ABSTRACT

Title of dissertation: THE ROLE OF NETWORKS IN THE CEO AND DIRECTOR LABOR MARKET

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The dissertation investigates the role of networks and connectedness on CEO and director labor market outcomes. I develop new measures of degree, closeness, betweenness, and eigenvector centrality using a new database of executive connections based on executive and director biographical information supplied by BoardEx. I then study the influence of networks and connectedness on CEO labor market outcomes, including new CEO appointments, CEO termination, and CEO compensation. I distinguish between the pairwise specific CEO-board connectedness and the strength and structure of the CEO's overall connectedness. I find that both types of connectedness add to traditional turnover and compensation variables in distinct and economically significant ways. Specific connectedness increases CEO entrenchment. Greater overall CEO connectedness on the employment network results in greater likelihood of CEO departure, greater turnover-performance sensitivity, and more rapid re-employment of a departed CEO. The existence of specific links between the

CEO candidate and the board of directors enhances the chances of appointment in the event a company chooses to appoint an outsider as the CEO. Finally, CEOs with better overall connectedness enjoy higher total compensation. The evidence suggests that the general connectedness of a CEO in the employment network has significant and distinct economic effects beyond those of the connections between the CEO and the board in the current firm.

In the paper "On the Independence of Independent Directors", I examine director appointment and replacement decisions after a new CEO assumes office. A new incoming CEO can make many changes in the size and structure of the board and influence on the types of individuals that populate it. I assess the role played by prior connections between the CEO and outside directors, including the overlaps established through common employment history, educational background, and other activities. I also test the nature of these changes in specifications that model CEO and director changes jointly. I find that with a higher proportion of professionally connected outside directors on the board, the CEO is more likely to stay. New CEOs reshape the board in the early years of their tenure rather than later years when they may have more power and influence. Conditional on CEO continuation, outside directors that are of similar age to the CEO and share common employment antecedents with the CEO are less likely to be replaced. Replacements of unconnected directors are accompanied by appointments of connected directors. I discuss the implications of the findings for research and practice.

THE ROLE OF NETWORKS IN THE CEO AND DIRECTOR LABOR MARKET

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Dedication

To Dad and Mom with love and gratitude.

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Essay 1:

The Impact of Networks on CEO Turnover, Appointment, and Compensation

Abstract

I study the influence of networks and connectedness on CEO labor market outcomes, including new CEO appointments, CEO termination, and CEO compensation. I distinguish between the pairwise specific CEO-board connectedness and the strength and structure of the CEO's overall connectedness. I find that both types of connectedness add to traditional turnover and compensation variables in distinct and economically significant ways. Specific connectedness increases CEO entrenchment. Greater overall CEO connectedness on the employment network results in greater likelihood of CEO departure, greater turnover-performance sensitivity, and more rapid re-employment of a departed CEO. The existence of specific links between the CEO candidate and the board of directors enhances the chances of appointment in the event a company chooses to appoint an outsider as the CEO. Finally, CEOs with better overall connectedness enjoy higher total compensation. The evidence suggests that the general connectedness of a CEO in the employment network has significant and distinct economic effects beyond those of the connections between the CEO and the board in the current firm.

1 Introduction

Innovations in technology have made networking a crucial part of everyday life and business activities. Social networking services such as Facebook, LinkedIn, and Twitter were nonexistent until the early 2000s, but today they have hundreds of millions of users. The impact of networks on economic outcomes have attracted considerable and growing attention from researchers (Granovetter (2005)). This paper focuses on the role of networks in the labor markets for chief executive officers (CEOs).

Networks play an important role in the decision to hire, let go, or retain a CEO and in decisions about how to compensate the CEO. Links between the CEO and the board could prevent the board of directors from effectively monitoring and objectively disciplining the CEO. Board directors who are not socially independent from the CEO may retain a poorly performing CEO or agree to high compensation without justification (Hwang and Kim (2009b) and Kramarz and Thesmar (2006)). In addition, the strength and structure of the CEO's overall connectedness represents his or her social capital and outside employment opportunities (Burt (1992) and Granovetter (1995)). A better-connected CEO is more likely to find a good new position after departure from the current firm. As a result, overall connectedness could affect CEO turnover and compensation in different ways than the pairwise specific CEO-board connectedness. Most prior empirical studies on CEO and director networks ignore the general connectedness. This paper shows that both types of connectedness are important in multiple key functions of the board of directors: CEO firing, CEO appointment, and CEO compensation.

Using the biographical data of executives and directors in more than 5,000 U.S. companies from 1990 to 2007, I construct annual networks resulting from overlapping employment affiliations. I evaluate an individual's overall connectedness by borrowing four measures from the science and sociology literature. These measures capture different aspects of an individual's prominence on a network. For each pair of CEO and board of directors, I count the specific ties between them. Controlling for other determinants of CEO turnover, CEO appointment, and CEO compensation, I test whether, how, and in what direction the two types of connectedness variables affect these decisions.

I first examine the impact of the incumbent CEO's network connectedness on the likelihood of a turnover event. I find that the existence of ties between the CEO and the board directors decreases both the probability of CEO turnover and the turnover-performance sensitivity. This evidence suggests that a CEO linked to the board is entrenched in the current position, even if he performs poorly. In contrast, the general connectedness of the CEO is related to a higher probability of turnover and stronger turnover-performance sensitivity. This result implies that more outside opportunities make it easier for the CEO to depart. The board's disciplinary replacement decision faces less resistance from the incumbent CEO with better job market insurance.

A follow-up question is whether the overall connectedness measures indeed represent the CEO's outside opportunities. My second test examines how the type of new position assumed by the departed CEO is related to his connectedness. I find that greater connectedness on the overall employment network leads to a better chance of becoming a top executive or director in another company after CEO departure. However, the pairwise connections to the old company's board of directors does not help the departed CEO in getting a good outside position. This result highlights the distinct effect of general connectedness on CEO outside opportunities, which is ignored by prior work such as Hwang and Kim (2009b).

I then address the issue of new CEO appointments. Controlling for other observable characteristics of CEO candidates, I test whether the likelihood of being selected as the new CEO is a function of the candidate's connectedness. For the subsample of companies that choose to recruit an outsider as the new CEO, I find that pairwise connectedness between the CEO candidate and the board of directors boosts the chances of appointment. This finding is consistent with survey results suggesting that companies searching for a new CEO from outside largely rely on board member references. Connections to the board members reduce the uncertainty about the candidate's quality. For the subsample of companies that choose to promote an insider as the new CEO, I find that overall connectedness of the candidate has a negative effect on the likelihood of appointment. The costs of hiring a busy networking CEO appear to outweigh the potential benefits derived from the candidate's overall connectedness.

Finally, I examine whether the CEO's social network explains compensation. I again differentiate between the specific CEO-board connectedness and the CEO general connectedness. Each of them could have its own effect. Pairwise connectedness may increase CEO compensation due to the board members' attachments to the CEO. General connectedness reflects the CEO's outside opportunities and helps to bid up the market price of his human capital. My findings show that the overall connectedness has a bigger impact on CEO compensation than the pairwise connectedness. Omitting the CEO's general connectedness when considering the specific CEO-board connectedness could incorrectly attribute the higher compensation enjoyed by well-connected CEOs to director nepotism only.

This paper makes several contributions. First, I bring out the contrast between the notions of a CEO's specific connectedness to the board of directors and his general connectedness on the overall executive and director network. This dichotomy allows me to disentangle potential entrenchment effects resulting from pairwise connectedness from the impact of outside opportunities created by overall connectedness. Related studies on social networks and corporate governance look at only one type of the connectedness. For examples, Hwang and Kim (2009b) and Kramarz and Thesmar (2006) focus on the mutual affinity between the CEO and the board of directors but ignore CEO overall connectedness. They argue that CEO-board connectedness reduces the board's monitory and disciplinary effectiveness and thus is detrimental to the firm. On the other hand, Ang, Nagel, and Yang (2009) consider the CEO's social interactions outside the company but not those within the company. They suggest that well-connected CEOs demand higher compensation due to peer pressure. My results show that it is important to consider both types of connectedness because each has significant and distinct economic effects on multiple important corporate decisions regarding CEOs.

Moreover, my empirical tests provide evidence on the importance of connectedness in all critical choice variables pertaining to the CEO. Therefore, this paper contributes to the literature of CEO turnover, CEO appointment, and CEO compensation. For CEO turnover, I clarify some findings reported in prior work. For example, Kramarz and Thesmar (2006) document that well-connected CEOs are less likely to be replaced and exhibit weaker turnover-performance sensitivity. I point out that it is the internal connectedness that entrenches the incumbent CEO and that CEO overall connectedness increases the turnover-performance sensitivity. I report several new findings on CEO appointments. Prior empirical studies such as Parrino (1997) examine the industry and company characteristics that affect a company's decision to appoint a new CEO from inside or outside the firm. My analysis explores the characteristics of a CEO candidate that influence his chance of being appointed. In particular, I find that pairwise connectedness between the CEO candidate and the board of directors is important, especially for companies that hire from outside. For CEO compensation, my results show that CEO overall connectedness increases his compensation, controlling for specific CEO-board connectedness and other conventional determinants. Therefore, the higher compensation enjoyed by a well-connected CEO could be a result of more bidders for his human capital. This result adds to related studies suggesting that connected CEOs receive higher compensation due to bad governance (e.g., Hwang and Kim (2009b)).

Also, the network measures used in this paper are more encompassing than those used in other studies on CEO connectedness. I define various senses of connectedness. I distinguish the pairwise connectedness from the overall connectedness. To further clarify what "overall connectedness" means, I borrow four measures from the graph theory, each capturing one aspect of the concept. The four measures take into consideration direct ties, indirect ties, the quality of ties, and the strategic position based on the pattern of ties.

Finally, the sample used in this paper includes a large set of executives and directors. I study the extensive social networks formed by CEOs, and by other executives and directors in more than 5,000 U.S. companies. The network formation includes links established in an even greater range of public and private companies, and foreign countries. Related studies on social networks in the field of corporate finance typically study a much smaller sample of companies (e.g., Hwang and Kim (2009b) focus on the Fortune 100 companies.) Moreover, since the analytical unit in this paper is a single executive or director, the size of networks is an order of magnitude larger than those in papers focusing on a set of firms or boards (e.g., Fracassi (2008)).

The remainder of this paper proceeds as follows. Section 2 reviews the related literature. Section 3 introduces different network measures and related concepts, and Section 4 describes the data. Sections 5 - 7 present main empirical results, and Section 8 offers conclusions.

2 Literature

There are a few recent papers on the impact of social networks on CEO turnover and compensation. In a closely related paper, Hwang and Kim (2009b) find that firms whose boards have social ties to the CEOs award a significantly higher level of compensation, exhibit weaker pay-performance sensitivity, and have a lower CEO turnover probability than firms whose boards are conventionally and socially independent. In contrast with these authors, this paper asks different questions, uses different connectedness measures, and goes beyond their sample of Fortune 100 companies. Hwang and Kim focus on a new board independence measure that takes social ties into consideration and how it affects the effectiveness of board monitoring. I approach the issue from the CEO perspective and ask how different types of connectedness influence CEO labor market outcomes. Previous authors define social ties through shared background such as same regional origin or academic discipline, which are essentially a similarity measure between the CEO and the board directors indicating the *probability* of a social connection through homohpily–love of the same. I define connectedness more directly through overlapped employment as directors or executives in a same company at a same point in time, which ensures actual interactions generating information that is relevant to the CEO position. Furthermore, I differentiate between general and specific connectedness, while the previous authors do not even look at specific connectedness directly. In addition, I add new results regarding departed CEO subsequent positions and new CEO appointment.

Other work in this area includes Kramarz and Thesmar (2006), Barnea and Guedj (2006) and Ang, Nagel, and Yang (2009). Kramarz and Thesmar analyze social networks in the boardroom using a sample of French firms. They document that CEOs who belong to the network of former civil servants are less likely to be fired for bad performance. Only a few papers consider the connections to individuals outside the company. From the directors' perspectives, Barnea and Guedj find that firms with boards that are more connected to other directors award their CEOs higher compensation. They suggest that the exposure of directors to other companies' practices may change their perceptions of what is an acceptable compensation. From the CEOs' perspectives, Ang *et al.* analyze the effect of social pressures on CEO compensation, focusing on social interactions within 60 miles of the firm. They show that there are significant social premiums for well-connected CEOs, who are motivated to demand higer pay in order to secure or improve their social ranking. A common feature of these studies is that they each focus on one type of connectedness. My study considers both pairwise CEO-board connectedness and CEO overall connectedness. Also, the common theme in these papers is that social networks jeopardize corporate governance either by distorting the incentives or abilities of the boards of directors to effectively monitor the CEOs, or by magnifying CEO greed. Consequently, connected CEOs receive higher compensation and are less likely to be subject to turnover. This paper provides evidence that connectedness has other implications–such as more outside employment opportunities–than just being an indicator of bad governance.

One part of this study adds to the work on determinants of CEO turnover. Warner, Watts, and Wruck (1988) examine the association between a firm's stock performance and subsequent top management changes, including changes in CEO, president, and chairman of the board. They find that there is a negative relationship between the probability of a top management change and a firm's stock returns. In another earlier study, Weisbach (1988) documents similar results for CEO changes. In addition to stock returns, he reports that prior accounting performance is also negatively associated with the likelihood of CEO turnover. Furthermore, he finds that the turnover-performance relationship is stronger for companies with outsider-dominated boards. In this paper, I introduce and explain the role of a new determinant of CEO turnover: network connectedness. More recently, Parrino (1997) finds that the probability of turnover is greater in industries that consist of similar firms as compared with heterogeneous industries. He argues that the availability of a strong outside candidate is an important consideration in the decision to replace a CEO. In the same spirit, but from a different angle, I argue that the availability of good outside positions for the CEO is also an important factor in CEO turnover events. Huson, Parrino, and Starks (2001) investigate the incidence of CEO turnover during the 1971-1994 period. They find that the turnover-performance relationship does not change significantly from the beginning to the end of the period they examine, despite substantial changes in internal governance mechanisms and the intensity of the takeover market. The findings in my paper show that CEO connectedness is important in explaining the cross-sectional variation in the turnover-performance sensitivity.

Besides CEO turnover, Parrino (1997), and Huson, Parrino, and Starks (2001) also look at CEO succession decisions. Both papers categorize succession outcomes based on whether the newly appointed CEO is an insider or from outside the firm. Parrino finds that firms in homogeneous industries are more likely to hire replacement CEOs from outside. Huson *et al.* document an increase in the percentage of outside successions over the sample period of 1971 to 1994. They suggest that the trend in outside hiring reflects greater board diligence in monitoring CEOs. My paper asks a follow-up question: which candidate does the company choose? I explore the importance of many observable characteristics of CEO candidates and focus on the role of candidate connectedness in the CEO appointment process. Based on prior work, I examine separately the choices made by the companies that hire from outside and those that hire from inside separately.

This paper also adds to the vast literature on CEO compensation by introducing CEO connectedness as an additional determinant beyond those previously documented. The traditional explanatory variables include firm size (e.g., Rosen (1982)), firm performance (e.g., Jensen and Murphy (1990)), firm risk (e.g., Aggarwal and Samwick (1999)), board and ownership structure (e.g., Core, Holthausen, and Larcker (1999)), regulatory environment (e.g., Perry and Zenner (2001)), etc. Prior studies also indicate that CEO personal characteristics are important. For example, Bertrand and Schoar (2003) find that manager fixed effects matter for a wide range of corporate practices. In particular, they show that managers with higher performance fixed effects receive higher salary and total compensation, and they tie the findings to the manager's age and educational background. The evidence presented in this paper suggest that both the pairwise and general connectedness of the CEO have distinct and significant effects on compensation, controlling for the traditional variables.

More broadly, this study joins the emerging literature on the role of social networks in finance and economics. Researchers find that connections among firms, managers, board directors, investors, and analysts affect a wide variety of business activities. Hochberg, Ljungqvist, and Lu (2005) study the co-investment networks that venture capital syndication gives rise to and find that better network position of the venture capital firm leads to better fund performance. Cohen, Frazzini, and Malloy (2008) focus on connections between mutual fund managers and corporate directors via shared education networks. They find that portfolio managers place larger bets and earn higher returns on firms to which they are connected. Cohen, Frazzini, and Malloy (2009) analyze the effect of educational networks between sell-side equity analysts and senior officers of firms. They show that the educational connection enables analysts to gather more information about the firm, which results in better stock recommendations. Stuart and Yim (2008) examine how director networks are associated with the generation of private equity transactions targeted at U.S. public companies. They find that if a company has a director who has had leverage-buy-out experience through outside board service, this company is more likely to receive a private equity offer. This paper shows that networks also feature prominently in the CEO labor market.

The current study draws on tools developed in the science and sociology literatures. Newman (2003) provides a comprehensive review of academic developments in the field of complex networks. He notes that one of the important issues addressed in social network studies is identifying which individuals are most central, best connected to others, or most influential. Researchers typically use mathematical graph theory to quantify the notion of "centrality." The most noteworthy centrality measures include degree (Proctor and Loomis (1951)), closeness (Sabidussi (1966)), betweenness (Freeman (1977)), and eigenvector (Bonacich (1972)). I borrow these four metrics to describe an individual's overall connectedness on U.S. executive and director networks. The definitions of these measures are explained in Section 3 below.

3 Network Analysis Tools

As everyday concepts, "networks" or "connectedness" are quite complicated and allow for multiple interpretations. To quantify such concepts in an empirical study requires more specific definitions. I use network analysis tools developed in the science and sociology literatures to construct executive and director networks and to evaluate individual positions on them.

In graph theory, a network is a set of units and the connections between them, and the units are often referred to as vertices or nodes. The connections are called edges or links. Figure 1 shows a simple network with 10 nodes and 9 edges. Various "centrality measures" are develped to describe the relative prominence of a vertex on a network. In the context of this paper, centrality measures help to quantify how connected an executive or director is on the network of corporate leaders. In contrast to the internal connections that only reflect how the managers are connected to the board of directors in a particular company, centrality measures characterize the overall embeddedness of an individual in the network that consists of all the business leaders.

Using multiple measures instead of a single one has the advantage of capturing different aspects of the concept "connectedness" and allowing the comparison of their effects. As argued in Wasserman and Faust (1997), page 218, one measure "... is just one–of many–manifestations of the primary centrality concept. One should not utilize any single centrality measure. Each has its virtues and utility." I choose four commonly used centrality measures for my study: degree, closeness, betweenness, and eigenvector.

Briefly, the degree centrality is simply the number of direct links a node has; the closeness centrality is the inverse of the average distance between a node and all other nodes on the network; the betweenness centrality captures how important a node is in reducing the distance between all pairs of other nodes; and the eigenvector centrality is a weighted sum of the direct links a node has, with the weights being the importance of the linked nodes. I define these four measures mathematically in the following subsection.

3.1 Definitions of centrality measures

The first and most straightforward centrality measure is degree. It was first suggested by Proctor and Loomis (1951) to indicate how active a node is. The absolute degree $c_D(x)$ of a node x is simply the number of edges connecting x with other nodes.

Second, the closeness centrality measure indicates a person's ability to quickly interact with all others on the network. This measure, offered by Sabidussi (1966), is different from the degree centrality because it takes into account not only direct connections among units but also indirect connections. The absolute closeness of a node x is defined by

$$c_C(x) = \frac{1}{\sum_{y \in U} d(x,y)}, \tag{1}$$

where U represents the set of all nodes on the network, and $d(x, y)$ is the number of edges in a shortest path connecting units x and y.

Third, the betweenness centrality measure was introduced by Freeman (1977) to indicate a person's ability to act as an intermediary, bringing people together. A person is central, if he or she lies on several shortest paths among other pairs of persons. Such persons have control over the flow of information in the network. The absolute betweenness of a node x is defined by

$$c_B(x) = \sum_{y<z} \frac{m(y, z; x)}{m(y, z)}, \tag{2}$$

where $m(y, z; x)$ is the number of shortest paths between y and z through unit x, and $m(y, z)$ is the number of shortest paths between y and z.

Finally, Bonacich (1972) suggests the eigenvector centrality measure that potentially takes into account the "quality" of a link. The basic idea is that a link to a central node is more important than a link to a node on the fringe. Let the $n \times n$ matrix M be the adjacency matrix of the network. That is, $M_ij = 1$ if there is a link between node i and node j, and $M_ij = 0$ otherwise. Let the $n \times 1$ vector p satisfy the following conditions:

1. $Mp = ap$, where a is the largest eigenvalue of M;

2. $max_i(p_i) = 1$.

Then, the eigenvector centrality measure of node x, $C_E(x)$ corresponds to the x^{th} element of p. In essence, eigenvector centrality is a recursive measure of degree, whereby the node's centrality is defined as the sum of its links to other nodes, weighted by their respective centrality measures.

3.2 Normalization

Absolute degree centrality, closeness centrality, and betweenness centrality are correlated with the size of the network. A central node in a small network would have a smaller value of absolute centrality measure than a peripheral person in a big network. To allow comparison of connectedness across different networks, it is important to normalize these measures by the size of the network. Therefore, I define the relative centrality measures below.

The relative degree is defined by

$$C_D(x) = \frac{c_D(x)}{n-1}, \tag{3}$$

where $c_D(x)$ is the absolute degree centrality, and n represents the number of nodes in a network.

The relative closeness of a node x is defined by

$$C_C(x) = (n-1) \times c_C(x), \tag{4}$$

where $c_C(x)$ is the absolute degree centrality, and n represents the number of nodes in a network.

The relative betweenness of a node x is defined by

$$C_B(x) = \frac{c_B(x)}{(n-1)(n-2)/2}, \tag{5}$$

where $c_B(x)$ is the absolute degree centrality, and n represents the number of nodes in a network.

Notice that the theoretical maximums of all relative measures are 1.

3.3 Components

The definitions of several network measures are problematic if not all nodes in a network can be reached from one another. Such networks have multiple "components." A component of a network is defined as the subset of nodes that can be reached from one another by paths running along connections. The largest component is the component consisting of the largest number of nodes. For example, Figure 1 represents a network consisting of three components. One consists of nodes $v1$ and $v2$. One consists of nodes $v3$, $v4$, and $v5$. All other nodes belong to the largest component.

Problems arise because the shortest distance d is undefined for unconnected pairs. Conventionally, one assigns infinite d to the unconnected pairs, but then the mean value of d also becomes infinite, the value of closeness measures as defined in Equation 1 becomes zero for all nodes, and the betweenness measures as defined in Definition 2 are not calculable. To circumvent these problems in this paper, I calculate the closeness and betweenness measures over the component to which this person belongs, and then scale by the ratio of the size of this component and the size of the whole network. This method was proposed by Sabidussi (1966).

3.4 An example

Consider a simple network illustrated in Figure 2, developed by Krackhardt (1990). It has only 10 nodes and 18 edges. But it brings out the distinction of different centrality measures. Table 1 lists the values of normalized degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality as defined in Section 3.2 for each node.

In Figure 2, Diane has the highest degree measure. She is directly connected to 6 persons, and thus has the highest normalized degree measure of $\frac{6}{(10-1)} = 0.667$. However, she does not have the highest closeness measure in this network when both direct and indirect contacts are considered. It takes Diane at least four steps to reach Jane, three steps to reach Ian, two steps to reach Heather, and one step to reach everyone else. Therefore, $c_C(\text{Diane}) = \frac{1}{4+3+2+1\times 6} = 0.067$ and $C_C(\text{Diane}) = (10-1) \times 0.067 = 0.600$. Gary and Frank have the highest closeness measures (0.643). Although they have fewer direct connections than Diane does, the pattern of their direct and indirect links allows them to quickly reach everyone else in the network.

The eigenvector centrality extends the degree measure in another way. It is a weighted sum of direct links. For example, in Figure 2, Carol and Heather have the same number of direct contacts, $c_D(\text{Carol}) = c_D(\text{Heather}) = 3$. But they are connected to different persons. Carol is connected to Andy, Diane, and Frank.

Heather is connected to Ian, Gary, and Frank. Comparing their contacts, we see that Andy's degree measure (4) is higher than Ian's (2), and Diane's degree measure (6) is higher than Gary's (5). Therefore, in a sense, the "quality" of Carol's contacts is higher than Heather's. This is reflected in the values of eigenvector centrality: $C_E(\text{Carol}) = 0.594$ and $C_E(\text{Heather}) = 0.407$.

The calculation of betweenness centrality involves identifying the shortest paths between all other pairs on the network. Take Andy in Figure 2 as an example. Excluding him, there are $(n-1)(n-2)/2 = 36$ pairs of nodes on the network, and Andy lies on one of the two shortest paths between Brad and Carol. That is, $m(\text{Brad}, \text{Carol}) = 2$ and $m(\text{Brad}, \text{Carol}; \text{Andy}) = 1$. Andy also lies on one of the three shortest paths between Brad and Frank. No other shortest path runs through Andy. Therefore, $c_B(\text{Andy}) = \frac{1}{2} + \frac{1}{3} = 0.833$ and $C_B(\text{Andy}) = \frac{c_B(\text{Andy})}{36} = 0.023$. It turns out that Heather has the highest betweenness measure. She acts as a "broker," joining two parts of the network together. Her connections are fewer but more important, because they give Heather the control over the information flow from one end of the network to the other. Betweenness centrality can also be viewed as a measure of network resilience — it tells us how many shortest paths will get longer when a vertex is removed from the network. In our example, without Heather, Ian and Jane will be cut off from the rest of the network.

To summarize, each of these four centrality measure reflects a distinct and important facet of connectedness. The degree centrality is most intuitive and can be easily interpreted. It is directly related to how busy a person is in networking, but it does not consider indirect contacts and treats each connection equally. The closeness centrality considers every potential contact on the entire network and measures how many steps one has to take to reach all of them. But one may argue that those who are more than 2 steps away do not matter. The eigenvector centrality uses recursively defined weights to evaluate the "quality" of links, but it is less straightforward to interpret. The betweenness centrality emphasizes the connections to different parts of the network. A node with a higher betweenness measure has access to richer and more differentiated information.

4 Data

This section discusses sources of data and regression variables.

4.1 Sources

The data used to construct executive and director networks is provided by BoardEx, a corporate research company that specializes in social network data on business leaders. BoardEx consolidates information concerning the board of directors and senior management of publicly quoted and large private companies from various public-domain sources. For each individual covered, BoardEx provides his employment history, educational background, and other activities such as club membership. Personal biographical information in BoardEx dates back to as early as 1926.

Stock return and accounting data are from CRSP and COMPUSTAT, respectively. BoardEx provides CUSIP and ticker symbol for companies that are currently trading. Therefore, I first find corresponding GVKEYs for these companies by matching CUSIPs and ticker symbols. For the rest of the BoardEx companies, I manually look up similar company names in the COMPUSTAT database. I verify such matches by checking company locations and histories from company Web sites and other sources. Most of the unmatched companies are either private, short listed, or not traded in North America.

For the tests examining whether the CEO's social network explains compensation, I use EXECUCOMP, which provides executive compensation for S&P 1500 companies starting from 1992. EXECUCOMP annual CEO flag "CEOANN" identifies the CEO for each company in each year. I match the CEOs identified in EXECUCOMP to those in BoardEx by name, age, and employment history. Due to the limit of EXECUCOMP coverage, compensation data are only available for a subset of CEOs identified in BoardEx.

4.2 Regression variables

4.2.1 Network measures

I use dummy variables to indicate the pairwise connection between an individual and a board of directors. An outsider who is not currently employed by the company is classified as "linked to the board" if he worked in a same company as directors or top executives in the same year with any of the board members. An insider who is currently employed by the company is classified as "linked to the board" if he had additional employment overlaps with the board members outside the company in question.

In addition to the pairwise connection measures, I define general connectedness measures on the overall network. To calculate the centrality measures described in Section 3, I first construct an annual network for each year during the 1990-2007 sample period. For each year t, the annual network includes all individuals who are reported by BoardEx as a board director or a disclosed earner of a U.S. company from year $t-5$ to year t. If two people were employed by a same company as directors or were disclosed earners in a same year during the 6-year window, a link is established between them. The rolling window approach has the advantage of preserving information from the relevant past, while at the same time alleviating the correlation between a person's network measure and the number of years since he or she first appeared in the data set. The results in this paper are not sensitive to the choice of a 6-year window.

Table 2 describes the overall structures of the 18 annual networks. This table lists the total number of individuals on a network, the sizes of the two largest components, the number of components with size greater than or equal to 30, and the number of CEOs for public companies. One observation is that the networks grew larger each year from 20,151 in 1990 to 59,751 in 2007. Therefore, in the following analysis I use relative centrality measures to allow comparison across time. Another observation is that the largest component always has a decisively larger size than all other components. For instance, in year 2003, 45,379 out of 52,209 individuals were in the largest component, and all other components consisted of less than 30 individuals.

For each of the 18 annual networks, I calculate four centrality measures for every executive and director using the definitions described in Section 3. Table 3a presents the summary statistics of degree centrality (both absolute and relative), relative closeness centrality, relative betweenness centrality, and eigenvector centrality. The relative degree and betweenness measures are multiplied by 10^4. The closeness and eigenvector measures are multiplied by 10^2.

As indicated by the mean of absolute degree centrality, an average director or executive has 13.8 direct contacts resulting from employment overlaps. The mean of relative degree centrality suggests that on average an individual on the network has direct connections to 0.0295% of all other business leaders. Closeness, betweenness, and eigenvector centrality average 12.34%, 0.0054%, and 0.0133% of their respective theoretical maximum. The median of betweenness centrality is 0, which suggests that a majority of individuals does not lie on any shortest path of other pairs and would have no effect at all on the overall connectivity of the network when singled out and removed. The standard deviations of all measures except for the closeness centrality are greater than their respective mean, indicating substantial differences in connectedness among individuals.

Except for the closeness centrality, all measures are right skewed, as reflected by the high skewness statistics. This is due to the existence of some extremely connected people. Comparing the summary statistics for those who are CEOs of public companies and those who are not, the CEO group has a higher mean centrality in all five measures. Table 4 lists the most connected CEOs of public companies for each year based on various centrality measures. There are overlaps across measures. For example, Andrew Lewis Jr. of the Union Pacific Corp. scored the highest in year 1996 based on all four centrality measures. This observation suggests that the four centrality measures are capturing similar effects. Table 5 confirms that the four centrality measures are highly correlated. The correlation coefficients range from 0.19 (between the closeness and betweenness measure) to 0.78 (between the degree and betweenness measure). In my analysis, I will use the closeness measure as the proxy for overall connectedness because it is least correlated with other characteristics such as CEO age and firm size, as shown in Table 5. I will use the other three centrality measures as robustness checks for the effects of overall connectedness.

4.2.2 Personal and firm characteristics

Prior work such as Bertrand and Schoar (2003) suggests that CEO personal characteristics matter for a wide range of corporate practices. I use several personal characteristics besides the network measures as explanatory variables in the regression analyses: age, tenure as CEO in a particular firm, a dummy indicating whether an individual had ever been a CEO, the number of years since an individual first became a CEO, the number of years since an individual joined a particular firm, and a dummy indicating whether an individual had earned an MBA degree. I generate these variables using the biographical information provided by BoardEx.

Firm characteristics also affect the decisions about CEOs. I measure firm size as the natural logarithm of sales (COMPUSTAT data item 12), and I measure firm age as the number of years since the firm's share price first appeared in the CRSP database. Firm risk is measured as the stock price volatility calculated over the past 60 months (EXECUCOMP data item BS_VOLATILITY). The industry-adjusted annual return is the difference between the firm-specific buy-and-hold annual stock return and the value-weighted industry portfolio return in the same 12-month period. Industry grouping is based on the Fama-French 48-industry classification.[1]

4.2.3 Dependent variables

I look at the impact of connectedness on three outcomes in the CEO labor market–CEO turnover, CEO appointment, and CEO compensation–and I define each of the dependent variables in sequence below.

Using BoardEx data, I identify turnover events during the period 1991-2007

[1] Industry classification is obtained from the Ken French Web site: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

with the following rules:

1. If individual i ended his only CEO tenure at company j in year t and company j continued to exist in year $t+1$, observation ijt is marked as a turnover;

2. If individual i ended one of his multiple CEO tenures at company j in year t and his next CEO tenure at company j started more than 730 days later, observation ijt is marked as a turnover.

I identify new CEO appointments that occurred during the period 1991-2007 with the following rules:

1. If individual i started his only CEO tenure at company j in year t, observation ijt is marked as a hiring event;

2. If individual i started one of his multiple CEO tenures at company j in year t and his previous CEO tenure at company j ended more than 730 days ago, observation ijt is marked as a hiring event.

Three levels of CEO compensation are examined in this paper. CEO total compensation (EXECUCOMP data item TDC1) comprises salary, bonus, other annual, total value of restricted stock granted, total Black-Scholes value of stock options granted, long-term incentive payouts, and all other total. CEO salary (EXECUCOMP data item Salary) is defined as the dollar value of the base salary (cash and non-cash). CEO stock-based compensation (EXECUCOMP data item RSTKGRNT plus BLK_VALUE) includes the value of restricted stock granted and the Black-Scholes value of stock options granted. I winsorize all three compensation variables at the 1% level.

Table 3 presents the summary statistics for the data. It is broken into several subtables because I use different samples to analyze CEO turnover, CEO appointment, and CEO compensation. In the following sections, I describe sample construction for each regression before discussing the empirical results.

5 Networks and CEO turnover

5.1 CEO turnover decisions

The departure of a CEO has profound implications for a company. Previous studies identified executive age and prior firm performance as the primary factors affecting the CEO turnover decisions (e.g., Murphy (1999) and Kaplan and Minton (2006)). I consider networks as an additional determinant of turnover. There are at least two reasons why the networks of the incumbent CEO could be influential. One the one hand, a CEO with social ties to the board directors is potentially entrenched in the position even when it is not in the shareholders' best interests. On the other hand, more outside opportunities are available for a CEO who is well connected on the network that consists of other top-level executives and directors. Such a CEO could resist less strongly when facing pressure to leave, because there are competitive alternatives elsewhere, and he could even voluntarily depart for a tempting new position. The former effect is related to the CEO's connections to the board members that are supposed to monitor and discipline him, and the latter is related to the CEO's position in the overall network in the business world. Both effects are empirically tested here.

I start with all CEO-company-year observations reported in BoardEx. Regulated companies (utilities and financial companies) are excluded from the sample because CEO turnover decisions in such firms might be heavily affected by the government.[2] Moreover, for an observation of company j in year t to be included in any of the samples, the accounting and stock return of company j must be available for the fiscal year ended in year $t-1$. Also, the CEO must started his tenure at company j no later than $t-1$, which ensures that the CEO was responsible for the company performance prior to the event year. The resulting sample consists of 40,208 CEO-firm-year observations for the 17-year period 1991-2007. It involves 5,160 companies and 7,447 CEOs. There are 4,445 turnover events, which account

[2]Note that I do not delete the experiences formed in these companies when constructing the connectedness measures.

for 11.06% of all observations.

I estimate logit models to examine the impact of networks on CEO turnover. The dependent variable is a binary variable that takes value 1 when there is a turnover event and 0 otherwise. The key explanatory variables are CEO centrality, a dummy variable indicating whether the CEO had additional connections to the board outside the company, and their interaction terms with the industry-adjusted stock returns. The control variables include CEO age, tenure as CEO, company size, and industry-adjusted stock returns. I also control for year and industry fixed effects. All explanatory variables are lagged as their values in the prior year. The left panel of Table 3b reports the summary statistics for the data used in these regressions.

Table 6a reports estimated marginal effects for the CEO turnover logit regression. The marginal effects are partial derivatives of turnover probabilities with respect to the independent variables. To compare the magnitudes of impacts of different independent variables, which are in different units of measurement, I also calculate the standardized marginal effect by multiplying the raw marginal effect with the independent variable's standard deviations.

The signs of marginal effects for control variables are as expected and are consistent with the results reported by prior empirical studies such as Parrino (1997). Higher industry-adjusted stock returns are related to significantly lower CEO turnover probabilities. Smaller firms do not change CEOs as frequently as larger firms. Also, when the CEO is getting older, a turnover is more likely to occur. However, a CEO with longer tenure could have established a power base over time and may thus be less likely to depart. These effects are statistically significant at the 1% or 5% level. A one-standard-deviation increase in company performance, company size, CEO age, and CEO tenure is associated with a -0.6%, 0.4%, 3.2%, and -1.4% change in CEO turnover probability, respectively. The magnitudes of all marginal effects appear to be small. But they are economically significant considering that the average turnover rate in this sample is only 11.06%. This order of magnitude is also similar to what Murphy (1999) found for the 1969-1983 U.S.

sample and what Kramarz and Thesmar (2006) found for their 1992-2003 French sample.

The results show that a CEO is less likely to depart if he and any of the board members both had top-level positions in a same outside company. The impact of the internal connection dummy on CEO turnover is negative at the 1% level. The marginal effect of the internal connection dummy is -1.4%, with the z-statistic equal to 4.58. Furthermore, the sign of the interaction term of the internal connection dummy and the industry-adjusted stock return is positive. Though not statistically significant at the conventional level, it suggests a reduced turnover-performance sensitivity. These findings about the CEO-board connection are consistent with Hwang and Kim (2009b), in which they document that a socially dependent board is less likely to fire the CEO for bad performance.

In contrast, the CEO's overall connectedness is positively associated with the likelihood of turnover. The statistical significance of the centrality measure is at the 1% level, with the z-statistic equal to 8.24. A one standard deviation increase in the CEO's overall connectedness is related to a 2.4% increase in the probability of turnover. The economic magnitudes for the marginal effects of the connectedness measures are bigger than most of the control variables. Furthermore, the interaction term of the centrality measures and the company performance is negative, with z-statistics equal to -2.50, significant at the 5% level. These findings indicate that a CEO's overall connectedness strengthens the negative relation between company performance and CEO turnover. Table 6b reports estimated marginal effects for three logit specifications, each based on an alternative centrality measures. The results are robust to these alternative measures.

The findings confirm that pairwise CEO-board connections have entrenchment effects–that is, the CEO is less likely to depart, even with poor performance. In contrast, overall connectedness is associated with greater probabilities of turnover and stronger turnover-performance sensitivity. The evidence suggests that a good network position creates outside opportunities, and therefore increases the likelihood of CEO turnover. Moreover, a CEO with more outside opportunities potentially suffers less from the termination of the current employment, and thus would be more likely to leave facing pressure.

Presumably, the effect of pairwise connections could be more pronounced in the cases of forced CEO turnover, and overall connectedness should be more influential for voluntary turnover. I use the new position assumed by a departed CEO as a proxy for "forced" Vs. "voluntary" turnover. I look at all 4,445 turnover events identified in the sample and document the new positions assumed by the departed CEOs within 2 years from the departure. Because some individuals left multiple CEO positions in a particular year, there are 4,423 unique CEO-year observations, which I categorize into three groups based on the new jobs taken by the departed CEOs. In the 2-year windows from the turnover dates, 645 (%14.58) departed CEOs did not have any new employment, while another 2,000 (%45.22) became either a director or a disclosed earner of another company, and the remaining 1,778 (%40.20) assumed other positions, typically staying in the old company as a director or an executive. If the departed CEO did not get any new position within 2 years from the turnover, I categorize the turnover as forced. If the departed CEO obtained a top position in another company, I categorize the turnover as voluntary. Table 6c reports the results for the two sub-samples. The estimated marginal effects and statistical significance support that overall connectedness has a bigger effect for voluntary turnovers and pairwise connections have a bigger effect for forced turnovers.

