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Director Networks and Firm Governance

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ABSTRACT

In this paper we show that firms whose directors have tied social networks among the corporate elite exhibit weaker firm governance. Using data on 25,621 unique directors who served on the boards of S&P 1,500 firms between the years 1996-2004, we map the entire social network of directors, and generate different measures that account for each director's importance in the network. We find strong evidence that in firms that have more connected directors, i.e., whose directors are more central in the network, CEO pay is higher, CEO pay is less sensitive to firm performance, CEO turnover is less sensitive to firm performance, and forced CEO turnover is less likely to occur. Moreover, well-connected directors are more likely to be awarded more directorships in the future. These results continue to hold when looking only at the connectedness level of independent directors. Our results suggest that social networks among directors affect firm governance and that these social connections are an important board characteristic.

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In view of the major recent corporate governance scandals, which led to the 2002 Sarbanes-Oxley Act, in the past few years there has been a resurgence of interest both in the popular press and the academic literature on the way firms are governed. At the same time, considerable interest has emerged in the economic and finance literatures on the importance of social connections and their economic impact. Many of these studies explore the economic value of being part of a social network and find that belonging to a social network has an impact on employment, investment decisions, and even quality of life.[1]

This paper focuses on the intersection of social connections and firm governance. We begin by mapping the entire network of directors of the S&P 1,500 firms between 1996 and 2004 in order to explore the economic impact such connections may have on firm governance. We then ask whether membership in a tight social network impacts directors' decision-making and affects their ability to perform their governance duty well. Specifically, we inquire whether firms' decisions with respect to CEO compensation, CEO pay-performance sensitivity, and CEO turnover are affected by how connected the firm's directors are. Furthermore, we test whether the effects of networks associated with insiders and outsiders have different implications on firm governance.

In order to proxy for directors' social connections, we employ methods from social network analysis similar to those used by Hochberg et al. (2007) and Kuhnen (2005) and construct a measure that captures the various dimensions of connectivity. This measure captures how well-connected a director is and the quality and predominance of each director's connections in the network.

Our main result is that firms whose directors are better connected and whose connections are with better connected directors exhibit weaker firm governance. In particular, in firms where members of the board are highly connected, CEO pay is

[1]See for example Duflo and Saez (2003), Ioannides, and Loury (2004), Bayer, Ross, and Topa (2005) and Costa and Kahn (2006).

higher, CEO pay is less sensitive to firm performance, and poorly performing CEOs are less likely to be fired. These results continue to hold when we look only at the connectivity level of independent directors. Additionally, we find that these well-connected directors are more likely to be awarded additional directorships in the future. Our results suggest that social networks among directors affect firm governance and that these social connections are an important board characteristic.

Theoretically, the board of directors is the highest authority in governing the firm.[2] This power held by the board highlights the importance of understanding how decisions are made at the board level and whether board characteristics are relevant to its decisions. Our approach of applying measures of social networks to analyze boards of directors emerges from two main motives.

First, boards of large firms are populated by a fairly homogenous group of directors, most of whom are associated with firm executives either by working with them directly or by interacting with them in various professional or social contexts. Arguably, these individuals are among the more qualified for a position on a board, as they know the inner workings of such firms and they personally know many of the firms' executives. However, paradoxically, this can also create what social science researchers define as *"... a cohesive 'inner circle' of organizational elites accountable only to themselves"* (Useem (1984)). There is a lot of evidence about the benefits that one can have from belonging to a social group or a club. Alumni, for example, tend to help each other in finding jobs or investment opportunities. They do so not because they hope to receive something in return from the person they help. Similarly, directors who belong to an exclusive group of corporate elite can benefit from such association. This sense of exclusivity and the potential benefit from these connections can make directors feel highly committed to their network. This raises the question of whether a director who feels highly committed to a group of people but at the same time is supposed to govern individuals from this group, may, on the

[2]See, for example, Kole (1997) or the Delaware Corporate Law sec 141.

margin, be less critical of these individuals.

The challenge is to find a way to measure these social connections and interactions. Since there are no data available on which social club a director belongs to, we employ network measures specifically designed to evaluate how well-connected people are. These measures, which we explain in detail in Section 2.2, proxy for the immeasurable social functions such as parties, golfing, hunting, and so on that can have a large impact on the perceptions of board members and in turn on the decisions that these board members make.

Second, the methodology we employ in this study overcomes the limitation in observable characteristics of boards of directors. Unfortunately, we do not know much about board members themselves, even though they directly impact firms' decisions. Most academic research on boards uses available data such as the identity of board members, the size of the board, and the independence of individuals on the board. However, this information does not provide a full picture of what can potentially influence the decisions of board members, and in some cases results based on the latter characteristic can be limited as its definition is somewhat arbitrary. For example, Verizon Communications contributed hundreds of thousands of dollars to the National Urban League (NUL) while the NUL head was sitting on Verizon's board (Strauss (2002)). Had the NUL been a business partner, and not a non-profit, the director would have been defined as an insider. This example illustrates why it is important to identify various characteristics that describe what may motivate board members' decisions. Our approach contributes to the literature by using existing data, but extracting from it an alternative and complementary measure that is independent of subjective definitions.

