CEO” and “Length of connections with non-CEO” are estimated similarly. All variables are defined in Appendix 1. The t values are reported in parentheses. \*, \*\*, and \*\*\* denote statistical significance at the 10%, 5% and 1% level, respectively.

**Panel A: Number of connections**

Dependent variable	Independent variable: Instrumented interaction	Coefficient	t-value	Other control variables as in
Abnormal returns (-1,+1) at director appointment	Number of connections x Board size (log)	0.846	(2.44)**	Table 6, Model (2)
	Number of connections x Complexity factor	0.366	(2.95)***	Table 6, Model (3)
	Number of connections x Industry sales growth	0.018	(1.75)*	Table 6, Model (4)
	Number of connections x Product market fluidity	0.025	(0.36)	Table 6, Model (5)
	CEO connection (1/0)	-0.760	(-1.73)*	Table 6, Model (6)
	Number of connections to non-CEO	-0.588	(-1.71)*	Table 6, Model (6)
Excess shareholder vote	Number of connections x Board size (log)	4.548	(3.42)***	Table 7, Model (2)
	Number of connections x Complexity factor	1.370	(2.50)**	Table 7, Model (3)
	Number of connections x Industry sales growth	0.036	(0.82)	Table 7, Model (4)
	Number of connections x Product market fluidity	0.087	(1.76)*	Table 7, Model (5)
	CEO connection (1/0)	-1.561	(-1.22)	Table 7, Model (6)
	Number of connections to non-CEO	-0.896	(-0.58)	Table 7, Model (6)

**Panel B: Length of connections**

Dependent variable	Independent variable: Instrumented interaction	Coefficient	t-value	Other control variables as in
Abnormal returns (-1,+1) at director appointment	Length of connections x Board size (log)	0.629	(3.20)***	Table 6, Model (2)
	Length of connections x Complexity factor	0.193	(2.02)**	Table 6, Model (3)
	Length of connections x Industry sales growth	0.008	(1.75)*	Table 6, Model (4)
	Length of connections x Product market fluidity	0.019	(0.80)	Table 6, Model (5)
	Length of connections to CEO	-1.074	(-1.91)*	Table 6, Model (6)
	Length of connections to non-CEO	-0.374	(-1.21)	Table 6, Model (6)
Excess shareholder vote	Length of connections x Board size (log)	3.460	(5.58)***	Table 7, Model (2)
	Length of connections x Complexity factor	0.826	(3.04)***	Table 7, Model (3)
	Length of connections x Industry sales growth	0.018	(1.68)*	Table 7, Model (4)
	Length of connections x Product market fluidity	0.064	(1.86)*	Table 7, Model (5)
	Length of connections to CEO	-0.684	(-1.88)*	Table 7, Model (6)
	Length of connections to non-CEO	-0.413	(-1.42)	Table 7, Model (6)

## Appendix 1: Variable definitions

**Abnormal return (-1,+1) around an outside director appointment announcement** is calculated as the stock return of an appointing firm over the three trading days centered on a director appointment announcement date, minus the CRSP value-weighted market return over the same period.

**Appointed director is a CEO (1/0)** equals one if the appointee is a CEO of a public firm.

**Appointed director's number of board seats** is the number of directorships in public firms that the appointee holds at the time of her new appointment.

**Appointed director's total network** is the total number of 1<sup>st</sup> and 2<sup>nd</sup> degree connections of an appointed director in our sample.

**Board size** is the total number of directors in the board.

**Book-to-market (BM)** equals the book value of common equity divided by the market value of common equity.

**Candidate pool size** is the number of potential director candidates for a particular appointment in our sample; an individual is classified as a candidate if she was appointed to a firm in the same Metropolitan Statistical Area (MSA) and with total assets value between 50% and 150% of the appointing firm, within one year before and one year after the sample director appointment at the appointing firm.