5.2 Departed CEO's new position

The results in the previous subsection indicate that CEO overall connectedness and CEO-board pairwise connectedness have distinct effects on CEO turnover. The explanation lies in the their different impacts on the career outlook of departed CEOs. I highlight the difference by examining the determinants of departed CEOs' new positions.

I estimate multinomial logit models with the dependent variable taking value 0, 1, and 2, representing "no new position," "outside top business positions," and "other positions," respectively. The explanatory variables include CEO centrality, a dummy indicating the CEO-board connection, CEO age, MBA education, and the size and industry-adjusted stock return of the company the CEO previously managed. Each specification uses one of the four centrality measures. I also control for industry and year fixed effects. The right panel of Table 3b reports the summary statistics for the data used in these regressions. Comparing with the summary statistics for the full sample, the departed CEOs have higher centrality values, are older, and are from larger and poorly performing companies. This confirms the findings from the regression results in the previous section.

Table 7a presents the estimated results from the multinomial logit regression. Since the dependent variable takes three values, one could make comparisons between three pairs of outcomes. To focus on the impact of the internal connection on getting any new position and the impact of overall connectedness on getting a high-level position in another company, the reference outcome in Table 7 is set to be "other positions." For ease of interpretation, Table 7 reports the exponential coefficient instead of the raw coefficient for each explanatory variable. It represents the factor change in odds for unit increase in the explanatory variable. If the estimated factor change is less than 1, the impact is negative, and vice versa. To compare the magnitudes of impacts of variables, which are in different units of measurement, I also report the factor change in odds for one standard deviation increase in the explanatory variable.

The results show that the relative risk of having "no new position" over getting "other positions" significantly decreases with the departed CEO's age and the performance of the company he previously managed. The effects of these two variables are significant at the 1% level. For one standard deviation increase in the departed CEO's age and the industry-adjusted stock return, the relative risk of having no new position is reduced by a factor of 0.67 and 0.77, respectively. MBA education and company size do not have strong effects on the relative risk ratio. Controlling for these factors, the existence of a connection between the departed CEO and the board is associated with significantly lower odds of having "no new position" over getting "other positions." The relative risk for the linked ex-CEO is lowered by a factor of 0.69. In contrast, the centrality measures do not have much impact on the ratio of probabilities of these two outcomes. The results here support the hypothesis that CEO-board connectedness has an entrenchment effect. Even if the connected CEO steps down from the position, he has a better chance to stay employed by the company.

The second part of Table 7a compares the probability of getting "outside top business positions" versus getting "other positions." The odds of becoming an executive or director in another company are significantly higher for a departed CEO with younger age, an MBA degree, and previous management of a larger company. The statistical significance levels for these three variables are 1%. A one standard deviation increase in the departed CEO's age reduces the odds of getting a high-level position at another company by a factor of 0.61. An MBA education and one standard deviation bigger firm size increases the chance of getting "outside top business positions" by a factor of 1.66 and 1.23, respectively. The effect of prior performance is positive, but not significantly so. For the comparison of this pair of outcomes, whether the departed CEO had additional connections to the board members does not have a significant effect. However, the centrality measure, which captures the departed CEO's overall connectedness, is significant at the 1% level. Its z-statistic is 7.46, and the factor change in odds for one standard deviation increase in the closeness measure is 1.63. The results provide direct evidence that CEOs with better overall connectedness have better outside opportunities after departure.

Table 7b shows that these results remain unchanged using alternative centrality measures.

In sum, the connections to the board of directors help the departed CEO to remain employed as opposed to having no new position. Typically, the linked ex-CEO continued to be employed by the company, with a new role as a director or an executive. Nevertheless, unlike overall connectedness, such internal connections do not enhance the departed CEO's chance of getting a top position at another company. In line with the finding in the previous section, the overall connectedness expands outside employment opportunities for the CEO.

6 Networks and new CEO appointments

Following a CEO's departure, the board of directors has to take the important action of appointing a new CEO. Empirical studies such as Parrino (1997) provides evidence on factors that affect a company's decision to hire from inside or outside the firm. However, there is little attention given to which particular candidate would eventually be selected. Here, I explore the factors that are likely to affect the CEO hiring decisions, with a focus on the role played by the connectedness of CEO candidates.

Direct connections between a CEO candidate and the hiring board are expected to improve the candidate's chance of getting the position. After a field study on the CEO search process, Khurana (2000) reports that directors, candidates, and executive search firms agree that CEO hiring relies on board member references. Many of the board members are former CEOs or top executives themselves and know potential CEO candidates from overlapping experience.

However, the anticipated effect of overall connectedness is not as straightforward. On the positive side, a company could be more interested in hiring a well-connected candidate because his networks are potentially valuable to the firm in facilitating activities like finding business partners or raising capital. On the flip side, board members may have concerns about the limited time and energy such a CEO could commit to the firm. Fich and Shivdasani (2006) show that busy outside directors are not effective monitors. Similarly, busy, networking CEOs could be less effective in managing the core operations of the firm. Also, there is evidence in Section 5 indicating that the probabilities of turnover are higher for CEOs with higher centrality measures. Firms concerned about retention and about reducing future search costs might be reluctant to hire such candidates. The net effect of connectedness on CEO selection remains an empirical question.

I examine the outside CEO recruiting and inside CEO hiring decisions separately because the importance of networks could be different in these two types of successions. I categorize hiring events into outside appointments and inside promotions based on the following rules:

1. If individual i was selected as the new CEO by company j in year t and this was his first year of employment with this company, observation ijt is marked as an outside appointment;

2. If individual i was selected as the new CEO by company j in year t and his first year of employment with this company was earlier than $t-1$, observation ijt is marked as an inside promotion.

6.1 Networks and outside CEO appointments

Networks are likely to be more important for outside hiring than for inside hiring. Information asymmetry is more severe when hiring from outside the company because board directors have to rely more on their social connections to the candidates in order to observe and evaluate their abilities as a CEO. Furthermore, the decision to hire from outside reflects the fact that the company is in need of a new leader with broader connections as opposed to someone with more firm-specific skills. Overall connectedness is expected to be more valuable to such companies.

To test the hypotheses on candidate connectedness and outside CEO appointment, I first identify the outside candidate pools and then estimate regression models to assess the importance of two types of connectedness.

6.1.1 Outside candidate pools

For each company j that was hiring from outside in year t, I compile a list of outside candidates that were potentially qualified for the job. Basically, I get all or some of the disclosed earners and executive directors working for companies similar to company j in year $t-1$ in terms of industry and size. I first sort all companies in the COMPUSTAT database into various size and industry groups for each year, and then I follow the procedure described below:

1. Identify companies with the same 4-digit SIC code and in the same 1/20 size group as company j in year $t-1$. The number of executives working for these

companies is $n1$. If $n1 \leq 20$, all of them are included in the candidate pool. If $n1 > 20$, I randomly select 20 of them. If $n1 < 5$, move to the next step.

2. Identify companies with the same 3-digit SIC code and in the same size decile as company j in year $t-1$. The number of executives working for these companies is $n2$. If $n1 + n2 \leq 5$, all of them are added to the candidate pool. If $n1 + n2 > 5$, I randomly select $5 - n1$ of them. If $n1 + n2 < 5$, move to the next step.

3. Identify companies with the same 2-digit SIC code and in the same size quintile as company j in year $t-1$. The number of executives working for these companies is $n3$. If $n1 + n2 + n3 \leq 5$, all of them are added to the candidate pool. If $n1+n2+n3 > 5$, I randomly select $5-n1-n2$ of them. If $n1+n2+n3 < 5$, move to the next step.

4. Identify companies with the same 2-digit SIC code as company j in year $t-1$. The number of executives working for these companies is $n4$. If $n1+n2+n3+n4 \leq 5$, all of them are added to the candidate pool. If $n1+n2+n3+n4 > 5$, I randomly select $5 - n1 - n2 - n3$ of them.

The average number of outside candidates identified this way is 8.72 per succession. Excluding financial companies and utilities, the final sample consists of 23,894 position-candidate observations. It involves 2,741 outside CEO hiring events that occurred in 2,336 companies during the 17-year period from 1991 to 2007.

6.1.2 Outside appointment results

I estimate logit models to examine the impact of a candidate's networks on the likelihood of getting the CEO position at a company that is hiring from outside. The dependent variable is a binary variable that takes the value one when the candidate is selected and zero otherwise. The explanatory variables include the candidate's centrality measure, a dummy variable indicating the existence of a connection between the candidate and the hiring board, candidate age, a dummy variable indicating

MBA education, a dummy variable indicating that the candidate was a CEO for a company in the past, and the number of years since the candidate first served as a CEO for a company. Each specification has one of the four centrality measures as the proxy for the candidate's overall connectedness. I also control for firm fixed effects. Table 3c presents the summary statistics of the data used in this section.

Table 8a presents the estimated marginal effects of the regression. The marginal effects of candidate age, the MBA indicator, and the past CEO indicator are significant at the 1% level. A candidate who is younger, who holds an MBA degree, and who used to be a CEO is more likely to be selected. A one standard deviation increase in age is related to a 2.0% lower probability of getting the CEO position. As expected, an MBA education and past experience as a CEO enhances the chance by 4.2% and 5.5%, respectively. The marginal effects of the number of years as a CEO is negative. This is not surprising because, although a candidate with a long CEO tenure is potentially more experienced, his human capital and other assets had been heavily invested in another company, preventing him from job change.

The results show that the pairwise connection measure is positively related to the hiring probability, over and above the set of control variables. The marginal effect of the candidate-board connection dummy is significant at the 1% level. Having a direct link to the hiring board boosts the probability of getting the CEO job by 92%, which is substantially greater than the effects of all the other explanatory variables. The evidence suggests that the overlapping experience between the CEO candidate and the board members is crucial for outside hiring.

I also examine the impact of the outside candidate's overall connectedness on the probability of being hired as a CEO. The marginal effect of the centrality measures is negative, significant at the 1% level. A one standard deviation increase in overall connectedness reduces the probability of hiring by 8.7%, with the z-statistic equal to 4.47.

Table 8b reports the results for alternative centrality measures. Like the closeness measure, the marginal effects of the degree and eigenvector measures are negative. The negative effect is significant at the 1% level for the degree measure, but not significant for the eigenvector centrality. The marginal effect of the betweenness centrality has a positive sign with the z-statistic equal to 1.61, which is not significant at the convention level.

Controlling for the direct connections between the candidates and the hiring boards as well as other factors, the evidence suggests that companies generally consider the costs of hiring a well-connected CEO as outweighing the potential benefits derived from the CEO's network. The opposite signs of centrality measures reflect the different aspects of connectedness captured by them. As discussed in Section 3, the degree and closeness centrality measures count the total number of direct or indirect contacts. It takes time and energy to develop and maintain such connections, so the negative effects of these two measures are significant. The eigenvalue is a weighted version of degree that takes the quality of links into consideration, not just the quantity. Therefore, the negative effect is better balanced by the positive effect. Finally, a high betweenness measure does not necessarily indicate many outside jobs or social interactions. It could be the case that the candidate has only a few outside connections and yet these connections are very influential because they enable him to join people from different parts of the network together. This situation benefits the firm by bringing more business opportunities without costing too much of the CEO's time and energy.

6.2 Networks and inside CEO appointments

It is interesting to examine how networks affect inside CEO selection. Although, by definition, an inside candidate is professionally connected to all the board members, additional ties established from other common experience could still help to improve the chance of hiring, maybe because of more effective communication between the candidate and the directors, or simply due to homophily–i.e., the tendency to bond with someone with similar characteristics. The attractiveness of a candidate's overall connectedness is likely to be smaller. The company's decision to hire from inside reveals its preference to firm-specific expertise over broad business connections.

To test the hypotheses on candidate connectedness and inside CEO appointment, I first identify the inside candidate pools and then estimate regression models to assess the importance of the two types of connectedness.

6.2.1 Inside candidate pools

For each company j that was hiring from within the firm in year t, I compile a list of inside candidates who were potentially qualified for the job. Basically, I get all or some of the top executives and directors working for company j in year $t-1$. The detailed procedure is described below:

1. Identify all disclosed earners and executive directors working for company j in year $t-1$, except for the CEO. The total number of them is $n1$. Since $n1$ does not exceed 16, all of the executives identified are included in the candidate pool. If $n1 < 5$, move to the next step.

2. Consider all supervisor directors working for company j in year $t-1$. The total number of them is $n2$. If $n1 + n2 \leq 5$, all of them are added to the candidate pool. If $n1 + n2 > 5$, I randomly select $5 - n1$ of them.

The average number of inside candidates identified this way is 4.72 per succession. Excluding financial companies and utilities, the final sample consists of 20,422 position-candidate observations and involves 4,328 inside CEO hiring events that occurred in 3,439 companies during the 17-year period from 1991 to 2007.

6.2.2 Inside appointment results

A set of logit models is estimated to assess the effect of an inside candidate's networks on the likelihood of being promoted to the CEO position. The dependent variable is a binary variable that takes value one when the candidate is selected and zero otherwise. The explanatory variables include the candidate's centrality measure, a dummy variable indicating the existence of additional connections between the candidate and the board of directors, candidate age, a dummy variable indicating MBA education, a dummy variable indicating whether the candidate was a CEO for a company in the past, the number of years since the candidate first served as a

CEO, and the number of years since the candidate joined the company in question. Each specification uses one of the four centrality measures as the proxy for the candidate's overall connectedness. I also control for firm fixed effects.

Table 9a presents the estimated marginal effects of the main regressions. The pseudo-R^2s in this table are markedly smaller than those in Table 8, suggesting that when a company searches for a new CEO from inside the firm, non-publicly observed characteristics of the candidates play more important roles, which cannot be controlled for in my models. The model for the outside hiring explains 78% of the variation in CEO selection, and the inside hiring model, only 21%. Removing firm fixed effects, the pseudo R^2statistics of the outside and inside hiring models become 64% and 8%, respectively. The marginal effects of all the control variables are still statistically significant in the inside hiring models. The directions of their impacts are similar to what I find in the outside hiring regression, but the economic magnitudes are generally smaller. For instance, a one standard deviation increase in candidate age and the number of years since he first served as a CEO is related to a 0.3% and 0.1% lower probability of getting the CEO position, respectively. An MBA education and past experience as a CEO enhances the chance by 0.04% and 0.2%, respectively. In addition, a one standard deviation increase in the number of years since the candidate joined the company increases the chance by 0.2%. The statistical significance level of the MBA dummy is lower compared with that in the outside hiring model. These findings suggest that companies hiring from inside place more importance on firm-specific expertise than on general managerial skills.

The results indicate that networks matter for CEO selection, and much more so for outside hiring than for inside hiring. It is not surprising given that the directors have plenty of chances to observe and appraise an insider's abilities for the CEO position. The marginal effect of additional connections between the inside candidate and the board bears a positive sign. However, both the statistical significance and economic magnitude are much smaller than in the outside hiring models. The z-statistic is 3.99. The existence of an extra link to the board slightly increases the probability of being selected by 0.1%, but the inside candidate's overall connectedness is associated with lower probabilities of being promoted to the CEO position. The marginal effects of the centrality measure is significant at the 1% level, with z-statistic equal to -7.34. A one standard deviation increase in the centrality measure reduces the probability of hiring by 0.4%. This magnitude of impact is comparable to that of the control variables. Table 9b shows that these results are robust to alternative centrality measures.

7 Networks and CEO compensation

The level of CEO compensation and its components have drawn much attention from both the public and academia. The CEO's networks can increase CEO compensation in several ways. One the one hand, board members with social connections to the CEO tend to be generous when deciding CEO pay because of their attachments to the CEO. On the other hand, as I find in Section 5, connected CEOs have more outside opportunities of getting top positions in other companies, which increases the value of their human capital. In particular, due to their safety net in the job market, they are better shielded from idiosyncratic firm risk. According to contract theories, I expect them to have higher levels of stock-based incentives in their compensation packages.

I start with all CEO compensation observations in EXECUCOMP. Financial companies and utilities are excluded because CEO compensation in those companies are likely to be regulated. Moreover, the CEO must have been in office for at least one year to enter the final sample, which ensures that the CEO was responsible for the company performance prior to the event year. The resulting sample consists of 13,006 CEO-firm-year observations for the 16-year period from 1992 to 2007. It involves 1,839 companies and 2,841 CEOs. The sample size is considerably smaller than the turnover or selection sample, because EXECUCOMP only covers the S&P 1500 starting from 1992.

I estimate OLS models to examine the impact of networks on CEO compensation. To draw inferences on both the level and mix of CEO compensation packages, in addition to the total compensation, I also look at two compensation components separately: stock-based compensation and salary. Due to the skewness of the compensation variables, all three dependent variables are log-transformed. The key explanatory variables are the CEO's centrality measures and the CEO-board connection dummy. I control for three CEO characteristics including age, tenure, and MBA education, and three company characteristics–company age, risk, and performance. I also control for year and industry fixed effects. The standard errors are robust and clustered in year. Table 3d presents the summary statistics for the data used in this section. Because the core data come from the EXECUCOMP data set instead of the BoardEx data set, the sample size here is smaller than in the CEO turnover and selection regressions. The companies in this sample belong to the S&P 1500 index and thus are larger in size.

Table 10a reports the estimated results, with Specification (1) for total compensation, Specifications (2) for stock-based compensation, and Specifications (3) for salary. Because the dependent variables are log-transformed, the exponentiated coefficients are reported for ease of interpretation. This represents the factor change in compensation for unit increase in the explanatory variable. If the estimated factor change is less than 1, the impact is negative, and vice versa. To compare the magnitudes of impacts of variables, which are in different units of measurement, I also report the factor change for one standard deviation increase in the explanatory variable.

The results show that additional links between the CEO and the board of directors have limited impact on CEO total compensation. The estimated coefficient of the CEO-board connection dummy is positive and statistically insignificant at the conventional level: a 0.8% increase with the t-statistic equal to 0.54. Its impacts on the two compensation components are opposite. The coefficient of the CEO-board connection dummy is positive in the stock-based compensation regression and is statistically significant at the 5% level. In contrast, it bears a negative sign in the salary regression, statistically significant at the 1% level. The economic magnitude of increase in the stock-based compensation dominates the decrease in salary. The existence of extra CEO-board links is related to a 6% increase in stock-based compensation, which is about $121,560 on average. The CEO-board link dummy is related to a 1.4% decrease in salary, which is about $8,840 on average. There is some evidence that the CEOs who are closely linked to the board members receive higher compensation, but only in the form of stock-based compensation. One interpretation is that if indeed the boards are awarding higher pay to linked CEOs without justification, they would prefer a less transparent way to do so. The valuation and disclosure on stock-based compensation is much more complicated than on salaries. If anything, their salaries are slightly lower as compared with other CEOs. This could be explained as a trade-off of enhanced job security.

There is strong and consistent evidence that the overall connectedness of a CEO is associated with higher compensation, in both the stock-based and salary components. The coefficients of the centrality measure are positive in all specifications, with the t-statistics ranging from 3.61 to 7.82. An increase of one standard deviation in the overall connectedness increases total compensation, stock-based compensation, and salary by 7.2%, 16.8%, and 8.8%, respectively. For a CEO who is compensated at the average level, these changes imply a difference of $279,541 in annual total compensation, $340,373 in stock-based compensation, and $55,569 in salary. The results reveal substantial monetary benefits that CEOs can derive from their overall connectedness on the professional networks. The benefits are especially pronounced in terms of stock options and restricted stock awards, which is expected because connected CEOs, with better job market insurance, can tolerate higher firm-specific risks.

The impacts of the control variables on CEO compensation packages are also interesting. The effects of firm size, firm risk, and prior performance on CEO compensation are significantly positive, consistent with previous findings (e.g., Rosen (1982)), Aggarwal and Samwick (1999), and Jensen and Murphy (1990)). CEO age, CEO tenure, and firm age have opposite impact on the salary component versus the incentive component. MBA education also increases CEO compensation, especially for the stock-based compensation.

Altogether, the control variables and connectedness variables explain a substantial part of CEO compensation, with regression R^2 ranging from 33% to 53%. The evidence presented here suggests that the general connectedness of a CEO in the employment network has significant and distinct economic effects beyond those of the connections between the CEO and the board in the current firm. It adds to the empirical results reported in Hwang and Kim (2009b) that only consider pairwise CEO-board affinity. Omitting overall connectedness would incorrectly attribute the higher compensation received by well-connected CEOs to bad corporate governance. As shown in Table 10b, these results are robust to the use of alternative centrality measures as proxies for the overall connectedness.

8 Conclusions

Networking has natural influences in the CEO labor market. Motivated by the theories of social capital and agency, this paper adopts an exploratory approach, which assumes that the structure or pattern of social ties between corporate executives and directors are consequential to key corporate decisions on CEO turnover, CEO hiring, and CEO compensation. Using a comprehensive data set, I characterize different aspects of CEO networks and empirically test their economic impacts. I distinguish between the pairwise specific CEO-board connectedness and the strength and structure of the CEO's overall connectedness.

I construct annual networks consisting of board directors and disclosed earners of U.S. companies during the period 1990-2007, and I look at the professional connections between board members and the CEO they are supposed to monitor. I also use four measures to reflect a person's position on the overall professional networks. Each measure offers a different perspective of connectedness. I analyze whether, how, and in what direction these variables affect the likelihood of CEO turnover, the departed CEOs' career opportunities, the selection of new CEOs from both inside and outside the company, and the level and mixture of CEO compensation packages.

This paper provides a rich set of empirical results. Consistent with the theories of agency, CEOs that are linked to the boards of directors are more entrenched in the company. They are less likely to depart from the CEO positions. And when turnovers happen, such CEOs have more chances of obtaining other positions within the company. The turnover-performance sensitivity appears to be weaker for the linked CEOs, and they also enjoy significantly higher pay in stock-based compensation. Consistent with the theories of social capital, connections between a CEO candidate and the directors of the hiring board are important in the selection process. The ties are influential for inside candidates and are absolutely critical for outside candidates.

The overall connectedness on the professional networks has quite different impacts from the pairwise connections. I find that externally better-connected CEOs are more likely to depart from their positions, and that the turnover-performance sensitivity is stronger for them. Their connectedness enhances the chances of getting high-level positions in other companies after their departure. CEO connectedness is also valuable in that connected CEOs typically receive higher levels of total compensation, in terms of both the salary and stock-based components. In the choice of a new CEO, the results indicate that companies generally consider the costs of hiring a well-connected CEO to outweigh the potential benefits derived from the CEO's network. This is especially true for companies that are hiring an insider. Furthermore, some aspects of connectedness are more valuable than others.

Given the evidence developed in this paper, networks add to traditional turnover and compensation variables in economically significant ways. They also play an important role in the CEO selection process. In line with previous studies, the social connections between the CEO and the board could be signs of bad corporate governance. By contrast, the overall connectedness works in ways that could be interpreted as a type of valuable social capital. This paper also provides interesting comparisons on the impacts of different aspects of connectedness. These are new empirical results revealed by data and pose challenges for theory development in the future.

9 Figures and Tables

Figure 1: Network with three components.

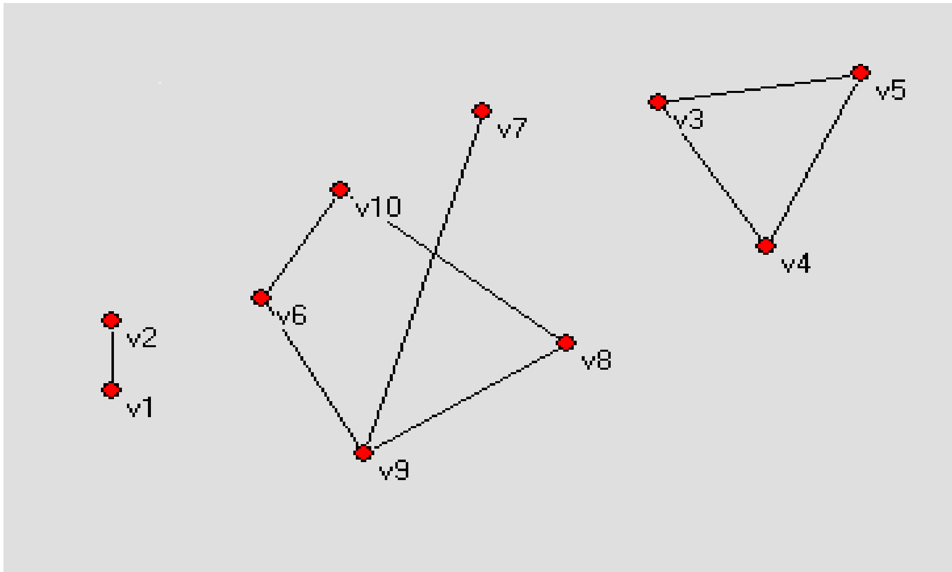

Figure 2: Network with a kite structure.

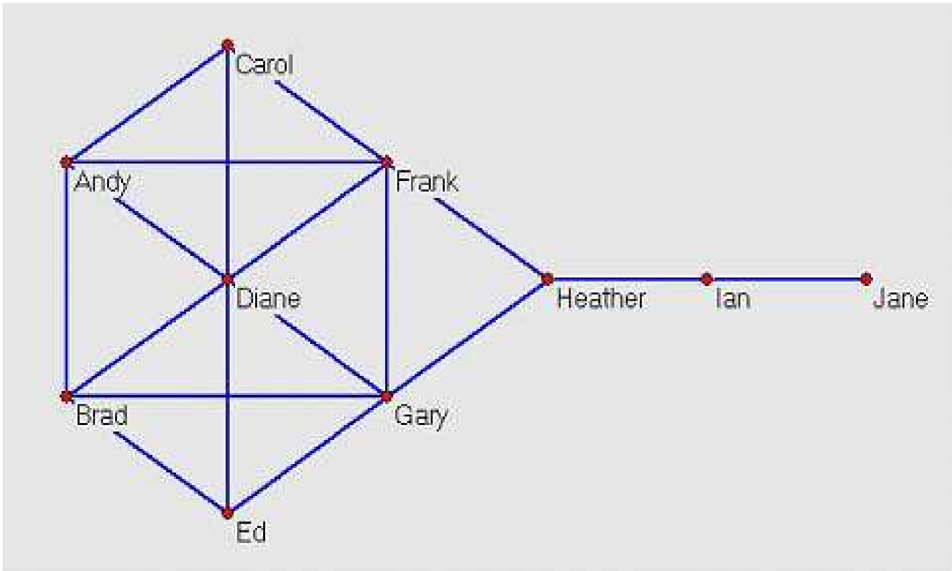

Table 1: **Centrality Measures Corresponding to Figure 2**

This table shows the values of four centrality measures (normalized) for each node in Figure 2.

Node	**Degree**	**Closeness**	**Betweenness**	**Eigenvector**
Andy	0.444	0.529	0.023	0.732
Brad	0.444	0.5294	0.023	0.732
Carol	0.333	0.500	0.000	0.594
Diane	0.667	0.600	0.102	1.000
Ed	0.333	0.500	0.000	0.594
Frank	0.556	0.643	0.231	0.827
Gary	0.556	0.643	0.231	0.827
Heather	0.333	0.600	0.389	0.407
Ian	0.222	0.429	0.222	0.100
Jane	0.111	0.310	0.000	0.023

Table 2: **Structure of Executive and Director Networks**

This table shows the structure of network for each year t during the period 1990 to 2007, consisting of corporate executives and directors from year $t-5$ to year t. *All* is the number of all individuals on the network. *Largest* is the size of the largest component. *Second* is the size of the second largest component. *Components* is the number of components with size greater than or equal to 30. *CEOs* is the number of CEOs in public firms.

Year	**All**	**Largest**	**Second**	**Components**	**CEOs**
1990	20,151	6,586	33	2	2,359
1991	21,715	7,854	31	3	2,606
1992	23,386	9,679	30	2	2,867
1993	25,355	11,953	<30	1	3,192
1994	27,316	14,271	30	2	3,521
1995	29,421	16,813	31	2	3,863
1996	31,778	19,766	38	4	4,244
1997	34,362	23,240	38	2	4,649
1998	37,113	26,724	42	2	5,045
1999	40,300	30,778	<30	1	5,516
2000	43,964	35,136	<30	1	5,875
2001	47,052	38,973	<30	1	5,973
2002	49,640	42,177	<30	1	6,018
2003	52,209	45,379	<30	1	6,089
2004	54,945	48,953	35	2	6,158
2005	57,242	52,065	57	4	6,214
2006	58,928	54,209	50	4	6,115
2007	59,751	55,273	54	5	5,853

Table 3: **Summary Statistics**

This table presents summary statistics on all variables for different samples. The relative degree and betweenness measures are multiplied by 10^4. The closeness and eigenvector measures are multiplied by 10^2.

(a) **Summary Statistics on Centrality Measures for All Nodes**

	Measures	Mean	Median	Max	SD	Skewness
Non-CEO	**Abs. Degree**	13.64	10.00	289.00	15.35	3.42
(n=628,471)	**Rel. Degree**	2.89	2.27	50.49	3.01	3.18
	Closeness	12.27	15.11	27.54	8.16	-0.49
	Betweenness	0.50	0.00	84.01	1.89	9.07
	Eigenvector	1.29	0.07	100.00	4.22	7.69
CEO	**Abs. Degree**	14.93	9.00	244.00	17.56	2.90
(n=86,157)	**Rel. Degree**	3.33	2.11	40.94	3.62	2.65
	Closeness	12.90	15.11	26.90	7.48	-0.61
	Betweenness	0.79	0.00	53.38	2.20	5.95
	Eigenvector	1.66	0.08	100.00	5.56	7.26
Total	**Abs. Degree**	13.80	10.00	289.00	15.64	3.35
(n=714,628)	**Rel. Degree**	2.95	2.23	50.49	3.09	3.11
	Closeness	12.34	15.11	27.54	8.08	-0.50
	Betweenness	0.54	0.00	84.01	1.93	8.54
	Eigenvector	1.33	0.07	100.00	4.40	7.72

Table 3

(b) **Summary Statistics for the Turnover Sample**

	All Company-CEO-Years					Turnover=1				
	Mean	**Median**	**SD**	**Min**	**Max**	**Mean**	**Median**	**SD**	**Min**	**Max**
Degree	3.58	2.27	3.76	0.00	40.94	4.25	2.72	4.39	0.00	40.90
Closeness	13.48	15.21	6.76	0.00	26.39	15.01	16.60	6.08	0.00	26.26
Betweenness	0.88	0.00	2.33	0.00	39.52	1.21	0.01	2.76	0.00	38.59
Eigenvector	1.88	0.12	5.99	0.00	100.00	2.51	0.23	7.23	0.00	100.00
Linked	0.35	0.00	0.48	0.00	1.00	0.35	0.00	0.48	0.00	1.00
CEO Age	53.25	53.00	8.39	25.00	90.00	55.23	56.00	8.89	28.00	90.00
CEO Tenure	7.45	5.00	7.78	0.00	55.00	.	.	.	.	.
MBA	.	.	.	.	.	0.26	0.00	0.44	0.00	1.00
ARET	0.12	-0.02	0.93	-1.75	31.21	0.01	-0.10	0.87	-1.50	15.71
Sales (MM$)	2,083.70	258.54	9,036.21	0.001	335,086.00	2,574.30	347.58	9,591.59	0.001	263,989.00

Table 3

(c) Summary Statistics for the Succession Sample

	Outside Hires					Inside Hires				
	Mean	**Median**	**SD**	**Min**	**Max**	**Mean**	**Median**	**SD**	**Min**	**Max**
Degree	3.21	2.34	3.18	0.00	37.86	4.16	2.87	4.36	0.00	41.76
Closeness	15.14	16.87	6.24	0.00	27.29	13.27	15.29	7.21	0.00	27.30
Betweenness	0.60	0.00	2.02	0.00	39.52	1.42	0.00	3.94	0.00	71.12
Eigenvector	1.60	0.14	5.24	0.00	100.00	2.27	0.20	6.39	0.00	100.00
Linked	0.13	0.00	0.33	0.00	1.00	0.32	0.00	0.47	0.00	1.00
Candidate Age	51.09	51.00	8.65	22.00	93.00	53.90	54.00	9.89	22.00	95.00
MBA	0.23	0.00	0.42	0.00	1.00	0.23	0.00	0.42	0.00	1.00
Past CEO	0.51	1.00	0.50	0.00	1.00	0.28	0.00	0.45	0.00	1.00
Experience as CEO	4.82	1.00	7.11	0.00	53.00	3.35	0.00	6.95	0.00	58.00
Years in Firm	.	.	.	.	.	8.52	5.00	8.80	0.00	69.00

Table 3

(d) Summary Statistics for the Compensation Sample

	Mean	**Median**	**SD**	**Min**	**Max**
Total Compensation (M$)	3,882.52	2,302.08	4,059.88	439.98	16,060.64
Stock-based Compensation (M$)	2,026.03	866.96	2,786.99	0.00	10,346.17
Salary (M$)	631.47	591.67	273.94	233.65	1,200.00
Degree	5.30	3.66	4.56	0.00	40.94
Closeness	15.16	16.15	5.59	0.00	26.01
Betweenness	1.49	0.18	3.05	0.00	39.52
Eigenvector	3.68	0.65	8.45	0.00	100.00
Linked	0.41	0.00	0.49	0.00	1.00
CEO Age	53.97	54.00	7.64	27.00	89.00
CEO Tenure	7.20	5.00	7.67	0.00	54.00
MBA	0.30	0.00	0.46	0.00	1.00
ARET	0.11	0.02	0.70	-1.69	16.96
Sales (MM$)	4,556.98	1,194.35	12,304.16	0.04	328,213.00
Firm Age	22.50	16.26	19.15	0.84	80.14
Firm Risk	0.45	0.39	0.23	0.12	4.21

Table 4: **Most Connected CEOs**

(a) **CEOs with the Highest Degree Centrality**

Year	Abs. Degree	CEO Name	Company	Industry
1990	57	Louis Gerstner Jr	RJR NABISCO HOLDINGS CORP	Food
1991	54	Louis Gerstner Jr	RJR NABISCO HOLDINGS CORP	Food
1992	58	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1993	96	Louis Gerstner Jr	IBM	Software & Computer Services
1994	103	Louis Gerstner Jr	IBM	Software & Computer Services
1995	91	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1996	103	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1997	108	George Fisher	EASTMAN KODAK CO	Electronic & Electrical Equipment
1998	134	John Snow	CSX CORP	Transport
1999	152	John Snow	CSX CORP	Transport
2000	180	John Snow	CSX CORP	Transport
2001	181	John Snow	CSX CORP	Transport
2002	203	John Snow	CSX CORP	Transport
2003	202	John Snow	CSX CORP	Transport
2004	182	William Owens	NORTEL NETWORKS CORP	Information Technology Hardware
2005	196	William Owens	NORTEL NETWORKS CORP	Information Technology Hardware
2006	196	Mary Wilderotter	FRONTIER COMMUNICATIONS CORP	Telecommunication Services
2007	244	Mary Wilderotter	FRONTIER COMMUNICATIONS CORP	Telecommunication Services

Table 4

(b) **CEOs with the Highest Closeness Centrality**

Year	Closeness	CEO Name	Company	Industry
1990	7.48	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1991	8.48	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1992	9.91	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1993	11.50	Louis Gerstner Jr	IBM	Software & Computer Services
1994	13.07	Louis Gerstner Jr	IBM	Software & Computer Services
1995	14.53	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1996	16.17	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1997	17.45	Doctor George Fisher	EASTMAN KODAK CO	Electronic & Electrical Equipment
1998	19.44	John Snow	CSX CORP	Transport
1999	20.98	John Snow	CSX CORP	Transport
2000	22.59	John Snow	CSX CORP	Transport
2001	23.74	John Snow	CSX CORP	Transport
2002	24.68	John Snow	CSX CORP	Transport
2003	25.48	John Snow	CSX CORP	Transport
2004	25.77	Richard Notebaert	QWEST COMMUNICATIONS INTERNATIONAL INC	Telecommunication Services
2005	26.57	David Dorman	AT&T CORP	Telecommunication Services
2006	26.61	Steve Miller Jr	DELPHI CORP	Automobiles & Parts
2007	26.90	Paula Reynolds	SAFECO CORP	Insurance

Table 4

(c) **CEOs with the Highest Betweenness Centrality**

Year	Betweenness	CEO Name	Company	Industry
1990	29.45	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1991	24.81	James Williams	SUNTRUST BANKS INC	Banks
1992	35.10	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1993	35.23	Louis Gerstner Jr	IBM	Software & Computer Services
1994	36.70	Louis Gerstner Jr	IBM	Software & Computer Services
1995	38.31	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1996	37.27	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1997	31.40	William Stiritz	RALSTON-RALSTON PURINA CO	
1998	53.38	Rodney Dammeyer	ANIXTER INTERNATIONAL INC	Information Technology Hardware
1999	34.95	Roger Penske Sr	PENSKE AUTOMOTIVE	Automobiles & Parts
2000	31.57	John Snow	CSX CORP	Transport
2001	31.54	Henry Schacht	LUCENT TECHNOLOGIES INC	
2002	33.97	Joseph Wright Jr	PANAMSAT CORP	Telecommunication Services
2003	39.52	James Hackett	ANADARKO PETROLEUM CORP	Oil & Gas
2004	38.59	Admiral William Owens	NORTEL NETWORKS CORP	Information Technology Hardware
2005	41.59	Admiral William Owens	NORTEL NETWORKS CORP	Information Technology Hardware
2006	33.14	James Hackett	ANADARKO PETROLEUM CORP	Oil & Gas
2007	48.25	Mary Wilderotter	FRONTIER COMMUNICATIONS CORP	Telecommunication Services

Table 4

(d) **CEOs with the Highest Eigenvector Centrality**

Year	Eigenvector	CEO Name	Company	Industry
1990	100	James Robinson III	AMERICAN EXPRESS CO	Speciality & Other Finance
1991	100	James Robinson III	AMERICAN EXPRESS CO	Speciality & Other Finance
1992	100	James Robinson III	AMERICAN EXPRESS CO	Speciality & Other Finance
1993	100	Louis Gerstner Jr	IBM	Software & Computer Services
1994	100	Louis Gerstner Jr	IBM	Software & Computer Services
1995	100	Louis Gerstner Jr	IBM	Software & Computer Services
1996	100	Andrew Lewis Jr	UNION PACIFIC CORP	Transport
1997	100	George Fisher	EASTMAN KODAK CO	Electronic & Electrical Equipment
1998	100	George Fisher	EASTMAN KODAK CO	Electronic & Electrical Equipment
1999	100	Charles Knight	EMERSON ELECTRIC CO	Electronic & Electrical Equipment
2000	100	Henry Schacht	LUCENT TECHNOLOGIES INC	Telecommunication Services
2001	100	George Conrades	AKAMAI TECHNOLOGIES INC	Telecommunication Services
2002	91.92	George Conrades	AKAMAI TECHNOLOGIES INC	Telecommunication Services
2003	89.64	George Conrades	AKAMAI TECHNOLOGIES INC	Telecommunication Services
2004	100	George Conrades	AKAMAI TECHNOLOGIES INC	Telecommunication Services
2005	96.70	George Conrades	AKAMAI TECHNOLOGIES INC	Telecommunication Services
2006	67.40	Peter Brabeck-Letmathe	NESTLE SA&Personal Care	Household Products
2007	65.36	Paula Reynolds	SAFECO CORP	Insurance

Table 5: **Correlation Matrix**

This table presents correlation matrix for four centrality measures, CEO age, and firm size.