Based on the argument that people who are connected through a social network tend to take care of each other, and that a director's network provides such a benefit, it follows that more connected directors will feel more committed to the network. Moreover, directors who are connected to better-connected directors will feel that they

have higher potential benefits from their association with the network. Therefore, we hypothesize that firms that have more connected directors exhibit weaker firm governance. We directly test this hypothesis by exploring four testable implications on the relation between firm connectivity and firm governance.

Our first testable hypothesis is that firms that have more connected directors pay their CEOs more. We find that, controlling for firm size, investment opportunities, industry, and observable CEO and board characteristics, firms that have more connected boards grant CEOs higher pay. Our results are statistically and economically significant. *Ceteris paribus*, a CEO of a firm that is in the top quintile of connected firms receives a salary and total compensation that are 11% and 13% higher, respectively, than those of a CEO of a firm that is in the bottom quintile of connected firms.

A potential concern in the above test is endogeneity, that is, our network measures may be capturing an unobserved board, firm, or CEO characteristic. In order to account for this possibility, we perform several robustness tests. First, we control for many board characteristics and alternative explanations that have been shown in the literature to have an impact on governance or CEO compensation. In particular, we control for independent boards (Mehran (1995), Core et al. (1999)), busy boards (Fich and Shivdasani (2006)), interlocked boards (Hallock (1997)), staggered boards (Bebchuk and Cohen (2005)), the Gompers, Ishii, and Metrick (2003) governance index, and the Bebchuk, Cohen, and Ferrell (2005) entrenchment index. Our results are robust to all of these alternative specifications. However, while these controls are important, they do not directly address the concern that our results may be driven by unobserved characteristics at the firm level or the CEO level. For example, it is possible that "good CEOs" attract both high pay and connected board members independently yet simultaneously. In order to account for this possibility we take several steps. First, we apply an instrumental-variables approach. We do this by estimating an instrumental variables version of the model. The instrument is a variable

that is related to the level of connectedness of the firm but does not affect the ability of the CEO directly. Second, we construct a proxy for "CEO ability" and incorporate it in the analysis. Lastly, in order to validate the robustness of our results we also perform our analysis using CEO fixed effects, firm fixed effects, between-effects and changes-on-changes analysis. All these alternative specifications yield essentially the same result: CEOs of companies that have a more connected board receive higher compensation.

Our second testable hypothesis is that in a well-governed firm, CEO pay should be closely tied to firm performance. There are two reasons for this to be the case. First, CEO pay-for-performance provides better alignment between the manager and the firm's shareholders. Second, it prevents situations in which the CEO is rewarded for "luck" as opposed to effort. Hence, our second hypothesis is that in firms that have more connected directors, CEO pay-performance sensitivity is lower. Following Jensen and Murphy (1990) and using the methodology suggested by Aggarwal and Samwick (1999), we find that CEO pay-performance sensitivity is lower in firms that have well-connected directors. We construct four different proxies to evaluate the sensitivity of pay to firm performance. These are the change in CEO firm-specific wealth, the change in CEO firm-specific wealth excluding options, the change in CEO stock value, and the change in CEO options value. With respect to all four proxies, we find that pay-performance sensitivity is significantly lower in well-connected firms.

These effects are also economically important. For example, with respect to the change in CEO firm-specific wealth, pay-performance sensitivity is \$6.24 per \$1,000 increase in shareholder return for a CEO in the top quintile of connected firms compared to \$7.89 per \$1,000 increase in shareholder return for a CEO of a firm that is in the bottom quintile of connected firms. Hence, pay-performance sensitivity of well connected CEOs is 21% lower than that of CEOs of firms whose boards are not well connected. This result highlights the fact that firms that have well-connected directors are less effective in aligning CEO pay with firm performance, an evidence

for poor governance.

Our third testable hypothesis is based on the theory that suggests that the board of directors should replace a CEO when a firm is performing poorly. Hence, given that this is the ultimate governance tool and the most costly one for the CEO, when a firm is poorly governed the board is much less likely to make such a decision. Indeed, Weisbach (1988) shows that CEO turnover decisions are related to the governance of the firm. We hypothesize, therefore, that when members of the board are well-connected, they are less capable of performing their governance duty well and therefore CEO turnover will be less sensitive to firm performance. Furthermore, we expect that in these well-connected firms, forced CEO turnover is less likely to occur.