**CEO chairman (1/0)** equals one if a CEO is also the chairman of the board and zero otherwise.

**CEO tenure** equals the number of years the incumbent CEO has been in her position.

**CEO turnover last 12 months (1/0)** equals one if there is a CEO turnover event during the past 12 months of a sample director appointment.

**Complexity factor** is the score from a factor analysis where the components are number of business segments, natural logarithm of sales, and leverage.

**Connected director (1/0)** equals one if the appointing firm has at least one incumbent director who has a first- degree or second-degree connection with the appointee/candidate.

**Connected to CEO (1/0)** equals one if the CEO of the appointing firm has a first-degree or second-degree connection with the appointee/candidate.

**Connected to non-CEO (1/0)** equals one if the appointee/candidate is connected to only non-CEO directors of the appointing firm.

**Coordination need variables** include board size, complexity factor, mean industry sales growth with industries being defined using Fama and French (1997) classification, and product market fluidity.

**Different industry (1/0)** equals one if the candidate has experience in a different BoardEx sector than that of the appointing firm, and zero otherwise.

**Excess shareholder votes for director appointment** are the percentage votes for the newly appointed director minus the company average votes for all other directors up for election at the same shareholder meeting.

**Female added to an all-male board (1/0)** equals one if a candidate is female while all incumbent directors are male, and zero otherwise.

**First-degree connection** exists when two directors have worked (in executive capacity) or been on the board at the same company.

**Fraction of coopted directors** equals the number of outside directors who join the firm after the current CEO, divided by the number of outside directors.

**Fraction of independent directors** equals the number of outside directors divided by board size.

**Fraction of network loss due to director death** equals the number of first- and second-degree connections lost in the appointing firm's director network due to deaths of connected directors in the last three years, divided by the size of its director network at the time of a new director appointment.

**Institutional holdings** equals the fraction of the total shares outstanding held by institutions.

**ISS recommendation (1/0)** equals one if the ISS recommend “For” for the election of a newly appointed outside director and zero otherwise.

**Length of connections** equals to the natural logarithm of (the total length (in years) of all connections between incumbent directors and the candidate/appointee, plus one).

**Length of connections with CEO** is set to the natural logarithm of (the total length (in years) of all connections between the incumbent CEO and the candidate/appointee, plus one).

**Leverage** equals total debt divided by total assets.

**Local labor market** is the fraction of directors working in firms within 60 miles of appointing firms at the time of a new director appointment.

**Long connection (1/0)** equals one if a candidate/appointee is connected to the incumbent board and the connection is at least ten years long, and zero otherwise.

**M&A last 12 months (1/0)** equals one if there is any M&A activity involving the appointing firm within the past 12 months of a sample director appointment and zero otherwise.

**Multiple connection (1/0)** equals one if the candidate/appointee is connected to more than one incumbent board members and zero otherwise.

**Number of connections** equals to the natural logarithm of (the number of incumbent directors that are connected with the candidate/appointee, plus one).

**Number of connected directors' deaths last 3 years** equals the number of deaths in the appointing firms' director network in the last 3 years before a new director appointment.

**Number of new experiences** is the sum of 27 dummy variables that each equals one if the appointee has some experience that none of the incumbent directors has. Such experience (available in BoardEx database) includes MBA degree, Ivy League graduate, government, military, foreign, CEO, CFO, COO, general manager, regulator, finance, human resources, marketing, operating, accounting, law, academic, IT, R&D, strategy, logistics, manufacturing, public relations, M&A, audit committee, compensation committee, and governance committee experience.

**Past connection (1/0)** equals one if a candidate/appointee is connected to the incumbent board and the connection ended more than ten years before the sample director appointment, and zero otherwise.

**Product market fluidity** is obtained from the Hoberg-Phillips' data library.

**Recent connection (1/0)** equals one if a candidate/appointee is connected to the incumbent board and the connection has not ended or ended within ten years before the sample director appointment, and zero otherwise.

**Second-degree connection** exists when two directors have worked (in an executive capacity) or been on the board with the same third person at a company.

**Shareholder votes for director appointment** is the percentage of shareholders that vote “for” an appointment of an outside director.