	Degree	**Closeness**	**Betweenness**	**Eigenvector**	**CEO Age**	**Firm Size**
Degree	1.00					
Closeness	0.41	1.00				
Betweenness	0.77	0.19	1.00			
Eigenvector	0.63	0.23	0.47	1.00		
CEO Age	0.19	0.07	0.14	0.11	1.00	
Firm Size	0.31	0.16	0.15	0.39	0.07	1.00

Table 6: **Networks and CEO Turnover**

This table presents estimated marginal effects of logit CEO turnover models. Standardized marginal effects are in square brackets; z statistics are in parentheses; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Panel (a) reports the main results using closeness centrality as proxy for overall connectedness. Panel (b) reports robustness results using other centrality measures as proxies for overall connectedness. Panel (c) presents the results using forced and voluntary turnover subsamples.

(a) **CEO Turnover Main Results**

Centrality	0.004^a	[0.024]	(8.24)
Centrality×ARET	-0.001^b	[-0.012]	(-2.50)
Linked CEO	-0.014^a	[-0.007]	(-4.58)
Linked×ARET	0.003	[0.002]	(0.73)
ARET	-0.007	[-0.006]	(-1.22)
Company Size	0.002^b	[0.004]	(2.34)
CEO Age	0.004^a	[0.032]	(19.82)
CEO Tenure	-0.002^a	[-0.014]	(-8.57)
Observations		40,208	
Pseudo R^2		0.034	

Table 6

(b) **CEO Turnover Robustness Results**

	(1) Degree	(2) Betweenness	(3) Eigenvector
Centrality	0.002^a	0.003^a	0.000^b
	[0.009]	[0.007]	[0.003]
	(5.70)	(5.52)	(2.03)
Centrality×ARET	-0.002^b	-0.003^b	-0.001
	[-0.006]	[-0.003]	[-0.003]
	(-2.33)	(-2.03)	(-1.52)
Linked CEO	-0.015^a	-0.012^a	-0.011^a
	[-0.007]	[-0.006]	[-0.005]
	(-4.58)	(-4.00)	(-3.46)
Linked×ARET	0.005	0.003	0.003
	[0.003]	[0.002]	[0.001]
	(0.98)	(0.70)	(0.54)
ARET	-0.014^a	-0.018^a	-0.018^a
	[-0.013]	[-0.016]	[-0.017]
	(-4.50)	(-6.39)	(-6.64)
Company Size	0.003^a	0.004^a	0.005^a
	[0.006]	[0.009]	[0.010]
	(3.25)	(5.28)	(5.59)
CEO Age	0.004^a	0.004^a	0.004^a
	[0.032]	[0.032]	[0.033]
	(19.08)	(19.25)	(19.92)
CEO Tenure	-0.002^a	-0.002^a	-0.002^a
	[-0.016]	[-0.016]	[-0.016]
	(-9.42)	(-9.64)	(-9.94)
Observations	40,208	40,208	40,208
Pseudo R^2	0.032	0.032	0.031

Table 6

(c) **CEO Turnover Results: Forced Vs. Voluntary**

	(1) Forced			(2) Voluntary		
Centrality	0.000^c	[0.002]	(1.76)	0.001^a	[0.006]	(3.33)
Centrality×ARET	-0.000	[-0.002]	(-0.95)	-0.000^c	[-0.005]	(-1.88)
Linked CEO	-0.003^b	[-0.001]	(-2.24)	-0.003	[-0.001]	(-1.19)
Linked×ARET	0.002	[0.001]	(0.84)	-0.003	[-0.001]	(-0.76)
ARET	-0.006^b	[-0.005]	(-2.17)	-0.000	[-0.000]	(-0.15)
Company Size	-0.001^b	[-0.001]	(-2.19)	-0.001	[-0.002]	(-1.41)
CEO Age	0.000^a	[0.003]	(6.19)	0.002^a	[0.019]	(18.97)
CEO Tenure	-0.001^a	[-0.005]	(-7.22)	0.000	[0.001]	(0.64)
Observations	36,246			37,563		
Pseudo R^2	0.061			0.048		

Table 7: **Departed CEO's New Position**

This table presents estimated factor changes in odds of multinomial logit models for new positions after turnover. Standardized factor changes in odds are in square brackets; z statistics are in parentheses; the base outcome is "other positions"; superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Panel (a) reports the main results using closeness centrality as proxy for overall connectedness. Panel (b) reports robustness results using other centrality measures as proxies for overall connectedness.

(a) **New Position Main Results**

Outcome = No New Position			
Centrality	1.023^c	[1.148]	(1.86)
Linked CEO	0.687^a	[0.836]	(-3.45)
CEO Age	0.957^a	[0.678]	(-7.53)
MBA	1.187	[1.078]	(1.50)
Company Size	0.995	[0.989]	(-0.18)
ARET	0.743^a	[0.773]	(-3.65)
Outcome = Outside Top Position			
Centrality	1.084^a	[1.633]	(7.46)
Linked CEO	1.038	[1.018]	(0.48)
CEO Age	0.946^a	[0.611]	(-12.28)
MBA	1.659^a	[1.249]	(6.07)
Company Size	1.095^a	[1.231]	(4.53)
ARET	1.030	[1.026]	(0.75)
Observations		4,423	
Pseudo R^2		0.103	

Table 7

(b) **New Position Robustness Results**

	(1) Degree	(2) Betweenness	(3) Eigenvector
	Outcome = No New Position		
Centrality	1.013	1.036	1.001
	[1.060]	[1.103]	[1.007]
	(0.86)	-1.4	(0.10)
Linked CEO	0.690[a]	0.690[a]	0.709[a]
	[0.838]	[0.837]	[0.848]
	(-3.34)	(-3.41)	(-3.18)
CEO Age	0.957[a]	0.956[a]	0.957[a]
	[0.674]	[0.671]	[0.676]
	(-7.57)	(-7.64)	(-7.56)
MBA	1.184	1.183	1.197
	[1.077]	[1.076]	[1.082]
	(1.47)	-1.47	(1.57)
Company Size	1.002	1.005	1.013
	[1.005]	[1.011]	[1.029]
	(0.09)	-0.19	(0.48)
ARET	0.743[a]	0.744[a]	0.743[a]
	[0.772]	[0.773]	[0.773]
	(-3.67)	(-3.65)	(-3.66)
	Outcome = Outside Top Position		
Centrality	1.067[a]	1.096[a]	1.005
	[1.329]	[1.288]	[1.037]
	(6.20)	-5.67	(0.91)
Linked CEO	0.998	1.053	1.133
	[0.999]	[1.025]	[1.061]
	(-0.02)	-0.66	(1.61)
CEO Age	0.944[a]	0.945[a]	0.948[a]
	[0.599]	[0.604]	[0.621]
	(-12.73)	(-12.60)	(-12.05)
MBA	1.633[a]	1.660[a]	1.704[a]
	[1.240]	[1.249]	[1.264]
	(5.88)	-6.08	(6.42)
Company Size	1.096[a]	1.131[a]	1.153[a]
	[1.236]	[1.327]	[1.386]
	(4.50)	-6.49	(7.26)
ARET	1.026	1.027	1.020
	[1.023]	[1.023]	[1.018]
	(0.67)	-0.68	(0.52)
Observations	4,423	4,423	4,423
Pseudo R^2	0.101	0.101	0.096

Table 8: **Networks and Outside CEO Hiring**

This table presents estimated marginal effects of logit outside CEO hiring models. Standardized marginal effects are in square brackets; z statistics are in parentheses; superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Panel (a) reports the main results using closeness centrality as proxy for overall connectedness. Panel (b) reports robustness results using other centrality measures as proxies for overall connectedness.

(a) **Outside Hiring Main Results**

Centrality	-0.014^{a}	[-0.087]	(-4.47)
Linked	0.920^{a}	[0.307]	(81.41)
Age	-0.002^{a}	[-0.020]	(-8.50)
MBA	0.042^{a}	[0.018]	(2.58)
Past CEO	0.055^{a}	[0.027]	(2.91)
Years as CEO	-0.002	[-0.012]	(-1.46)
Observations		23,894	
Pseudo R^2		0.780	

Table 8

(b) **Outside Hiring Robustness Results**

	(1) **Degree**	**(2)** **Betweenness**	**(3)** **Eigenvector**
Centrality	-0.015^{a}	0.006	-0.002
	[-0.047]	[0.013]	[-0.011]
	(-3.94)	(1.61)	(-1.04)
Linked	0.739^{a}	0.751^{a}	0.740^{a}
	[0.246]	[0.250]	[0.247]
	(13.96)	(14.69)	(14.06)
Age	-0.005^{a}	-0.006^{a}	-0.006^{a}
	[-0.046]	[-0.054]	[-0.052]
	(-4.38)	(-5.83)	(-5.20)
MBA	0.076^{a}	0.063^{a}	0.067^{a}
	[0.032]	[0.027]	[0.028]
	(3.15)	(2.61)	(2.81)
Past CEO	0.106^{a}	0.090^{a}	0.095^{a}
	[0.053]	[0.045]	[0.048]
	(3.79)	(3.23)	(3.44)
Years as CEO	-0.003	-0.004^{c}	-0.004^{c}
	[-0.025]	[-0.029]	[-0.027]
	(-1.61)	(-1.85)	(-1.75)
Observations	23,894	23,894	23,894
Pseudo R^2	0.764	0.763	0.763

Table 9: **Networks and Inside CEO Hiring**

This table presents estimated marginal effects of logit inside CEO hiring models. Standardized marginal effects are in square brackets; z statistics are in parentheses; superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Panel (a) reports the main results using closeness centrality as proxy for overall connectedness. Panel (b) reports robustness results using other centrality measures as proxies for overall connectedness.

(a) **Inside Hiring Main Results**

Centrality	-0.001^a	[-0.004]	(-7.34)
Linked	0.001^a	[0.001]	(3.99)
Age	-0.000^a	[-0.003]	(-8.36)
MBA	0.000^b	[0.000]	(2.24)
Past CEO	0.002^a	[0.001]	(4.32)
Years as CEO	-0.000^a	[-0.001]	(-3.20)
Years in Company	0.000^a	[0.002]	(6.91)
Observations		20,422	
Pseudo R^2		0.207	

Table 9

(b) **Inside Hiring Robustness Results**

	(1) Degree	(2) Betweenness	(3) Eigenvector
Centrality	-0.002[a]	-0.002[a]	-0.000[a]
	[-0.009]	[-0.007]	[-0.003]
	(-7.26)	(-5.98)	(-4.35)
Linked	0.004[a]	0.002[c]	0.001
	[0.002]	[0.001]	[0.000]
	(3.82)	(1.87)	(1.27)
Age	-0.001[a]	-0.001[a]	-0.001[a]
	[-0.011]	[-0.013]	[-0.012]
	(-10.01)	(-10.13)	(-9.97)
MBA	0.002[a]	0.002[b]	0.001[c]
	[0.001]	[0.001]	[0.001]
	(2.95)	(2.56)	(1.92)
Past CEO	0.007[a]	0.008[a]	0.006[a]
	[0.003]	[0.003]	[0.002]
	(4.71)	(4.38)	(3.98)
Years as CEO	-0.000[a]	-0.000[a]	-0.000[a]
	[-0.002]	[-0.002]	[-0.002]
	(-2.99)	(-3.29)	(-3.37)
Years in Company	0.001[a]	0.001[a]	0.001[a]
	[0.008]	[0.009]	[0.008]
	(7.72)	(7.87)	(7.87)
Observations	20,422	20,422	20,422
Pseudo R^2	0.171	0.156	0.148

Table 10: Networks and CEO Compensation

This table presents exponentiated coefficients estimated in OLS CEO compensation models. Standardized factor changes are in square brackets; t statistics are in parentheses; superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Panel (a) reports the main results using closeness centrality as proxy for overall connectedness. Panel (b) reports robustness results using other centrality measures as proxies for overall connectedness.

(a) **CEO Compensation Main Results**

	(1) Total Compensation			**(2) Stock-based Compensation**			**(3) Salary**		
Centrality	1.033^a	[1.197]	(7.26)	1.030^a	[1.168]	(3.61)	1.015^a	[1.088]	(7.82)
Linked	1.008	[1.004]	(0.54)	1.059^b	[1.029]	(2.67)	0.986^a	[0.993]	(-3.52)
CEO Age	0.998^b	[0.986]	(-2.65)	0.988^a	[0.917]	(-10.37)	1.006^a	[1.045]	(13.68)
CEO Tenure	0.997^b	[0.980]	(-2.44)	1.002	[1.012]	(1.17)	1.001	[1.004]	(0.71)
MBA	1.048^a	[1.022]	(3.26)	1.039^c	[1.018]	(1.89)	1.003	[1.001]	(0.56)
Firm Age	1.000	[0.995]	(-0.86)	0.996^a	[0.922]	(-7.05)	1.002^a	[1.043]	(23.60)
Firm Size	1.457^a	[1.825]	(40.33)	1.592^a	[2.117]	(26.33)	1.187^a	[1.316]	(35.06)
Firm Risk	1.308^a	[1.064]	(3.37)	2.113^a	[1.181]	(4.07)	1.006	[1.001]	(0.35)
ARET	1.097^a	[1.067]	(8.70)	1.202^a	[1.135]	(7.61)	0.986^b	[0.991]	(-2.86)
Observations	12,886			9,684			13,006		
R^2	0.423			0.323			0.533		

Table 10

(b) **CEO Compensation Robustness Results**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	C_D	C_B	C_E	C_D	C_B	C_E	C_D	C_B	C_E
	Total Compensation			**Stock-based Compensation**			**Salary**		
Centrality	1.027^{a}	1.023^{a}	1.005^{a}	1.029^{a}	1.029^{a}	1.008^{a}	1.008^{a}	1.007^{a}	1.001^{b}
	[1.127]	[1.072]	[1.047]	[1.141]	[1.095]	[1.074]	[1.038]	[1.020]	[1.007]
	(12.50)	(8.68)	(5.30)	(8.66)	(5.67)	(7.01)	(14.88)	(9.97)	(2.96)
Linked	0.988	1.022	1.031	1.027	1.062^{b}	1.070^{a}	0.985^{a}	0.996	1.000
	[0.994]	[1.011]	[1.015]	[1.013]	[1.030]	[1.034]	[0.993]	[0.998]	[1.000]
	(-0.73)	(1.21)	(1.73)	(1.12)	(2.73)	(3.25)	(-3.42)	(-0.79)	(-0.03)
CEO Age	0.997^{a}	0.998^{a}	0.999	0.987^{a}	0.987^{a}	0.989^{a}	1.006^{a}	1.006^{a}	1.006^{a}
	[0.978]	[0.984]	[0.992]	[0.907]	[0.912]	[0.922]	[1.044]	[1.046]	[1.049]
	(-4.14)	(-3.00)	(-1.41)	(-11.44)	(-11.79)	(-11.71)	(12.15)	(12.90)	(13.89)
CEO Tenure	0.996^{a}	0.996^{a}	0.995^{a}	1.001	1.001	1.000	1.000	1.000	1.000
	[0.972]	[0.968]	[0.966]	[1.004]	[1.004]	[1.002]	[0.999]	[0.998]	[0.997]
	(-3.28)	(-3.50)	(-3.61)	(0.40)	(0.34)	(0.20)	(-0.07)	(-0.26)	(-0.36)
MBA	1.042^{b}	1.053^{a}	1.058^{a}	1.030	1.039^{c}	1.044^{b}	1.003	1.006	1.008^{c}
	[1.019]	[1.024]	[1.026]	[1.014]	[1.018]	[1.020]	[1.001]	[1.003]	[1.004]
	(2.90)	(3.67)	(3.93)	(1.43)	(1.97)	(2.34)	(0.63)	(1.37)	(1.79)
Firm Age	0.999^{c}	1.000	1.000	0.995^{a}	0.996^{a}	0.996^{a}	1.002^{a}	1.002^{a}	1.002^{a}
	[0.988]	[0.998]	[0.997]	[0.913]	[0.924]	[0.920]	[1.042]	[1.045]	[1.046]
	(-2.05)	(-0.28)	(-0.40)	(-9.27)	(-7.74)	(-8.42)	(25.94)	(27.58)	(26.38)
Firm Size	1.450^{a}	1.479^{a}	1.477^{a}	1.575^{a}	1.604^{a}	1.599^{a}	1.190^{a}	1.198^{a}	1.199^{a}
	[1.811]	[1.870]	[1.867]	[2.081]	[2.145]	[2.133]	[1.321]	[1.335]	[1.337]
	(48.16)	(51.25)	(49.71)	(30.87)	(31.60)	(32.71)	(44.25)	(52.84)	(57.16)
Firm Risk	1.320^{a}	1.323^{a}	1.343^{a}	2.106^{a}	2.091^{a}	2.141^{a}	1.013	1.014	1.019
	[1.066]	[1.066]	[1.070]	[1.180]	[1.178]	[1.184]	[1.003]	[1.003]	[1.004]
	(3.58)	(3.82)	(3.99)	(4.07)	(4.18)	(4.35)	(0.85)	(0.93)	(1.24)
ARET	1.098^{a}	1.096^{a}	1.095^{a}	1.204^{a}	1.202^{a}	1.201^{a}	0.986^{b}	0.986^{a}	0.985^{a}
	[1.068]	[1.066]	[1.066]	[1.136]	[1.135]	[1.134]	[0.990]	[0.990]	[0.990]
	(8.57)	(8.07)	(7.93)	(7.75)	(7.59)	(7.54)	(-2.85)	(-2.98)	(-3.02)
Observations	12,886	12,886	12,886	9,684	9,684	9,684	13,006	13,006	13,006
R^2	0.425	0.419	0.417	0.327	0.325	0.323	0.530	0.527	0.525

Essay 2:

On Independence of Independent Directors

Abstract

We study the decisions to appoint and replace independent directors using a broad vector of CEO attributes, director attributes, and CEO-Director connections. The connections are further classified by whether the connections have professional origins established through common employment history or through shared educational experiences or other forms of service outside the employment context. We find that board changes are especially common in the first year after a new CEO is appointed, with both a higher probability of replacing existing directors and new outside director appointments. Director attributes matter in the replacement decision: outside directors of similar age as the CEO and with connections established through a shared employment history are less likely to be replaced. The decision to replace a director who is not connected to the CEO is accompanied by appointment of individuals who are connected to the CEO. These results suggest that CEOs shape the board to their own image and do so in the first year of their tenure. These results hold even after controlling for CEO involvement in the director selection process and even in subsamples where rules require CEOs to recuse themselves from the director nomination process, suggesting that the appointment of connected directors is not a back-door mechanism to retain CEO influence in the nomination process.

We also study CEO turnover and find that with a higher proportion of professionally related outside directors on the board, the CEO is less likely to experience turnover. The cross-sectional relation between director turnover and professional employment connections and the insignificance of non-professional connections also holds in bivariate PROBIT models in which the CEO continuation is modeled in conjunction with director replacement or appointment decisions. We discuss the implications of our findings for corporate governance research and practice.

1 Introduction

In the modern corporation, the board of directors represents a key institutional mechanism by which shareholders exert influence over managers of a corporation. Board members have a fiduciary responsibility to watch out for shareholders' best interests. A key element of this function is to monitor and discipline firm management, as articulated in Fama and Jensen (1983, p. 303). The monitoring and disciplining functions involve hiring top management, establishing compensation plans, and where necessary, shaking up and replacing top management.

The disciplining and monitoring role of boards suggests that there should be some degree of separation between board members and top management. Independent directors plausibly have fewer incentives to engage in activities that benefit CEOs at the expense of shareholders. However, academic studies and practitioners often question whether boards have been truly independent. Much of this work stresses the CEO involvement in director selection. Early work by Mace (1971), or Lorsch and MacIver (1989) finds that CEOs play a key role in director selection, and Shivdasani and Yermack (1999) find that CEO involvement lessens the odds of appointing outside directors.

Concerns over board independence became especially elevated after high profile fraud cases such as Enron and WorldCom. For instance, the New York Stock Exchange now requires that more than 50% of the directors on a board should be independent. The upshot has been a dramatic shift in board structure with a surge in board members that meet the technical definition of independence. For instance, the median percentage of outside directors is 82%, up from 45% reported by Shivdasani and Yermack (1999)[3]. The dominance of independent directors – who are perhaps more aptly called "outsiders" – raises interesting empirical questions about these individuals. Are these individuals essentially drawn from symmetric distribu-

[3]We use "outside" and "independent" interchangeably in this paper. We acknowledge that the conventional definition of independent directors per Shivdasani and Yermack (1999) is outside but not gray. However, our main sample period is after 2003. After the 2003 Sarbanes Oxley Act and other changes in corporate governance regulations, gray directors are essentially gone due to legal requirement and public scrutiny.

tions, so they are functionally identical individuals with differences attributable to random chance? Or are there systematic differences in director attributes, and in particular, their relation to a firm's CEO? For instance, two directors may be nominally independent of the CEO yet one may be connected to the CEO through ties with the CEO separate from their role as director or CEO of the firm in question. Such ties can arise, for example, from having common educational backgrounds, a shared interest and participation in clubs and charities, or having served together with the same employer at sometime in their careers. How do such CEO-Director relationships affect the appointment and replacement decisions of an individual director?

In this paper, we investigate the characteristics of CEOs and the independent directors appointed by CEOs and assess the existence of any prior relationship using a broader vector of characteristics than used in prior work. Our basic tests examine whether CEOs pick individuals who share similar antecedents that generate CEO-Director connectedness or directors who have similar attributes. Our analysis is dynamic. We start with the time a new CEO assumes office. In the years subsequent to the hiring of the CEO, we examine all inside and outside directorial replacement and appointments made until the CEO's tenure ends. For each replacement and appointment of a director, we assemble a vector of characteristics that comprises the observable traits of the CEO and that of the director and the affiliations between the CEO and the director.

Our source of data for developing a detailed picture of ties between the CEO and the director to construct our connection variables is the *BoardEx* database. BoardEx has detailed biographical data for senior executives of US public firms and provides the raw data we use to develop CEO and director traits. We separately examine two samples of firms that reflect the evolution of the BoardEx data. First we examine firms over the period from 2004 to 2007 (the 2003 sample). BoardEx has complete coverage for a large number of both small and large firms for this sample period. Second we examine a sample of primarily large firms over the period from 2001 to 2007 (the 2000 sample). The two samples allow us to analyze both a large number of firms of different sizes and a smaller set of large firms for a longer time period, especially a period that straddles the passage of the 2002 Sarbanes-Oxley Act (henceforth "SOX").

The biographical data available on BoardEx is extensive, so it permits us to develop educational, social and employment connections between the CEO and directors. The first source of connections between the CEO and the director we explore are the ties formed based on their common educational background. We document educational connectedness on the lines of Cohen, Frazzini, and Malloy (2008, 2009), who argue that shared experiences and common culture arise from attending a common educational institution, especially because such links are often formed long before the CEO's current position. Thus, educational connections can serve as effective conduits for information flows between individuals with the same alma mater. Additionally, individuals may also interpret and form different judgments about actions of those from a similar educational institutions. Finally, education at the same institution may be more likely to lead to social relationships. While such relationships could help when the connected individuals work together in teams, they could be far less benign when the task is to monitor the CEO.

The second source of connections we analyze are connections formed through common service on not-for-profit organizations such as universities or memberships of charitable organizations, golf clubs, etc. These types of connections have gained considerable notoriety in the popular press. For instance, donations of hundreds of millions of dollars were made by Enron to the M.D. Andersen cancer center, whose president John Mendelsohn sat on Enron's board as an ostensibly independent director. Such anecdotal evidence suggests that directors with these other connections to the CEOs may be compromised in their monitoring of the CEO. CEO-Director connections that arise from ties based on common educational background and service at non-for-profit institutions represent ties from social settings other than their professional careers. We refer to these ties as *non-professional connections.*

The third category of CEO-Director ties we analyze are those that arise out of shared professional experience at the same employer in their careers. These connections represent shared work experience and business relationships that engender mutual respect as professional colleagues. We refer to these as *professional connections*.

We define an education connection when the CEO and director attended the same undergraduate institution as in Cohen, Frazzini, and Malloy (2008, 2009). We use data on an individuals service at not-for-profit organizations and their memberships in charities, golf clubs etc., to develop the service connections. We define a service connection if the CEO and director have served or are members in the same not-for-profit organizations. For employment connections, we examine the employment history of the CEO and director. We define an employment connection when the CEO and director have overlapped and previously worked in another firm.

We find strong evidence in support of a homophily hypothesis. CEOs tend to retain directors who are similar to them. Outside directors of similar age as the CEO and professionally related to the CEO are less likely to be replaced. Further, replacements of directors that are not connected to the CEO are accompanied by appointments of directors that have connections to the CEO. In examining the tendency of CEOs to shape the board, we also incorporate the decision by the board to replace or retain the CEO. The CEO's decision to replace an existing director or to add new directors is conditional on the firm choosing to retain the CEO. We use a bivariate PROBIT model to incorporate the probability of the firm replacing the CEO into the director replacement and appointment decisions. We find that with a higher proportion of professionally related outside directors on the board, the CEO is more likely to stay.

We note that prior literature has examined the role of the CEO in the selection of nominees to serve as directors. Shivdasani and Yermack (1999), for example, point out that when no nominating committee exists or when the CEO is on the nominating committee, fewer independent directors and more grey directors with outside conflicts of interest get appointed to boards. We examine whether the CEO-Director connections essentially serve as a backdoor mechanism to assert the CEO's influence over the nomination process. Board changes, including those related to the appointment of connected directors, occur early in a CEO's tenure. This result suggests that boards are altered to complement the CEO who assumes office; these appointments do not appear to be driven by increasing power as CEOs increase their tenure in the corner office. Moreover, CEO involvement in the nomination process has decreased over our sample period, and at least in a legal sense, is entirely absent in the post-2003 sample period. Nevertheless, the fraction of directors on the nominating committee who are connected to the CEO remains constant. We conclude that it is unlikely that the CEO-Director connections is evidence of a backdoor mechanism by which CEOs influence the nomination process.

Our evidence is more suggestive of an advisory role played by boards. One function of boards is to monitor and discipline managers, a view stressed Fama and Jensen (1983). The other function is to provide advice and counsel to top management. Under this view, board members work together with top management to review and influence key elements of the strategy and business direction of the firm. This role for boards is discussed, for instance, in the book by Lorsch and MacIver (1989) or the survey by Demb and Neubauer (1992). Our evidence suggests that the presence of CEO-Director connections improves the ability of the CEO to seek advice and the board to provide it. Shared experiences make it more likely that CEOs will see the advice of the board. At the same time, the independent nature of the board makes it likely that the board continues to serve a monitoring role. In addition to our basic results, we also explore the role of the passage of the SOX, firm size, and forced CEO turnovers. We find support for homophily in the sample of both small and large firms. We also find that the role of CEO-Director connections has decreased after the passage of SOX, but the role of professional connections between the CEO and the director remain significant.

The remainder of the paper is organized as follows. The next section, Section 2 reviews the related literature. Section 3 discusses the data and method. Section 4 and 5 present the empirical results. Section 6 expands on our basic tests and discusses the effects of the 2002 Sarbanes-Oxley Act, the differences across large and small firms, and the role of forced CEO turnovers on director replacements and appointments. Section 7 concludes.

2 Related Literature

In this section, we review the related literature on the role of the board of directors, the replacement and appointment of directors, and CEO-Director social networks.

The independence of directors comprising the board has been a focus of much of shareholder and regulatory activity. The Board is seen as fulfilling the dual roles of monitoring and advising firm management as articulated in Fama and Jensen (1983) and Adams (2005). Literature has found that the level of independence of the board has been deemed crucial for the board to execute their fiduciary obligations. Weisbach (1988) finds that independent boards are more likely than other boards to replace poorly performing management. Byrd and Hickman (1992), Shivdasani (1993), Cotter, Shivdasani, and Zenner (1997), and McWilliams and Sen (1997) demonstrate that independent boards increase the chances of value increasing merger bids for the shareholders. Beasley, Carcello, Hermanson, and Lapides (2000), Dechow, Sloan, and Sweeney (1996), Klein (2002), and Uzun, Szewczyk, and Varma (2004) have also found that as the number of independent outside directors on a board increases, the incidence of corporate fraud decreases.

Of particular importance in understanding director independence is the process by which individuals are selected to serve on the Board of Directors. Especially important is the role of the CEO in the nomination process. Early work by Mace (1971), or Lorsch and MacIver (1989) finds that CEOs play a key role in director selection. Shivdasani and Yermack (1999) find that CEO involvement lessens the odds of appointing outside directors. Recent trends in enforcing independence requirements on the board of directors discourage the appointment of insider directors, nevertheless the CEOs involvement in the nomination process could severely compromise the independence of the board.

Another aspect of director selection relates to the role of pre-existing connections, i.e. *social networks*, between the CEO and the director. There is a burgeoning literature on CEO-Director social networks. Behavioral research shows that personal ties foster collaboration and counseling by creating a sense of social security and enhanced mutual trust that reduces the perceived risks of seeking advice. (see, e.g., Anderson and Williams (1996), Fischer (1982), and Rosen (1983)). Cohen, Frazzini, and Malloy (2008) were among the first to examine and document the role of education connections in facilitating information transfer between the board of directors and mutual fund managers. Cohen, Frazzini, and Malloy (2009) document that analyst's forecasts are more accurate when they have an education connection with the executives of the firm.

Several papers have expanded the scope of CEO-Director connections over and above educational ties (see e.g. Mizruchi (1982), Mizruchi (1992), Useem (1984)) and develop an aggregate measure that includes ties arising from a shared employment history with a former employer and shared service in non-profit organizations. Hwang and Kim (2009a) examine the impact of such aggregate CEO-Director connections in Fortune 100 firms and find that the presence of connected CEOs is associated with greater CEO compensation. Fracassi and Tate (2009) document the effect of aggregate CEO networks on a variety of corporate policies like acquisitions and accounting restatements. Fracassi and Tate (2009) examine the announcement of accounting restatements and focus on the discovery of fraud. They find that connected CEOs are associated with fewer internally initiated restatements. Schmidt (2009) and Cai and Sevilir (2009) find higher bidder returns in acquisitions in the presence of connected CEOs. This role of connections is also emphasized in the "collaborative board" perspective of Westphal (1999), who argues that besides monitoring, boards also play a role in providing expert advice and counsel to CEOs.

Our work complements the literature in that we separately examine each component of the CEO-Director connections based on how they arise, i.e. non-professional connections based on shared educational background and service on not-for-profit companies Vs. professional connections based on prior employment ties. Sociology literature documents that the source of ties and connections between people can have differential impact. Sanit-Charles and Mongeau (2009) and

Krackhardt and Brass (1994) had also proposed different use of different networks depending on the situation. For example, specialists networks are used for consultation on work related matters and a network of friends are used to seek advice on difficult decision that involve ambiguity and a lack of information. Engelberg, Gao, and Parsons (2009) also separate the different connections but find no difference in how these individual ties impact CEO compensation. While all sources of connections may have a similar effect on compensation of the CEO, it is plausible that the different connection sources impact differently on the director replacement and appointment decision as the the source of connections may have a differential impact on the monitoring and counseling functions of the board. As Westphal (1999) shows using survey data, that though CEO ties with directors hinder board monitoring they have a positive effect on the counseling role of directors.

Our work also complements the literature that has examined the characteristics and attributes of the board in determining their efficacy and ability to execute their fiduciary obligation. Fich and Shivdasani (2006) study the role of busy directors and find that that busy boards are associated with weak corporate governance and operating profits. However, Fich and Shivdasani (2007) find that shareholder lawsuits impose costs on directors suggesting that the potential of losses from their multiple board positions may actually give incentives to such busy directors to monitor management and reduce the probability of a lawsuit. We therefore incorporate the number of directorships held in determining the director replacement and appointment decisions. Our work also builds on the work of Coles, Daniel, and Naveen (2008) who study coopted boards, or the members of a board brought on board by a new CEO. We characterize more precisely what kinds of individual directors are coopted on corporate boards.

Our empirical model incorporates the decision by the board to replace or retain the CEO. The CEO's decision to replace an existing director or to add new directors is condition on the firm choosing to retain the CEO. In part of their survey, John and Senbet (1998) examine both empirical and theoretical literature on monitoring function of corporate board and discuss findings of CEO turnover as a particular measure of board monitoring effectiveness. Our model builds on the work by Weisbach (1988), Parrino (1997), Jenter and Kanaan (2008), etc. and includes the role of CEO-Director connections on the probability that the CEO is replaced.

3 Data and Methodology

Our analysis focuses on the replacement and appointment decisions of directors and we develop probability models for the replacement and appointment of directors. Our focus is on understanding the evolution of the board, especially the replacement and appointment of independent directors, from the time a new CEO is appointed.

Our main data source is the BoardEx database provided by Management Diagnostic Limited. Additionally, we obtain stock return and accounting data from CRSP and COMPUSTAT, respectively. BoardEx collects biographical information of corporate directors and senior managers from a wide variety of public domain sources. BoardEx initiated coverage of director and executive data for fewer than 100 U.S. companies in 1999 and has increased its coverage over time. The first main expansion of the database in 2000 added more than 1,500 large U.S. companies. The second expansion in 2003 added more than 2,000 smaller companies. For each director and executive, BoardEx collects his or her biographical details and provides data on each individual's employment history, educational background, and other activities such as club membership. The personal information provided in BoardEx dates back to as early as 1926. We sort and code the data at the individual executive and director level and then aggregate data at the firm level for each fiscal year. We filter the data in several ways to screen out errors and inconsistencies.

3.1 Sample construction

We construct a sample of publicly traded firms for which we can identify the CEO and the list of members on the Board of Directors. We require that coverage of the firms by BoardEx is complete, i.e., the list of directors is not a partial list. The distinction on complete versus partial coverage is especially important for the years prior to 2003. When coverage is complete, we match CUSIP, tickers symbols, and company names give on BoardEx with corresponding data on COMPUSTAT to identify the GVKEY of the firm. When matches between BoardEx and COMPUSTAT are only based on the name of the company, we manually verify such matches by checking company locations and histories from company Web sites and other sources. Companies for which there are no matches on COMPUSTAT are either private, short listed, or not traded in North America.

BoardEx provides the position of each individual in the firm, their dates of service, and classifies each individual as being an executive, an Executive Director, or a Supervisory Director. For each firm, we identify the list of CEOs using the position title and the starting and ending dates of CEO tenure. For each firm, we identify an annual snapshot of the CEO and the Board of Directors in place at the beginning and the end of the fiscal year using the starting and ending dates for each director and fiscal year data from COMPUSTAT. We also determine CEO tenure as of the end of the fiscal year. For each fiscal year, we use the integer tenure years to determine the number of years the CEO has been in office and label the year as the *Event Year*. The year in which the CEO is appointed is a turnover year, which we refer to as *Event Year 0*. We examine director appointment and replacement decisions for the first six years following the appointment of the CEO, that is up to *Event Year 6*.

Comparing the snapshot of board of directors at the end of fiscal year t and that at the end of fiscal year $t-1$, we determine director appointments and replacements occurred during fiscal year t. A director is considered to be newly appointed if the director serves on the board at the end of fiscal year t, but not $t-1$. A director is considered to be replaced if the director serves on the board at the end of fiscal year $t-1$, but not t.

Given the nature of BoardEx's partial coverage of firms up to 2003, we construct two samples for our analysis. Our first sample consists of all firm-fiscal year combinations from after 2003, the year in which BoardEx's initiated coverage of small firms in addition to the large firms it was already covering and the number of firms covered was substantially increased. We label this sample the 2003 sample. The sample covers a total of over 52,905 director-CEO-firm-year observations. As shown in Table 11a, the sample consists of 7,399 firm-year over the 4-year period from 2004 to 2007. There are 2,824 unique firms and 19,119 unique directors in this sample. There are 804 CEO turnovers in the sample. A total of 4,956 directors were replaced and total of 4,678 directors were newly appointed in the 4-year period from 2004-2007.

Table 11b shows that number of director appointments and replacements by Event Year. As the table shows, 1,126 directors are replaced and 1,143 directors are appointed in the first year after the new CEO is appointed. The number of director replacements and appointments declines in each subsequent event year and the number of replacements and appointments in year 6 are 593 and 610 respectively. Table 11b also reports that the percentage of firms that make any outside director appointment is 49.33% in year 1 but goes down to 42.08% in year 6. In terms of the proportion of outside directors replaced on the board, it goes down from 18.57% in year 1 to 15.49% in year 6. Similar patterns exist for director appointments. The data thus indicate that director replacements and appointments are highest in the years following a CEO turnover.

Our second sample focuses on the companies that entered into BoardEx coverage in 2000-2003 and we gather data on these firms for the 2001-2007 period. We refer to this sample as the 2000 sample. Note that the 2000 sample ignores all firms that were first covered in BoardEx in 2003 and consequently there are fewer firms in the sample and the firms in this sample are large firms. This sample consists of 48,699 director-CEO-firm-year over 5,858 firm years in the 2000 sample. The sample involves 1,914 unique firms and 11,302 unique directors. As shown in Table 11c, there are 610 CEO turnovers in the 2000 sample; a total of 4,607 directors were replaced and total of 4,396 directors were newly appointed in the 7-year period from 2001-2007. The 2000 sample of firms serves as a robustness check for our results. Table 11d shows the counts by event year. As in the 2000 sample, the number of director replacements and appointments start from a high of 984 and 986, respectively. The number of replacements and appointments declines in each subsequent event year, and the number of replacements and appointments in year 6 are 534 and 510, respectively.

The set of director replacements and appointments and their pattern by fiscal and event year represents the raw data that we analyze further.

3.2 Methodology

We develop probability models for the replacement and appointment of directors. Our focus is on understanding the evolution of the board for analyzing the role of the CEO, director attributes and CEO-Director connections.

3.2.1 Director Replacement

Our dependent variable in understanding director replacement is a zero/one variable that indicates whether a director on the board at the beginning of the fiscal year is replaced in the fiscal year. The dependent variable is one if the director is replaced and is zero if the director is retained in the fiscal year.

We estimate two models in examining the probability that a director is replaced by the firm. First we estimate the probability of director replacement using a PROBIT model specified by the following equation,

$$Prob(Dir_{Repl}) = \alpha + \beta_F X_F + \beta_C X_{CEO} + \beta_D X_{Dir} + \beta_{Connec} X_{Connec} + \beta_{EY} X_{EY} + \epsilon \quad (6)$$

where X_F are firm characteristic variables, X_{CEO} are CEO attributes, X_{Dir} are director attributes, X_{Connec} are variables that represent the connections between the CEO and the Board of Directors, and X_{EY} are the event year indicators.