While Kaplan and Minton (2007) show that in the last decade boards are getting better in performing their duty with respect to CEO turnover, we still find that even after controlling for firm characteristics and performance, CEOs of poorly performing firms are less likely to lose their job when their boards are highly connected. Furthermore, following the methodology suggested by Parrino (1997), we document those cases in which a CEO is forced out of the firm and find that the connectedness of the board is strongly and negatively correlated with these events. We find that a CEO in a firm that is in the top quintile of connected firms is 24.5% less likely to be fired that a CEO of a firm in the bottom quintile of connected firms.

These two findings with respect to CEO turnover highlight the fact that firm connectedness is an important firm characteristic that contributes to our understanding of governance decisions at the board level.

Fourth, as we discuss above, our main hypothesis is that we expect a friendly approach from a well-connected board towards management. While the board's attitude towards management captures one dimension of the story, the other dimension, which in some way is the mirror image of these expectations, is the attitude of management towards well-connected directors. If, indeed, connections affect the behavior of the board, they may also affect the behavior of the CEO. For example, when a CEO is

considering a candidate to be appointed as a new director on the board, it stands to reason that a higher priority will be given to nominees who are part of the exclusive milieu of corporate elites. Hence, we expect management to have a preference to appoint better-connected directors to the board.

We find that even after controlling for director characteristics, the probability of a connected director receiving one more director seat the following year is 68% higher than that of an unconnected board member (4.2% vs. 2.5%).

Previous studies examine other aspects of connections at the firm level that may affect a board's decisions. Agrawal and Knoeber (2001) explore how political connections of board members affect the likelihood of the firm receiving government contracts. Fich and Shivdasani (2006) find that boards that have "busy directors", those in which a majority of outside directors hold three or more directorships, have weaker governance. Hallock (1997) finds a positive correlation between CEO compensation and the fact that a firm has an interlocking relationship with another firm. Bizjak et al. (2007) find that interlocked boards play a significant role in the spread of the backdating of employee stock options. Frazzini et. al. (2007) explore connections between mutual fund managers and corporate board members via shared education networks. Larcker et al. (2006) analyze the "back door" distance between a CEO and the chair of her compensation committee and find that closer connections between the CEO and the chair of the compensation committee result in higher CEO compensation. Finally, Fich (2005) shows that firms prefer to appoint as new board members CEOs of other successful firms. Our study is conceptually different from these papers in the sense that it maps a board's entire network, as opposed to analyzing specific connections.

Our paper contributes to the literature by suggesting a mechanism that affects the governance of the firm. We show that a measurable characteristic of the board, the extent to which directors are connected, has a clear and direct impact on the decisions the board makes in a way that weakens the governance of the firm. Our

connectedness measure identifies a form of "friendliness" of the board, not because of any direct link between management and the board but more so because of a certain predisposition to be more "lenient" when board members are well-connected.

The remainder of the paper proceeds as follows. Section 1 presents our hypotheses. In Section 2 we describe the data and the construction of our different network measures. Section 3 presents our results on CEO compensation. Section 4 presents our results on CEO pay-performance sensitivity. Section 5 presents our results on CEO turnover. Section 6 investigates the impact of directors connections on their future additional appointments. Section 7 discusses potential alternative specifications of our measures and robustness tests. Lastly, Section 8 concludes.

1. Hypothesis Development

Many of the papers in the growing literature on the importance of social connections and their interaction with people's decisions focus on the economic value of being part of a social network. For example, Duflo and Saez (2003) show that social network effects within the workplace can play an important role in the decision to contribute to 401(k) retirement plans. Bayer, Ross, and Topa (2005) find that the fact that people live on the same block increases the probability of them working together by over 50%. In a survey paper, Ioannides and Loury (2004) discuss the importance of social networks for employment. Munshi (2003) analyzes networks of Mexican migrants to the U.S. and shows that preexisting social ties ensure that a new migrant receives various forms of assistance in finding jobs from members of the network who live in the migrant's place of destination in the U.S. There is also evidence that networks may be an important determinant of government program participation (Bertrand, Mullainathan, and Luttmer (2000) and Aizer and Currie (2004)). Social networks are also important in extreme situations. Costa and Kahn (2006), for example, show that at time of war those who have friends are more likely to survive. In the finance

literature, Hochberg et al. (2007) find that better-networked Venture Capital firms realize superior performance, as measured by the proportion of investments that are successfully exited through an IPO or a sale to another firm. In another paper, Kuhnen (2005) highlights the role of social connections in the mutual fund industry. From these findings stems a natural question: do similar network effects exist, among firms, or more specifically among directors, and do they have an impact on firm governance?

Boards of large firms are populated by a fairly homogenous group of directors, most of whom are associated with firm executives either by working with them directly or by interacting with them in various professional or social contexts. Kenneth Langone, for example, a board member at Home Depot who engineered the hiring of Robert Nardelli (now ex-CEO of Home Depot) was also the head of the compensation committee that approved Richard Grasso's extravagant payout at the New York Stock Exchange, and was on the General Electric compensation committee that approved Jack Welch's luxurious retirement package.