**Short connection (1/0)** equals one if a candidate/appointee is connected to the incumbent board and the connection is shorter than ten years, and zero otherwise.

**Single connection** equals one if the candidate/appointee is connected to only one board member and zero otherwise.

**Stock return** is the compounded daily stock return during the fiscal year ending before a director appointment.

**Total incumbent directors' network** is the total number of 1<sup>st</sup> and 2<sup>nd</sup> degree connections of the incumbent directors at appointing firms.

**Unconnected director (1/0)** equals one if the appointing firm does not have any incumbent director who has a first-degree or second-degree connection with the appointee or candidate.



## **Appendix 2: Additional details on data selection**

### ***Merging BoardEx data and Compustat/CRSP/RiskMetrics firms:***

BoardEx provides the International Securities Identification Number (ISIN) for all public firms in their database. For U.S. firms, the ISIN is assigned by the CUSIP Service Bureau and the 9 digits after the country code consist of the firm's CUSIP code. We use the announcement date of a director appointment and the appointing firm's CUSIP code to match with the Compustat/CRSP and RiskMetrics data at the most recent fiscal year end. To get shareholder votes on elections of directors in our sample, we manually merge the directors in our sample and the directors from ISS database of shareholder votes by director names.

### ***Defining connections between directors:***

Two individuals have a direct connection if they both have worked at the same company at the same time in the capacity of executives or directors. We remove the non-board and non-executive positions where the role description is employee, researcher, faculty member, visiting fellow/scholar, lecturer, instructor, teacher, research assistant, secretary, trainee, trainer, scholar, reporter, writer, editor, columnist, journalist, dean, provost, administrator, governor, lieutenant, mayor, minister, senator, accountant, deputy/assistant director, director emeritus, observer, director - non-board, honorary chairman/director, associate director, fellow, intern, military service, captain, colonel, lieutenant, commander, major general, major, civil servant, assistant VP, scientist, clerk, physicist, chemist, geologist, economist, chartered accountant, advisory council member, MP, assistant manager, chairman emeritus, assistant treasurer, solicitor, technician, technical director/manager/consultant/advisor, judge, lawyer, attorney, investigator, inspector, prosecutor, branch manager, mentor, account manager, editor-in-chief, investor, superintendent, chancellor, statutory auditor, trader, deputy, sales representative, physician, resident doctor, doctor, independent consultant, broker, agent, plant manager, delegate, special assistant, program manager, executive-in-residence, apprentice, pilot, inspector, arbitrator, publisher, assistant controller, coach, advocate, entrepreneur-in-residence, developer, internal auditor, spokesman, producer, architect, designer, reviewer, underwriter, software engineer, salesman, collector, surgeon, permanent representative, director - administration, programmer, principal consultant, stockbroker, barrister, national director, examiner, planner, sales engineer, correspondent, spokesperson, representative director, liaison officer, actuary, comptroller, surveyor, diplomat, censor, geophysicist, investment professional, personal assistant, overseer, rector, player, shareholder, magistrate, creative director, alternate member, management accountant, assistant corporate secret, dealer, mediator, patron, strategist, staff assistant, cabinet member, or registrar.

If a firm has more than 100 employees, we further remove auditor, council, representative, consultant, analyst, business development, acting/ elect/ co-/ honorary/ assistant/ regional/ global/ division/ group/ executive VP, VP (except for general, executive, senior, finance, corporate, HR, corporation, investment, IR, marketing, legal, technology, strategy, and communication VP), manager (except for general and chief manager), advisor, counsel (except for corporate or general counsel), partner (except for managing or founding partner), representative, coordinator, ambassador, commissioner, supervisor, banker, brigadier, designate, chairman/woman, joint, deputy, trustee, investment banker, operating executive, project leader, team leader, specialist, sales executive, or a position with role description as 'various positions.'