In our second model we incorporate the probability that the firm replaces/continues with the current CEO in understanding the director replacement decision. The decision to replace a current director or appoint a new director in a fiscal year is conditional on retaining/replacing the current CEO in the same year. We therefore estimate a bivariate PROBIT model where the first equation is a model for the

CEO turnover decision and the second equation is to examine the replacement of a director.

$$Prob(CEO_{Turn}) = \alpha + \beta_F X1_F + \beta_C X1_{CEO} + \beta_{Connec} X1_{Connec} + \beta_{EY} X_{EY} + \epsilon \quad (7)$$

$$Prob(Dir_{Repl}) = \alpha + \beta_F X2_F + \beta_C X2_{CEO} + \beta_D X2_{Dir} + \beta_{Connec} X2_{Connec} + \beta_{EY} X_{EY} + \epsilon \quad (8)$$

where $X1_F$ and $X2_F$ are firm characteristic variables, $X1_{CEO}$ and $X2_{CEO}$ are CEO attributes, $X1_{Dir}$ and $X2_{Dir}$ are director attributes, $X1_{Connec}$ and $X2_{Connec}$ are variables that represent the connections between the CEO and the Board of Directors, and X_{EY} are the event year indicators. We note that the set of variables differ in the two equations. In general variables in Equation 7 are firm level variables and variables in Equation 8 are either at the firm level or individual director level.

3.2.2 Director Appointment

Our dependent variable in understanding director appointments is a zero/one variable that indicates whether a firm appoints a director in the fiscal year. The dependent variable is one if the firm appoints a director in the fiscal year and is zero otherwise. Since our unit of analysis is the firm's decision to appoint a director, we directly estimate a Bivariate PROBIT model that incorporates the firm's decision to retain/replace the CEO in understanding the firm's decision to appoint a director. The first equation is a model for the CEO turnover decision and the second equation is an equation that examines the appointment of a director.

$$Prob(CEO_{Turn}) = \alpha + \beta_F X1_F + \beta_C X1_{CEO} + \beta_{Connec} X1_{Connec} + \beta_{EY} X_{EY} + \epsilon \quad (9)$$

$$Prob(Dir_{App}) = \alpha + \beta_F X2_F + \beta_C X2_{CEO} + \beta_{Connec} X2_{Connec} + \beta_{EY} X_{EY} + \epsilon \quad (10)$$

where $X1_F$ and $X2_F$ are firm characteristic variables, $X1_{CEO}$ and $X2_{CEO}$ are CEO attributes, $X1_{Dir}$ and $X2_{Dir}$ are Director attributes, $X1_{Connec}$ and $X2_{Connec}$ are variables that represent the connections between the CEO and the Board of Directors, and X_{EY} are the event year indicators. We note that the set of variables differ in the two equations. In general variables in Equation 9 are firm level variables and variables in Equation 10 include current and lagged replacement and appointment decisions.

We next examine the variables used in our multivariate regressions.

3.2.3 CEO-Director Connections

The biographical data included in BoardEx covers educational qualifications, employment history, and details of the current employment such as the role within the firm and committee memberships. The personal biographical information collected by BoardEx dates back to as early as 1926. The dataset consists of two main files, containing the employment records and education records respectively, downloaded from BoardEx on Aug. 1, 2008. The key firm identification variable in BoardEx is *companyid*, the key individual identification variable is *directorid*, and the key variable to identify educational or certifying institutions attended by individual executives and directors is *universityid*. We use the biographical data for the CEO and each director on the board to determine whether the CEO and the director have educational, not-for-profit or employment overlaps.

Our first variable to capture connections between the CEO and director are based on educational institution attended. For each director and executive, we identify the educational institution attended and the degree or certificate received. With respect to the names of educational institutions, the biographies contain a variety of specifications. We manually match the names of educational institutions taking care to identify multiple versions of the names (e.g. Harvard University and Harvard). Specialized school names are matched back to institutions. Each satellite campus are treated as a separate institution. If just a university name is given for a university system that has satellite campuses, it is matched to the flagship campus. If a single name could refer to multiple institutions, we drop the observation. For each university, we assign a universityid to uniquely identify the institution. There is a similar variation in the specification of the degrees earned by the executive and director in the biographies. We manually sort through the degrees received and categorize them into the following six categories: Bachelors, Masters, MD, MBA, JD, and PhD.

We classify the CEO and the outside or supervisory director as having an educational connection if they attended the same undergraduate institution. These education connections encompass enhanced interactions or a sense of belonging through alumni networks, college newsletters, donations, sports and culture. This falls in the category of "weak" educational ties as in Cohen, Frazzini, and Malloy (2008). Many papers that have studied educational connections have also examined these ties only when the two individuals physically overlapped at the education institutions. This overlap increases the likelihood that the CEO and the director are friends during attendance at the education institution and since they graduated. Such a "strong" definition of education ties is overly very restrictive. Our intent is to capture shared beliefs, common culture and a sense of belonging, which is better captured by identifying cases where the CEO and the director went to the same institution. Cohen, Frazzini and Malloy (2008) find significant impact of these "weak" education ties.

We find that about 7.7% of firm-years in our sample were classified as having an educational connection between the CEO and an outside director. To capture the influence of these education ties on the CEO, we normalize the number of education ties by the total size of the board. This variable, referred to as the Frac_Edu, captures the fraction of the board that had education connections with the CEO and consequently the influence of education connections on board functions.

We next examine the effect of CEO-Director Non-Profit or other social connections. Consistent with the education connection variables, our measure of the influence of these CEO-Director connections on board functioning is the fraction of the board with Non-Profit ties to the CEO and is denoted as Frac_Oth.

Our last variable to capture connections between the CEO and the outside directors is based on employment connections. We classify a CEO as having an employment connection with an outside director if they have a prior history of being employed at the same time in another firm. Note that we have excluded their shared employment history at the firm in the sample. Consistent with education connections we create Frac_Prof, which is the fraction of the board that shares an employment connection with the CEO to capture the influence of these connections on board functioning. We find that about 41.3% of firm years in our sample were classified as having an employment connection between the CEO and an outside director.

3.2.4 CEO and Director Attributes

In addition to CEO-Director connections, the decisions to appoint or replace a director are likely to be related to other CEO and director traits. Table 12 presents the summary statistics of CEO and Director attributes we consider for the 2003 sample and Table 13 presents the summary statistics of the data for the 2000 sample.

The "homophily" argument in sociology suggests that the probability of interactions increases with similarity (see, for example, McPherson, Smith-Lovin, and Cook (2001)). We therefore use two mutual quality variables: the absolute age difference between the independent director and the CEO and a dummy variable indicating they are of the same gender. These mutual quality variables indicate the *potential* connection between the CEO and the director, which complements the *actual* connection captured by the overlap variables.

Personal traits of a CEO include age, gender, a dummy variable indicating whether the individual had earned an MBA degree, and a dummy indicating whether the individual had attended one of the "Ivy Plus" schools.[4] We define a CEO as "internal" if his or her first year of employment with this company preceded the year of CEO appointment. Instead of using CEO tenure as one explanatory variable, our regressions include 6 event year indicators with event year 6 as the omitted dummy. Unlike a single CEO tenure variable, which only captures the linear relation between the CEO's years in office and the likelihood of director change, using indicator variables allows us to compare the annual director change activities for each of the first 6 years since a new CEO was appointed. In CEO replacement equations, we

[4] The "Ivy Plus" list obtained from Zawel (2005) includes Harvard, Yale, U Penn, Princeton, Columbia, Brown, Dartmouth, Cornell, MIT, Stanford, and Chicago.

also use a retirement dummy to indicate the CEO was 60 or older. Liu (2010) shows that a good network position creates outside opportunities and therefore increases the likelihood of CEO turnover. We use the betweenness centrality as defined by Liu to measure a CEO's connectedness on the overall executive and director employment network. Our results are robust to the use of alternative centrality measures. We elect to use the betweenness measure because it has the minimum correlation with other variables such as age and board size. We winsorize the betweenness measure at the top and bottom 2.5% level.

Similarly, personal traits of a director include age, gender, an MBA dummy, an "Ivy Plus" dummy, and his or her overall connectedness on the executive and director employment network. We also calculate the number of years since the director first served on the board of a particular firm. Following Fich and Shivdasani (2006), who suggest that busy outside directors are not effective monitors, we measure a director's "busyness" by counting the total number of directorships the person has in a particular year.

3.2.5 Firm Characteristics

In our regressions, we control for standard firm and board characteristics including firm size, board size, board independence, and firm performance.

Table 12 presents the summary statistics of the firm characteristics we use for the 2003 sample and Table 13 presents the summary statistics for the 2000 sample. We measure firm size as the natural logarithm of sales (COMPUSTAT data item 12). We winsorize firm size at the top and bottom 2.5% level.

We measure board size as the total number of directors served on the company's board at the beginning of the fiscal year. In addition, we also calculate Frac_SD, the percentage of independent directors on the board. Frac_SD is the conventional board independence measure used in prior literature.

We use stock returns as the measure of firm performance. Following Jenter and Kanaan (2008), we include both firm specific and industry stock returns in our analysis. We calculate firm return as the buy-and-hold annual stock return of the firm. We calculate corresponding industry return as the value-weighted industry buy-and-hold portfolio return in the same 12-month period. We winsorize firm stock return at the top and bottom 2.5% level. Industry grouping is based on the Fama-French 48-industry classification.[5]

4 Director replacement

In this section we present our empirical results for the director replacement decision. We first present the results for a PROBIT model that examines the probability of replacing the director replacement in a given year and present separate models that examine the roles of the firm characteristics, CEO/director attributes, and the connections between the CEO and the director. We next present the results for the Bivariate PROBIT model that incorporates the decision of the firm to retain/replace the CEO in determining whether a director is replaced.

4.1 PROBIT results for replacement

We estimate PROBIT models to examine the determinants of independent directors replacements made by the CEO. Our unit of analysis is the director-firm-year observation. We identify a supervisory director replacement if a person was supervisory director of a company at the beginning of the fiscal year but did not appear as a board member at the end of the fiscal year. To make sure the director replacement decision was made under the influence of the CEO, we further compare the end date of the CEO and that of the director. Only when the director end date preceded the CEO end date, we consider the director as replaced by the CEO.

The dependent variable is a binary variable that takes value 1 when an independent director is replaced by the CEO and 0 otherwise. To highlight the effects of the overlap variables, we start with a base model including only conventional explanatory variables: firm size, firm return, industry return, board size, fraction

[5] Industry classification is obtained from the Ken French Web site: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

of supervisory directors, and event year dummies. The second model adds personal traits of the CEO and the director: CEO age, CEO MBA, CEO Ivyplus, internal CEO dummy, CEO connectedness, director's number of years on board, director busyness, director MBA, director Ivyplus, and director connectedness. The third model introduces the mutual quality variables (same gender and age difference) and the overlap variables (Prof Overlap and NonProf Overlap). All explanatory variables are lagged as their values at the end of the prior fiscal year.

We fit maximum-likelihood PROBIT models allowing the standard errors to be clustered at firm level. Table 14 reports the estimated results. Panel 14a reports the estimated coefficients. Panel 14b reports the estimated marginal effects. The marginal effects are partial derivatives of director replacement probabilities with respect to the explanatory variables. To compare the magnitudes of impacts of different explanatory variables, which are in different units of measurement, we also calculate the standardized marginal effect by multiplying the raw marginal effect with the standard deviation of each variable. The magnitudes of all marginal effects appear to be small. But their economic significance should be assessed considering that the average director turnover rate in this sample is only 8.77%.

The estimated results of the base model show that firm and board characteristics significantly affect the likelihood of independent director replacements. Independent directors are less likely to be replaced in larger firms. Board size and the proportion of independent directors are negatively related to the probability of director replacements. Interestingly, firm specific stock returns do not have significant impact on director turnover. But higher industry stock performance is related to more director turnover. The coefficients of the event year dummies indicate that CEOs typically replace independent directors in the first year after they took office. The probability of director replacement in event year 1 is 2.5% higher than that in event year 6. These effects remain statistically significant at the 1% level after adding personal traits and overlap variables.

Model (2) includes CEO and director personal traits, which increases the overall explanatory power substantially, as evident by the Pseudo R^2 statistics. Older

CEOs and CEOs who were promoted from inside the firm are less likely to replace independent directors. There is suggestive evidence that CEO's overall connectedness is associated with higher probability of director replacement. Whether the CEO had an MBA degree or attended an "Ivyplus" school does not matter. Not surprisingly, director personal characteristics matter more. The effects of director's number of years on board, busyness, overall connectedness, and whether the director had attended an "Ivyplus" school are all significant at the 1% level. A one-standard-deviation increase in the number of years on board, the number of total directorship, and overall connectedness is associated with a 1.6%, -0.5% and 0.6% change in director turnover probability, respectively. A director with "Ivyplus" experience is more likely to turnover than others by 0.8%.

Model (3) adds director-CEO mutual quality and overlap variables, which again increases the overall explanatory power. Results show that the absolute age difference between the independent director and the CEO has strong positive effect on the probability of director replacement, with a 13.20 z-statistic. If the independent director and the CEO are closer in age by one standard deviation, the probability of director replacement is reduced by 1.9%. It is worth noticing that CEO age becomes irrelevant controlling for age difference. This suggests that similarity in age is more important than CEO age alone. The same gender indicator is insignificant, probably due to the very small proportion of females in both the CEO and the director sample-only 3% of the CEOs and 10% of the directors are female in our sample.

The results indicate that an independent director is less likely to be replaced by the CEO if they had been employed by an same outside company at a same point in time. The existence of such professional overlap reduces the probability of director replacement by 1.4%. This effect is statistically significant at the 1% level, with a 4.26 z-statistic. In contrast, the existence of non-professional overlap between the CEO and the independent director increases the probability of director replacement by 0.7%. This effect is statistically significant at the 5% level, with a 2.28 z-statistic. The findings suggest that connections established through professional ties act differently from those established through common educational background and other social activities. CEOs tend to retain the independent directors they know from work, not their friends in the informal social settings.

4.2 Bivariate PROBIT model of director replacement

Notwithstanding the results from the PROBIT model, a concern with the regressions presented in Table 14 is whether we appropriately consider the effect of CEO turnover. The CEO's influence in remaking of the board is relevant only if the CEO stays. Therefore, we estimate the seemingly unrelated bivariate PROBIT model to incorporate CEO turnover decisions into our analysis of director replacement. This method fits a two-equation PROBIT system described in the methodology section, Section 3.2. The first equation tests the determinants of CEO replacement. The second equation tests the determinants of independent director replacement. The decision to replace the CEO and the decision to replace the directors are interrelated. The equations are allowed to be correlated and the correlation is estimated within the system.

The dependent variable in Equation 7 is a binary variable that takes value one when there was a CEO turnover and zero otherwise. We start with a base model including only firm and board characteristics as explanatory variables: firm size, firm return, industry Return, board size, fraction of supervisory directors, average number of directorship held by board members, and event year dummies. The second model adds personal traits of the CEO: a dummy indicating the CEO was 60 or older, CEO gender, CEO MBA, CEO Ivyplus, internal CEO dummy, and CEO connectedness. The third model introduces the proportion of independent directors that had professional overlap with the CEO and the proportion of independent directors that had educational or social overlap with the CEO. All explanatory variables are lagged as their values at the end of the prior fiscal year.

The dependent variable in Equation 8 is a binary variable that takes value one when the independent director was replaced by the CEO and zero otherwise. Again, the base model includes only firm and board characteristics and event year dummies. The second model adds CEO and director personal traits. The third model adds mutual quality variables and overlap variables.

Table 15a presents the estimated coefficients of the bivariate PROBIT models. Table 15c presents the estimated marginal effects. For the CEO replacement equation, we report the marginal effects of independent variables on the probability of CEO turnover. For the director replacement equation, we report the marginal effects of independent variables on the probability of independent director replacement conditional on no CEO turnover. Wald test results suggest that the two equations are correlated (p-values less than 10% in all models).

The results of the first equation show the effects of various determinants of CEO turnover. In general, we find these variables to influence CEO turnover in a manner consistent with that reported in previous research. For example, we find a significant negative relation between prior stock return and the likelihood of CEO turnover. CEOs with age 60 or older and better connected CEOs are more likely to go. We also find that firm size is negatively related to the probability CEO turnover, but board size increases the probability of CEO turnover. Interestingly, the fraction of independent director is associated with lower CEO turnover. The average number of directorship held by board members is positively related to CEO turnover. These findings are at odds with the prediction that more independent and more concentrated boards are more effective monitors of the management. Other CEO personal traits such as gender, MBA, Ivyplus, and internal hire do not yield significant coefficients. Controlling for these effects, we find that the fraction of independent directors who had professional overlap with the CEO significantly reduces the probability of CEO turnover. The marginal effect is statistically significant at the 1% level. A one-standard-deviation increase of the fraction of professionally related outside directors reduces the likelihood of CEO turnover by 1.3%, which is economically significant given the CEO turnover rate in our sample is merely 10.79%. However, the fraction of outside directors that had prior educational or social relation with the CEO does not matter.

Our bivariate PROBIT model results from support our earlier results from the

PROBIT models of outside director replacement. Outside director replacement is higher in the first year of the new CEO appointment. An CEO from the internal ranks of the firm is less likely to replace existing directors. The results also lend support to the homophilly hypothesis. CEOs tend to retain the outside directors who are closer to their own ages and those who have a shared employment experience with the CEO in their earlier careers, i.e. those with professional overlaps. Our findings also indicate that the existence of prior professional relation between the CEO and outside director also provides job security for both parties. A CEO is less likely to be replaced by a board with higher proportion of outside directors that are professionally related to the CEO. At the same time, an outside director is less likely to be replaced by the CEO if they overlapped through common employment experience.

5 Director appointment

In this section we present our empirical results on the director appointment decision. Our analysis of the director appointment decision is at the firm level and we examine the probability that a firm appoints an outside director and the probability that the outside director appointed has professional or non-professional ties with the CEO. We note that the decision on whether the firm appoints an outsider director is directly affected by the decision to retain the CEO and we therefore estimate the bivariate PROBIT model for the director appointment decision. As for the director replacement decision, we examine the roles of firm characteristics, CEO/Director attributes, and the connections between the CEO and the director in understanding director appointments.

The dependent variable in the first equation, Equation 9, of the bivariate PROBIT model is a binary variable indicating CEO replacement. Table 16 presents the results for three separate models. Model 1 presents the results for the base model including only firm and board characteristics as explanatory variables: firm size, firm return, industry Return, board size, fraction of supervisory directors, average number of directorship held by board members, and event year dummies. The second model adds personal traits of the CEO: a dummy indicating the CEO was 60 or older, CEO gender, CEO MBA, CEO Ivyplus, internal CEO dummy, and CEO connectedness. The third model introduces the proportion of independent directors that had professional overlap with the CEO and the proportion of independent directors that had educational or social overlap with the CEO. All explanatory variables are lagged as their values at the end of the prior fiscal year.

The dependent variable in the second equation, Equation 10, is a binary variable for outside director appointment. Table 16a presents the estimated coefficients of the BIPROBIT models. Table 16b presents the estimated marginal effects. For the CEO replacement equation, we report the marginal effects of independent variables on the probability of CEO turnover. For the director replacement equation, we report the marginal effects of independent variables on the probability of outside director appointment conditional on no CEO turnover. Each table presents the results for three models. Model 1, the base model includes only firm and board characteristics and event year dummies. Model 2 reports results for the base model plus variables that control for CEO attributes. Model 3, is the full model that adds contemporaneous outside director replacement, prior outside director replacement and appointment, and proportions of professionally or non-professionally related outside directors on the board. Wald test results suggest that the two equations are correlated (p-values less than 1% in all models).

The CEO turnover results are similar to those reported in Table 15. Controlling for the effects of firm, board, and CEO personal characteristics, we find that the fraction of independent directors who had professional overlap with the CEO significantly reduces the probability of CEO turnover. The marginal effect is statistically significant at the 1% level. A one-standard-deviation increase of the fraction of professionally related outside directors reduces the likelihood of CEO turnover by 1.0%. However, the fraction of outside directors that had prior educational or social relation with the CEO does not matter.

With respect to director appointments, we find that larger and better performing firms are more likely to appoint new outside directors. This is consistent with the notion that CEOs in more complex and better performing firms appointing independent directors for the counsel they provide. The probability of director appointment is negatively related to board size but increases with the average busyness of the board suggesting that the need for a new director decreases when there are already a large number of directors but increases when the existing directors have time constraints arising from service on multiple boards. The coefficients of the event year dummies indicate that CEOs typically appoint outside directors in the first year after they take office. The probability of director appointment in event year 1 is 3.0% higher than that in event year 6.

As Model (2) reports, older CEOs and CEOs with MBA degrees are less likely to appoint new outside directors but the significance of these effects disappears in Model (3) when we add board change and overlap variables. Interestingly, a higher quality CEO as proxied by an Ivy league background increases the probability of the firm adding an additional outside director.

Results presented in Model (3) provide strong evidence that outside director appointment is likely to occur with outside director replacement. Concurrent replacement and previous year replacement are associated with 39.6% and 12.1% higher probability of outside director appointment, respectively. These results indicate that CEO typically appoints a new outside director to fill the seat vacant by a replaced one. However, if the firm has appointed a director in the prior year, it is less likely to appoint a director in the current fiscal year. Finally, the proportions of both professionally overlapped and non-professionally overlapped outside directors reduce the likelihood of new outside director appointment by 1.4%.

We next examine the probability that the outside director appointed has a professional or a non-professional connections with the CEO.

5.1 Professionally overlapped outside director appointment

We estimate a bivariate PROBIT models to examine the decision to appoint a new outside director who is professionally related to the CEO. The first equation is the same CEO replacement regression as specified the previous section. The dependent variable in the second equation is a binary variable indicating at least one professionally overlapped director was appointed. The explanatory variables include firm and board characteristics, CEO personal traits, event year dummies, a dummy variable indicating the replacement of an outside director who did not overlap with the CEO (NonOverlap Rep), dummies indicating the replacements and appointments occurred in the previous year (Lag Prof App, Lag NonProf App, Lag NonOverlap Rep), and fractions of professionally or non-professionally overlapped outside directors.

Table 17 presents the estimated results. The CEO turnover results are practically identical to those reported in Table 16. In the second equation, we find that larger firm size is associated with higher probability of appointing new outside directors that are professionally related to the CEO. Better connected CEOs are more likely to appoint a professionally related director. Other firm, board, and CEO characteristics do not have a robust effect across all models. For example, the average number of directorship help by board members has significant negative coefficients in Model (1) and (2), but the significance of the effect disappears in Model (3). There is suggestive evidence that the appointment of professionally related directors happen in the first year of a CEO's tenure. The z-statistic for event year 1 dummy range from 1.51 to 1.73. It is also interesting to notice that neither firm stock return or industry stock return matter for the decision to appoint a professionally related outside director.

The results show a clear pattern that CEOs consistently reshape the board by adding and retaining outside directors who had prior professional relation with them. The marginal effects of NonOverlap Rep and Lag Prof App are 4.6% (z-statistic=6.22) and 3.0%(z-statistic=2.60), respectively. Also, one-standard-deviation increase in the proportion of professionally overlapped outside directors leads to 3% (z-statistic=12.53) higher probability of appointing another professionally related director. However, the non-professional overlap variables do not have significant effect.

5.2 Non-professionally overlapped outside director appointment

We use seemingly unrelated bivariate PROBIT models to examine the decision to appoint a new outside director who is related to the CEO through educational or social overlaps. The first equation is the same CEO replacement regression as specified the previous section. The dependent variable in the second equation is a binary variable indicating at least one non-professionally overlapped director was appointed. The explanatory variables include firm and board characteristics, CEO personal traits, event year dummies, a dummy variable indicating the replacement of an outside director who did not overlap with the CEO (NonOverlap Rep), dummies indicating the replacements and appointments occurred in the previous year (Lag Prof App, Lag NonProf App, Lag NonOverlap Rep), and fractions of professionally or non-professionally overlapped outside directors.

Table 18 presents the estimated results. The CEO turnover results are practically identical to those reported in Table 16 and 17. In the second equation, we find that larger board size is associated with lower probability of appointing new outside directors that are non-professionally related to the CEO. CEOs who had attended an "Ivyplus" school are more likely to appoint non-professionally related outside directors. There is suggestive evidence that younger CEOs are less likely to make such appointments. We also find that such appointments are more likely to occur in the first year of the CEO's tenure. The effect of event year 1 dummy is positive at the 5% level in all models.

The results show a clear pattern that CEOs consistently reshape the board to add and retain those outside directors who had prior non-professional connections with them. The marginal effect of NonOverlap Rep is 12.26% (z-statistic=9.93). Also, one-standard-deviation increase in the proportion of non-professionally overlapped outside directors leads to 7.6% (z-statistic=16.55) higher probability of appointing another non-professionally related director. However, board changes in the prior year and the proportion of professionally overlaped outside directors do not have significant effect.

6 The role of SOX, Firm Size, and Forced CEO turnovers

This section expands on our basic tests and discusses the effects of the 2002 Sarbanes-Oxley Act, the differences across large and small firms, and the role of forced CEO turnovers on director replacements and appointments.

6.1 Impact of 2002 Sarbanes-Oxley Act

The passage of the SOX has important implications on corporate governance practice. the 2000 sample allows us to analyze whether and how the decisions to appoint and replace directors change before and after SOX came in effect. We split the sample into two sub-samples: the pre-SOX years from 2001 to 2003, and the post-SOX years from 2004 to 2007. The pre-SOX sub-sample contains 22,182 firm-CEO-Director-year observations and 1,859 firm-years. The post-SOX sub-sample contains 26,805 firm-CEO-Director-year observations and 3,117 firm-years.

Using the two sub-samples, we estimate BIPROBIT models for CEO and director replacement, as specified in Equation (1) and (2). Table 19 presents the estimated coefficients and marginal effects. In the CEO replacement equation, prior stock returns become more important in affecting the probability of CEO turnover after SOX. In the post-SOX sub-sample, firm specific return is positive at the 1% significance level and industry return is negative at the 5% level. In the pre-SOX subsample, industry return is not significant and the marginal effect of firm return is smaller. In the director replacement equation, we find support for homophilly in both sub-samples. Directors that are of similar age with the CEOs are less likely to be replaced. Absolute age difference is significantly positive at the 1% level in both sub-samples. There is some evidence that professional connections between the CEO and the director reduce the probability of director replacement. However, we find that the role of CEO-Director connections has decreased after the passage of SOX.

Table 20-22 present the estimated results for the BIPROBIT director appointment models as specified in Equation (3) and (4) using the pre- and post-SOX sub-samples. Comparing the coefficients on stock return variables in the CEO replacement equations, we confirm that the passage of SOX strengthens the CEO turnover-performance sensitivity. In the director appointment equation of Table 20, the dependent variable is an indicator of appointing any new director. We find that the coefficient on Lag App is negative at the 1% level in the post-SOX subsample but only marginally significant in the pre-SOX sub-sample, indicating new appointments are less likely to be made in two consecutive years after SOX.

In the director appointment equation of Table 21, the dependent variable is an indicator of appointing a new director who is professionally connected to the CEO. We find that in both periods, NonOverlap Rep and Frac_Prof are significantly positive, suggesting the appointment of professionally connected director is accompanied by the replacement of non-overlapped directors and more likely to happen if the existing board has higher proportion of professionally connected directors. Interestingly, the coefficient on Lag Prof App is positive at the 1% level in the post-SOX sub-sample but insignificant in the pre-SOX sub-sample. So after SOX, the appointment of connected directors are more likely to occur in consecutive years.

In the director appointment equation of Table 22, the dependent variable is an indicator of appointing a new director who has non-professional connections to the CEO. We find that in both periods, NonOverlap Rep and Frac_NonProf are significantly positive, suggesting the appointment of socially connected director is also accompanied by the replacement of non-overlapped directors and more likely to happen if the existing board has higher proportion of non-professionally connected directors.

6.2 Impact of firm size

The 2003 sample covers a wide range of companies and allows us to analyze the effect of firm size. We split the sample based on whether the firm is first covered by BoardEx before or after 2003. The firms enter into the BoardEx database before 2003 largely coincide with the EXECUCOMP companies and we label them as "Large" and those enter later "Small". The Large sub-sample contains 26,805 firm-CEO-Director-year observations and 3,118 firm-years. The Small sub-sample contains 26,809 firm-CEO-Director-year observations and 2,990 firm-years.

Using the Large and Small sub-samples, Table 23-26 present the estimated results for the BIPROBIT director replacement and appointment models as specified in Equation (1)-(4). The CEO replacement results suggest that industry stock return matters more for the large firms and the fraction of professionally connected directors matters more for the small firms. For example, Table 23c shows that for large firms, an one-standard-deviation increase in industry stock return increase the probability of CEO turnover by 1.3%, and yet for small firms, industry stock return seems irrelevant. Also, the coefficient of Frac_Prof is significantly negative at the 1% level for small firms, but not significant for large firms.

In the director replacement equation of Table 23, we find directors that are of similar age with the CEOs are less likely to be replaced in both the Large and Small sub-samples. Absolute age difference is significantly positive at the 1% level in both sub-samples. However, we find that the effects of CEO-Director connections concentrate in the Small sub-sample. For small firms, the existence of professional connection between the CEO and the director reduces the probability of director replacement by 1.8% with z-statistic equal to 3.90, and the existence of non-professional connection increases the probability by 0.9% with a 2.02 z-statistic. But for large firms, both types of connection are insignificant.

The results of the director appointment equations are generally the same for the two size sub-samples, as shown in Table 24-26. The appointment of a director with connections to the CEO is accompanied by the replacement of non-connected director. The proportion of connected directors on the existing board increases the chance of making another connected appointment.

6.3 Impact of CEO turnover

The way a new CEO appoints or replaces directors may change as a function of why the old CEO left. If the new CEO is the successor of a retired CEO, he or she might not make the board composition as much as a new CEO who step in office after a forced turnover.

For each CEO in the 2003 sample, we identify the prior CEO by finding out who was in office during the year before the new CEO started his or her tenure. And then we calculate the age of the departed CEO in the turnover year. We split the 2003 sample into two sub-samples based on whether the prior CEO left at the age greater than 62 or not. The "Retired" sub-sample contains the cases where the prior CEO was older than 62 when departed. The "Forced" sub-sample contains the cases where the prior CEO's age was 62 or younger. There are 13,601 firm-CEO-Director-year observations and 1,507 firm-years in the "Retired" sub-sample. There are 25,845 firm-CEO-Director-year observations and 3,064 firm-years in the "Forced" sub-sample.

Using the Retired and Forced sub-samples, Table 27-30 present the estimated results for the BIPROBIT director replacement and appointment models as specified in Equation (1)-(4). The CEO replacement results suggest that stock return matters more for the Forced sub-sample. For example, Table 27c shows that if the current CEO started tenure after a forced turnover, an one-standard-deviation decline in firm stock return increases the probability of CEO turnover by 2.6% (significant at 1% with z-statistic equal to 3.99). However, if the current CEO succeeded a retired CEO, the standardized marginal effect of firm return is only 1.2% (marginally significant with z-statistic equal to 1.81). We also find that in both sub-samples, the proportion of professionally connected directors on the board is associated with lower probability of CEO turnover.

In the director replacement equation of Table 27, we find the "Retired" and

“Forced” sub-samples render similar results. Consistent with homophily, directors that are of similar age with the CEOs are less likely to be replaced. Absolute age difference is significantly positive at the 1% level in both sub-samples. The existence of professional connection between the CEO and the director reduces the probability of director replacement.

Table 24-26 presents the director appointment results. Our main results are supported by both the “Retired” and “Forced” sub-samples. The appointment of a director with connections to the CEO is accompanied by the replacement of non-connected director. The proportion of connected directors on the existing board increases the chance of making another connected appointment. In addition, we find a positive relation between stock returns and the decision to appoint directors that are connected to the CEO in the “Retired” sub-sample. Also, in the “Forced” sample, the prior appointment of connected director is positively associated with the probability of appointing another such director in the current year. The findings are consistent with the notion that CEOs assumed office after a forced turnover have more power in reshaping the board and performance is not critical to their ability to do so.

6.4 Nomination Process

We examine the role of the CEO in the nomination process. Table 31 presents the trends of nomination committee in both the 2000 and 2003 samples. We find that a larger number of firms have a nominating committee and the nominating committee is unlikely to have the CEO as a member over our sample period. We also find that the number of independent directors connected to the CEO remains relatively stable. Therefore, while CEO-Director connections play a role in the replacement and appointment decisions, they do not represent a back-door mechanism for the CEO to influence the nomination process.

6.5 Robustness Test

Our analysis so far has been mainly on the 2003 sample of firms. For robustness, we re-run all our tests separately on the 2000 sample of firms. Table 31-34 report robustness tests. In these tables, Regression (1) uses Sample 1 and control for industry fixed effects, Regression (2) uses Sample 2 without industry fixed effects, and Regression (3) uses Sample 2 with industry fixed effects. Our main results are robust to these alternative specifications and different sample.

7 Conclusions

The board of directors is a critical institution by which shareholders influence management. This institution has undergone significant transformation over the last decade. Most board reforms are driven by activist institutions and others concerned with the reform of corporate governance, and much of their efforts have focused on establishing boards of directors who are independent in a technical sense. These efforts have been successful. Board are largely composed of independent directors with a dramatic decrease in the number of executives or individuals affiliated with the board serving as directors.

We study the independence of independent directors. If independence is the sole criterion by which directors are picked, boards at different companies should be identical to each other subject to idiosyncratic noise. Alternatively, boards might meet the technical definition of independence but might be affiliated to CEOs in other dimensions. It is worth stressing that these connections need not be baleful, and they may even be beneficial in facilitating advice seeking, advice giving, and counseling CEOs in the matters of broad corporation strategy and direction. We use detailed biographical data on the CEO and the directors of the firm obtained from the BoardEx database to test these hypotheses.

We find that directors are less likely to be fired and more likely to be hired if they are similar in age to the CEO and have an overlap in the professional careers of the CEO and the director. Using a bivariate PROBIT specification, we show that professional connections reduce the probability that a board replaces a CEO and the probability that a CEO replaces the connected director. Non-professional connections between the CEO and the director are not significant overall in the decision to replace and appoint outside directors. While CEO influence over the director selection process has all but disappeared since the Sarbanes-Oxley Act, we find that the number of independent directors connected to the CEO remains relatively stable. Therefore, while CEO-Director connections play a role in the replacement and appointment decisions, they do not represent a backdoor mechanism for the CEO to influence the nomination process.

We conclude that the presence of professionally connected directors perhaps increasing the ability of the board to provide advice and counsel to the CEO without compromising their monitoring role as independent directors.

8 Tables

Table 11: **Director Appointment and Replacement by Fiscal and Event Year**

This table reports the number of firms, CEO turnover, director appointments and replacements by fiscal year and event year.

(a) **The 2003 Sample by Fiscal Year**

Fiscal Year	#Firms	#CEO Turnover	#Director Appointments	#Director Replacements
2004	1,804	191	1,404	1,246
2005	1,868	200	1,189	1,165
2006	1,903	205	1,214	1,105
2007	1,824	208	1,149	1,162
Total	7,399	804	4,956	4,678

(b) **The 2003 Sample by Event Year**

Event	Director Appointments			Director Replacements		
Year	Total #	% of Firms	% of Boards	Total #	% of Firms	% of Boards
1	1,143	49.33%	14.85%	1,126	48.06%	18.57%
2	926	45.12	12.89	831	41.14	16.22
3	817	42.63	12.70	747	39.91	16.37
4	792	43.57	12.29	726	40.94	16.12
5	665	40.12	11.24	655	39.68	15.79
6	610	42.08	11.33	593	42.67	15.49
Total	4,953	44.07	12.74	4,678	42.20	16.58

(c) **The 2000 Sample by Fiscal Year**

Fiscal Year	#Firms Turnover	#CEO Appointments	#Director Replacements	#Director
2001	799	75	650	605
2002	987	95	630	724
2003	1011	84	887	753
2004	998	109	818	766
2005	862	100	617	601
2006	759	78	537	483
2007	642	69	468	464
Total	5,858	610	4,607	4,396

(d) **The 2000 Sample by Event Year**

Event	Director Appointments			Director Replacements		
Year	Total #	% of Firms	% of Boards	Total #	% of Firms	% of Boards
1	984	54.18%	13.01%	966	54.09%	15.72
2	905	51.60	12.49	831	47.27	15.11
3	824	49.32	11.81	757	45.66	15.17
4	746	48.64	11.29	708	45.73	15.00
5	614	44.41	9.84	624	45.05	14.40
6	534	45.00	11.83	510	43.88	14.94
Total	4,907	11.82	49.20	4,396	47.18	15.11

Table 12: **Summary Statistics for the 2003 Sample**

This table presents summary statistics on all variables for the 2003 sample. This sample contains CEOs and board directors of the companies that existed in BoardEx after fiscal year 2003. The sample period is 2004-2007.

	Mean	**Median**	**SD**	**Min**	**Max**
Firm Characteristics (N=7,180)					
Firm Size	4974.53	636.75	15046.47	14.86	104912.00
Board Size	8.73	8.00	2.61	3.00	29.00
Frac_SD	0.82	0.86	0.10	0.27	1.00
Frac_Prof	0.14	0.00	0.24	0.00	1.00
Frac_NonProf	0.22	0.17	0.21	0.00	1.00
Average Busyness	1.48	1.38	0.47	1.00	4.00
CEO Characteristics (N=7,448)					
CEO Age	52.34	52.00	7.46	27.00	86.00
CEO Gender	0.97	1.00	0.17	0.00	1.00
CEO MBA	0.30	0.00	0.46	0.00	1.00
CEO Ivyplus	0.23	0.00	0.42	0.00	1.00
CEO Internal	0.46	0.00	0.50	0.00	1.00
CEO Connectedness	0.69	0.00	1.49	0.00	7.45
Director Characteristics (N=53,614)					
Director Yrs on Brd	6.23	4.00	6.80	0.00	59.00
Director Busyness	1.51	1.00	0.89	1.00	9.00
Director Age	59.48	60.00	9.16	26.00	98.00
Director Gender	0.90	1.00	0.30	0.00	1.00
Director MBA	0.27	0.00	0.44	0.00	1.00
Director Ivyplus	0.31	0.00	0.46	0.00	1.00
Director Connectedness	1.98	0.44	3.33	0.00	15.59
Same Gender	0.87	1.00	0.33	0.00	1.00
Age Difference	10.39	9.00	7.69	0.00	58.00
Prof Overlap	0.19	0.00	0.39	0.00	1.00
NonProf Overlap	0.26	0.00	0.44	0.00	1.00

Table 13: **Summary Statistics for the 2000 Sample**

This table presents summary statistics on all variables for the 2000 sample. This sample contains CEOs and board directors of the companies that existed in BoardEx prior to fiscal year 2004. The sample period is 2001-2007.