While board members like Kenneth Langone are arguably among the more qualified for a position on a board, as they know the inner workings of such firms, the fact that these directors tend to associate in the same professional and social milieus has been shown to create *"... a sociological anchor of the community of interest, the unification of outlooks and policy, that prevails among the propertied class"* (Mills (1956)). Hence, sitting on multiple boards provides a communication network for the managerial elite (Davis (1991), Mizruchi (1982)). It is therefore important to inquire whether the mere association of board members has an economic consequence for the firm by impacting the board's ability to perform its governance duty well.

There is an abundant evidence on the benefits that belonging to a social group or a club can have. Alumni, for example, tend to help each other in finding jobs or investment opportunities. Harvard Business School, for example, boasts: *"... more than 38,000 of our alumni have signed up to be a resource for students and are*

available to help you find connections, capital, and business opportunities throughout your career ... What all this means is that no matter your interest, you'll find an alum who can help you take the first steps toward or continue with your professional adventure."

Similarly, directors who belong to an exclusive group of corporate elites can benefit from such association in terms of, e.g. social status, material benefits, and future business opportunities. Hence, this sense of exclusivity and the potential benefit from these connections can make directors feel highly committed to their network. The result is that a director who feels highly committed to a group of people, but at the same time is supposed to govern individuals from this group, may be less critical towards these individuals on the margin. In other words, we argue that the claim that people who are connected through a communication channel tend to take care of each other is likely to extend to the board room, resulting in directors being more friendly towards each other and in turn towards management. Such a friendly disposition towards management may weaken the board's monitoring ability and hence, weaken the governance of the firm. This general hypothesis has four testable implications:

Hypothesis 1: Firms that have more connected directors pay their CEOs more. This hypothesis is the simplest and the most straightforward implication to follow from our main conjecture above. CEO pay is set by the board of directors and has a large discretionary component. Paying 10% more or less to a CEO is something that most shareholders probably wouldn't even notice. Hence, CEO pay is a natural experiment to test our main hypothesis that people who belong to the same social circle tend to take care of each other.

There is ample evidence that poor governance and weak monitoring result in higher pay for CEOs. For example, Core, Holthausen, and Larcker (1999) find that CEO compensation is higher when the board is large, and when more of the outside directors have been appointed by the CEO. Cyert, Kang, and Kumar (2002) show

that when the CEO is also the chairman of the board her pay is higher. Finally, Bertrand and Mullainathan (2001) find that CEOs in firms that lack a large external shareholder tend to receive more "luck-based" pay, pay that is generated entirely by external factors rather than by the manager's effort. This evidence suggests that if, indeed, the connectedness of board members has an impact on the governance of the firm, this effect is likely to materialize as an effect on CEO compensation.

Hypothesis 2: In firms that have more connected directors, CEO pay is less sensitive to firm performance.

In a well-governed firm, CEO pay should be closely tied to firm performance. There are two reasons for this to be the case. First, performance-based pay provides better alignment between the manger and the firm's shareholders. Second, it prevents situations in which the CEO is rewarded for "luck" as opposed to effort.

There is evidence that in firms that exhibit poor governance, CEO pay-performance sensitivity is lower. Hartzell and Starks (2003) show that the concentration of institutional ownership, which is a proxy for good monitoring, is positively associated with the pay-for-performance sensitivity of executive compensation. Along the same lines, Bertrand and Mullainathan (2001) find that CEO pay is less sensitive to firm performance in firms that lack a large external shareholder. Hence, another area in which one can detect the quality of the governance and oversight performed by the board is the sensitivity of CEO compensation to firm performance. Accordingly, we hypothesize that if the connections of the members of the board impact their governance and monitoring abilities, this should be reflected not only in the level of CEO pay (Hypothesis 1) but also in the sensitivity this pay exhibits with respect to firm performance.

Hypothesis 3: In firms that have more connected directors,

A: Forced CEO Turnover is less likely to occur.

B: CEO Turnover is less sensitive to firm performance.

The board of directors is responsible for the firm's governance and thus has a clear mandate from shareholders to fire an under-performing CEO. This is an important mechanism that can enhance firm value. While ideally, the board acts in the interest of shareholders, when the board is entrenched it may be quite difficult to remove a poorly performing CEO. Hence, examining the role of the board with respect to CEO turnover is material in understanding how well-governed a firm is.

Many studies investigate the relationship between the governance of the firm, firm performance, and CEO turnover. Weisbach (1988) finds that when firms have outsider-dominated boards, which is typically considered as evidence of good governance, there is a stronger association between prior performance and the probability of resignation. In a related paper, Denis et al. (1997) report that ownership structure significantly affects the likelihood of an executive turnover. Controlling for stock price performance, they find that the probability of top executive turnover is positively related to the presence of an outside blockholder, which again, is evidence of effective monitoring. Moreover, they show that the likelihood of such change in the top executive is significantly less sensitive to stock price performance in firms with higher managerial ownership, that is, when managers are entrenched.