### Appendix 3: Instrumental Variables

#### Three-step approach:

Because the main variable of interest is an indicator variable, the conditional expectation function (CEF) associated with the first stage regression is likely to be nonlinear if we apply a standard 2SLS method. Using a logistic regression in the first stage (such as in the case of the indicator variable for an appointment of a connected director), however, is problematic because the second stage regressions would become ‘forbidden regressions,’ a term that refers to replacing a nonlinear function of an endogenous explanatory variable with the same nonlinear function of fitted values from a first-stage estimation. (See, for example, Angrist and Pischke (2008) and Wooldridge (2010).)

To avoid problems due to an incorrect nonlinear first stage, we follow Angrist and Pischke (2008) and use the nonlinear fitted values as instruments instead of plugging in nonlinear fitted values. We employ their three-step approach. For example, suppose the causal model of interest is:

$$Y_i = \delta D_i + \zeta C_i + \varepsilon I_i + \varrho X_i + \xi_i \quad (1)$$

where  $Y_i$  is the abnormal returns at director appointment  $i$ ,  $D_i$  is a dummy variable for connected appointee,  $C_i$  is a proxy for firm coordination need (i.e., board size, complexity factor, industry sales growth, or market fluidity),  $I_i$  is the interaction between  $D_i$  and  $C_i$  (i.e.,  $I_i = D_i \times C_i$ ); and  $X_i$ 's are control variables for firm/board/appointee characteristics.

In the first step, we run a logistic regression where the dependent variable is  $D_i$  and independent variables include  $Z_{1i}$  ( $Z_{2i}$ ) – the fraction of network loss (gain) due to deaths of connected directors (mergers by connected firms) – and  $X_i$ 's:

$$D_i = \frac{1}{1 + e^{-(\alpha Z_{1i} + \beta Z_{2i} + \gamma X_i + v_i)}} \quad (2)$$

In addition, in the first step we estimate an OLS regression where the dependent variable is  $I_i$ ; the main independent variables are the interactions ( $I_{1i}$  and  $I_{2i}$ ) between the each of the two instruments  $Z_{1i}$  and  $Z_{2i}$  and  $C_i$  (i.e.,  $I_{1i} = Z_{1i} \times C_i$ ;  $I_{2i} = Z_{2i} \times C_i$ ); we also control for  $X_i$ 's:

$$I_i = \theta I_{1i} + \lambda I_{2i} + \pi X_i + \eta_i \quad (3)$$

In the second step, we run the first stage OLS regressions of standard two stage least squares (2SLS) using the predicted values  $\widehat{D}_i$  and  $\widehat{I}_i$  from regressions (2) and (3), respectively, as instrumental variables along with  $X_i$ 's.

$$D_i = \rho \widehat{D}_i + \tau X_i + \varphi_i \quad (4)$$

$$I_i = \sigma \widehat{I}_i + \psi X_i + \omega_i \quad (5)$$

In the third step, we run the standard second stage of 2SLS for our dependent variable of interest. That is, we run OLS regression (1) where  $D_i$  and  $I_i$  are replaced by the predicted values  $\widehat{D}'_i$  and  $\widehat{I}'_i$  from models (4) and (5), respectively:

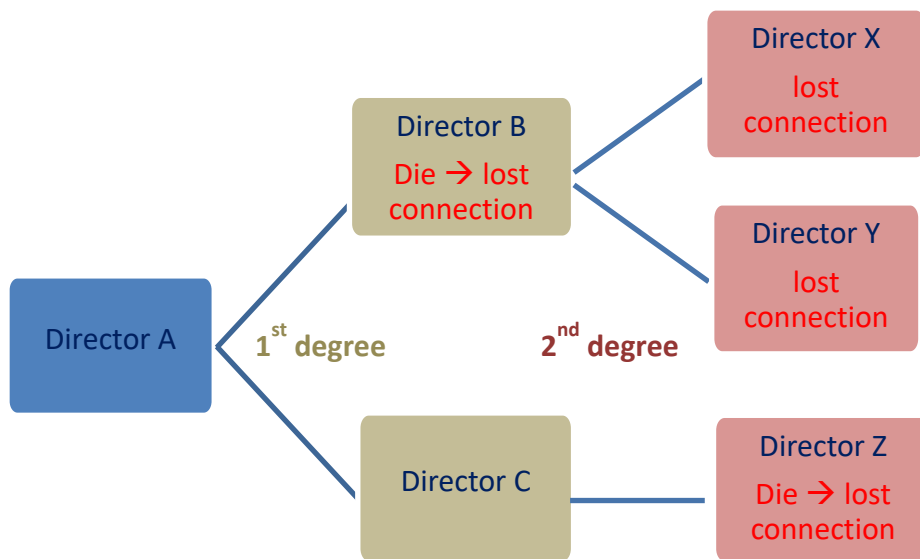
$$Y_i = \delta \widehat{D}'_i + \zeta C_i + \varepsilon \widehat{I}'_i + \varrho X_i + \xi_i \quad (6)$$

We note that the second and third steps are estimated together using the standard STATA 2SLS procedures to make sure the standard errors are correct and to avoid mistakes such as covariate ambivalence (Angrist and Pischke, 2008).

**Figure 1: Deaths of connected directors and network loss - Example**

Director A is an incumbent director of an appointing firm. Director B was director A's first-degree connection at a different firm from the appointing firm. When director B dies, director B is removed from director A's network. Directors X and Y were director B's first-degree connections, hence director A's second-degree connections. Directors X and Y, therefore, are also removed from director A's network after the death of director B.

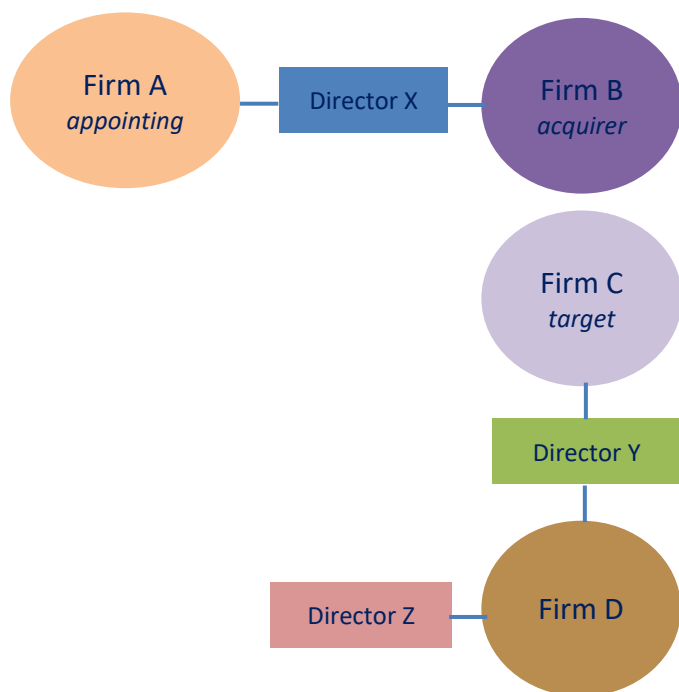
Director C is director A's first-degree connection at a different firm from the appointing firm. Director Z was director C's first-degree connection, hence director A's second-degree connection. When director Z dies, director Z is removed from director A's network.



**Figure 2: Acquisitions of connected firms and network gain - Example**

Appointing firm A is connected to firm B through director X, who sits on both A and B's board. When firm B acquires firm C, director Y from firm C joins firm B and becomes a 1<sup>st</sup> degree connection with director X. We do not count director Y when calculating the increase in firm A's network for our instrument, since Y is directly involved in the M&A as a director of the target firm C. Instead, if director Y shares a board with a director Z through a firm different than the target firm C, we count director Z as a gain in firm A's network, since director Z becomes a 2<sup>nd</sup> degree connection of firm A's director X as a result of the merger.

**Figure 2A: Before acquisition**



**Figure 2B: After firm B acquires firm C**