	Mean	**Median**	**SD**	**Min**	**Max**
Firm Characteristics (N=5,901)					
Firm Size	8726.71	1884.06	19774.44	14.86	104912.00
Board Size	9.67	9.00	2.83	4.00	31.00
Frac_SD	0.82	0.86	0.10	0.20	1.00
Frac_Prof	0.13	0.00	0.21	0.00	1.00
Frac_NonProf	0.18	0.14	0.18	0.00	0.89
Average Busyness	1.59	1.50	0.51	1.00	4.40
CEO Characteristics (N=6,129)					
CEO Age	52.43	53.00	7.03	30.00	83.00
CEO Gender	0.97	1.00	0.16	0.00	1.00
CEO MBA	0.34	0.00	0.47	0.00	1.00
CEO Ivyplus	0.30	0.00	0.46	0.00	1.00
CEO Internal	0.50	1.00	0.50	0.00	1.00
CEO Connectedness	1.09	0.11	1.87	0.00	7.45
Director Characteristics (N=48,987)					
Director Yrs on Brd	6.45	4.00	6.87	0.00	59.00
Director Busyness	1.63	1.00	0.99	1.00	9.00
Director Age	59.74	60.00	8.73	27.00	98.00
Director Gender	0.88	1.00	0.33	0.00	1.00
Director MBA	0.28	0.00	0.45	0.00	1.00
Director Ivyplus	0.35	0.00	0.48	0.00	1.00
Director Connectedness	2.77	1.02	3.93	0.00	15.59
Same Gender	0.86	1.00	0.35	0.00	1.00
Age Difference	9.94	9.00	7.30	0.00	53.00
Prof Overlap	0.16	0.00	0.37	0.00	1.00
NonProf Overlap	0.22	0.00	0.42	0.00	1.00

Table 14: PROBIT Director Replacement Models

This table presents the estimated results of PROBIT director replacement models, as specified in Equation 6. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **PROBIT Director Replacement Models Coefficients**

	(1)		(2)		(3)	
Firm Size	-0.035^a	(-5.66)	-0.038^a	(-5.58)	-0.035^a	(-5.07)
Firm Return	-0.015	(-0.68)	-0.018	(-0.80)	-0.016	(-0.70)
Industry Return	0.262^a	(4.52)	0.267^a	(4.54)	0.264^a	(4.49)
Board Size	0.029^a	(5.95)	0.028^a	(5.34)	0.028^a	(5.31)
Frac_SD	0.513^a	(3.87)	0.490^a	(3.58)	0.597^a	(4.33)
Event Year 1	0.149^a	(4.72)	0.147^a	(4.50)	0.136^a	(4.17)
Event Year 2	0.005	(0.16)	0.012	(0.36)	0.005	(0.16)
Event Year 3	-0.014	(-0.43)	-0.008	(-0.23)	-0.012	(-0.34)
Event Year 4	-0.014	(-0.42)	-0.007	(-0.21)	-0.008	(-0.25)
Event Year 5	-0.027	(-0.83)	-0.025	(-0.74)	-0.022	(-0.65)
CEO Age			-0.006^a	(-4.30)	0.001	(0.40)
CEO MBA			-0.026	(-1.19)	-0.024	(-1.09)
CEO Ivyplus			-0.004	(-0.18)	-0.013	(-0.54)
CEO Internal			-0.079^a	(-3.90)	-0.091^a	(-4.36)
CEO Connectedness			0.010	(1.56)	0.013^c	(1.87)
Director Yrs on Brd			0.016^a	(13.80)	0.011^a	(9.07)
Director Busyness			-0.036^a	(-2.83)	-0.030^b	(-2.33)
Director MBA			-0.031	(-1.58)	-0.007	(-0.38)
Director Ivyplus			0.058^a	(3.11)	0.049^a	(2.63)
Director Connectedness			0.013^a	(4.05)	0.010^a	(3.19)
Same Gender					0.022	(0.88)
Age Difference					0.017^a	(12.74)
Prof Overlap					-0.094^a	(-3.86)
NonProf Overlap					0.044^b	(2.28)
Observations	53,614		53,614		53,614	
Pseudo R^2	0.007		0.016		0.024	

Table 14

(b) **PROBIT Director Replacement Models Marginal Effects**

	(1)			(2)			(3)		
Firm Size	-0.006[a]	[-0.012]	(-5.61)	-0.006[a]	[-0.012]	(-5.53)	-0.005[a]	[-0.011]	(-5.03)
Firm Return	-0.002	[-0.001]	(-0.68)	-0.003	[-0.001]	(-0.80)	-0.002	[-0.001]	(-0.70)
Industry Return	0.041[a]	[0.007]	(4.52)	0.041[a]	[0.007]	(4.54)	0.040[a]	[0.007]	(4.49)
Board Size	0.005[a]	[0.013]	(5.89)	0.004[a]	[0.012]	(5.28)	0.004[a]	[0.012]	(5.24)
Frac_SD	0.080[a]	[0.007]	(3.88)	0.076[a]	[0.007]	(3.60)	0.091[a]	[0.008]	(4.35)
Event Year 1	0.025[a]	[0.010]	(4.44)	0.024[a]	[0.010]	(4.23)	0.022[a]	[0.009]	(3.93)
Event Year 2	0.001	[0.000]	(0.16)	0.002	[0.001]	(0.36)	0.001	[0.000]	(0.16)
Event Year 3	-0.002	[-0.001]	(-0.43)	-0.001	[-0.000]	(-0.23)	-0.002	[-0.001]	(-0.34)
Event Year 4	-0.002	[-0.001]	(-0.43)	-0.001	[-0.000]	(-0.21)	-0.001	[-0.000]	(-0.25)
Event Year 5	-0.004	[-0.002]	(-0.84)	-0.004	[-0.001]	(-0.75)	-0.003	[-0.001]	(-0.66)
CEO Age				-0.001[a]	[-0.007]	(-4.32)	0.000	[0.001]	(0.40)
CEO MBA				-0.004	[-0.002]	(-1.20)	-0.004	[-0.002]	(-1.10)
CEO Ivyplus				-0.001	[-0.000]	(-0.18)	-0.002	[-0.001]	(-0.54)
CEO Internal				-0.012[a]	[-0.006]	(-3.92)	-0.014[a]	[-0.007]	(-4.38)
CEO Connectedness				0.002	[0.003]	(1.56)	0.002[c]	[0.003]	(1.87)
Director Yrs on Brd				0.003[a]	[0.017]	(13.98)	0.002[a]	[0.012]	(9.12)
Director Busyness				-0.006[a]	[-0.005]	(-2.83)	-0.005[b]	[-0.004]	(-2.33)
Director MBA				-0.005	[-0.002]	(-1.60)	-0.001	[-0.001]	(-0.38)
Director Ivyplus				0.009[a]	[0.004]	(3.07)	0.008[a]	[0.003]	(2.60)
Director Connectedness				0.002[a]	[0.007]	(4.06)	0.002[a]	[0.005]	(3.19)
Same Gender							0.003	[0.001]	(0.90)
Age Difference							0.003[a]	[0.019]	(12.92)
Prof Overlap							-0.014[a]	[-0.005]	(-4.03)
NonProf Overlap							0.007[b]	[0.003]	(2.24)
Observations	53,614			53,614			53,614		
Pseudo R^2	0.007			0.016			0.024		

Table 15: BIPROBIT Director Replacement Models

This table presents the estimated results of BIPROBIT director replacement models, as specified in Equation 7-8. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Replacement Models Coefficients**

Y1 = CEO Replacement						
	(1)		(2)		(3)	
Firm Size	-0.063[a]	(-4.37)	-0.071[a]	(-4.54)	-0.066[a]	(-4.23)
Firm Return	-0.279[a]	(-5.35)	-0.290[a]	(-5.44)	-0.287[a]	(-5.40)
Industry Return	0.214	(1.58)	0.226	(1.63)	0.226	(1.64)
Board Size	0.032[a]	(2.60)	0.028[b]	(2.12)	0.030[b]	(2.31)
Frac_SD	-0.654[a]	(-2.86)	-0.547[b]	(-2.32)	-0.456[c]	(-1.92)
Average Busyness	0.178[a]	(3.94)	0.158[a]	(3.29)	0.134[a]	(2.72)
CEO 60			0.503[a]	(9.53)	0.518[a]	(9.80)
CEO Gender			-0.023	(-0.20)	-0.022	(-0.19)
CEO MBA			0.009	(0.19)	0.007	(0.15)
CEO Ivyplus			-0.017	(-0.32)	-0.026	(-0.48)
CEO Internal			0.008	(0.18)	-0.021	(-0.46)
CEO Connectedness			0.034[b]	(2.37)	0.032[b]	(2.23)
Frac_Prof					-0.293[a]	(-2.92)
Frac_NonProf					-0.060	(-0.57)
Event Year Dummies	Yes		Yes		Yes	

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Table 15

Table 15(a) – **continued from previous page**

Y2 = Director Replacement						
	(1)		(2)		(3)	
Firm Size	-0.035[a]	(-5.54)	-0.037[a]	(-5.46)	-0.033[a]	(-4.83)
Firm Return	-0.016	(-0.73)	-0.018	(-0.81)	-0.016	(-0.70)
Industry Return	0.267[a]	(4.57)	0.271[a]	(4.57)	0.271[a]	(4.55)
Board Size	0.028[a]	(5.71)	0.026[a]	(5.05)	0.027[a]	(5.07)
Frac_SD	0.561[a]	(4.51)	0.541[a]	(4.18)	0.643[a]	(4.92)
Event Year 1	0.151[a]	(4.74)	0.150[a]	(4.57)	0.138[a]	(4.18)
Event Year 2	0.009	(0.28)	0.016	(0.48)	0.012	(0.37)
Event Year 3	-0.012	(-0.37)	-0.006	(-0.17)	-0.006	(-0.17)
Event Year 4	-0.012	(-0.36)	-0.006	(-0.16)	-0.006	(-0.18)
Event Year 5	-0.030	(-0.89)	-0.027	(-0.83)	-0.022	(-0.66)
CEO Age			-0.006[a]	(-4.06)	0.001	(0.67)
CEO MBA			-0.026	(-1.18)	-0.023	(-1.03)
CEO Ivyplus			-0.005	(-0.21)	-0.015	(-0.61)
CEO Internal			-0.073[a]	(-3.56)	-0.087[a]	(-4.14)
CEO Connectedness			0.010	(1.55)	0.012[c]	(1.78)
Director Yrs on Brd			0.016[a]	(13.78)	0.011[a]	(9.16)
Director Busyness			-0.034[a]	(-2.65)	-0.027[b]	(-2.12)
Director MBA			-0.030	(-1.54)	-0.004	(-0.20)
Director Ivyplus			0.056[a]	(2.98)	0.045[b]	(2.39)
Director Connectedness			0.012[a]	(3.68)	0.009[a]	(2.84)
Same Gender					0.020	(0.80)
Age Difference					0.017[a]	(12.73)
Prof Overlap					-0.099[a]	(-4.06)
NonProf Overlap					0.046[b]	(2.35)
Observations	52,905		52,895		52,820	
Log pseudolikelihood	-33,394.33		-32,807.26		-32,560.34	
Wald test of $\rho = 0$	0.013		0.099		0.099	

Table 15

(c) **BIPROBIT Director Replacement Models Marginal Effects**

	Y1 = CEO Replacement								
	(1)			(2)			(3)		
Firm Size	-0.011^{a}	[-0.024]	(-4.35)	-0.012^{a}	[-0.026]	(-4.51)	-0.012^{a}	[-0.024]	(-4.20)
Firm Return	-0.050^{a}	[-0.023]	(-5.39)	-0.051^{a}	[-0.023]	(-5.47)	-0.050^{a}	[-0.023]	(-5.44)
Industry Return	0.039	[0.006]	(1.58)	0.039	[0.006]	(1.63)	0.039	[0.006]	(1.64)
Board Size	0.006^{b}	[0.017]	(2.57)	0.005^{b}	[0.014]	(2.10)	0.005^{b}	[0.015]	(2.28)
Frac_SD	-0.118^{a}	[-0.010]	(-2.87)	-0.096^{b}	[-0.008]	(-2.33)	-0.080^{c}	[-0.007]	(-1.93)
Average Busyness	0.032^{a}	[0.015]	(3.94)	0.028^{a}	[0.013]	(3.28)	0.023^{a}	[0.011]	(2.71)
CEO 60				0.109^{a}	[0.039]	(8.04)	0.112^{a}	[0.041]	(8.23)
CEO Gender				-0.004	[-0.001]	(-0.19)	-0.004	[-0.001]	(-0.19)
CEO MBA				0.002	[0.001]	(0.19)	0.001	[0.001]	(0.15)
CEO Ivyplus				-0.003	[-0.001]	(-0.32)	-0.004	[-0.002]	(-0.48)
CEO Internal				0.001	[0.001]	(0.18)	-0.004	[-0.002]	(-0.46)
CEO Connectedness				0.006^{b}	[0.010]	(2.39)	0.006^{b}	[0.009]	(2.24)
Frac_Prof							-0.051^{a}	[-0.013]	(-2.93)
Frac_NonProf							-0.010	[-0.002]	(-0.57)
Event Year Dummies	Yes			Yes			Yes		

Continue on next page

Table 15

Table 15(b) – **continued from previous page**

	Y2 = Director Replacement								
	(1)			(2)			(3)		
Firm Size	-0.006[a]	[-0.012]	(-5.62)	-0.006[a]	[-0.012]	(-5.50)	-0.005[a]	[-0.011]	(-4.87)
Firm Return	-0.003	[-0.001]	(-0.89)	-0.003	[-0.002]	(-0.93)	-0.003	[-0.001]	(-0.82)
Industry Return	0.043[a]	[0.007]	(4.62)	0.043[a]	[0.007]	(4.61)	0.042[a]	[0.007]	(4.59)
Board Size	0.004[a]	[0.013]	(5.72)	0.004[a]	[0.012]	(5.04)	0.004[a]	[0.012]	(5.07)
Frac_SD	0.088[a]	[0.008]	(4.44)	0.084[a]	[0.007]	(4.15)	0.098[a]	[0.008]	(4.90)
Event Year 1	0.025[a]	[0.010]	(4.39)	0.025[a]	[0.010]	(4.26)	0.022[a]	[0.009]	(3.91)
Event Year 2	0.001	[0.001]	(0.25)	0.003	[0.001]	(0.48)	0.002	[0.001]	(0.37)
Event Year 3	-0.002	[-0.001]	(-0.42)	-0.001	[-0.000]	(-0.19)	-0.001	[-0.000]	(-0.20)
Event Year 4	-0.002	[-0.001]	(-0.39)	-0.001	[-0.000]	(-0.18)	-0.001	[-0.000]	(-0.19)
Event Year 5	-0.004	[-0.002]	(-0.88)	-0.004	[-0.001]	(-0.81)	-0.003	[-0.001]	(-0.64)
CEO Age				-0.001[a]	[-0.007]	(-4.07)	0.000	[0.001]	(0.67)
CEO MBA				-0.004	[-0.002]	(-1.18)	-0.003	[-0.002]	(-1.03)
CEO Ivyplus				-0.001	[-0.000]	(-0.22)	-0.002	[-0.001]	(-0.62)
CEO Internal				-0.011[a]	[-0.006]	(-3.57)	-0.013[a]	[-0.007]	(-4.17)
CEO Connectedness				0.002	[0.003]	(1.59)	0.002[c]	[0.003]	(1.82)
Director Yrs on Brd				0.003[a]	[0.017]	(13.93)	0.002[a]	[0.012]	(9.20)
Director Busyness				-0.005[a]	[-0.005]	(-2.64)	-0.004[b]	[-0.004]	(-2.12)
Director MBA				-0.005	[-0.002]	(-1.55)	-0.001	[-0.000]	(-0.20)
Director Ivyplus				0.009[a]	[0.004]	(2.94)	0.007[b]	[0.003]	(2.37)
Director Connectedness				0.002[a]	[0.006]	(3.69)	0.001[a]	[0.005]	(2.85)
Same Gender							0.003	[0.001]	(0.81)
Age Difference							0.003[a]	[0.020]	(12.91)
Prof Overlap							-0.015[a]	[-0.006]	(-4.23)
NonProf Overlap							0.007[b]	[0.003]	(2.32)
Observations	52,905			52,895			52,820		
Log pseudolikelihood	-33,394.33			-32,807.26			-32,560.34		
Wald test of $\rho = 0$	0.013			0.099			0.099		

Table 16: BIPROBIT Director Appointment Models

This table presents the estimated results of BIPROBIT director appointment models, as specified in Equation 9-10. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Appointment Models Coefficients**

	(1)		(2)		(3)	
Y1 = CEO Replacement						
Firm Size	-0.064^{a}	(-4.88)	-0.070^{a}	(-5.01)	-0.079^{a}	(-4.42)
Firm Return	-0.271^{a}	(-5.64)	-0.279^{a}	(-5.67)	-0.313^{a}	(-4.51)
Industry Return	0.187	(1.50)	0.198	(1.55)	0.323^{c}	(1.81)
Board Size	0.027^{a}	(2.66)	0.022^{b}	(2.07)	0.024^{c}	(1.92)
Frac_SD	-0.324	(-1.55)	-0.231	(-1.07)	-0.322	(-1.19)
Average Busyness	0.151^{a}	(3.54)	0.132^{a}	(2.92)	0.079	(1.41)
CEO 60			0.436^{a}	(8.63)	0.416^{a}	(6.49)
CEO Gender			-0.068	(-0.60)	-0.073	(-0.52)
CEO MBA			0.016	(0.34)	0.013	(0.22)
CEO Ivyplus			-0.030	(-0.60)	-0.034	(-0.54)
CEO Internal			0.015	(0.36)	0.021	(0.39)
CEO Connectedness			0.041^{a}	(3.04)	0.035^{b}	(2.03)
Frac_Prof					-0.341^{a}	(-2.62)
Frac_NonProf					-0.014	(-0.12)
Event Year Dummies	Yes		Yes		Yes	
Y2 = Director Appointment						
	(1)		(2)		(3)	
Firm Size	0.089^{a}	(8.66)	0.087^{a}	(8.32)	0.115^{a}	(9.17)
Firm Return	0.101^{a}	(3.11)	0.096^{a}	(2.95)	0.091^{b}	(2.18)
Industry Return	0.201^{b}	(2.10)	0.201^{b}	(2.09)	0.008	(0.07)
Board Size	-0.032^{a}	(-4.17)	-0.030^{a}	(-3.94)	-0.076^{a}	(-7.81)
Frac_SD	0.142	(0.85)	0.132	(0.78)	-0.502^{b}	(-2.49)
Average Busyness	0.087^{b}	(2.55)	0.082^{b}	(2.39)	0.066^{c}	(1.67)
Event Year 1	0.198^{a}	(3.73)	0.188^{a}	(3.52)	0.169^{a}	(2.72)
Event Year 2	0.075	(1.42)	0.067	(1.27)	0.095	(1.55)
Event Year 3	0.005	(0.10)	-0.003	(-0.05)	0.019	(0.30)
Event Year 4	0.031	(0.57)	0.026	(0.48)	0.025	(0.39)
Event Year 5	-0.057	(-1.03)	-0.062	(-1.10)	-0.079	(-1.20)
CEO Age			-0.006^{a}	(-3.11)	-0.003	(-1.07)
CEO Gender			-0.020	(-0.24)	0.011	(0.12)
CEO MBA			-0.076^{b}	(-2.22)	-0.045	(-1.15)
CEO Ivyplus			0.051	(1.40)	0.074^{c}	(1.75)
CEO Internal			-0.033	(-1.05)	-0.009	(-0.25)
CEO Connectedness			0.016	(1.54)	0.013	(1.11)
Replacement					1.040^{a}	(27.73)
Lag App					-0.208^{a}	(-5.51)
Lag Rep					0.307^{a}	(8.06)
Frac_Prof					-0.145^{c}	(-1.78)
Frac_NonProf					-0.167^{c}	(-1.95)
Observations	7,355		7,353		6,008	
Log pseudolikelihood	-7,429.04		-7,370.81		-5,051.32	
Wald test of $\rho = 0$	0.000		0.000		0.008	

Table 16

(b) **BIPROBIT Director Appointment Models Marginal Effects**

	Y1 = CEO Replacement								
	(1)			(2)			(3)		
Firm Size	-0.012^{a}	[-0.024]	(-4.85)	-0.013^{a}	[-0.026]	(-4.98)	-0.010^{a}	[-0.020]	(-4.39)
Firm Return	-0.049^{a}	[-0.025]	(-5.69)	-0.049^{a}	[-0.025]	(-5.72)	-0.039^{a}	[-0.018]	(-4.58)
Industry Return	0.034	[0.006]	(1.50)	0.035	[0.006]	(1.55)	0.041^{c}	[0.006]	(1.82)
Board Size	0.005^{a}	[0.013]	(2.66)	0.004^{b}	[0.010]	(2.07)	0.003^{c}	[0.008]	(1.92)
Frac_SD	-0.059	[-0.006]	(-1.55)	-0.041	[-0.004]	(-1.07)	-0.040	[-0.004]	(-1.19)
Average Busyness	0.028^{a}	[0.013]	(3.54)	0.023^{a}	[0.011]	(2.91)	0.010	[0.005]	(1.42)
CEO 60				0.093^{a}	[0.034]	(7.45)	0.065^{a}	[0.023]	(5.38)
CEO Gender				-0.013	[-0.002]	(-0.58)	-0.010	[-0.002]	(-0.50)
CEO MBA				0.003	[0.001]	(0.34)	0.002	[0.001]	(0.22)
CEO Ivyplus				-0.005	[-0.002]	(-0.61)	-0.004	[-0.002]	(-0.55)
CEO Internal				0.003	[0.001]	(0.36)	0.003	[0.001]	(0.39)
CEO Connectedness				0.007^{a}	[0.011]	(3.05)	0.004^{b}	[0.007]	(2.04)
Frac_Prof							-0.043^{a}	[-0.010]	(-2.63)
Frac_NonProf							-0.002	[-0.000]	(-0.12)
Event Year Dummies	Yes			Yes			Yes		

Continue on next page

Table 16

Table 16(b) – **continued from previous page**

	Y2 = Director Appointment								
	(1)			(2)			(3)		
Firm Size	0.034^{a}	[0.070]	(8.33)	0.033^{a}	[0.069]	(8.00)	0.045^{a}	[0.091]	(9.05)
Firm Return	0.035^{a}	[0.017]	(2.71)	0.033^{b}	[0.017]	(2.57)	0.034^{b}	[0.015]	(2.03)
Industry Return	0.084^{b}	[0.014]	(2.20)	0.083^{b}	[0.014]	(2.19)	0.006	[0.001]	(0.12)
Board Size	-0.012^{a}	[-0.032]	(-3.99)	-0.012^{a}	[-0.030]	(-3.80)	-0.030^{a}	[-0.078]	(-7.76)
Frac_SD	0.050	[0.005]	(0.75)	0.048	[0.005]	(0.72)	-0.201^{b}	[-0.019]	(-2.53)
Average Busyness	0.038^{a}	[0.018]	(2.76)	0.035^{b}	[0.016]	(2.55)	0.027^{c}	[0.013]	(1.71)
Event Year 1	0.077^{a}	[0.030]	(3.65)	0.074^{a}	[0.029]	(3.48)	0.066^{a}	[0.026]	(2.68)
Event Year 2	0.030	[0.012]	(1.43)	0.028	[0.011]	(1.31)	0.038	[0.015]	(1.56)
Event Year 3	0.001	[0.000]	(0.05)	-0.002	[-0.001]	(-0.07)	0.006	[0.002]	(0.25)
Event Year 4	0.012	[0.004]	(0.54)	0.010	[0.004]	(0.47)	0.009	[0.004]	(0.38)
Event Year 5	-0.021	[-0.008]	(-0.96)	-0.023	[-0.008]	(-1.02)	-0.030	[-0.011]	(-1.17)
CEO Age				-0.003^{a}	[-0.019]	(-3.11)	-0.001	[-0.008]	(-1.07)
CEO Gender				-0.009	[-0.002]	(-0.27)	0.004	[0.001]	(0.10)
CEO MBA				-0.030^{b}	[-0.014]	(-2.21)	-0.018	[-0.008]	(-1.15)
CEO Ivyplus				0.020	[0.008]	(1.36)	0.029^{c}	[0.012]	(1.74)
CEO Internal				-0.013	[-0.006]	(-1.03)	-0.003	[-0.002]	(-0.23)
CEO Connectedness				0.007^{c}	[0.011]	(1.73)	0.006	[0.008]	(1.17)
Replacement							0.396^{a}	[0.197]	(30.26)
Lag App							-0.082^{a}	[-0.041]	(-5.53)
Lag Rep							0.121^{a}	[0.060]	(8.09)
Frac_Prof							-0.060^{c}	[-0.014]	(-1.86)
Frac_NonProf							-0.066^{c}	[-0.014]	(-1.95)
Observations	7,355			7,353			6,008		
Log pseudolikelihood	-7,429.04			-7,370.81			-5,051.32		
Wald test of $\rho = 0$	0.000			0.000			0.008		

Table 17: BIPROBIT Prof Overlap Director Appointment Models

This table presents the estimated results of BIPROBIT Prof Overlap director appointment models, as specified in Equation 9-10. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Prof Overlap Director Appointment Models Coefficients**

	(1)		(2)		(3)	
Y1 = CEO Replacement						
Firm Size	-0.064^a	(-4.89)	-0.070^a	(-5.02)	-0.079^a	(-4.42)
Firm Return	-0.271^a	(-5.64)	-0.278^a	(-5.67)	-0.313^a	(-4.49)
Industry Return	0.193	(1.54)	0.200	(1.58)	0.324^c	(1.82)
Board Size	0.027^a	(2.67)	0.022^b	(2.06)	0.024^c	(1.93)
Frac_SD	-0.311	(-1.49)	-0.216	(-1.00)	-0.311	(-1.15)
Average Busyness	0.155^a	(3.59)	0.136^a	(2.98)	0.079	(1.43)
CEO 60			0.443^a	(8.77)	0.418^a	(6.53)
CEO Gender			-0.068	(-0.60)	-0.074	(-0.53)
CEO MBA			0.017	(0.36)	0.012	(0.22)
CEO Ivyplus			-0.032	(-0.64)	-0.035	(-0.55)
CEO Internal			0.016	(0.37)	0.021	(0.39)
CEO Connectedness			0.041^a	(3.08)	0.035^b	(2.05)
Frac_Prof					-0.349^a	(-2.66)
Frac_NonProf					-0.016	(-0.13)
Event Year Dummies	Yes		Yes		Yes	
Y2 = Prof Overlap Director Appointment						
	(1)		(2)		(3)	
Firm Size	0.095^a	(5.34)	0.093^a	(5.09)	0.051^b	(2.47)
Firm Return	0.005	(0.10)	-0.001	(-0.02)	0.054	(0.76)
Industry Return	0.128	(0.88)	0.116	(0.79)	-0.036	(-0.18)
Board Size	-0.001	(-0.06)	0.001	(0.07)	-0.029^c	(-1.94)
Frac_SD	0.061	(0.19)	0.072	(0.22)	-0.873^b	(-2.41)
Average Busyness	-0.219^a	(-2.82)	-0.230^a	(-2.95)	-0.024	(-0.36)
Event Year 1	0.138	(1.63)	0.147^c	(1.70)	0.189^c	(1.92)
Event Year 2	0.030	(0.35)	0.026	(0.29)	-0.001	(-0.01)
Event Year 3	-0.055	(-0.61)	-0.056	(-0.61)	-0.108	(-1.02)
Event Year 4	-0.048	(-0.53)	-0.054	(-0.59)	-0.107	(-0.99)
Event Year 5	-0.058	(-0.68)	-0.063	(-0.73)	-0.125	(-1.16)
CEO Age			-0.003	(-0.85)	-0.006	(-1.52)
CEO Gender			0.266	(1.56)	0.207	(1.01)
CEO MBA			-0.049	(-0.76)	-0.035	(-0.52)
CEO Ivyplus			-0.076	(-1.07)	0.018	(0.25)
CEO Internal			-0.193^a	(-3.32)	0.033	(0.49)
CEO Connectedness			0.042^b	(2.56)	0.067^a	(4.01)
NonOverlap Rep					0.490^a	(7.18)
Lag Prof App					0.305^a	(3.24)
Lag NonProf App					0.041	(0.45)
Lag NonOverlap Rep					-0.003	(-0.04)
Frac_Prof					1.693^a	(12.97)
Frac_NonProf					-0.008	(-0.05)
Observations	7,355		7,353		6,008	
Log pseudolikelihood	-3,970.73		-3,905.05		-2,534.30	
Wald test of $\rho = 0$	0.100		0.080		0.936	

Table 17

(b) **BIPROBIT Prof Overlap Director Appointment Models Marginal Effects**

	Y1 = CEO Replacement								
	(1)			(2)			(3)		
Firm Size	-0.012^{a}	[-0.024]	(-4.86)	-0.013^{a}	[-0.026]	(-4.99)	-0.010^{a}	[-0.020]	(-4.40)
Firm Return	-0.049^{a}	[-0.025]	(-5.69)	-0.049^{a}	[-0.025]	(-5.71)	-0.039^{a}	[-0.018]	(-4.56)
Industry Return	0.035	[0.006]	(1.54)	0.036	[0.006]	(1.58)	0.041^{c}	[0.006]	(1.82)
Board Size	0.005^{a}	[0.013]	(2.67)	0.004^{b}	[0.010]	(2.06)	0.003^{c}	[0.008]	(1.93)
Frac_SD	-0.057	[-0.006]	(-1.49)	-0.038	[-0.004]	(-1.00)	-0.039	[-0.004]	(-1.15)
Average Busyness	0.028^{a}	[0.013]	(3.59)	0.024^{a}	[0.011]	(2.97)	0.010	[0.005]	(1.43)
CEO 60				0.095^{a}	[0.034]	(7.56)	0.065^{a}	[0.023]	(5.41)
CEO Gender				-0.013	[-0.002]	(-0.58)	-0.010	[-0.002]	(-0.51)
CEO MBA				0.003	[0.001]	(0.36)	0.002	[0.001]	(0.22)
CEO Ivyplus				-0.006	[-0.002]	(-0.64)	-0.004	[-0.002]	(-0.56)
CEO Internal				0.003	[0.001]	(0.37)	0.003	[0.001]	(0.38)
CEO Connectedness				0.007^{a}	[0.011]	(3.09)	0.004^{b}	[0.007]	(2.06)
Frac_Prof							-0.044^{a}	[-0.010]	(-2.68)
Frac_NonProf							-0.002	[-0.000]	(-0.13)
Event Year Dummies	Yes			Yes			Yes		

Continue on next page

Table 17

Table 17(b) – **continued from previous page**

	Y2 = Prof Overlap Director Appointment								
	(1)			(2)			(3)		
Firm Size	0.010[a]	[0.020]	(5.31)	0.009[a]	[0.019]	(5.01)	0.004[b]	[0.008]	(2.46)
Firm Return	-0.000	[-0.000]	(-0.00)	-0.001	[-0.000]	(-0.13)	0.004	[0.002]	(0.77)
Industry Return	0.014	[0.002]	(0.91)	0.012	[0.002]	(0.82)	-0.003	[-0.000]	(-0.18)
Board Size	-0.000	[-0.000]	(-0.02)	0.000	[0.000]	(0.11)	-0.002[c]	[-0.006]	(-1.92)
Frac_SD	0.006	[0.001]	(0.17)	0.007	[0.001]	(0.21)	-0.067[b]	[-0.006]	(-2.45)
Average Busyness	-0.022[a]	[-0.011]	(-2.80)	-0.023[a]	[-0.011]	(-2.93)	-0.002	[-0.001]	(-0.36)
Event Year 1	0.015	[0.006]	(1.51)	0.016	[0.006]	(1.57)	0.016[c]	[0.006]	(1.73)
Event Year 2	0.003	[0.001]	(0.34)	0.003	[0.001]	(0.30)	-0.000	[-0.000]	(-0.01)
Event Year 3	-0.006	[-0.002]	(-0.64)	-0.006	[-0.002]	(-0.64)	-0.008	[-0.003]	(-1.09)
Event Year 4	-0.005	[-0.002]	(-0.56)	-0.005	[-0.002]	(-0.61)	-0.008	[-0.003]	(-1.06)
Event Year 5	-0.006	[-0.002]	(-0.68)	-0.006	[-0.002]	(-0.73)	-0.009	[-0.003]	(-1.27)
CEO Age				-0.000	[-0.003]	(-0.85)	-0.000	[-0.004]	(-1.51)
CEO Gender				0.022[c]	[0.004]	(1.95)	0.013	[0.002]	(1.23)
CEO MBA				-0.005	[-0.002]	(-0.77)	-0.003	[-0.001]	(-0.53)
CEO Ivyplus				-0.008	[-0.003]	(-1.12)	0.001	[0.001]	(0.24)
CEO Internal				-0.019[a]	[-0.010]	(-3.34)	0.003	[0.001]	(0.49)
CEO Connectedness				0.004[a]	[0.007]	(2.61)	0.005[a]	[0.008]	(3.97)
NonOverlap Rep							0.046[a]	[0.021]	(6.22)
Lag Prof App							0.030[a]	[0.007]	(2.60)
Lag NonProf App							0.003	[0.001]	(0.44)
Lag NonOverlap Rep							-0.000	[-0.000]	(-0.04)
Frac_Prof							0.130[a]	[0.030]	(12.53)
Frac_NonProf							-0.001	[-0.000]	(-0.05)
Observations	7,355			7,353			6,008		
Log pseudolikelihood	-3,970.73			-3,905.05			-2,534.30		
Wald test of $\rho = 0$	0.100			0.080			0.936		

Table 18: BIPROBIT NonProf Overlap Director Appointment Models

This table presents the estimated results of BIPROBIT NonProf Overlap director appointment models, as specified in Equation 9-10. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT NonProf Overlap Director Appointment Models Coefficients**

	(1)		(2)		(3)	
Y1 = CEO Replacement						
Firm Size	-0.065^a	(-4.91)	-0.071^a	(-5.04)	-0.079^a	(-4.44)
Firm Return	-0.272^a	(-5.65)	-0.279^a	(-5.68)	-0.313^a	(-4.50)
Industry Return	0.195	(1.56)	0.204	(1.60)	0.324^c	(1.82)
Board Size	0.027^a	(2.70)	0.022^b	(2.10)	0.024^c	(1.94)
Frac_SD	-0.320	(-1.53)	-0.225	(-1.04)	-0.314	(-1.16)
Average Busyness	0.154^a	(3.58)	0.134^a	(2.95)	0.080	(1.43)
CEO 60			0.442^a	(8.76)	0.419^a	(6.54)
CEO Gender			-0.069	(-0.61)	-0.073	(-0.52)
CEO MBA			0.016	(0.34)	0.012	(0.22)
CEO Ivyplus			-0.033	(-0.65)	-0.035	(-0.56)
CEO Internal			0.016	(0.37)	0.020	(0.38)
CEO Connectedness			0.041^a	(3.07)	0.035^b	(2.04)
Frac_Prof					-0.349^a	(-2.67)
Frac_NonProf					-0.014	(-0.12)
Event Year Dummies	Yes		Yes		Yes	
Y2 = NonProf Overlap Director Appointment						
	(1)		(2)		(3)	
Firm Size	0.006	(0.46)	0.002	(0.12)	0.032^b	(2.15)
Firm Return	0.040	(1.05)	0.035	(0.91)	0.055	(1.15)
Industry Return	0.212^c	(1.84)	0.205^c	(1.78)	-0.088	(-0.59)
Board Size	-0.021^b	(-2.05)	-0.017^c	(-1.67)	-0.024^b	(-2.00)
Frac_SD	-0.056	(-0.27)	-0.094	(-0.44)	-0.782^a	(-3.02)
Average Busyness	-0.058	(-1.34)	-0.077^c	(-1.72)	0.033	(0.66)
Event Year 1	0.168^a	(2.61)	0.154^b	(2.38)	0.170^b	(2.29)
Event Year 2	0.101	(1.56)	0.094	(1.44)	0.105	(1.39)
Event Year 3	0.066	(0.99)	0.062	(0.92)	0.088	(1.15)
Event Year 4	-0.011	(-0.16)	-0.017	(-0.24)	0.017	(0.22)
Event Year 5	-0.012	(-0.18)	-0.018	(-0.26)	-0.084	(-1.03)
CEO Age			-0.008^a	(-3.06)	-0.005	(-1.54)
CEO Gender			0.152	(1.36)	0.130	(1.03)
CEO MBA			-0.007	(-0.17)	0.047	(1.01)
CEO Ivyplus			0.164^a	(3.65)	0.150^a	(3.06)
CEO Internal			0.012	(0.31)	0.046	(1.01)
CEO Connectedness			0.006	(0.42)	0.010	(0.67)
NonOverlap Rep					0.532^a	(10.74)
Lag Prof App					0.093	(1.04)
Lag NonProf App					-0.035	(-0.56)
Lag NonOverlap Rep					0.074	(1.49)
Frac_Prof					0.063	(0.56)
Frac_NonProf					1.798^a	(16.45)
Observations	7,355		7,353		6,008	
Log pseudolikelihood	-5,488.43		-5,423.55		-3,707.46	
Wald test of $\rho = 0$	0.003		0.012		0.173	

Table 18

(b) **BIPROBIT NonProf Overlap Director Appointment Models Marginal Effects**

	Y1 = CEO Replacement								
	(1)			(2)			(3)		
Firm Size	-0.012[a]	[-0.024]	(-4.88)	-0.013[a]	[-0.026]	(-5.01)	-0.010[a]	[-0.020]	(-4.42)
Firm Return	-0.050[a]	[-0.025]	(-5.70)	-0.050[a]	[-0.025]	(-5.72)	-0.039[a]	[-0.018]	(-4.57)
Industry Return	0.036	[0.006]	(1.56)	0.036	[0.006]	(1.60)	0.041[c]	[0.006]	(1.82)
Board Size	0.005[a]	[0.013]	(2.70)	0.004[b]	[0.010]	(2.10)	0.003[c]	[0.008]	(1.94)
Frac_SD	-0.058	[-0.006]	(-1.53)	-0.040	[-0.004]	(-1.04)	-0.039	[-0.004]	(-1.16)
Average Busyness	0.028[a]	[0.013]	(3.57)	0.024[a]	[0.011]	(2.95)	0.010	[0.005]	(1.44)
CEO 60				0.094[a]	[0.034]	(7.55)	0.065[a]	[0.023]	(5.42)
CEO Gender				-0.013	[-0.002]	(-0.58)	-0.010	[-0.002]	(-0.50)
CEO MBA				0.003	[0.001]	(0.34)	0.002	[0.001]	(0.22)
CEO Ivyplus				-0.006	[-0.002]	(-0.66)	-0.004	[-0.002]	(-0.57)
CEO Internal				0.003	[0.001]	(0.37)	0.003	[0.001]	(0.38)
CEO Connectedness				0.007[a]	[0.011]	(3.08)	0.004[b]	[0.007]	(2.05)
Frac_Prof							-0.044[a]	[-0.010]	(-2.69)
Frac_NonProf							-0.002	[-0.000]	(-0.12)
Event Year Dummies	Yes			Yes			Yes		