From this evidence it follows that if the directors of the firm are socially well-connected, they may be more committed to each other, and hence less likely to perform their governance duty well. This has two testable implications in the context of CEO turnover.

First, we hypothesize that we should observe less instances of CEOs being fired in firms that have better-connected board members (Hypothesis 3A); and second, in those firms with better-connected directors, CEO turnover should be less sensitive to firm performance (Hypothesis 3B) as directors will give the CEO the benefit of the doubt before pulling the trigger and showing him the door.

Hypothesis 4: Better connected directors are more likely to be appointed to new directorships in the future.

We hypothesize above that well-connected directors would be more friendly and lenient towards management (see Hypotheses 1-3). While the board's attitude towards management captures one part of the picture, the other part, which in some sense is the mirror image of these expectations, is the attitude of management towards well-connected directors. Hence, we should also expect management to have a preference for appointing better-connected directors to its board.

Even if a CEO does not personally know a certain potential director, the fact that they both belong to the same social circle should increase the likelihood of this person being appointed to the board. It is important to note that we expect that this preference towards better-connected directors should exist even if the director has not previously exhibited a uniquely friendly disposition towards management in the other boards the director has served on. Hence, we hypothesize that not only are better-connected directors more likely to be appointed to new directorships in the future, but this should hold even if the director doesn't have a reputation of being management-friendly.

Hypothesis 5: All the above hypotheses hold regardless of whether the well-connected directors are insiders or outsiders.

Our main conjecture in the paper is that when people belong to an exclusive milieu they tend to take care of each other. Serving together on the boards of America's top corporations, a social circle emerges that connects and generates strong commitment among directors.

The fact that some directors are insiders and some directors are independent can generate heterogeneity on the board. However, while insiders and outsiders are expected to have different roles on the board, we expect that when the social affiliation of the director is strong, it will transcend the role that the director would otherwise

play on the board. The reason for this is fairly simple: board independence simply means that one is not an executive or does not work directly with the firm. However, the same individual could be highly connected in general or have ties, not directly with the firm's executive, but with many other executives elsewhere. In addition, outsiders may have an interest in accumulating more directorships in the future. Therefore, we expect Hypotheses 1-4 to hold independently of which directors are better-connected, insiders or outsiders.

2. Data and Network Measures

2.1. Sample Selection

We use five different data sets in generating our sample. The first is the IRRC-Directors data set, which reports directors' characteristics for all firms that were included in the S&P 1,500 index during the years 1996 to 2004. The S&P 1,500 index is a composite index including all the firms in the S&P 500 index, the S&P 400 MidCap index, and the S&P 600 SmallCap index. Using this data set, we create directors' and firms' network measures, when feasible. Next, we obtain CEO compensation data from ExecuComp and firm characteristics from Compustat and CRSP. Lastly, we collect corporate governance variables from the IRRC-Governance data set. Of the resulting sample we exclude the 157 observations in which the annual salary of the CEO is lower than \$50K, since such salaries are well below the market value of a CEO of an S&P 1,500 firm. These cases exist because it has become popular among some mangers to deliberately give up their salary as a gesture to shareholders or employees. For example, Apple's CEO, Steve Jobs, has relinquished his entire salary for the past eight years. The final sample consists of 9,889 CEO-year observations and 1,914 unique firms.

We present summary statistics of firm and CEO characteristics in Table I. Panel A provides information on firm characteristics and Panel B provides information

on CEO characteristics. As can be seen from the table, the sample firms display considerable heterogeneity, with an average book value of assets of $13.9 billion, a median of $1.9 billion, and a range from assets of $335 million to assets of more than $23 billion. The firms demonstrate similar variation in other characteristics such as return on assets, debt level, investment opportunity, and age. In Panel B we can see that CEO compensation also varies across sample firms: salaries range from less than $350,000 to more than $1 million, and total compensations range from about $700,000 to more than $11 million.

2.2. Network Measure

We construct our network measure, which we refer to as *Connectedness*, using the following standard procedure. For each firm and each year in our sample, we collect data on the individual directors who serve on the firm's board. Based on this information, we build an annual matrix of director networks. The matrix maps the connections among the different directors in our sample. Rows and columns represent all directors in the sample for a specific year. If director i and director j sit together on at least one board, the value of cell (i, j) in the matrix is 1, otherwise it is 0. The diagonal of the matrix (the link between director i and herself) is equal to 0 by definition. The number of direct links that each director has to other directors in the network is the sum of each row (or column) of the symmetric matrix described above. This number is referred to in the literature as *Degree* and has also been applied in many studies (see for example Kuhnen (2005).)