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Table 18

Table 18(b) – **continued from previous page**

Y2 = NonProf Overlap Director Appointment									
	(1)			(2)			(3)		
Firm Size	0.001	[0.002]	(0.33)	-0.000	[-0.000]	(-0.00)	0.006[b]	[0.013]	(2.09)
Firm Return	0.008	[0.004]	(0.86)	0.007	[0.003]	(0.75)	0.010	[0.005]	(1.07)
Industry Return	0.050[c]	[0.008]	(1.89)	0.048[c]	[0.008]	(1.82)	-0.017	[-0.003]	(-0.56)
Board Size	-0.005[b]	[-0.012]	(-1.98)	-0.004	[-0.010]	(-1.62)	-0.005[b]	[-0.012]	(-1.98)
Frac_SD	-0.015	[-0.001]	(-0.31)	-0.022	[-0.002]	(-0.47)	-0.159[a]	[-0.015]	(-3.04)
Average Busyness	-0.012	[-0.006]	(-1.25)	-0.017[c]	[-0.008]	(-1.65)	0.007	[0.003]	(0.68)
Event Year 1	0.040[b]	[0.016]	(2.45)	0.036[b]	[0.014]	(2.25)	0.036[b]	[0.014]	(2.14)
Event Year 2	0.024	[0.009]	(1.51)	0.022	[0.009]	(1.41)	0.022	[0.009]	(1.35)
Event Year 3	0.015	[0.006]	(0.95)	0.014	[0.005]	(0.90)	0.018	[0.007]	(1.09)
Event Year 4	-0.003	[-0.001]	(-0.18)	-0.004	[-0.001]	(-0.25)	0.003	[0.001]	(0.22)
Event Year 5	-0.002	[-0.001]	(-0.15)	-0.004	[-0.001]	(-0.23)	-0.016	[-0.006]	(-1.05)
CEO Age				-0.002[a]	[-0.014]	(-3.06)	-0.001	[-0.007]	(-1.54)
CEO Gender				0.032	[0.005]	(1.46)	0.024	[0.004]	(1.10)
CEO MBA				-0.002	[-0.001]	(-0.16)	0.010	[0.005]	(1.00)
CEO Ivyplus				0.039[a]	[0.016]	(3.50)	0.032[a]	[0.014]	(2.94)
CEO Internal				0.003	[0.001]	(0.32)	0.009	[0.005]	(1.02)
CEO Connectedness				0.002	[0.002]	(0.49)	0.002	[0.003]	(0.70)
NonOverlap Rep							0.122[a]	[0.055]	(9.93)
Lag Prof App							0.020	[0.005]	(0.99)
Lag NonProf App							-0.007	[-0.002]	(-0.57)
Lag NonOverlap Rep							0.015	[0.007]	(1.46)
Frac_Prof							0.012	[0.003]	(0.52)
Frac_NonProf							0.363[a]	[0.076]	(16.55)
Observations	7,355			7,353			6,008		
Log pseudolikelihood	-5,488.43			-5,423.55			-3,707.46		
Wald test of $\rho = 0$	0.003			0.012			0.173		

Table 19: BIPROBIT Director Replacement Models: SOX Sub-samples

This table presents the estimated results of BIPROBIT director replacement models, as specified in Equation 7-8. The 2000 sample is split into two sub-samples based on the passage of SOX. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Replacement Models Coefficients**

Y1 = CEO Replacement				
	(1) Post-SOX		(2) Pre-SOX	
Firm Size	-0.039	(-1.47)	0.011	(0.37)
Firm Return	-0.413^{a}	(-4.18)	-0.347^{a}	(-3.33)
Industry Return	0.446^{b}	(2.18)	-0.052	(-0.31)
Board Size	0.019	(1.06)	-0.003	(-0.19)
Frac_SD	-1.046^{a}	(-2.71)	-1.187^{a}	(-3.51)
Frac_Prof	-0.309	(-1.63)	-0.051	(-0.28)
Frac_NonProf	-0.249	(-1.34)	0.144	(0.73)
Average Busyness	0.091	(1.30)	0.045	(0.50)
CEO 60	0.559^{a}	(7.10)	0.724^{a}	(7.98)
CEO Gender	0.004	(0.02)	-0.172	(-0.72)
CEO MBA	-0.030	(-0.43)	-0.011	(-0.13)
CEO Ivyplus	-0.037	(-0.50)	-0.121	(-1.39)
CEO Internal	-0.102	(-1.48)	-0.199^{a}	(-2.62)
CEO Connectedness	0.023	(1.26)	-0.008	(-0.35)
Event Year Dummies	Yes		Yes	

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Table 19(a) – **continued from previous page**

Y2 = Director Replacement				
	(1) Post-SOX		(2) Pre-SOX	
Firm Size	-0.004	(-0.36)	-0.024[b]	(-2.07)
Firm Return	0.005	(0.14)	0.008	(0.26)
Industry Return	0.198[b]	(2.44)	-0.111[c]	(-1.73)
Board Size	0.030[a]	(3.87)	0.019[a]	(2.95)
Frac_SD	0.569[b]	(2.56)	0.394[b]	(2.50)
CEO Age	0.006[b]	(2.35)	0.000	(0.08)
CEO MBA	-0.023	(-0.76)	0.010	(0.30)
CEO Ivyplus	-0.017	(-0.56)	0.002	(0.05)
CEO Internal	-0.089[a]	(-3.08)	-0.112[a]	(-3.57)
CEO Connectedness	0.008	(1.06)	0.012[c]	(1.67)
Director Yrs on Brd	0.010[a]	(5.56)	0.007[a]	(3.98)
Director Busyness	-0.036[b]	(-2.17)	-0.045[b]	(-2.36)
Director MBA	-0.023	(-0.86)	-0.068[b]	(-2.22)
Director Ivyplus	0.010	(0.40)	-0.031	(-1.06)
Director Connectedness	0.006	(1.37)	0.008[c]	(1.79)
Same Gender	0.019	(0.61)	0.061	(1.56)
Age Difference	0.026[a]	(12.47)	0.018[a]	(8.54)
Prof Overlap	-0.037	(-1.01)	-0.058	(-1.48)
NonProf Overlap	0.019	(0.68)	-0.022	(-0.69)
Event Year 1	0.123[a]	(2.67)	0.127[b]	(2.41)
Event Year 2	-0.033	(-0.72)	0.095[c]	(1.76)
Event Year 3	-0.049	(-1.03)	0.064	(1.18)
Event Year 4	-0.023	(-0.50)	0.054	(0.94)
Event Year 5	-0.043	(-0.93)	0.078	(1.39)
Observations	26,805		22,182	
Log pseudolikelihood	-16,218.91		-12,837.80	
Wald test of $\rho = 0$	0.013		0.002	

Table 19

(c) **BIPROBIT Director Replacement Models Marginal Effects**

	Y1 = CEO Replacement					
	(1) Post-SOX			(2) Pre-SOX		
Firm Size	-0.007	[-0.011]	(-1.47)	0.002	[0.003]	(0.37)
Firm Return	-0.070[a]	[-0.028]	(-4.19)	-0.049[a]	[-0.022]	(-3.40)
Industry Return	0.076[b]	[0.013]	(2.18)	-0.007	[-0.002]	(-0.31)
Board Size	0.003	[0.009]	(1.05)	-0.000	[-0.001]	(-0.19)
Frac_SD	-0.177[a]	[-0.014]	(-2.72)	-0.166[a]	[-0.016]	(-3.57)
Frac_Prof	-0.052	[-0.011]	(-1.63)	-0.007	[-0.002]	(-0.28)
Frac_NonProf	-0.042	[-0.008]	(-1.34)	0.020	[0.004]	(0.73)
Average Busyness	0.015	[0.007]	(1.30)	0.006	[0.003]	(0.49)
CEO 60	0.120[a]	[0.044]	(5.86)	0.143[a]	[0.051]	(6.24)
CEO Gender	0.001	[0.000]	(0.02)	-0.027	[-0.004]	(-0.64)
CEO MBA	-0.005	[-0.002]	(-0.43)	-0.002	[-0.001]	(-0.13)
CEO Ivyplus	-0.006	[-0.003]	(-0.50)	-0.016	[-0.008]	(-1.44)
CEO Internal	-0.017	[-0.009]	(-1.47)	-0.028[a]	[-0.014]	(-2.64)
CEO Connectedness	0.004	[0.007]	(1.27)	-0.001	[-0.002]	(-0.35)
Event Year Dummies		Yes			Yes	
	Y2 = Director Replacement					
	(1) Post-SOX			(2) Pre-SOX		
Firm Size	-0.001	[-0.001]	(-0.43)	-0.004[b]	[-0.007]	(-2.04)
Firm Return	-0.000	[-0.000]	(-0.06)	0.000	[0.000]	(0.05)
Industry Return	0.031[b]	[0.005]	(2.56)	-0.018[c]	[-0.004]	(-1.75)
Board Size	0.005[a]	[0.013]	(3.90)	0.003[a]	[0.011]	(2.92)
Frac_SD	0.083[b]	[0.007]	(2.50)	0.061[b]	[0.006]	(2.37)
CEO Age	0.001[b]	[0.006]	(2.35)	0.000	[0.000]	(0.08)
CEO MBA	-0.004	[-0.002]	(-0.78)	0.002	[0.001]	(0.30)
CEO Ivyplus	-0.003	[-0.001]	(-0.58)	-0.000	[-0.000]	(-0.02)
CEO Internal	-0.014[a]	[-0.007]	(-3.13)	-0.019[a]	[-0.009]	(-3.68)
CEO Connectedness	0.001	[0.002]	(1.11)	0.002[c]	[0.004]	(1.65)
Director Yrs on Brd	0.002[a]	[0.011]	(5.57)	0.001[a]	[0.008]	(3.97)
Director Busyness	-0.005[b]	[-0.005]	(-2.17)	-0.007[b]	[-0.007]	(-2.36)
Director MBA	-0.003	[-0.002]	(-0.86)	-0.011[b]	[-0.005]	(-2.26)
Director Ivyplus	0.002	[0.001]	(0.40)	-0.005	[-0.002]	(-1.07)
Director Connectedness	0.001	[0.003]	(1.37)	0.001[c]	[0.005]	(1.79)
Same Gender	0.003	[0.001]	(0.62)	0.010	[0.003]	(1.61)
Age Difference	0.004[a]	[0.029]	(12.79)	0.003[a]	[0.022]	(8.72)
Prof Overlap	-0.006	[-0.002]	(-1.03)	-0.009	[-0.004]	(-1.52)
NonProf Overlap	0.003	[0.001]	(0.68)	-0.004	[-0.002]	(-0.70)
Event Year 1	0.019[b]	[0.007]	(2.42)	0.022[b]	[0.009]	(2.27)
Event Year 2	-0.006	[-0.002]	(-0.82)	0.017[c]	[0.007]	(1.75)
Event Year 3	-0.008	[-0.003]	(-1.15)	0.010	[0.004]	(1.12)
Event Year 4	-0.004	[-0.001]	(-0.55)	0.009	[0.003]	(0.89)
Event Year 5	-0.006	[-0.002]	(-0.93)	0.014	[0.005]	(1.38)
Observations	26,805			22,182		
Log pseudolikelihood	-16,218.91			-12,837.80		
Wald test of $\rho = 0$	0.013			0.002		

Table 20: BIPROBIT Director Appointment Models: SOX Sub-samples

This table presents the estimated results of BIPROBIT director appointment models, as specified in Equation 9-10. The 2000 sample is split into two sub-samples based on the passage of SOX. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Post-SOX		(2) Pre-SOX	
Firm Size	-0.018	(-0.67)	0.049	(1.19)
Firm Return	-0.403^{a}	(-3.51)	-0.169	(-1.16)
Industry Return	0.376	(1.58)	-0.380	(-1.24)
Board Size	-0.007	(-0.38)	-0.018	(-0.90)
Frac_SD	-0.352	(-0.82)	-0.042	(-0.09)
Frac_Prof	-0.357	(-1.60)	-0.019	(-0.07)
Frac_NonProf	-0.154	(-0.78)	0.313	(1.09)
Average Busyness	0.059	(0.77)	-0.277^{a}	(-2.69)
CEO 60	0.394^{a}	(4.08)	0.685^{a}	(5.57)
CEO Gender	0.027	(0.13)	-0.149	(-0.44)
CEO MBA	-0.002	(-0.03)	0.049	(0.43)
CEO Ivyplus	-0.149^{c}	(-1.75)	-0.125	(-1.00)
CEO Internal	-0.119	(-1.53)	-0.091	(-0.80)
CEO Connectedness	0.013	(0.62)	-0.008	(-0.27)
Event Year Dummies	Yes		Yes	
Y2 = Director Appointment				
	(1) Post-SOX		(2) Pre-SOX	
Replacement	0.956^{a}	(18.61)	0.907^{a}	(13.90)
Lag App	-0.247^{a}	(-4.87)	-0.119^{c}	(-1.78)
Lag Rep	0.294^{a}	(5.67)	0.207^{a}	(3.14)
Firm Size	0.133^{a}	(6.52)	0.089^{a}	(3.42)
Firm Return	0.091	(1.43)	-0.025	(-0.33)
Industry Return	0.111	(0.73)	-0.045	(-0.26)
Board Size	-0.079^{a}	(-5.88)	-0.070^{a}	(-5.29)
Frac_SD	-0.630^{b}	(-2.13)	-0.611^{b}	(-2.04)
Frac_Prof	-0.113	(-0.85)	-0.161	(-1.01)
Frac_NonProf	-0.151	(-1.12)	-0.158	(-0.92)
Average Busyness	0.020	(0.39)	0.166^{b}	(2.47)
CEO Age	0.002	(0.51)	-0.000	(-0.11)
CEO Gender	-0.082	(-0.60)	0.027	(0.14)
CEO MBA	-0.033	(-0.62)	0.015	(0.22)
CEO Ivyplus	0.021	(0.38)	-0.053	(-0.73)
CEO Internal	-0.021	(-0.41)	-0.053	(-0.82)
CEO Connectedness	-0.004	(-0.30)	-0.018	(-1.04)
Event Year 1	0.172^{b}	(1.99)	0.195^{c}	(1.67)
Event Year 2	0.118	(1.40)	0.226^{b}	(2.01)
Event Year 3	0.050	(0.59)	0.173	(1.54)
Event Year 4	0.086	(1.03)	0.148	(1.28)
Event Year 5	-0.006	(-0.07)	-0.057	(-0.46)
Observations	3,117		1,859	
Log pseudolikelihood	-2,644.66		-1,498.52	
Wald test of $\rho = 0$	0.002		0.002	

Table 20

(b) **BIPROBIT Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Post-SOX			(2) Pre-SOX		
Firm Size	-0.002	[-0.004]	(-0.67)	0.004	[0.008]	(1.19)
Firm Return	-0.048[a]	[-0.021]	(-3.57)	-0.015	[-0.007]	(-1.17)
Industry Return	0.045	[0.008]	(1.58)	-0.034	[-0.006]	(-1.24)
Board Size	-0.001	[-0.002]	(-0.38)	-0.002	[-0.005]	(-0.89)
Frac_SD	-0.042	[-0.004]	(-0.82)	-0.004	[-0.000]	(-0.09)
Frac_Prof	-0.043	[-0.009]	(-1.62)	-0.002	[-0.000]	(-0.07)
Frac_NonProf	-0.018	[-0.003]	(-0.78)	0.028	[0.005]	(1.10)
Average Busyness	0.007	[0.003]	(0.77)	-0.025[a]	[-0.013]	(-2.65)
CEO 60	0.059[a]	[0.020]	(3.37)	0.093[a]	[0.032]	(4.09)
CEO Gender	0.003	[0.001]	(0.13)	-0.015	[-0.002]	(-0.39)
CEO MBA	-0.000	[-0.000]	(-0.03)	0.004	[0.002]	(0.42)
CEO Ivyplus	-0.017[c]	[-0.008]	(-1.84)	-0.011	[-0.005]	(-1.05)
CEO Internal	-0.014	[-0.007]	(-1.52)	-0.008	[-0.004]	(-0.80)
CEO Connectedness	0.002	[0.003]	(0.62)	-0.001	[-0.001]	(-0.27)
Event Year Dummies		Yes			Yes	
Y2 = Director Appointment						
	(1) Post-SOX			(2) Pre-SOX		
Replacement	0.368[a]	[0.184]	(20.15)	0.351[a]	[0.175]	(14.93)
Lag App	-0.098[a]	[-0.049]	(-4.89)	-0.047[c]	[-0.024]	(-1.78)
Lag Rep	0.117[a]	[0.058]	(5.71)	0.083[a]	[0.041]	(3.16)
Firm Size	0.053[a]	[0.089]	(6.49)	0.036[a]	[0.062]	(3.50)
Firm Return	0.031	[0.013]	(1.24)	-0.012	[-0.006]	(-0.42)
Industry Return	0.049	[0.009]	(0.82)	-0.024	[-0.004]	(-0.34)
Board Size	-0.032[a]	[-0.082]	(-5.90)	-0.028[a]	[-0.086]	(-5.36)
Frac_SD	-0.256[b]	[-0.023]	(-2.17)	-0.245[b]	[-0.026]	(-2.05)
Frac_Prof	-0.050	[-0.010]	(-0.93)	-0.065	[-0.014]	(-1.02)
Frac_NonProf	-0.062	[-0.012]	(-1.16)	-0.059	[-0.011]	(-0.85)
Average Busyness	0.009	[0.004]	(0.43)	0.062[b]	[0.033]	(2.33)
CEO Age	0.001	[0.005]	(0.51)	-0.000	[-0.001]	(-0.11)
CEO Gender	-0.032	[-0.006]	(-0.60)	0.008	[0.001]	(0.10)
CEO MBA	-0.013	[-0.006]	(-0.62)	0.007	[0.003]	(0.25)
CEO Ivyplus	0.006	[0.003]	(0.29)	-0.023	[-0.011]	(-0.79)
CEO Internal	-0.010	[-0.005]	(-0.49)	-0.022	[-0.011]	(-0.87)
CEO Connectedness	-0.002	[-0.003]	(-0.27)	-0.007	[-0.014]	(-1.06)
Event Year 1	0.065[c]	[0.024]	(1.90)	0.078[c]	[0.030]	(1.71)
Event Year 2	0.046	[0.018]	(1.38)	0.096[b]	[0.039]	(2.20)
Event Year 3	0.018	[0.007]	(0.52)	0.069	[0.027]	(1.55)
Event Year 4	0.034	[0.013]	(1.03)	0.062	[0.023]	(1.36)
Event Year 5	-0.002	[-0.001]	(-0.05)	-0.019	[-0.007]	(-0.39)
Observations	3,117			1,859		
Log pseudolikelihood	-2,644.66			-1,498.52		
Wald test of $\rho = 0$	0.002			0.002		

Table 21: BIPROBIT Prof Overlap Director Appointment Models: SOX Subsampless

This table presents the estimated results of BIPROBIT Prof Overlap director appointment models, as specified in Equation 9-10. The 2000 sample is split into two sub-samples based on the passage of SOX.The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Prof Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Post-SOX		(2) Pre-SOX	
Firm Size	-0.019	(-0.70)	0.051	(1.20)
Firm Return	-0.395[a]	(-3.41)	-0.161	(-1.11)
Industry Return	0.375	(1.56)	-0.403	(-1.32)
Board Size	-0.007	(-0.39)	-0.019	(-0.93)
Frac_SD	-0.338	(-0.78)	-0.093	(-0.19)
Frac_Prof	-0.358	(-1.62)	-0.009	(-0.03)
Frac_NonProf	-0.162	(-0.82)	0.326	(1.14)
Average Busyness	0.059	(0.78)	-0.271[a]	(-2.64)
CEO 60	0.392[a]	(4.07)	0.696[a]	(5.65)
CEO Gender	0.033	(0.16)	-0.118	(-0.34)
CEO MBA	0.000	(0.00)	0.051	(0.44)
CEO Ivyplus	-0.151[c]	(-1.77)	-0.134	(-1.08)
CEO Internal	-0.121	(-1.55)	-0.088	(-0.77)
CEO Connectedness	0.014	(0.66)	-0.008	(-0.28)
Event Year Dummies	Yes		Yes	

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Table 21

Table 21(a) – **continued from previous page**

Y2 = Prof Overlap Director Appointment				
	(1) Post-SOX		(2) Pre-SOX	
NonOverlap Rep	0.454[a]	(4.91)	0.419[a]	(3.56)
Lag Prof App	0.350[a]	(2.68)	0.116	(0.64)
Lag NonProf App	0.091	(0.73)	0.061	(0.40)
Lag NonOverlap Rep	-0.087	(-0.93)	0.148	(1.43)
Firm Size	0.063[c]	(1.82)	0.050	(1.20)
Firm Return	0.183[c]	(1.78)	0.086	(0.68)
Industry Return	-0.163	(-0.64)	-0.139	(-0.45)
Board Size	-0.040[c]	(-1.79)	-0.039	(-1.39)
Frac_SD	-0.940	(-1.63)	-0.777	(-1.44)
Frac_Prof	1.850[a]	(9.25)	2.132[a]	(8.31)
Frac_NonProf	-0.124	(-0.51)	-0.136	(-0.42)
Average Busyness	0.032	(0.38)	0.144	(1.28)
CEO Age	-0.001	(-0.14)	0.009	(1.23)
CEO Gender	0.369	(1.13)	-0.241	(-0.81)
CEO MBA	-0.015	(-0.18)	0.159	(1.40)
CEO Ivyplus	0.061	(0.65)	-0.129	(-1.04)
CEO Internal	0.061	(0.68)	-0.259[b]	(-2.14)
CEO Connectedness	0.060[a]	(2.96)	0.007	(0.28)
Event Year 1	0.184	(1.29)	0.380[c]	(1.88)
Event Year 2	0.098	(0.68)	0.217	(1.12)
Event Year 3	-0.005	(-0.04)	0.126	(0.65)
Event Year 4	-0.055	(-0.38)	0.158	(0.78)
Event Year 5	-0.094	(-0.64)	0.135	(0.65)
Observations	3,117		1,859	
Log pseudolikelihood	-1,286.21		-711.15	
Wald test of $\rho = 0$	0.655		0.655	

Table 21

(c) **BIPROBIT Prof Overlap Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Post-SOX			(2) Pre-SOX		
Firm Size	-0.002	[-0.004]	(-0.70)	0.005	[0.008]	(1.19)
Firm Return	-0.047[a]	[-0.020]	(-3.48)	-0.014	[-0.006]	(-1.12)
Industry Return	0.045	[0.008]	(1.57)	-0.036	[-0.007]	(-1.33)
Board Size	-0.001	[-0.002]	(-0.39)	-0.002	[-0.005]	(-0.93)
Frac_SD	-0.041	[-0.004]	(-0.78)	-0.008	[-0.001]	(-0.19)
Frac_Prof	-0.043	[-0.009]	(-1.63)	-0.001	[-0.000]	(-0.03)
Frac_NonProf	-0.019	[-0.004]	(-0.82)	0.029	[0.005]	(1.15)
Average Busyness	0.007	[0.003]	(0.77)	-0.024[a]	[-0.013]	(-2.60)
CEO 60	0.058[a]	[0.020]	(3.37)	0.095[a]	[0.033]	(4.14)
CEO Gender	0.004	[0.001]	(0.17)	-0.012	[-0.002]	(-0.31)
CEO MBA	0.000	[0.000]	(0.00)	0.005	[0.002]	(0.43)
CEO Ivyplus	-0.017[c]	[-0.008]	(-1.87)	-0.012	[-0.005]	(-1.13)
CEO Internal	-0.015	[-0.007]	(-1.54)	-0.008	[-0.004]	(-0.76)
CEO Connectedness	0.002	[0.003]	(0.66)	-0.001	[-0.001]	(-0.28)
Event Year Dummies		Yes			Yes	
Y2 = Prof Overlap Director Appointment						
	(1) Post-SOX			(2) Pre-SOX		
NonOverlap Rep	0.041[a]	[0.019]	(4.42)	0.040[a]	[0.019]	(3.25)
Lag Prof App	0.036[b]	[0.009]	(2.10)	0.011	[0.003]	(0.58)
Lag NonProf App	0.007	[0.003]	(0.69)	0.005	[0.002]	(0.39)
Lag NonOverlap Rep	-0.007	[-0.003]	(-0.96)	0.013	[0.006]	(1.38)
Firm Size	0.005[c]	[0.008]	(1.82)	0.004	[0.007]	(1.22)
Firm Return	0.014[c]	[0.006]	(1.73)	0.007	[0.003]	(0.68)
Industry Return	-0.012	[-0.002]	(-0.63)	-0.012	[-0.002]	(-0.45)
Board Size	-0.003[c]	[-0.008]	(-1.78)	-0.003	[-0.010]	(-1.44)
Frac_SD	-0.073	[-0.006]	(-1.62)	-0.066	[-0.007]	(-1.49)
Frac_Prof	0.144[a]	[0.029]	(8.56)	0.180[a]	[0.039]	(7.96)
Frac_NonProf	-0.010	[-0.002]	(-0.51)	-0.011	[-0.002]	(-0.41)
Average Busyness	0.002	[0.001]	(0.38)	0.012	[0.006]	(1.28)
CEO Age	-0.000	[-0.000]	(-0.14)	0.001	[0.005]	(1.23)
CEO Gender	0.021	[0.004]	(1.64)	-0.025	[-0.004]	(-0.68)
CEO MBA	-0.001	[-0.001]	(-0.18)	0.014	[0.007]	(1.35)
CEO Ivyplus	0.005	[0.002]	(0.63)	-0.011	[-0.005]	(-1.10)
CEO Internal	0.005	[0.002]	(0.68)	-0.022[b]	[-0.011]	(-2.21)
CEO Connectedness	0.005[a]	[0.008]	(2.93)	0.001	[0.001]	(0.28)
Event Year 1	0.016	[0.006]	(1.14)	0.040	[0.015]	(1.56)
Event Year 2	0.008	[0.003]	(0.64)	0.021	[0.008]	(1.01)
Event Year 3	-0.001	[-0.000]	(-0.05)	0.011	[0.005]	(0.61)
Event Year 4	-0.004	[-0.002]	(-0.39)	0.015	[0.006]	(0.72)
Event Year 5	-0.007	[-0.003]	(-0.67)	0.013	[0.004]	(0.61)
Observations	3,117			1,859		
Log pseudolikelihood	-1,286.21			-711.15		
Wald test of $\rho = 0$	0.655			0.655		

Table 22: BIPROBIT NonProf Overlap Director Appointment Models: SOX Subsamples

This table presents the estimated results of BIPROBIT NonProf Overlap director appointment models, as specified in Equation 9-10. The 2000 sample is split into two sub-samples based on the passage of SOX. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT NonProf Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Post-SOX		(2) Pre-SOX	
Firm Size	-0.020	(-0.72)	0.050	(1.18)
Firm Return	-0.396^a	(-3.44)	-0.168	(-1.16)
Industry Return	0.376	(1.57)	-0.394	(-1.29)
Board Size	-0.007	(-0.37)	-0.019	(-0.92)
Frac_SD	-0.347	(-0.81)	-0.074	(-0.15)
Frac_Prof	-0.355	(-1.60)	-0.011	(-0.04)
Frac_NonProf	-0.157	(-0.80)	0.326	(1.14)
Average Busyness	0.060	(0.78)	-0.275^a	(-2.67)
CEO 60	0.394^a	(4.09)	0.694^a	(5.64)
CEO Gender	0.032	(0.16)	-0.123	(-0.36)
CEO MBA	-0.001	(-0.01)	0.051	(0.44)
CEO Ivyplus	-0.152^c	(-1.78)	-0.136	(-1.09)
CEO Internal	-0.121	(-1.55)	-0.092	(-0.81)
CEO Connectedness	0.014	(0.65)	-0.007	(-0.23)
Event Year Dummies	Yes		Yes	

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Table 22

Table 22(a) – **continued from previous page**

Y2 = NonProf Overlap Director Appointment				
	(1) Post-SOX		(2) Pre-SOX	
NonOverlap Rep	0.429[a]	(6.70)	0.449[a]	(5.16)
Lag Prof App	-0.018	(-0.15)	-0.313[c]	(-1.71)
Lag NonProf App	0.034	(0.38)	0.003	(0.02)
Lag NonOverlap Rep	0.058	(0.87)	0.191[b]	(2.22)
Firm Size	0.047[c]	(1.91)	0.060[c]	(1.86)
Firm Return	0.093	(1.25)	0.128	(1.43)
Industry Return	-0.097	(-0.53)	-0.073	(-0.32)
Board Size	-0.013	(-0.81)	-0.012	(-0.71)
Frac_SD	-0.799[b]	(-2.23)	-0.873[b]	(-2.12)
Frac_Prof	0.207	(1.18)	0.228	(1.07)
Frac_NonProf	1.802[a]	(10.46)	2.234[a]	(9.97)
Average Busyness	-0.019	(-0.28)	0.049	(0.56)
CEO Age	-0.004	(-0.84)	0.001	(0.23)
CEO Gender	0.151	(0.82)	-0.045	(-0.18)
CEO MBA	0.098	(1.58)	0.089	(1.05)
CEO Ivyplus	0.069	(1.07)	0.053	(0.60)
CEO Internal	0.038	(0.59)	-0.139[c]	(-1.65)
CEO Connectedness	0.001	(0.06)	0.006	(0.28)
Event Year 1	0.148	(1.43)	0.173	(1.11)
Event Year 2	0.126	(1.22)	0.213	(1.42)
Event Year 3	-0.018	(-0.17)	0.216	(1.43)
Event Year 4	-0.019	(-0.19)	0.200	(1.25)
Event Year 5	-0.077	(-0.72)	-0.036	(-0.22)
Observations	3,117		1,859	
Log pseudolikelihood	-1,900.33		-999.95	
Wald test of $\rho = 0$	0.224		0.171	

Table 22

(c) **BIPROBIT NonProf Overlap Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Post-SOX			(2) Pre-SOX		
Firm Size	-0.002	[-0.004]	(-0.72)	0.004	[0.008]	(1.18)
Firm Return	-0.048[a]	[-0.020]	(-3.50)	-0.015	[-0.007]	(-1.17)
Industry Return	0.045	[0.008]	(1.57)	-0.035	[-0.007]	(-1.30)
Board Size	-0.001	[-0.002]	(-0.37)	-0.002	[-0.005]	(-0.91)
Frac_SD	-0.042	[-0.004]	(-0.81)	-0.007	[-0.001]	(-0.15)
Frac_Prof	-0.043	[-0.009]	(-1.61)	-0.001	[-0.000]	(-0.04)
Frac_NonProf	-0.019	[-0.003]	(-0.80)	0.029	[0.005]	(1.14)
Average Busyness	0.007	[0.003]	(0.78)	-0.025[a]	[-0.013]	(-2.63)
CEO 60	0.059[a]	[0.020]	(3.38)	0.095[a]	[0.033]	(4.14)
CEO Gender	0.004	[0.001]	(0.16)	-0.012	[-0.002]	(-0.33)
CEO MBA	-0.000	[-0.000]	(-0.01)	0.005	[0.002]	(0.44)
CEO Ivyplus	-0.017[c]	[-0.008]	(-1.88)	-0.012	[-0.005]	(-1.14)
CEO Internal	-0.015	[-0.007]	(-1.53)	-0.008	[-0.004]	(-0.81)
CEO Connectedness	0.002	[0.003]	(0.65)	-0.001	[-0.001]	(-0.23)
Event Year Dummies		Yes			Yes	
Y2 = NonProf Overlap Director Appointment						
	(1) Post-SOX			(2) Pre-SOX		
NonOverlap Rep	0.094[a]	[0.045]	(6.41)	0.092[a]	[0.044]	(4.86)
Lag Prof App	-0.004	[-0.001]	(-0.15)	-0.050[b]	[-0.012]	(-2.09)
Lag NonProf App	0.007	[0.002]	(0.37)	0.000	[0.000]	(0.02)
Lag NonOverlap Rep	0.012	[0.006]	(0.86)	0.038[b]	[0.018]	(2.14)
Firm Size	0.010[c]	[0.016]	(1.91)	0.012[c]	[0.020]	(1.89)
Firm Return	0.018	[0.008]	(1.17)	0.024	[0.011]	(1.40)
Industry Return	-0.019	[-0.003]	(-0.50)	-0.015	[-0.003]	(-0.35)
Board Size	-0.003	[-0.007]	(-0.81)	-0.002	[-0.007]	(-0.73)
Frac_SD	-0.164[b]	[-0.014]	(-2.25)	-0.166[b]	[-0.018]	(-2.13)
Frac_Prof	0.041	[0.008]	(1.15)	0.043	[0.009]	(1.06)
Frac_NonProf	0.367[a]	[0.068]	(10.50)	0.425[a]	[0.078]	(10.07)
Average Busyness	-0.004	[-0.002]	(-0.27)	0.008	[0.004]	(0.50)
CEO Age	-0.001	[-0.006]	(-0.84)	0.000	[0.002]	(0.23)
CEO Gender	0.028	[0.005]	(0.91)	-0.009	[-0.001]	(-0.18)
CEO MBA	0.020	[0.010]	(1.55)	0.017	[0.008]	(1.04)
CEO Ivyplus	0.014	[0.006]	(1.02)	0.010	[0.005]	(0.56)
CEO Internal	0.007	[0.004]	(0.57)	-0.027[c]	[-0.013]	(-1.67)
CEO Connectedness	0.000	[0.000]	(0.08)	0.001	[0.002]	(0.27)
Event Year 1	0.031	[0.012]	(1.32)	0.035	[0.014]	(1.05)
Event Year 2	0.027	[0.010]	(1.16)	0.046	[0.018]	(1.37)
Event Year 3	-0.004	[-0.002]	(-0.19)	0.044	[0.018]	(1.33)
Event Year 4	-0.004	[-0.002]	(-0.19)	0.042	[0.016]	(1.18)
Event Year 5	-0.015	[-0.006]	(-0.73)	-0.006	[-0.002]	(-0.19)
Observations	3,117			1,859		
Log pseudolikelihood	-1,900.33			-999.95		
Wald test of $\rho = 0$	0.224			0.171		

Table 23: BIPROBIT Director Replacement Models: Size Sub-samples

This table presents the estimated results of BIPROBIT director replacement models, as specified in Equation 7-8. The 2003 sample is split into two sub-samples based on firm size as proxied by BoardEx initial coverage. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Replacement Models Coefficients**

Y1 = CEO Replacement				
	(1) Large		(2) Small	
Firm Size	-0.039	(-1.47)	-0.102^a	(-4.76)
Firm Return	-0.413^a	(-4.18)	-0.229^a	(-3.70)
Industry Return	0.446^b	(2.18)	0.035	(0.20)
Board Size	0.019	(1.06)	0.041^b	(2.17)
Frac_SD	-1.046^a	(-2.71)	-0.050	(-0.16)
Frac_Prof	-0.309	(-1.63)	-0.338^a	(-2.73)
Frac_NonProf	-0.249	(-1.34)	0.100	(0.76)
Average Busyness	0.091	(1.30)	0.205^a	(2.90)
CEO 60	0.559^a	(7.10)	0.479^a	(6.62)
CEO Gender	0.004	(0.02)	-0.054	(-0.35)
CEO MBA	-0.030	(-0.43)	0.027	(0.41)
CEO Ivyplus	-0.037	(-0.50)	-0.005	(-0.07)
CEO Internal	-0.102	(-1.48)	0.055	(0.91)
CEO Connectedness	0.023	(1.26)	0.054^b	(2.13)
Event Year Dummies	Yes		Yes	

Continue on next page

Table 23

Table 23(a) – **continued from previous page**

Y2 = Director Replacement				
	(1) Large		(2) Small	
Firm Size	-0.004	(-0.36)	-0.058[a]	(-5.89)
Firm Return	0.005	(0.14)	-0.023	(-0.82)
Industry Return	0.198[b]	(2.44)	0.309[a]	(3.58)
Board Size	0.030[a]	(3.87)	0.024[a]	(2.96)
Frac_SD	0.569[b]	(2.56)	0.690[a]	(3.92)
CEO Age	0.006[b]	(2.35)	-0.003	(-1.39)
CEO MBA	-0.023	(-0.76)	-0.030	(-0.94)
CEO Ivyplus	-0.017	(-0.56)	-0.018	(-0.49)
CEO Internal	-0.089[a]	(-3.08)	-0.101[a]	(-3.37)
CEO Connectedness	0.008	(1.06)	0.013	(1.00)
Director Yrs on Brd	0.010[a]	(5.56)	0.012[a]	(7.16)
Director Busyness	-0.036[b]	(-2.17)	-0.019	(-0.99)
Director MBA	-0.023	(-0.86)	0.012	(0.40)
Director Ivyplus	0.010	(0.40)	0.076[a]	(2.81)
Director Connectedness	0.006	(1.37)	0.017[a]	(3.44)
Same Gender	0.019	(0.61)	-0.000	(-0.01)
Age Difference	0.026[a]	(12.47)	0.010[a]	(6.00)
Prof Overlap	-0.037	(-1.01)	-0.120[a]	(-3.73)
NonProf Overlap	0.019	(0.68)	0.054[b]	(2.06)
Event Year 1	0.123[a]	(2.67)	0.168[a]	(3.60)
Event Year 2	-0.033	(-0.72)	0.051	(1.08)
Event Year 3	-0.049	(-1.03)	0.024	(0.50)
Event Year 4	-0.023	(-0.50)	0.008	(0.17)
Event Year 5	-0.043	(-0.93)	-0.002	(-0.03)
Observations	26,805		26,809	
Log pseudolikelihood	-16,218.91		-16,491.39	
Wald test of $\rho = 0$	0.013		0.891	

Table 23

(c) **BIPROBIT Director Replacement Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Large			(2) Small		
Firm Size	-0.007	[-0.011]	(-1.47)	-0.017[a]	[-0.032]	(-4.71)
Firm Return	-0.070[a]	[-0.028]	(-4.19)	-0.039[a]	[-0.020]	(-3.73)
Industry Return	0.076[b]	[0.013]	(2.18)	0.006	[0.001]	(0.20)
Board Size	0.003	[0.009]	(1.05)	0.007[b]	[0.019]	(2.13)
Frac_SD	-0.177[a]	[-0.014]	(-2.72)	-0.009	[-0.001]	(-0.16)
Frac_Prof	-0.052	[-0.011]	(-1.63)	-0.058[a]	[-0.016]	(-2.76)
Frac_NonProf	-0.042	[-0.008]	(-1.34)	0.017	[0.004]	(0.76)
Average Busyness	0.015	[0.007]	(1.30)	0.035[a]	[0.014]	(2.88)
CEO 60	0.120[a]	[0.044]	(5.86)	0.100[a]	[0.037]	(5.59)
CEO Gender	0.001	[0.000]	(0.02)	-0.010	[-0.002]	(-0.34)
CEO MBA	-0.005	[-0.002]	(-0.43)	0.005	[0.002]	(0.41)
CEO Ivyplus	-0.006	[-0.003]	(-0.50)	-0.001	[-0.000]	(-0.07)
CEO Internal	-0.017	[-0.009]	(-1.47)	0.010	[0.005]	(0.90)
CEO Connectedness	0.004	[0.007]	(1.27)	0.009[b]	[0.011]	(2.13)
Event Year Dummies	Yes			Yes		
Y2 = Director Replacement						
	(1) Large			(2) Small		
Firm Size	-0.001	[-0.001]	(-0.43)	-0.009[a]	[-0.016]	(-5.78)
Firm Return	-0.000	[-0.000]	(-0.06)	-0.004	[-0.002]	(-0.83)
Industry Return	0.031[b]	[0.005]	(2.56)	0.048[a]	[0.007]	(3.58)
Board Size	0.005[a]	[0.013]	(3.90)	0.004[a]	[0.010]	(2.97)
Frac_SD	0.083[b]	[0.007]	(2.50)	0.106[a]	[0.010]	(3.91)
CEO Age	0.001[b]	[0.006]	(2.35)	-0.000	[-0.003]	(-1.39)
CEO MBA	-0.004	[-0.002]	(-0.78)	-0.005	[-0.002]	(-0.95)
CEO Ivyplus	-0.003	[-0.001]	(-0.58)	-0.003	[-0.001]	(-0.50)
CEO Internal	-0.014[a]	[-0.007]	(-3.13)	-0.015[a]	[-0.008]	(-3.41)
CEO Connectedness	0.001	[0.002]	(1.11)	0.002	[0.002]	(1.01)
Director Yrs on Brd	0.002[a]	[0.011]	(5.57)	0.002[a]	[0.013]	(7.21)
Director Busyness	-0.005[b]	[-0.005]	(-2.17)	-0.003	[-0.002]	(-0.99)
Director MBA	-0.003	[-0.002]	(-0.86)	0.002	[0.001]	(0.40)
Director Ivyplus	0.002	[0.001]	(0.40)	0.012[a]	[0.005]	(2.74)
Director Connectedness	0.001	[0.003]	(1.37)	0.003[a]	[0.007]	(3.44)
Same Gender	0.003	[0.001]	(0.62)	-0.000	[-0.000]	(-0.01)
Age Difference	0.004[a]	[0.029]	(12.79)	0.002[a]	[0.012]	(6.03)
Prof Overlap	-0.006	[-0.002]	(-1.03)	-0.018[a]	[-0.007]	(-3.90)
NonProf Overlap	0.003	[0.001]	(0.68)	0.009[b]	[0.004]	(2.02)
eventyr==1	0.019[b]	[0.007]	(2.42)	0.028[a]	[0.011]	(3.37)
eventyr==2	-0.006	[-0.002]	(-0.82)	0.008	[0.003]	(1.06)
eventyr==3	-0.008	[-0.003]	(-1.15)	0.004	[0.001]	(0.50)
eventyr==4	-0.004	[-0.001]	(-0.55)	0.001	[0.000]	(0.17)
eventyr==5	-0.006	[-0.002]	(-0.93)	-0.000	[-0.000]	(-0.03)
Observations	26,805			26,809		
Log pseudolikelihood	-16,218.91			-16,491.39		
Wald test of $\rho = 0$	0.013			0.891		

Table 24: BIPROBIT Director Appointment Models: Size Sub-samples

This table presents the estimated results of BIPROBIT director appointment models, as specified in Equation 9-10. The 2003 sample is split into two sub-samples based on firm size as proxied by BoardEx initial coverage. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Large		(2) Small	
Firm Size	-0.053^c	(-1.86)	-0.116^a	(-4.48)
Firm Return	-0.296^a	(-2.88)	-0.330^a	(-3.70)
Industry Return	0.283	(1.22)	0.111	(0.37)
Board Size	0.011	(0.64)	0.043^b	(2.36)
Frac_SD	-0.563	(-1.42)	0.022	(0.06)
Frac_Prof	-0.214	(-1.14)	-0.524^a	(-2.89)
Frac_NonProf	-0.121	(-0.59)	0.118	(0.73)
Average Busyness	0.061	(0.80)	0.108	(1.26)
CEO 60	0.324^a	(3.55)	0.333^a	(3.69)
CEO Gender	0.165	(0.76)	-0.246	(-1.26)
CEO MBA	-0.049	(-0.60)	-0.040	(-0.48)
CEO Ivyplus	-0.135	(-1.54)	0.092	(1.00)
CEO Internal	0.017	(0.22)	0.076	(1.03)
CEO Connectedness	0.034^c	(1.71)	0.051	(1.63)
Event Year Dummies	Yes		Yes	
Y2 = Director Appointment				
	(1) Large		(2) Small	
Replacement	0.951^a	(18.43)	1.149^a	(21.33)
Lag App	-0.216^a	(-4.28)	-0.186^a	(-3.37)
Lag Rep	0.289^a	(5.61)	0.321^a	(5.63)
Firm Size	0.128^a	(6.29)	0.093^a	(5.26)
Firm Return	0.094	(1.50)	0.096^c	(1.75)
Industry Return	0.093	(0.60)	-0.396^c	(-1.78)
Board Size	-0.077^a	(-5.93)	-0.072^a	(-5.04)
Frac_SD	-0.599^b	(-1.99)	-0.550^b	(-1.98)
Frac_Prof	-0.109	(-0.83)	-0.122	(-1.10)
Frac_NonProf	-0.171	(-1.29)	-0.106	(-0.94)
Average Busyness	0.023	(0.44)	0.104^c	(1.70)
CEO Age	0.001	(0.18)	-0.004	(-1.25)
CEO Gender	-0.119	(-0.85)	0.035	(0.27)
CEO MBA	-0.024	(-0.46)	-0.050	(-0.84)
CEO Ivyplus	0.000	(0.01)	0.146^b	(2.19)
CEO Internal	-0.026	(-0.51)	-0.001	(-0.02)
CEO Connectedness	-0.005	(-0.36)	0.039^c	(1.77)
Event Year 1	0.156^c	(1.81)	0.186^b	(2.07)
Event Year 2	0.113	(1.34)	0.085	(0.94)
Event Year 3	0.033	(0.38)	0.042	(0.45)
Event Year 4	0.112	(1.34)	-0.028	(-0.30)
Event Year 5	-0.025	(-0.29)	-0.075	(-0.75)
Observations	3,118		2,990	
Log pseudolikelihood	-2,660.41		-2,474.56	
Wald test of $\rho = 0$	0.005		0.082	

Table 24

(b) **BIPROBIT Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Large			(2) Small		
Firm Size	-0.007[c]	[-0.011]	(-1.86)	-0.015[a]	[-0.027]	(-4.45)
Firm Return	-0.036[a]	[-0.016]	(-2.91)	-0.043[a]	[-0.020]	(-3.77)
Industry Return	0.035	[0.006]	(1.22)	0.014	[0.002]	(0.37)
Board Size	0.001	[0.004]	(0.64)	0.006[b]	[0.013]	(2.36)
Frac_SD	-0.069	[-0.006]	(-1.42)	0.003	[0.000]	(0.06)
Frac_Prof	-0.026	[-0.005]	(-1.13)	-0.068[a]	[-0.018]	(-2.96)
Frac_NonProf	-0.015	[-0.003]	(-0.59)	0.015	[0.003]	(0.73)
Average Busyness	0.008	[0.004]	(0.80)	0.014	[0.006]	(1.26)
CEO 60	0.048[a]	[0.016]	(3.04)	0.051[a]	[0.019]	(3.17)
CEO Gender	0.018	[0.003]	(0.86)	-0.038	[-0.006]	(-1.08)
CEO MBA	-0.006	[-0.003]	(-0.61)	-0.005	[-0.002]	(-0.49)
CEO Ivyplus	-0.016	[-0.007]	(-1.61)	0.013	[0.005]	(0.95)
CEO Internal	0.002	[0.001]	(0.22)	0.010	[0.005]	(1.01)
CEO Connectedness	0.004[c]	[0.007]	(1.73)	0.007	[0.007]	(1.63)
Event Year Dummies	Yes			Yes		
Y2 = Director Appointment						
	(1) Large			(2) Small		
Replacement	0.366[a]	[0.183]	(19.93)	0.429[a]	[0.209]	(23.41)
Lag App	-0.086[a]	[-0.043]	(-4.29)	-0.071[a]	[-0.035]	(-3.40)
Lag Rep	0.115[a]	[0.057]	(5.65)	0.124[a]	[0.060]	(5.62)
Firm Size	0.051[a]	[0.085]	(6.19)	0.035[a]	[0.061]	(5.17)
Firm Return	0.034	[0.015]	(1.37)	0.034	[0.016]	(1.64)
Industry Return	0.040	[0.007]	(0.66)	-0.151[c]	[-0.017]	(-1.78)
Board Size	-0.031[a]	[-0.080]	(-5.87)	-0.027[a]	[-0.063]	(-5.00)
Frac_SD	-0.246[b]	[-0.021]	(-2.04)	-0.210[b]	[-0.021]	(-1.98)
Frac_Prof	-0.046	[-0.009]	(-0.87)	-0.050	[-0.013]	(-1.19)
Frac_NonProf	-0.070	[-0.013]	(-1.31)	-0.040	[-0.009]	(-0.92)
Average Busyness	0.010	[0.005]	(0.48)	0.040[c]	[0.017]	(1.73)
CEO Age	0.000	[0.002]	(0.18)	-0.002	[-0.012]	(-1.25)
CEO Gender	-0.046	[-0.008]	(-0.82)	0.011	[0.002]	(0.23)
CEO MBA	-0.010	[-0.005]	(-0.48)	-0.019	[-0.009]	(-0.86)
CEO Ivyplus	-0.001	[-0.001]	(-0.06)	0.057[b]	[0.022]	(2.20)
CEO Internal	-0.010	[-0.005]	(-0.50)	0.000	[0.000]	(0.01)
CEO Connectedness	-0.002	[-0.003]	(-0.29)	0.015[c]	[0.017]	(1.82)
Event Year 1	0.059[c]	[0.022]	(1.74)	0.073[b]	[0.030]	(2.06)
Event Year 2	0.044	[0.017]	(1.32)	0.034	[0.014]	(0.99)
Event Year 3	0.012	[0.004]	(0.35)	0.016	[0.006]	(0.46)
Event Year 4	0.043	[0.016]	(1.30)	-0.011	[-0.004]	(-0.30)
Event Year 5	-0.009	[-0.004]	(-0.27)	-0.028	[-0.010]	(-0.74)
Observations	3,118			2,990		
Log pseudolikelihood	-2,660.41			-2,474.56		
Wald test of $\rho = 0$	0.005			0.082		

Table 25: BIPROBIT Prof Overlap Director Appointment Models: Size Sub-samples

This table presents the estimated results of BIPROBIT Prof Overlap director appointment models, as specified in Equation 9-10. The 2003 sample is split into two sub-samples based on firm size as proxied by BoardEx initial coverage. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Prof Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Large		(2) Small	
Firm Size	-0.053[c]	(-1.86)	-0.116[a]	(-4.49)
Firm Return	-0.292[a]	(-2.83)	-0.333[a]	(-3.72)
Industry Return	0.282	(1.21)	0.119	(0.40)
Board Size	0.011	(0.60)	0.044[b]	(2.43)
Frac_SD	-0.552	(-1.40)	0.026	(0.07)
Frac_Prof	-0.212	(-1.13)	-0.536[a]	(-2.93)
Frac_NonProf	-0.129	(-0.62)	0.115	(0.71)
Average Busyness	0.063	(0.83)	0.108	(1.27)
CEO 60	0.329[a]	(3.59)	0.334[a]	(3.70)
CEO Gender	0.176	(0.81)	-0.247	(-1.26)
CEO MBA	-0.045	(-0.56)	-0.041	(-0.49)
CEO Ivyplus	-0.135	(-1.55)	0.093	(1.00)
CEO Internal	0.016	(0.21)	0.074	(1.00)
CEO Connectedness	0.033[c]	(1.71)	0.051	(1.62)
Event Year Dummies	Yes		Yes	

Continue on next page

Table 25

Table 25(a) – **continued from previous page**

Y2 = Prof Overlap Director Appointment				
	(1) Large		(2) Small	
NonOverlap Rep	0.450[a]	(4.83)	0.592[a]	(6.04)
Lag Prof App	0.334[a]	(2.73)	0.397[a]	(2.91)
Lag NonProf App	0.103	(0.84)	-0.128	(-0.93)
Lag NonOverlap Rep	-0.045	(-0.48)	0.072	(0.67)
Firm Size	0.059[c]	(1.72)	0.033	(1.20)
Firm Return	0.171[c]	(1.65)	-0.071	(-0.71)
Industry Return	-0.149	(-0.58)	0.062	(0.18)
Board Size	-0.039[c]	(-1.74)	-0.012	(-0.65)
Frac_SD	-0.914	(-1.52)	-1.147[b]	(-2.36)
Frac_Prof	1.860[a]	(9.32)	1.601[a]	(9.25)
Frac_NonProf	-0.073	(-0.30)	0.139	(0.65)
Average Busyness	0.026	(0.32)	-0.014	(-0.14)
CEO Age	-0.003	(-0.43)	-0.008	(-1.53)
CEO Gender	0.363	(1.11)	-0.098	(-0.39)
CEO MBA	-0.022	(-0.25)	-0.026	(-0.26)
CEO Ivyplus	0.021	(0.22)	-0.068	(-0.56)
CEO Internal	0.059	(0.66)	-0.013	(-0.13)
CEO Connectedness	0.064[a]	(3.22)	0.063[b]	(2.08)
Event Year 1	0.205	(1.42)	0.161	(1.19)
Event Year 2	0.127	(0.86)	-0.093	(-0.63)
Event Year 3	-0.007	(-0.05)	-0.136	(-0.89)
Event Year 4	-0.055	(-0.37)	-0.095	(-0.60)
Event Year 5	-0.059	(-0.40)	-0.157	(-1.00)
Observations	3,118		2,990	
Log pseudolikelihood	-1,288.32		-1,294.73	
Wald test of $\rho = 0$	0.060		0.342	

Table 25

(c) **BIPROBIT Prof Overlap Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Large			(2) Small		
Firm Size	-0.006[c]	[-0.011]	(-1.85)	-0.015[a]	[-0.027]	(-4.46)
Firm Return	-0.036[a]	[-0.015]	(-2.86)	-0.043[a]	[-0.020]	(-3.79)
Industry Return	0.035	[0.006]	(1.21)	0.016	[0.002]	(0.40)
Board Size	0.001	[0.003]	(0.61)	0.006[b]	[0.013]	(2.43)
Frac_SD	-0.068	[-0.006]	(-1.40)	0.003	[0.000]	(0.07)
Frac_Prof	-0.026	[-0.005]	(-1.13)	-0.070[a]	[-0.018]	(-3.00)
Frac_NonProf	-0.016	[-0.003]	(-0.63)	0.015	[0.003]	(0.71)
Average Busyness	0.008	[0.004]	(0.82)	0.014	[0.006]	(1.27)
CEO 60	0.048[a]	[0.017]	(3.07)	0.051[a]	[0.019]	(3.18)
CEO Gender	0.019	[0.003]	(0.93)	-0.038	[-0.006]	(-1.08)
CEO MBA	-0.005	[-0.003]	(-0.56)	-0.005	[-0.002]	(-0.50)
CEO Ivyplus	-0.016	[-0.007]	(-1.61)	0.013	[0.005]	(0.96)
CEO Internal	0.002	[0.001]	(0.21)	0.010	[0.005]	(0.98)
CEO Connectedness	0.004[c]	[0.007]	(1.73)	0.007	[0.007]	(1.62)
Event Year Dummies		Yes			Yes	
Y2 = Prof Overlap Director Appointment						
	(1) Large			(2) Small		
NonOverlap Rep	0.041[a]	[0.019]	(4.37)	0.058[a]	[0.025]	(4.75)
Lag Prof App	0.034[b]	[0.008]	(2.17)	0.040[b]	[0.010]	(2.19)
Lag NonProf App	0.009	[0.003]	(0.79)	-0.009	[-0.003]	(-1.01)
Lag NonOverlap Rep	-0.003	[-0.002]	(-0.48)	0.005	[0.002]	(0.65)
Firm Size	0.005[c]	[0.008]	(1.67)	0.003	[0.005]	(1.28)
Firm Return	0.013	[0.005]	(1.56)	-0.005	[-0.002]	(-0.65)
Industry Return	-0.011	[-0.002]	(-0.55)	0.004	[0.001]	(0.17)
Board Size	-0.003[c]	[-0.008]	(-1.71)	-0.001	[-0.002]	(-0.69)
Frac_SD	-0.073	[-0.006]	(-1.54)	-0.083[b]	[-0.008]	(-2.42)
Frac_Prof	0.146[a]	[0.029]	(8.64)	0.117[a]	[0.030]	(9.03)
Frac_NonProf	-0.006	[-0.001]	(-0.32)	0.010	[0.002]	(0.64)
Average Busyness	0.002	[0.001]	(0.34)	-0.001	[-0.000]	(-0.16)
CEO Age	-0.000	[-0.001]	(-0.43)	-0.001	[-0.005]	(-1.53)
CEO Gender	0.021	[0.004]	(1.63)	-0.007	[-0.001]	(-0.35)
CEO MBA	-0.002	[-0.001]	(-0.27)	-0.002	[-0.001]	(-0.25)
CEO Ivyplus	0.001	[0.001]	(0.18)	-0.005	[-0.002]	(-0.60)
CEO Internal	0.005	[0.002]	(0.67)	-0.001	[-0.001]	(-0.14)
CEO Connectedness	0.005[a]	[0.009]	(3.23)	0.004[b]	[0.005]	(2.02)
Event Year 1	0.018	[0.007]	(1.23)	0.013	[0.005]	(1.08)
Event Year 2	0.011	[0.004]	(0.79)	-0.007	[-0.003]	(-0.70)
Event Year 3	-0.001	[-0.000]	(-0.07)	-0.009	[-0.003]	(-0.98)
Event Year 4	-0.004	[-0.002]	(-0.41)	-0.006	[-0.002]	(-0.64)
Event Year 5	-0.004	[-0.002]	(-0.40)	-0.010	[-0.004]	(-1.13)
Observations	3,118			2,990		
Log pseudolikelihood	-1,288.32			-1,294.73		
Wald test of $\rho = 0$	0.060			0.342		

Table 26: BIPROBIT NonProf Overlap Director Appointment Models: Size Subsamples

This table presents the estimated results of BIPROBIT NonProf Overlap director appointment models, as specified in Equation 9-10. The 2003 sample is split into two sub-samples based on firm size as proxied by BoardEx initial coverage. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT NonProf Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Large		(2) Small	
Firm Size	-0.075^a	(-2.59)	-0.096^a	(-3.59)
Firm Return	-0.337^a	(-3.12)	-0.318^a	(-3.54)
Industry Return	0.388^c	(1.72)	0.451	(1.51)
Board Size	0.026	(1.47)	0.026	(1.41)
Frac_SD	-0.444	(-1.10)	0.233	(0.61)
Frac_Prof	-0.409^b	(-2.04)	-0.668^a	(-3.54)
Frac_NonProf	0.065	(0.34)	0.020	(0.12)
Average Busyness	0.015	(0.18)	0.105	(1.25)
CEO 60	0.452^a	(4.97)	0.291^a	(3.06)
CEO Gender	0.100	(0.45)	-0.128	(-0.61)
CEO MBA	-0.023	(-0.28)	0.099	(1.23)
CEO Ivyplus	-0.202^b	(-2.27)	0.059	(0.63)
CEO Internal	-0.015	(-0.19)	0.074	(0.98)
CEO Connectedness	0.027	(1.27)	0.053	(1.62)
Event Year Dummies	Yes		Yes	

Continue on next page

Table 26

Table 26(a) – **continued from previous page**

Y2 = NonProf Overlap Director Appointment				
	(1) Large		(2) Small	
NonOverlap Rep	0.442^a	(6.81)	0.635^a	(8.53)
olh_empm	0.005	(0.04)	0.061	(0.45)
olh_socm	0.057	(0.64)	-0.126	(-1.40)
nolfm	0.093	(1.38)	0.091	(1.20)
Firm Size	0.054^b	(2.17)	0.010	(0.48)
Firm Return	0.089	(1.19)	0.053	(0.85)
Industry Return	-0.068	(-0.36)	-0.226	(-0.84)
Board Size	-0.017	(-1.06)	-0.035^b	(-2.16)
Frac_SD	-0.890^b	(-2.41)	-0.726^b	(-2.02)
Frac_Prof	0.185	(1.03)	0.098	(0.66)
Frac_NonProf	1.812^a	(10.52)	1.827^a	(12.71)
Average Busyness	-0.031	(-0.44)	0.048	(0.63)
CEO Age	-0.005	(-1.08)	-0.005	(-1.32)
CEO Gender	0.182	(0.96)	0.048	(0.28)
CEO MBA	0.089	(1.41)	0.013	(0.18)
CEO Ivyplus	0.045	(0.69)	0.205^a	(2.72)
CEO Internal	0.011	(0.18)	0.061	(0.94)
CEO Connectedness	0.002	(0.12)	0.029	(0.94)
Event Year 1	0.145	(1.39)	0.198^c	(1.84)
Event Year 2	0.136	(1.30)	0.083	(0.75)
Event Year 3	-0.024	(-0.23)	0.178	(1.61)
Event Year 4	-0.003	(-0.03)	0.015	(0.13)
Event Year 5	-0.110	(-1.01)	-0.047	(-0.39)
Observations	3,104		2,973	
Log pseudolikelihood	-1,855.37		-1,821.09	
Wald test of $\rho = 0$	0.012		0.605	

Table 26

(c) **BIPROBIT NonProf Overlap Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Large			(2) Small		
Firm Size	-0.009[a]	[-0.015]	(-2.59)	-0.012[a]	[-0.021]	(-3.60)
Firm Return	-0.039[a]	[-0.017]	(-3.15)	-0.040[a]	[-0.019]	(-3.57)
Industry Return	0.045[c]	[0.008]	(1.72)	0.056	[0.006]	(1.52)
Board Size	0.003	[0.008]	(1.47)	0.003	[0.008]	(1.41)
Frac_SD	-0.051	[-0.004]	(-1.10)	0.029	[0.003]	(0.61)
Frac_Prof	-0.047[b]	[-0.009]	(-2.04)	-0.083[a]	[-0.022]	(-3.65)
Frac_NonProf	0.007	[0.001]	(0.34)	0.002	[0.001]	(0.12)
Average Busyness	0.002	[0.001]	(0.18)	0.013	[0.005]	(1.25)
CEO 60	0.067[a]	[0.023]	(4.05)	0.042[a]	[0.015]	(2.67)
CEO Gender	0.011	[0.002]	(0.49)	-0.018	[-0.003]	(-0.56)
CEO MBA	-0.003	[-0.001]	(-0.28)	0.013	[0.006]	(1.19)
CEO Ivyplus	-0.022[b]	[-0.010]	(-2.43)	0.008	[0.003]	(0.61)
CEO Internal	-0.002	[-0.001]	(-0.19)	0.009	[0.005]	(0.96)
CEO Connectedness	0.003	[0.006]	(1.28)	0.007	[0.007]	(1.62)
Event Year Dummies		Yes			Yes	
Y2 = NonProf Overlap Director Appointment						
	(1) Large			(2) Small		
NonOverlap Rep	0.097[a]	[0.046]	(6.51)	0.149[a]	[0.064]	(7.53)
olh_empm	0.001	[0.000]	(0.04)	0.012	[0.003]	(0.43)
olh_socm	0.012	[0.004]	(0.62)	-0.023	[-0.008]	(-1.48)
nolfm	0.019	[0.009]	(1.35)	0.018	[0.008]	(1.17)
Firm Size	0.010[b]	[0.018]	(2.09)	0.002	[0.003]	(0.45)
Firm Return	0.016	[0.007]	(1.06)	0.010	[0.005]	(0.81)
Industry Return	-0.012	[-0.002]	(-0.30)	-0.043	[-0.005]	(-0.83)
Board Size	-0.003	[-0.009]	(-1.02)	-0.007[b]	[-0.016]	(-2.15)
Frac_SD	-0.184[b]	[-0.016]	(-2.46)	-0.142[b]	[-0.014]	(-2.02)
Frac_Prof	0.035	[0.007]	(0.97)	0.018	[0.005]	(0.63)
Frac_NonProf	0.370[a]	[0.068]	(10.61)	0.357[a]	[0.080]	(12.71)
Average Busyness	-0.006	[-0.003]	(-0.43)	0.010	[0.004]	(0.64)
CEO Age	-0.001	[-0.007]	(-1.08)	-0.001	[-0.008]	(-1.32)
CEO Gender	0.034	[0.006]	(1.09)	0.009	[0.002]	(0.28)
CEO MBA	0.018	[0.009]	(1.38)	0.003	[0.001]	(0.19)
CEO Ivyplus	0.008	[0.004]	(0.60)	0.043[b]	[0.017]	(2.55)
CEO Internal	0.002	[0.001]	(0.17)	0.012	[0.006]	(0.94)
CEO Connectedness	0.001	[0.001]	(0.16)	0.006	[0.006]	(0.96)
Event Year 1	0.030	[0.011]	(1.29)	0.041[c]	[0.017]	(1.72)
Event Year 2	0.029	[0.011]	(1.23)	0.017	[0.007]	(0.73)
Event Year 3	-0.006	[-0.002]	(-0.26)	0.037	[0.014]	(1.51)
Event Year 4	-0.000	[-0.000]	(-0.00)	0.003	[0.001]	(0.13)
Event Year 5	-0.022	[-0.008]	(-1.06)	-0.009	[-0.003]	(-0.40)
Observations	3,104			2,973		
Log pseudolikelihood	-1,855.37			-1,821.09		
Wald test of $\rho = 0$	0.012			0.605		

Table 27: BIPROBIT Director Replacement Models: Retired vs. Forced

This table presents the estimated results of BIPROBIT director replacement models, as specified in Equation 7-8. The 2003 sample is split into two sub-samples based on whether the prior CEO departed at the age older than 62. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT NonProf Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Retired		(2) Forced	
Firm Size	-0.064^{c}	(-1.70)	-0.039^{c}	(-1.79)
Firm Return	-0.279^{c}	(-1.80)	-0.290^{a}	(-3.96)
Industry Return	0.202	(0.58)	0.109	(0.56)
Board Size	0.050^{c}	(1.78)	0.014	(0.81)
Frac_SD	-0.833^{c}	(-1.80)	-1.143^{a}	(-3.11)
Frac_Prof	-0.524^{c}	(-1.87)	-0.324^{c}	(-1.83)
Frac_NonProf	-0.124	(-0.44)	0.001	(0.01)
Average Busyness	0.226^{c}	(1.81)	-0.000	(-0.00)
CEO 60	0.765^{a}	(6.86)	0.456^{a}	(5.63)
CEO Gender	0.110	(0.39)	0.044	(0.28)
CEO MBA	-0.141	(-1.25)	0.095	(1.45)
CEO Ivyplus	-0.038	(-0.29)	-0.086	(-1.22)
CEO Internal	-0.261^{b}	(-2.46)	0.000	(0.00)
CEO Connectedness	0.044	(1.51)	0.027	(1.38)
Event Year Dummies	Yes		Yes	

Continue on next page

Table 27

Table 27(a) – **continued from previous page**

Y2 = Director Replacement				
	(1) Retired		(2) Forced	
Firm Size	0.007	(0.54)	-0.047[a]	(-4.60)
Firm Return	-0.031	(-0.59)	-0.023	(-0.70)
Industry Return	0.020	(0.15)	0.185[b]	(2.18)
Board Size	0.013	(1.37)	0.039[a]	(4.48)
Frac_SD	1.046[a]	(4.11)	0.435[b]	(2.01)
CEO Age	0.015[a]	(3.96)	-0.003	(-1.47)
CEO MBA	0.002	(0.06)	-0.028	(-0.89)
CEO Ivyplus	-0.074	(-1.50)	0.028	(0.87)
CEO Internal	-0.102[b]	(-2.47)	-0.085[a]	(-2.86)
CEO Connectedness	0.008	(0.62)	0.014	(1.50)
Director Yrs on Brd	0.008[a]	(3.79)	0.013[a]	(7.15)
Director Busyness	-0.019	(-0.72)	-0.031[c]	(-1.76)
Director MBA	0.021	(0.49)	-0.055[b]	(-2.04)
Director Ivyplus	0.041	(1.07)	0.039	(1.51)
Director Connectedness	0.003	(0.41)	0.011[b]	(2.47)
Same Gender	-0.003	(-0.05)	0.033	(0.96)
Age Difference	0.031[a]	(10.49)	0.010[a]	(5.20)
Prof Overlap	-0.104[c]	(-1.96)	-0.073[b]	(-1.98)
NonProf Overlap	0.064[c]	(1.68)	0.038	(1.39)
Event Year 1	0.177[a]	(2.71)	0.163[a]	(3.00)
Event Year 2	0.001	(0.01)	0.050	(0.91)
Event Year 3	-0.029	(-0.43)	0.015	(0.26)
Event Year 4	-0.089	(-1.35)	0.056	(0.95)
Event Year 5	-0.038	(-0.57)	-0.024	(-0.39)
Observations	13,601		25,845	
Log pseudolikelihood	-7,072.15		-16,898.05	
Wald test of $\rho = 0$	0.841		0.109	

Table 27

(c) **BIPROBIT Director Replacement Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Retired			(2) Forced		
Firm Size	-0.008[c]	[-0.015]	(-1.71)	-0.007[c]	[-0.015]	(-1.79)
Firm Return	-0.033[c]	[-0.012]	(-1.81)	-0.055[a]	[-0.026]	(-3.99)
Industry Return	0.024	[0.004]	(0.58)	0.021	[0.003]	(0.56)
Board Size	0.006[c]	[0.018]	(1.76)	0.003	[0.007]	(0.81)
Frac_SD	-0.098[c]	[-0.009]	(-1.81)	-0.219[a]	[-0.017]	(-3.12)
Frac_Prof	-0.061[c]	[-0.014]	(-1.89)	-0.062[c]	[-0.013]	(-1.84)
Frac_NonProf	-0.015	[-0.003]	(-0.44)	0.000	[0.000]	(0.01)
Average Busyness	0.026[c]	[0.013]	(1.82)	-0.000	[-0.000]	(-0.00)
CEO 60	0.137[a]	[0.045]	(5.12)	0.105[a]	[0.036]	(4.81)
CEO Gender	0.012	[0.002]	(0.42)	0.008	[0.002]	(0.29)
CEO MBA	-0.016	[-0.007]	(-1.31)	0.019	[0.009]	(1.42)
CEO Ivyplus	-0.004	[-0.002]	(-0.30)	-0.016	[-0.007]	(-1.25)
CEO Internal	-0.032[b]	[-0.016]	(-2.30)	0.000	[0.000]	(0.00)
CEO Connectedness	0.005	[0.009]	(1.51)	0.005	[0.009]	(1.38)
Event Year Dummies	Yes			Yes		
Y2 = Director Replacement						
	(1) Retired			(2) Forced		
Firm Size	0.001	[0.002]	(0.53)	-0.008[a]	[-0.016]	(-4.60)
Firm Return	-0.005	[-0.002]	(-0.60)	-0.004	[-0.002]	(-0.82)
Industry Return	0.003	[0.000]	(0.15)	0.030[b]	[0.005]	(2.20)
Board Size	0.002	[0.006]	(1.38)	0.006[a]	[0.017]	(4.43)
Frac_SD	0.153[a]	[0.014]	(4.18)	0.068[c]	[0.005]	(1.95)
CEO Age	0.002[a]	[0.014]	(4.05)	-0.001	[-0.004]	(-1.47)
CEO MBA	0.000	[0.000]	(0.05)	-0.004	[-0.002]	(-0.85)
CEO Ivyplus	-0.011	[-0.004]	(-1.55)	0.004	[0.002]	(0.83)
CEO Internal	-0.015[b]	[-0.007]	(-2.44)	-0.014[a]	[-0.007]	(-2.84)
CEO Connectedness	0.001	[0.002]	(0.63)	0.002	[0.004]	(1.54)
Director Yrs on Brd	0.001[a]	[0.010]	(3.77)	0.002[a]	[0.013]	(7.22)
Director Busyness	-0.003	[-0.003]	(-0.72)	-0.005[c]	[-0.005]	(-1.76)
Director MBA	0.003	[0.001]	(0.49)	-0.009[b]	[-0.004]	(-2.07)
Director Ivyplus	0.006	[0.003]	(1.06)	0.006	[0.003]	(1.50)
Director Connectedness	0.000	[0.001]	(0.41)	0.002[b]	[0.006]	(2.47)
Same Gender	-0.000	[-0.000]	(-0.05)	0.005	[0.002]	(0.98)
Age Difference	0.004[a]	[0.036]	(10.96)	0.002[a]	[0.012]	(5.25)
Prof Overlap	-0.014[b]	[-0.005]	(-2.08)	-0.011[b]	[-0.004]	(-2.06)
NonProf Overlap	0.010[c]	[0.004]	(1.65)	0.006	[0.003]	(1.37)
Event Year 1	0.028[b]	[0.012]	(2.53)	0.028[a]	[0.012]	(2.84)
Event Year 2	0.000	[0.000]	(0.01)	0.009	[0.003]	(0.92)
Event Year 3	-0.004	[-0.002]	(-0.44)	0.002	[0.001]	(0.26)
Event Year 4	-0.012	[-0.005]	(-1.41)	0.009	[0.003]	(0.95)
Event Year 5	-0.006	[-0.002]	(-0.58)	-0.003	[-0.001]	(-0.32)
Observations	13,601			25,845		
Log pseudolikelihood	-7,072.15			-16,898.05		
Wald test of $\rho = 0$	0.841			0.109		

Table 28: BIPROBIT Director Appointment Models: Retired vs. Forced

This table presents the estimated results of BIPROBIT director appointment models, as specified in Equation 9-10. The 2003 sample is split into two sub-samples based on whether the prior CEO departed at the age older than 62. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Director Appointment Models Coefficients**

	(1) Retired		(2) Forced	
Y1 = CEO Replacement				
Firm Size	-0.096^{b}	(-2.45)	-0.018	(-0.75)
Firm Return	-0.319^{c}	(-1.67)	-0.335^{a}	(-3.78)
Industry Return	0.464	(1.06)	0.294	(1.25)
Board Size	0.027	(1.00)	0.008	(0.45)
Frac_SD	0.273	(0.46)	-0.813^{b}	(-2.01)
Frac_Prof	-0.611^{c}	(-1.65)	-0.406^{c}	(-1.88)
Frac_NonProf	-0.343	(-1.10)	0.072	(0.45)
Average Busyness	0.117	(0.88)	-0.020	(-0.25)
CEO 60	0.617^{a}	(4.39)	0.399^{a}	(4.36)
CEO Gender	0.293	(0.70)	-0.150	(-0.87)
CEO MBA	-0.070	(-0.53)	0.125^{c}	(1.70)
CEO Ivyplus	-0.175	(-1.16)	-0.121	(-1.46)
CEO Internal	-0.082	(-0.65)	-0.080	(-1.14)
CEO Connectedness	0.059^{c}	(1.71)	0.008	(0.38)
Event Year Dummies	Yes		Yes	
Y2 = Director Appointment				
	(1) Retired		(2) Forced	
Replacement	1.050^{a}	(14.12)	1.017^{a}	(19.61)
Lag App	-0.223^{a}	(-2.94)	-0.185^{a}	(-3.55)
Lag Rep	0.288^{a}	(3.58)	0.293^{a}	(5.52)
Firm Size	0.088^{a}	(3.72)	0.134^{a}	(7.43)
Firm Return	-0.052	(-0.52)	0.097^{c}	(1.71)
Industry Return	-0.122	(-0.49)	0.049	(0.28)
Board Size	-0.064^{a}	(-4.10)	-0.095^{a}	(-6.11)
Frac_SD	-0.118	(-0.32)	-0.879^{a}	(-2.92)
Frac_Prof	-0.239	(-1.40)	-0.010	(-0.08)
Frac_NonProf	-0.061	(-0.33)	-0.163	(-1.39)
Average Busyness	0.089	(1.17)	-0.011	(-0.19)
CEO Age	0.005	(0.89)	-0.003	(-0.79)
CEO Gender	0.050	(0.29)	-0.045	(-0.36)
CEO MBA	0.027	(0.36)	-0.052	(-0.97)
CEO Ivyplus	0.117	(1.38)	0.085	(1.47)
CEO Internal	-0.066	(-0.90)	-0.014	(-0.27)
CEO Connectedness	-0.012	(-0.50)	0.012	(0.72)
Event Year 1	0.171	(1.34)	0.187^{b}	(2.01)
Event Year 2	0.162	(1.28)	0.085	(0.89)
Event Year 3	0.088	(0.66)	0.075	(0.75)
Event Year 4	0.179	(1.27)	0.086	(0.86)
Event Year 5	0.241^{c}	(1.66)	-0.159	(-1.46)
Observations	1,507		3,064	
Log pseudolikelihood	-1,180.20		-2,689.23	
Wald test of $\rho = 0$	0.437		0.000	

Table 28

(b) **BIPROBIT Director Appointment Models Marginal Effects**

	(1) Retired			(2) Forced		
Y1 = CEO Replacement						
Firm Size	-0.008[b]	[-0.016]	(-2.46)	-0.003	[-0.005]	(-0.75)
Firm Return	-0.027[c]	[-0.010]	(-1.69)	-0.049[a]	[-0.023]	(-3.83)
Industry Return	0.040	[0.006]	(1.07)	0.043	[0.007]	(1.25)
Board Size	0.002	[0.006]	(0.99)	0.001	[0.003]	(0.45)
Frac_SD	0.023	[0.002]	(0.46)	-0.119[b]	[-0.010]	(-2.01)
Frac_Prof	-0.052[c]	[-0.011]	(-1.69)	-0.059[c]	[-0.012]	(-1.90)
Frac_NonProf	-0.029	[-0.006]	(-1.10)	0.010	[0.002]	(0.45)
Average Busyness	0.010	[0.005]	(0.89)	-0.003	[-0.001]	(-0.25)
CEO 60	0.079[a]	[0.026]	(3.25)	0.071[a]	[0.024]	(3.65)
CEO Gender	0.020	[0.003]	(0.92)	-0.024	[-0.005]	(-0.79)
CEO MBA	-0.006	[-0.003]	(-0.54)	0.019[c]	[0.009]	(1.66)
CEO Ivyplus	-0.014	[-0.006]	(-1.25)	-0.017	[-0.007]	(-1.52)
CEO Internal	-0.007	[-0.003]	(-0.63)	-0.012	[-0.006]	(-1.14)
CEO Connectedness	0.005[c]	[0.008]	(1.71)	0.001	[0.002]	(0.38)
Event Year Dummies		Yes			Yes	
Y2 = Director Appointment						
	(1) Retired			(2) Forced		
Replacement	0.400[a]	[0.200]	(15.49)	0.390[a]	[0.194]	(21.40)
Lag App	-0.088[a]	[-0.044]	(-2.96)	-0.074[a]	[-0.037]	(-3.56)
Lag Rep	0.114[a]	[0.057]	(3.61)	0.117[a]	[0.058]	(5.55)
Firm Size	0.035[a]	[0.071]	(3.75)	0.053[a]	[0.108]	(7.41)
Firm Return	-0.020	[-0.008]	(-0.49)	0.033	[0.016]	(1.47)
Industry Return	-0.050	[-0.008]	(-0.51)	0.024	[0.004]	(0.36)
Board Size	-0.025[a]	[-0.070]	(-4.12)	-0.038[a]	[-0.094]	(-6.11)
Frac_SD	-0.048	[-0.005]	(-0.33)	-0.364[a]	[-0.031]	(-3.04)
Frac_Prof	-0.093	[-0.019]	(-1.37)	-0.011	[-0.002]	(-0.20)
Frac_NonProf	-0.023	[-0.004]	(-0.32)	-0.064	[-0.014]	(-1.36)
Average Busyness	0.035	[0.017]	(1.16)	-0.005	[-0.002]	(-0.21)
CEO Age	0.002	[0.012]	(0.89)	-0.001	[-0.008]	(-0.79)
CEO Gender	0.019	[0.003]	(0.27)	-0.021	[-0.004]	(-0.42)
CEO MBA	0.011	[0.005]	(0.37)	-0.019	[-0.009]	(-0.87)
CEO Ivyplus	0.047	[0.020]	(1.40)	0.032	[0.014]	(1.39)
CEO Internal	-0.026	[-0.012]	(-0.89)	-0.007	[-0.003]	(-0.33)
CEO Connectedness	-0.005	[-0.008]	(-0.52)	0.005	[0.008]	(0.75)
Event Year 1	0.069	[0.029]	(1.36)	0.077[b]	[0.034]	(2.09)
Event Year 2	0.065	[0.026]	(1.29)	0.039	[0.016]	(1.02)
Event Year 3	0.036	[0.014]	(0.67)	0.031	[0.012]	(0.79)
Event Year 4	0.072	[0.026]	(1.28)	0.040	[0.014]	(0.99)
Event Year 5	0.096[c]	[0.033]	(1.67)	-0.055	[-0.018]	(-1.30)
Observations	1,507			3,064		
Log pseudolikelihood	-1,180.20			-2,689.23		
Wald test of $\rho = 0$	0.437			0.000		