Connectedness[3], our network measure, evaluates the importance of the links that each director has by measuring the extent to which a director is connected to other well-connected directors. *Connectedness* is different from the number of links of each director (*Degree*) as it is a recursive variable that assigns weights to each connection by taking into account the importance of the directors one is connected to. Formally, we

[3]It is also also called *Closeness* or *"eigenvector centrality"* (Bonacich (1972, 1987))

calculate *Connectedness* by finding the eigenvector which corresponds to the largest eigenvalue of the symmetric matrix described above that documents the connections among all directors.

The mean number of connections that a director has to other directors (in all the boards she serves on) in the network over the entire sample is about 16. At the far end of the distribution, some directors have as many as 100 direct links to other directors in the network for some years during the sample period. For example, Lazard Frères managing partner Vernon E. Jordan Jr., who is informally referred to as a Washington "power broker", was directly connected to 111 other directors in 1999 resulting from his holding directorships in 10 different firms that year.

To illustrate the additional dimensions that *Connectedness* captures, consider again the case of Vernon E. Jordan Jr. who in 1999 was directly connected to 111 other directors, resulting in a *Connectedness* score of 0.235. In the same year, Rozanne L. Ridgway, a well-connected former assistant Secretary of State and ambassador, was connected to only 87 other directors, but had higher *Connectedness* score of 0.236. The reason for this difference is that while Mrs. Ridgway is connected to fewer directors, she is connected to better connected directors.

Since the purpose of this paper is to empirically investigate the effect of networks on firm governance, we require firm-level network measures. Hence, we form the firm level measure analogous by averaging the corresponding director-level *Connectedness* scores across all directors in each firm for every year.

There are several different variations in the literature that are used to evaluate network connections. We focus on *Connectedness* as it incorporates the most information, by explaining both the magnitude and the predominance of director connections, which is the more relevant information for the purpose of this study[4].

[4]In an unreported (but available upon request) appendix we compare this measure with the other prevalent measures (such as the ones used in Hochberg et al. (2007)) and show using Mizon and Richards (1986)'s *Encompassing Principle* tests that *Connectedness* is also statistically more relevant for this study.

Table II presents summary statistics of network connections in firms and between directors in our sample. Table II Panel A presents the basic summary statistics of the average number of links each director in the sample has, the average firm *Connectedness*, and the average number of firm, each firm's board is linked to. The number of links have decreased over time both at the director and at the firm level. The average director is connected to 15.96 other directors, and the average firm is connected to 7.11 other firms from the connections its own directors have. II Panel B presents the basic Pearson correlations of our main variables in the paper. The *Connectedness* of the CEO and the *Connectedness* of the firm are highly correlated. This should not come as a surprise, as the main connections the CEO has is from the board members in her own firm and their separate connections. Size, Salary, and Total Compensation are only mildly correlated with *Connectedness*. Larger firms have more connected board members, and well connected individuals will tend to be on the board of firms that are larger and more successful. however, those correlations are relatively weak, which indicates that our variable captures a different and new characteristics of the firm and of its governance.

3. CEO Compensation

In this section, we present the results of our empirical analyses testing Hypothesis 1 on the association between firm *Connectedness* and CEO compensation. Our main specification regresses CEO compensation on our network measure, *Connectedness*, and a set of firm-level controls. Table III reports the results of the different specifications. We use two measures for CEO compensation: Panel A reports the results when regressing *CEO Salary* on *Connectedness* and controls, and Panel B uses *CEO Total Comp.* as the dependent variable. In each Panel there are six specifications, each corresponding to a different set of controls. All the specifications yield the same fundamental result: CEO compensation increases with an increase in the connectivity

of the board.

In Table III Panel A, the dependent variable is *CEO Salary*, which is defined as the dollar value ($ thousands) of the base salary (cash and non-cash) earned by the CEO during the fiscal year. This variable represents the CEO's basic compensation (we exclude from the sample CEOs that elect not to receive any salary). In Table III Panel B the dependent variable is *CEO Total Comp*, which is the natural log of the CEO's total compensation (ExecuComp data item TDC1) and comprises salary, bonus, other annual compensation, total value of restricted stock granted, total value of stock options granted (using Black and Scholes (1973)), and long-term incentive payout. This variable gives the CEO's full compensation. As Table III shows, we obtain the same results using either compensation variables, that is, CEO compensation increases with an increase in the network scores of her firm.

Turning to our control variables, the first control in our analysis is *Assets*, the natural log of the book value of assets. As has been shown in many previous studies, firm size is the most significant factor explaining CEO pay. Unsurprisingly, we find a positive relation between firm size and CEO compensation that is both statistically and economically significant. Of course, this is a very intuitive result: the larger the firm, the more the firm can (and needs) to pay its CEO. Note that in unreported tests we also run our regressions using non-linear specifications of size (such as size deciles) and replacing size with market capitalization. In all these cases, the results are similar.

Next, we control for the current and future profitability of the firm using *Tobin's q*, *Stock Return*, total debt to assets (*TDA*), and *Firm Age*. We find that *Tobin's q*, which controls for firm investment opportunities, is statistically significant and positively related to CEO compensation in all the specifications of *CEO Total Comp.* and in most of the specifications where *CEO Salary* is the dependent variable. This indicates that CEO compensation is higher when the firm's investment opportunities are better. Firm *Stock Return* has no real impact on CEO salary. The variable

TDA which proxies for the leverage of the firm, is somewhat negatively related to CEO compensation, but insignificant. Lastly, we include the variable *Firm Age* as numerous studies show it is highly correlated with compensation. In the context of network analysis, *Firm Age* is a natural control since it is possible that some firms acquire more connections simply due to the fact that they have been around longer. As Panel A in Table III shows, we find that firm age is positively correlated with CEO salary. Older firms pay higher base salary to their CEOs. With respect to *CEO Total Comp*, we typically document a negative relation, but it has a small economic significance. All the regressions include year, industry and state fixed effects to control for variation in compensation over time and across industries.

Firms' headquarters are not uniformly spread across the different states in the U.S., and they also tend to cluster by industry. For example, there is a cluster of high-tech firms in Silicon Valley. It is, therefore, possible that firms whose headquarters are in the same geographic location (same state) are more connected to each other and, potentially, mimic each other's CEO compensation schemes. In order to rule out this possibility, we perform our analysis using also state fixed effects that appear in all specifications. The state fixed effects are significant in the regressions but not reported for clarity.

Many studies show that CEO characteristics have explanatory power for both firm performance (Bertrand and Schoar (2003)) and CEO compensation (Murphy (1999)). Accordingly, it is important to test whether observable CEO characteristics have an impact on compensation when the board's connectivity is taken into account. To do so, in column (2) of both Panel A and Panel B, we include three additional variables in order to explore the impact of CEO characteristics on compensation. Specifically, we include *CEO Age*, *CEO Tenure*, and *CEO Gender*. When comparing columns (1) and (2) one can see that the inclusion of CEO characteristics does not alter either the economic or the statistical significance of the results. Note that because ExecuComp does not have complete CEO characteristic data for each firm in our sample, the

sample size is reduced from 9,889 observations to as low as 2,901 observations when all CEO characteristics are incorporated in the analysis. Notwithstanding, adding these variables increases the R^2 of the results from 54% to 60%, highlighting the additional value of these variables when they are available. However, due to the substantial loss of sample size we are not using CEO characteristics in other specifications presented in Table III.

As expected, we find that *CEO Age* is positively correlated with CEO compensation; on average, each additional year of experience increases CEO salary by about $1,100. There are two somewhat surprising results (that do not hold in Panel B with *CEO Total Comp*), *CEO Tenure* is negatively related to salary. Similarly, we find that female CEOs earn more than male CEOs. This may be explained by the fact that in this specification we use a very small sample (due to ExecuComp limitations) that includes only 60 female CEOs.

CEO compensation is clearly related to firm governance (see, for example, Bertrand and Mullainathan (2001)). In firms in which governance is weak, the board is essentially controlled by the CEO and will award the CEO any compensation she seeks, whereas in firms in which governance is strong, the board has a say in compensation decisions and will not be as likely to award unwarranted compensation to the CEO. Hence, controlling for governance is important to determine the robustness of our results and to test whether our network measure proxies in some way for the level of firm governance. Therefore, in order to assure that our *Connectedness* measure captures other governance qualities beyond those we know from the literature, we show results in Table III columns (3) - (6) controlling for a variety of governance controls.

First, following Mehran (1995), Core, Holthausen, and Larker (1999), and others, we control for the independence of the board. A board is defined as independent if the majority of the directors in a firm are classified as independent. Second, following Bebchuk and Cohen (2005), we control for staggered boards. A staggered board is one in which the shareholders of the company cannot replace a majority of the board

of directors without the passage of at least two annual elections. Third, following Yermack (1996), who finds that smaller boards are more efficient, we control for the number of directors on the board. We also add two widely used measures of governance, the Gompers, Ishii, and Metrick (2003) governance index and the Bebchuk, Cohen, and Ferrell (2005) entrenchment index; both use the charter provisions of the firm to determine the level of management entrenchment. Lastly, we control for two additional board characteristics that have been shown in the literature to be related to CEO compensation and firm governance; these are *Interlocked Boards* (Hallock (1997)) and *Busy Boards* (Fich and White (2003)).

While the definition of *Interlocked Boards* is somewhat complex, an interlocking relation between two directors is related to our network measure and therefore, we include the variable *Interlocked Boards* as a control in our regression analysis.[5] Perry and Peyer (2005) and Fich and Shivdasani (2006) investigate the impact of board seat accumulation by directors on the firm. Fich and Shivdasani (2006), who explore whether "busy boards" are effective monitors, define busy boards as those boards in which the majority of outside directors hold three or more directorships. While the authors do not test directly whether busy boards affect CEO compensation, CEO pay-performance sensitivity and CEO turnover they do find that busy boards are associated with lower market-to-book ratios, and weaker profitability. In line with these results, we include busy boards as a control variable in our analysis.