Table 29: BIPROBIT Prof Overlap Director Appointment Models: Retired vs. Forceds

This table presents the estimated results of BIPROBIT Prof Overlap director appointment models, as specified in Equation 9-10. The 2003 sample is split into two sub-samples based on whether the prior CEO departed at the age older than 62. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT Prof Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Retired		(2) Forced	
Firm Size	-0.095^{b}	(-2.44)	-0.018	(-0.75)
Firm Return	-0.316^{c}	(-1.66)	-0.340^{a}	(-3.81)
Industry Return	0.456	(1.04)	0.306	(1.29)
Board Size	0.028	(1.03)	0.007	(0.37)
Frac_SD	0.259	(0.44)	-0.806^{b}	(-2.00)
Frac_Prof	-0.625^{c}	(-1.68)	-0.417^{c}	(-1.93)
Frac_NonProf	-0.337	(-1.08)	0.062	(0.38)
Average Busyness	0.118	(0.89)	-0.017	(-0.22)
CEO 60	0.615^{a}	(4.39)	0.399^{a}	(4.36)
CEO Gender	0.291	(0.70)	-0.156	(-0.90)
CEO MBA	-0.074	(-0.56)	0.127^{c}	(1.73)
CEO Ivyplus	-0.171	(-1.13)	-0.121	(-1.47)
CEO Internal	-0.082	(-0.65)	-0.080	(-1.13)
CEO Connectedness	0.059^{c}	(1.69)	0.009	(0.41)
Event Year Dummies	Yes		Yes	

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Table 29

Table 29(a) – **continued from previous page**

Y2 = Prof Overlap Director Appointment				
	(1) Retired		(2) Forced	
NonOverlap Rep	0.592[a]	(4.03)	0.472[a]	(4.98)
Lag Prof App	0.087	(0.47)	0.387[a]	(2.77)
Lag NonProf App	0.211	(1.30)	0.068	(0.52)
Lag NonOverlap Rep	0.008	(0.06)	-0.057	(-0.57)
Firm Size	0.054	(1.38)	0.069[b]	(2.28)
Firm Return	0.343[b]	(2.13)	0.006	(0.05)
Industry Return	-0.472	(-1.18)	-0.113	(-0.42)
Board Size	-0.045[c]	(-1.71)	-0.030	(-1.33)
Frac_SD	-0.919	(-1.35)	-1.117[c]	(-1.93)
Frac_Prof	2.143[a]	(7.76)	1.585[a]	(8.13)
Frac_NonProf	0.175	(0.50)	-0.190	(-0.80)
Average Busyness	-0.112	(-0.86)	-0.050	(-0.55)
CEO Age	0.002	(0.22)	-0.000	(-0.04)
CEO Gender	0.462	(0.82)	0.410	(1.30)
CEO MBA	-0.001	(-0.00)	-0.068	(-0.70)
CEO Ivyplus	0.127	(0.95)	0.026	(0.25)
CEO Internal	-0.052	(-0.41)	-0.092	(-0.97)
CEO Connectedness	0.050	(1.53)	0.055[b]	(2.43)
Event Year 1	0.040	(0.20)	0.258	(1.57)
Event Year 2	-0.005	(-0.02)	0.034	(0.20)
Event Year 3	-0.238	(-1.03)	0.155	(0.88)
Event Year 4	0.038	(0.17)	0.026	(0.14)
Event Year 5	-0.223	(-0.98)	0.073	(0.39)
Observations	1,507		3,064	
Log pseudolikelihood	-535.02		-1,371.73	
Wald test of $\rho = 0$	0.213		0.561	

Table 29

(c) **BIPROBIT Prof Overlap Director Appointment Models Marginal Effects**

	Y1 = CEO Replacement					
	(1) Retired			(2) Forced		
Firm Size	-0.008^b	[-0.016]	(-2.44)	-0.003	[-0.005]	(-0.75)
Firm Return	-0.027^c	[-0.010]	(-1.68)	-0.049^a	[-0.023]	(-3.86)
Industry Return	0.039	[0.006]	(1.05)	0.045	[0.007]	(1.29)
Board Size	0.002	[0.007]	(1.02)	0.001	[0.002]	(0.37)
Frac_SD	0.022	[0.002]	(0.44)	-0.117^b	[-0.010]	(-2.01)
Frac_Prof	-0.054^c	[-0.011]	(-1.73)	-0.061^c	[-0.012]	(-1.94)
Frac_NonProf	-0.029	[-0.005]	(-1.09)	0.009	[0.002]	(0.38)
Average Busyness	0.010	[0.005]	(0.90)	-0.002	[-0.001]	(-0.22)
CEO 60	0.079^a	[0.026]	(3.26)	0.071^a	[0.024]	(3.65)
CEO Gender	0.020	[0.003]	(0.91)	-0.025	[-0.005]	(-0.82)
CEO MBA	-0.006	[-0.003]	(-0.58)	0.019^c	[0.009]	(1.69)
CEO Ivyplus	-0.014	[-0.006]	(-1.21)	-0.017	[-0.007]	(-1.53)
CEO Internal	-0.007	[-0.003]	(-0.63)	-0.012	[-0.006]	(-1.13)
CEO Connectedness	0.005^c	[0.008]	(1.69)	0.001	[0.002]	(0.41)
Event Year Dummies		Yes			Yes	
	Y2 = Prof Overlap Director Appointment					
	(1) Retired			(2) Forced		
NonOverlap Rep	0.051^a	[0.024]	(3.59)	0.042^a	[0.019]	(4.37)
Lag Prof App	0.007	[0.002]	(0.44)	0.039^b	[0.009]	(2.11)
Lag NonProf App	0.017	[0.006]	(1.13)	0.005	[0.002]	(0.50)
Lag NonOverlap Rep	0.001	[0.000]	(0.06)	-0.004	[-0.002]	(-0.58)
Firm Size	0.004	[0.008]	(1.44)	0.005^b	[0.010]	(2.27)
Firm Return	0.025^b	[0.010]	(2.21)	0.000	[0.000]	(0.02)
Industry Return	-0.034	[-0.005]	(-1.22)	-0.008	[-0.001]	(-0.41)
Board Size	-0.003^c	[-0.009]	(-1.72)	-0.002	[-0.005]	(-1.32)
Frac_SD	-0.066	[-0.007]	(-1.40)	-0.083^c	[-0.007]	(-1.95)
Frac_Prof	0.153^a	[0.032]	(7.08)	0.117^a	[0.023]	(7.74)
Frac_NonProf	0.013	[0.002]	(0.53)	-0.014	[-0.003]	(-0.80)
Average Busyness	-0.008	[-0.004]	(-0.88)	-0.004	[-0.002]	(-0.54)
CEO Age	0.000	[0.001]	(0.22)	-0.000	[-0.000]	(-0.04)
CEO Gender	0.022	[0.003]	(1.37)	0.021^b	[0.004]	(1.97)
CEO MBA	0.000	[0.000]	(0.01)	-0.005	[-0.002]	(-0.70)
CEO Ivyplus	0.010	[0.004]	(0.93)	0.002	[0.001]	(0.23)
CEO Internal	-0.004	[-0.002]	(-0.39)	-0.007	[-0.003]	(-0.98)
CEO Connectedness	0.003	[0.006]	(1.51)	0.004^b	[0.007]	(2.37)
Event Year 1	0.003	[0.001]	(0.22)	0.022	[0.009]	(1.41)
Event Year 2	-0.000	[-0.000]	(-0.01)	0.003	[0.001]	(0.21)
Event Year 3	-0.014	[-0.005]	(-1.15)	0.013	[0.005]	(0.81)
Event Year 4	0.003	[0.001]	(0.18)	0.002	[0.001]	(0.15)
Event Year 5	-0.014	[-0.005]	(-1.16)	0.006	[0.002]	(0.40)
Observations	1,507			3,064		
Log pseudolikelihood	-535.02			-1,371.73		
Wald test of $\rho = 0$	0.213			0.561		

Table 30: BIPROBIT NonProf Overlap Director Appointment Models: Retired vs. Forced

This table presents the estimated results of BIPROBIT NonProf Overlap director appointment models, as specified in Equation 9-10. The 2003 sample is split into two sub-samples based on whether the prior CEO departed at the age older than 62. The standard errors are allowed to be clustered at firm level. Panel (a) reports estimated coefficients. Panel (b) reports estimated marginal effects. z statistics are in parentheses; Standardized marginal effects are in square brackets; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively.

(a) **BIPROBIT NonProf Overlap Director Appointment Models Coefficients**

Y1 = CEO Replacement				
	(1) Retired		(2) Forced	
Firm Size	-0.097^{b}	(-2.47)	-0.018	(-0.77)
Firm Return	-0.315^{c}	(-1.65)	-0.339^{a}	(-3.80)
Industry Return	0.458	(1.05)	0.301	(1.27)
Board Size	0.027	(1.00)	0.007	(0.40)
Frac_SD	0.274	(0.46)	-0.812^{b}	(-2.01)
Frac_Prof	-0.619^{c}	(-1.67)	-0.420^{c}	(-1.94)
Frac_NonProf	-0.348	(-1.10)	0.066	(0.41)
Average Busyness	0.122	(0.92)	-0.018	(-0.23)
CEO 60	0.611^{a}	(4.35)	0.400^{a}	(4.37)
CEO Gender	0.295	(0.70)	-0.153	(-0.88)
CEO MBA	-0.068	(-0.52)	0.127^{c}	(1.72)
CEO Ivyplus	-0.179	(-1.19)	-0.122	(-1.47)
CEO Internal	-0.083	(-0.65)	-0.080	(-1.13)
CEO Connectedness	0.060^{c}	(1.73)	0.009	(0.41)
Event Year Dummies	Yes		Yes	

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Table 30

Table 30(a) – **continued from previous page**

Y2 = NonProf Overlap Director Appointment				
	(1) Retired		(2) Forced	
NonOverlap Rep	0.529[a]	(5.37)	0.485[a]	(7.45)
Lag Prof App	0.003	(0.01)	0.165	(1.33)
Lag NonProf App	-0.112	(-0.81)	-0.077	(-0.88)
Lag NonOverlap Rep	0.040	(0.41)	0.152[b]	(2.28)
Firm Size	0.062[b]	(2.15)	0.027	(1.24)
Firm Return	-0.058	(-0.53)	0.082	(1.31)
Industry Return	-0.077	(-0.28)	-0.213	(-1.02)
Board Size	-0.056[a]	(-2.71)	-0.033[c]	(-1.77)
Frac_SD	-0.575	(-1.19)	-0.613	(-1.63)
Frac_Prof	0.203	(0.79)	0.083	(0.46)
Frac_NonProf	2.214[a]	(8.71)	1.580[a]	(10.49)
Average Busyness	0.080	(0.83)	-0.004	(-0.06)
CEO Age	0.001	(0.19)	-0.007	(-1.46)
CEO Gender	0.565[c]	(1.66)	-0.043	(-0.29)
CEO MBA	0.041	(0.45)	0.029	(0.43)
CEO Ivyplus	-0.038	(-0.37)	0.232[a]	(3.37)
CEO Internal	-0.152[c]	(-1.74)	0.100	(1.59)
CEO Connectedness	0.026	(0.98)	0.001	(0.07)
Event Year 1	0.382[b]	(2.30)	0.167	(1.47)
Event Year 2	0.343[b]	(2.04)	0.067	(0.57)
Event Year 3	0.459[a]	(2.76)	0.060	(0.49)
Event Year 4	0.429[b]	(2.56)	-0.032	(-0.25)
Event Year 5	0.349[c]	(1.92)	-0.201	(-1.49)
Observations	1,507		3,064	
Log pseudolikelihood	-854.90		-2,014.37	
Wald test of $\rho = 0$	0.264		0.165	

Table 30

(c) **BIPROBIT NonProf Overlap Director Appointment Models Marginal Effects**

Y1 = CEO Replacement						
	(1) Retired			(2) Forced		
Firm Size	-0.008[b]	[-0.017]	(-2.48)	-0.003	[-0.005]	(-0.77)
Firm Return	-0.027[c]	[-0.010]	(-1.67)	-0.049[a]	[-0.023]	(-3.86)
Industry Return	0.039	[0.006]	(1.06)	0.044	[0.007]	(1.27)
Board Size	0.002	[0.006]	(0.99)	0.001	[0.003]	(0.40)
Frac_SD	0.023	[0.002]	(0.46)	-0.118[b]	[-0.010]	(-2.01)
Frac_Prof	-0.053[c]	[-0.011]	(-1.71)	-0.061[c]	[-0.012]	(-1.95)
Frac_NonProf	-0.030	[-0.006]	(-1.11)	0.010	[0.002]	(0.41)
Average Busyness	0.010	[0.005]	(0.92)	-0.003	[-0.001]	(-0.23)
CEO 60	0.078[a]	[0.025]	(3.24)	0.072[a]	[0.024]	(3.66)
CEO Gender	0.020	[0.003]	(0.92)	-0.024	[-0.005]	(-0.80)
CEO MBA	-0.006	[-0.003]	(-0.53)	0.019[c]	[0.009]	(1.68)
CEO Ivyplus	-0.014	[-0.006]	(-1.28)	-0.017	[-0.007]	(-1.54)
CEO Internal	-0.007	[-0.003]	(-0.64)	-0.012	[-0.006]	(-1.13)
CEO Connectedness	0.005[c]	[0.008]	(1.74)	0.001	[0.002]	(0.41)
Event Year Dummies		Yes			Yes	
Y2 = NonProf Overlap Director Appointment						
	(1) Retired			(2) Forced		
NonOverlap Rep	0.121[a]	[0.057]	(5.12)	0.111[a]	[0.052]	(6.97)
Lag Prof App	0.001	[0.000]	(0.01)	0.037	[0.009]	(1.23)
Lag NonProf App	-0.022	[-0.008]	(-0.86)	-0.016	[-0.005]	(-0.91)
Lag NonOverlap Rep	0.008	[0.004]	(0.41)	0.033[b]	[0.015]	(2.19)
Firm Size	0.013[b]	[0.027]	(2.21)	0.005	[0.011]	(1.22)
Firm Return	-0.011	[-0.004]	(-0.48)	0.016	[0.007]	(1.21)
Industry Return	-0.018	[-0.003]	(-0.31)	-0.043	[-0.007]	(-0.99)
Board Size	-0.012[a]	[-0.032]	(-2.74)	-0.007[c]	[-0.017]	(-1.77)
Frac_SD	-0.120	[-0.012]	(-1.21)	-0.130[c]	[-0.011]	(-1.67)
Frac_Prof	0.044	[0.009]	(0.84)	0.016	[0.003]	(0.42)
Frac_NonProf	0.461[a]	[0.086]	(9.00)	0.328[a]	[0.070]	(10.48)
Average Busyness	0.016	[0.008]	(0.80)	-0.001	[-0.000]	(-0.07)
CEO Age	0.000	[0.002]	(0.19)	-0.001	[-0.010]	(-1.46)
CEO Gender	0.084[b]	[0.013]	(2.48)	-0.010	[-0.002]	(-0.30)
CEO MBA	0.009	[0.004]	(0.46)	0.007	[0.003]	(0.46)
CEO Ivyplus	-0.007	[-0.003]	(-0.35)	0.051[a]	[0.022]	(3.17)
CEO Internal	-0.032[c]	[-0.015]	(-1.70)	0.021	[0.010]	(1.57)
CEO Connectedness	0.005	[0.008]	(0.93)	0.000	[0.001]	(0.08)
Event Year 1	0.090[b]	[0.038]	(2.10)	0.037	[0.016]	(1.43)
Event Year 2	0.080[c]	[0.032]	(1.86)	0.015	[0.006]	(0.60)
Event Year 3	0.113[b]	[0.043]	(2.43)	0.013	[0.005]	(0.49)
Event Year 4	0.105[b]	[0.038]	(2.23)	-0.006	[-0.002]	(-0.21)
Event Year 5	0.083[c]	[0.028]	(1.69)	-0.037	[-0.012]	(-1.56)
Observations	1,507			3,064		
Log pseudolikelihood	-854.90			-2,014.37		
Wald test of $\rho = 0$	0.264			0.165		

Table 31: **Nomination Committee Trends**

This table presents trends in the existence and composition of nomination committee for both the 2003 and the 2000 sample. Panel (a) and (c) present the number and proportion of firms with nomination committee by fiscal year. Panel (b) and (d) present the proportion of nomination committee members who have connections to the CEO.

(a) **Existence of Nomination Committee - 2003 Sample**

		(1)	
	0	1	Total
2004	337	1,479	1,816
	18.56%	81.44%	100.00%
2005	346	1,537	1,883
	18.37	81.63	100.00
2006	342	1,574	1,916
	17.85	82.15	100.00
2007	543	1,290	1,833
	29.62	70.38	100.00
Total	1,568	5,880	7,448
	21.05	78.95	100.00

(b) **Connected Nomination Committee Members - 2003 Sample**

	Frac_Prof	Frac_NonProf	Frac_Any
2004	0.02%	0.02%	0.06%
2005	0.03	0.03	0.06
2006	0.02	0.02	0.06
2007	0.03	0.03	0.05
Total	0.03	0.03	0.06
Observations	5,880		

Table 31

(c) **Existence of Nomination Committee - 2000 Sample**

	(1)		
	0	1	Total
2001	174	641	815
	21.35%	78.65%	100.00%
2002	206	795	1,001
	20.58	79.42	100.00
2003	323	702	1,025
	31.51	68.49	100.00
2004	197	811	1,008
	19.54	80.46	100.00
2005	161	709	870
	18.51	81.49	100.00
2006	151	614	765
	19.74	80.26	100.00
2007	198	447	645
	30.70	69.30	100.00
Total	1,410	4,719	6,129
	23.01	76.99	100.00

(d) **Connected Nomination Committee Members - 2000 Sample**

	Frac_Prof	Frac_NonProf	Frac_Any
2001	0.02%	0.02%	0.05%
2002	0.02	0.02	0.05
2003	0.02	0.02	0.04
2004	0.02	0.02	0.05
2005	0.02	0.02	0.05
2006	0.02	0.02	0.04
2007	0.02	0.02	0.04
Total	0.02	0.02	0.04
Observations	4,719		

Table 31: Robustness BIPROBIT Director Replacement Models Coefficients

This table presents the estimated coefficients of BIPROBIT director replacement models. z statistics are in parentheses; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Regression (1) uses the 2003 sample with industry dummies. Regression (2) uses the 2000 sample without industry dummies. Regression (3) uses the 2000 sample with industry dummies.

Y1 = CEO Replacement	(1)		(2)		(3)	
Firm Size	-0.051^a	(-2.97)	-0.010	(-0.49)	0.004	(0.19)
Firm Return	-0.294^a	(-5.57)	-0.388^a	(-5.33)	-0.386^a	(-5.42)
Industry Return	0.314^b	(2.27)	0.316^a	(2.82)	0.382^a	(3.43)
Board Size	0.033^b	(2.49)	0.007	(0.63)	0.012	(1.12)
Frac_SD	-0.484^b	(-1.98)	-1.041^a	(-4.14)	-1.028^a	(-3.94)
Frac_Prof	-0.179^c	(-1.67)	-0.150	(-1.18)	-0.067	(-0.51)
Frac_NonProf	-0.032	(-0.30)	-0.133	(-0.97)	-0.107	(-0.76)
Average Busyness	0.093^c	(1.74)	0.082	(1.51)	0.059	(0.97)
CEO 60	0.519^a	(9.81)	0.642^a	(11.33)	0.650^a	(11.31)
CEO Gender	0.010	(0.09)	-0.080	(-0.56)	-0.055	(-0.39)
CEO MBA	0.006	(0.11)	-0.021	(-0.40)	-0.021	(-0.40)
CEO Ivyplus	-0.027	(-0.50)	-0.065	(-1.21)	-0.066	(-1.21)
CEO Internal	-0.025	(-0.54)	-0.149^a	(-2.92)	-0.143^a	(-2.80)
CEO Connectedness	0.029^b	(2.04)	-0.002	(-0.18)	-0.006	(-0.44)
Event Year Dummies	Yes		Yes		Yes	
Industry Dummies	Yes		No		Yes	

Continue on next page

Table 31

Table 31(a) – **continued from previous page**

	Y2 = Director Replacement					
	(1)		(2)		(3)	
Firm Size	-0.027[a]	(-3.71)	-0.012	(-1.49)	-0.011	(-1.22)
Firm Return	-0.021	(-0.91)	0.021	(0.89)	0.021	(0.87)
Industry Return	0.291[a]	(4.86)	-0.060	(-1.32)	-0.040	(-0.89)
Board Size	0.031[a]	(5.70)	0.022[a]	(4.25)	0.025[a]	(4.62)
Frac_SD	0.664[a]	(5.02)	0.469[a]	(3.68)	0.495[a]	(3.87)
CEO Age	0.001	(0.86)	0.004[b]	(2.02)	0.005[b]	(2.44)
CEO MBA	-0.023	(-1.03)	-0.004	(-0.17)	0.001	(0.03)
CEO Ivyplus	-0.017	(-0.71)	-0.009	(-0.39)	-0.005	(-0.20)
CEO Internal	-0.084[a]	(-3.95)	-0.095[a]	(-4.27)	-0.088[a]	(-3.96)
CEO Connectedness	0.010	(1.53)	0.012[b]	(2.17)	0.010[c]	(1.81)
Director Yrs on Brd	0.012[a]	(9.31)	0.009[a]	(6.97)	0.010[a]	(7.06)
Director Busyness	-0.031[b]	(-2.41)	-0.043[a]	(-3.62)	-0.044[a]	(-3.67)
Director MBA	-0.007	(-0.37)	-0.043[b]	(-2.15)	-0.041[b]	(-2.07)
Director Ivyplus	0.036[c]	(1.89)	-0.012	(-0.62)	-0.019	(-0.96)
Director Connectedness	0.008[b]	(2.44)	0.006[b]	(2.18)	0.006[b]	(1.99)
Same Gender	0.020	(0.78)	0.042[c]	(1.70)	0.035	(1.43)
Age Difference	0.017[a]	(12.81)	0.023[a]	(14.45)	0.023[a]	(14.64)
Prof Overlap	-0.069[a]	(-2.72)	-0.049[c]	(-1.76)	-0.042	(-1.48)
NonProf Overlap	0.050[a]	(2.62)	-0.001	(-0.02)	0.000	(0.02)
Event Year 1	0.136[a]	(4.09)	0.113[a]	(3.28)	0.115[a]	(3.32)
Event Year 2	0.011	(0.32)	0.029	(0.85)	0.031	(0.91)
Event Year 3	-0.008	(-0.23)	0.003	(0.08)	0.006	(0.17)
Event Year 4	-0.008	(-0.23)	0.012	(0.33)	0.015	(0.40)
Event Year 5	-0.024	(-0.72)	0.005	(0.13)	0.005	(0.15)
Industry Dummies	Yes		No		Yes	
Observations	52,820		48,699		48,699	
Log pseudolikelihood	-32,463.40		-29,225.70		-29,110.04	
Wald test of $\rho = 0$	0.081		0.000		0.000	

Table 32: BIPROBIT Director Appointment Models Coefficients

This table presents the estimated coefficients of BIPROBIT director appointment models. z statistics are in parentheses; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Regression (1) uses the 2003 sample with industry dummies. Regression (2) uses the 2000 sample without industry dummies. Regression (3) uses the 2000 sample with industry dummies.

	Y1 = CEO Replacement					
	(1)		(2)		(3)	
Firm Size	-0.073^{a}	(-3.77)	-0.011	(-0.47)	0.004	(0.18)
Firm Return	-0.329^{a}	(-4.71)	-0.254^{a}	(-2.69)	-0.264^{a}	(-2.79)
Industry Return	0.400^{b}	(2.18)	0.229	(1.50)	0.276^{c}	(1.78)
Board Size	0.022^{c}	(1.74)	-0.000	(-0.01)	0.000	(0.02)
Frac_SD	-0.283	(-1.03)	-0.386	(-1.23)	-0.322	(-1.00)
Frac_Prof	-0.278^{b}	(-2.00)	-0.236	(-1.52)	-0.166	(-1.01)
Frac_NonProf	0.006	(0.05)	0.027	(0.16)	0.041	(0.25)
Average Busyness	0.066	(1.10)	-0.001	(-0.02)	-0.009	(-0.13)
CEO 60	0.420^{a}	(6.52)	0.501^{a}	(6.90)	0.507^{a}	(6.91)
CEO Gender	-0.027	(-0.19)	-0.113	(-0.66)	-0.072	(-0.42)
CEO MBA	0.022	(0.39)	0.036	(0.57)	0.039	(0.60)
CEO Ivyplus	-0.029	(-0.46)	-0.145^{b}	(-2.06)	-0.134^{c}	(-1.87)
CEO Internal	0.024	(0.45)	-0.078	(-1.22)	-0.080	(-1.24)
CEO Connectedness	0.034^{c}	(1.95)	0.012	(0.68)	0.009	(0.53)
Event Year Dummies	Yes		Yes		Yes	
Industry Dummies	Yes		No		Yes	
	Y2 = Director Appointment					
	(1)		(2)		(3)	
Replacement	1.040^{a}	(27.71)	0.924^{a}	(22.23)	0.929^{a}	(22.28)
Lag App	-0.211^{a}	(-5.57)	-0.190^{a}	(-4.69)	-0.195^{a}	(-4.78)
Lag Rep	0.306^{a}	(8.04)	0.260^{a}	(6.34)	0.264^{a}	(6.41)
Firm Size	0.126^{a}	(9.24)	0.114^{a}	(7.01)	0.116^{a}	(6.61)
Firm Return	0.083^{b}	(2.00)	0.054	(1.10)	0.055	(1.11)
Industry Return	0.067	(0.53)	0.013	(0.14)	-0.007	(-0.07)
Board Size	-0.076^{a}	(-7.66)	-0.074^{a}	(-7.45)	-0.076^{a}	(-7.43)
Frac_SD	-0.536^{a}	(-2.63)	-0.606^{a}	(-2.81)	-0.604^{a}	(-2.80)
Frac_Prof	-0.084	(-0.96)	-0.119	(-1.13)	-0.111	(-0.98)
Frac_NonProf	-0.152^{c}	(-1.75)	-0.165	(-1.55)	-0.174	(-1.61)
Average Busyness	0.037	(0.89)	0.066	(1.57)	0.068	(1.54)
CEO Age	-0.002	(-1.00)	-0.001	(-0.41)	-0.001	(-0.40)
CEO Gender	0.028	(0.30)	-0.019	(-0.17)	0.008	(0.07)
CEO MBA	-0.046	(-1.15)	-0.009	(-0.22)	-0.017	(-0.39)
CEO Ivyplus	0.071^{c}	(1.68)	-0.031	(-0.72)	-0.024	(-0.55)
CEO Internal	-0.012	(-0.33)	-0.038	(-0.96)	-0.040	(-0.98)
CEO Connectedness	0.011	(0.94)	-0.006	(-0.57)	-0.006	(-0.51)
Event Year 1	0.165^{a}	(2.65)	0.152^{b}	(2.19)	0.151^{b}	(2.16)
Event Year 2	0.093	(1.52)	0.151^{b}	(2.22)	0.151^{b}	(2.22)
Event Year 3	0.019	(0.30)	0.060	(0.88)	0.059	(0.86)
Event Year 4	0.024	(0.39)	0.108	(1.58)	0.108	(1.57)
Event Year 5	-0.081	(-1.23)	-0.077	(-1.06)	-0.080	(-1.10)
Industry Dummies	Yes		No		Yes	
Observations	6,008		4,861		4,861	
Log pseudolikelihood	-5,035.71		-4,059.43		-4,043.45	
Wald test of $\rho = 0$	0.005		0.000		0.000	

Table 33: BIPROBIT Prof Overlap Director Appointment Models Coefficients

This table presents the estimated coefficients of BIPROBIT Prof Overlap director appointment models. z statistics are in parentheses; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Regression (1) uses the 2003 sample with industry dummies. Regression (2) uses the 2000 sample without industry dummies. Regression (3) uses the 2000 sample with industry dummies.

	Y1 = CEO Replacement					
	(1)		(2)		(3)	
Firm Size	-0.073^{a}	(-3.78)	-0.011	(-0.47)	0.004	(0.15)
Firm Return	-0.329^{a}	(-4.69)	-0.248^{a}	(-2.62)	-0.257^{a}	(-2.72)
Industry Return	0.400^{b}	(2.18)	0.219	(1.43)	0.263^{c}	(1.70)
Board Size	0.022^{c}	(1.77)	-0.001	(-0.05)	0.000	(0.00)
Frac_SD	-0.272	(-1.00)	-0.381	(-1.21)	-0.315	(-0.98)
Frac_Prof	-0.287^{b}	(-2.06)	-0.235	(-1.52)	-0.170	(-1.03)
Frac_NonProf	0.005	(0.04)	0.024	(0.15)	0.037	(0.23)
Average Busyness	0.067	(1.12)	0.000	(0.01)	-0.005	(-0.08)
CEO 60	0.422^{a}	(6.56)	0.509^{a}	(7.01)	0.516^{a}	(7.01)
CEO Gender	-0.030	(-0.21)	-0.099	(-0.58)	-0.059	(-0.34)
CEO MBA	0.022	(0.38)	0.037	(0.58)	0.040	(0.62)
CEO Ivyplus	-0.030	(-0.47)	-0.142^{b}	(-2.03)	-0.133^{c}	(-1.86)
CEO Internal	0.024	(0.44)	-0.076	(-1.19)	-0.078	(-1.21)
CEO Connectedness	0.034^{b}	(1.97)	0.012	(0.72)	0.009	(0.56)
Event Year Dummies	Yes		Yes		Yes	
Industry Dummies	Yes		No		Yes	

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Table 33

Table 33(a) – **continued from previous page**

Y2 = Prof Overlap Director Appointment						
	(1)		(2)		(3)	
NonOverlap Rep	0.498[a]	(7.24)	0.424[a]	(5.88)	0.430[a]	(5.94)
Lag Prof App	0.281[a]	(2.99)	0.243[b]	(2.26)	0.237[b]	(2.22)
Lag NonProf App	0.041	(0.44)	0.093	(0.96)	0.088	(0.92)
Lag NonOverlap Rep	0.001	(0.01)	-0.004	(-0.06)	-0.008	(-0.11)
Firm Size	0.034	(1.56)	0.060[b]	(2.13)	0.037	(1.22)
Firm Return	0.078	(1.07)	0.142[c]	(1.81)	0.133[c]	(1.67)
Industry Return	-0.157	(-0.74)	-0.160	(-1.01)	-0.193	(-1.20)
Board Size	-0.032[b]	(-2.15)	-0.045[b]	(-2.52)	-0.045[b]	(-2.55)
Frac_SD	-0.843[b]	(-2.27)	-0.586	(-1.47)	-0.582	(-1.44)
Frac_Prof	1.537[a]	(11.31)	1.924[a]	(11.66)	1.864[a]	(10.97)
Frac_NonProf	-0.054	(-0.33)	-0.087	(-0.43)	-0.128	(-0.63)
Average Busyness	0.048	(0.73)	0.031	(0.46)	0.090	(1.28)
CEO Age	-0.006	(-1.30)	-0.001	(-0.14)	0.001	(0.13)
CEO Gender	0.197	(0.96)	0.167	(0.79)	0.137	(0.64)
CEO MBA	-0.026	(-0.39)	0.047	(0.69)	0.066	(0.95)
CEO Ivyplus	0.021	(0.29)	-0.008	(-0.10)	-0.007	(-0.09)
CEO Internal	0.028	(0.41)	-0.037	(-0.52)	-0.027	(-0.38)
CEO Connectedness	0.066[a]	(3.93)	0.049[a]	(3.00)	0.052[a]	(3.11)
Event Year 1	0.185[c]	(1.87)	0.219[c]	(1.86)	0.231[c]	(1.95)
Event Year 2	-0.003	(-0.03)	0.129	(1.10)	0.134	(1.14)
Event Year 3	-0.108	(-1.02)	0.008	(0.07)	0.014	(0.12)
Event Year 4	-0.109	(-1.01)	-0.023	(-0.20)	-0.014	(-0.12)
Event Year 5	-0.137	(-1.27)	-0.031	(-0.26)	-0.027	(-0.23)
Industry Dummies	Yes		No		Yes	
Observations	6,008		4,861		4,861	
Log pseudolikelihood	-2,512.97		-1,957.76		-1,940.51	
Wald test of $\rho = 0$	0.923		0.327		0.353	

Table 34: BIPROBIT NonProf Overlap Director Appointment Models Coefficients

This table presents the estimated coefficients of BIPROBIT NonProf director appointment models. z statistics are in parentheses; Superscripts a, b, and c denote statistical significance at the 1%, 5%, and 10% levels, respectively. Regression (1) uses the 2003 sample with industry dummies. Regression (2) uses the 2000 sample without industry dummies. Regression (3) uses the 2000 sample with industry dummies.

	Y1 = CEO Replacement					
	(1)		(2)		(3)	
Firm Size	-0.074^a	(-3.80)	-0.012	(-0.52)	0.002	(0.09)
Firm Return	-0.329^a	(-4.70)	-0.251^a	(-2.66)	-0.262^a	(-2.76)
Industry Return	0.402^b	(2.19)	0.224	(1.46)	0.268^c	(1.74)
Board Size	0.022^c	(1.77)	0.000	(0.00)	0.001	(0.05)
Frac_SD	-0.275	(-1.00)	-0.385	(-1.23)	-0.319	(-0.99)
Frac_Prof	-0.287^b	(-2.06)	-0.234	(-1.51)	-0.167	(-1.01)
Frac_NonProf	0.007	(0.06)	0.030	(0.18)	0.043	(0.26)
Average Busyness	0.068	(1.13)	-0.001	(-0.01)	-0.006	(-0.09)
CEO 60	0.423^a	(6.57)	0.508^a	(7.03)	0.516^a	(7.03)
CEO Gender	-0.027	(-0.20)	-0.098	(-0.57)	-0.057	(-0.33)
CEO MBA	0.022	(0.38)	0.035	(0.55)	0.038	(0.59)
CEO Ivyplus	-0.030	(-0.48)	-0.145^b	(-2.07)	-0.136^c	(-1.90)
CEO Internal	0.024	(0.44)	-0.078	(-1.23)	-0.080	(-1.25)
CEO Connectedness	0.034^c	(1.95)	0.012	(0.74)	0.010	(0.58)
Event Year Dummies	Yes		Yes		Yes	
Industry Dummies	Yes		No		Yes	

Continue on next page

Table 34

Table 34(a) – **continued from previous page**

Y2 = NonProf Overlap Director Appointment						
	(1)		(2)		(3)	
NonOverlap Rep	0.533^a	(10.76)	0.454^a	(8.63)	0.460^a	(8.77)
Lag Prof App	0.098	(1.09)	-0.050	(-0.51)	-0.049	(-0.51)
Lag NonProf App	-0.046	(-0.73)	0.023	(0.31)	0.013	(0.18)
Lag NonOverlap Rep	0.071	(1.43)	0.109^b	(2.04)	0.110^b	(2.05)
Firm Size	0.035^b	(2.12)	0.054^a	(2.78)	0.050^b	(2.36)
Firm Return	0.053	(1.11)	0.092	(1.59)	0.099^c	(1.69)
Industry Return	-0.087	(-0.55)	0.011	(0.10)	0.007	(0.06)
Board Size	-0.024^c	(-1.95)	-0.013	(-1.10)	-0.012	(-0.98)
Frac_SD	-0.838^a	(-3.21)	-0.720^b	(-2.50)	-0.815^a	(-2.77)
Frac_Prof	0.089	(0.75)	0.204	(1.56)	0.203	(1.45)
Frac_NonProf	1.796^a	(16.27)	1.987^a	(14.14)	1.982^a	(13.97)
Average Busyness	0.011	(0.20)	0.000	(0.01)	-0.002	(-0.03)
CEO Age	-0.005	(-1.60)	-0.005	(-1.34)	-0.005	(-1.31)
CEO Gender	0.139	(1.09)	0.141	(0.88)	0.149	(0.92)
CEO MBA	0.047	(0.99)	0.065	(1.27)	0.060	(1.18)
CEO Ivyplus	0.147^a	(2.99)	0.054	(1.02)	0.053	(1.00)
CEO Internal	0.044	(0.97)	-0.029	(-0.55)	-0.036	(-0.68)
CEO Connectedness	0.009	(0.62)	0.008	(0.57)	0.007	(0.48)
Event Year 1	0.167^b	(2.24)	0.123	(1.40)	0.122	(1.39)
Event Year 2	0.104	(1.38)	0.158^c	(1.85)	0.157^c	(1.84)
Event Year 3	0.084	(1.10)	0.075	(0.87)	0.073	(0.84)
Event Year 4	0.017	(0.21)	0.071	(0.82)	0.071	(0.81)
Event Year 5	-0.082	(-1.01)	-0.098	(-1.06)	-0.097	(-1.05)
Industry Dummies	Yes		No		Yes	
Observations	6,008		4,861		4,861	
Log pseudolikelihood	-3,690.99		-2,844.29		-2,829.74	
Wald test of $\rho = 0$	0.145		0.033		0.036	

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