The results in columns (3)-(5) suggest that consistent with Hallock (1997) and Fich and White (2003), the presence of interlocked boards is positively related to CEO compensation. However, *Connectedness* continues to be robust to the inclusion of *Interlocked Boards* as a control variable. With respect to the variable *Busy Boards*,

[5]A board is defined as "interlocked" if one of the following cases applies: 1) the CEO serves on the committee that makes her compensation decisions; 2) the CEO serves on the board of another company that has an executive officer serving on the compensation committee of the indicated CEO's company; or 3) the CEO serves on the compensation committee of another company that has an executive officer serving on the board of the indicated CEO's company.

we find that its coefficient is positively related to CEO compensation, though it is insignificant. The *Connectedness* measure is therefore also robust to this potential alternative specification. In column (4) we add to the specification the entrenchment index of Bebchuk, Cohen, and Ferrell (2005) and in column (5) we include the Gompers, Ishii, and Metrick (2003) governance index; neither is significant when *CEO Salary* is the dependent variable. When using *CEO Total Comp*, both the GIM index and the BCF index are statistically significant and positive, indicating that high entrenchment leads to higher total compensation. After controlling for all the potential firm, CEO, and governance characteristics our results remains robust: CEOs get a higher compensation when their firms are better connected.

These results are not only highly statistically significant, but they are economically meaningful as well. For example, the economic interpretation of *Connectedness* is that, all else equal, a CEO of a firm in the top quintile of connected firms, receives a salary that is \$73,000 or 11% higher than that of a CEO of a firm in the bottom quintile of connected firms. This highlights the extent of the impact a board's network can have on the CEO's compensation decision. Similarly, all else equal, a CEO of a firm that is in the top quintile of connected firms, receives total compensation that is \$746,000 or 14% higher than that of a CEO of a firm in the bottom quintile of connected firms.

As we discuss in Section 1, Hypothesis 5 conjectures that all the above results should hold also when looking only at independent directors. The role of independent board members is widely explored in the literature (see, for example, Hermalin and Weisbach (1988)). Moreover, after the major corporate governance scandals in recent years, board independence is widely viewed as fundamental in helping steer corporate governance in the firm. The 2002 Sarbanes-Oxley Act, for example, requires now a majority of independent board members on each firm's board.

Since it is commonly believed that independent board members and insiders may act differently with respect to different governance issues within the firm, it is im-

portant to explore whether our network measure differs among these two groups. Accordingly, we separate the network scores of directors by their independence classification. In Table III column (6) we define the variable *Connectedness - Insiders* as the average *Connectedness* score for each firm for all directors who are defined as insiders in the IRRC database. We then repeat the regression analysis but this time using *Connectedness - Insiders* as the dependent variable. As the table suggests, there is no fundamental difference between insiders and outsiders; the *Connectedness* coefficients in specification (6) (independent directors) are very similar to those of specifications (1) -(5) (all directors). This result, which supports Hypothesis 5 is important as it highlights an additional aspect of board independence that to date has been unexplored in the finance literature. While the fact that a board has a majority of independent members is believed to improve firm governance, the fact that its board members are also well-connected works in the opposite direction. It seems that the pure fact that independent directors are socially connected, tend to make them more inclined to approve higher CEO pay.

3.1. Endogeneity Concern

A potential concern in the above test is endogeneity, that is, our network measure may be capturing an unobserved board, firm, or CEO characteristic. For example, it is possible that "good CEOs" attract both high pay and connected board members independently yet simultaneously. In order to account for this possibility, we perform several tests. First, we run our analysis with firm and CEO fixed effects. Second, we apply an instrumental-variable approach. Then, we run a series of between-effects, Fama Macbeth (1973) regression, and changes-on-changes regression. Finally, we construct a proxy for "CEO ability" and incorporate it in the analysis. All these alternative specifications yield essentially the same result: CEOs of companies that have a more connected board receive significantly higher compensation.

In Table IV we present the results of these tests. In specifications (1) and (2) we

present the results of fixed effects regressions at the firm level and at the CEO level, respectively. These regressions address the concern that our results may be driven by an unobserved characteristic either at the firm level or at the CEO level. For example, it is possible that some firms have an ability to diagnose the true "type" of the CEO and pay her accordingly. Alternatively, it is possible that some firms pay high salaries and attract connected board members at the same time. The fixed effects analysis controls for these potential concerns. As the table shows, our results are robust to these alternative specifications.

In specification (3) of Table IV, we report the results of an instrumental-variable approach. To ensure that we do not find an endogenous relationship between connectedness and CEO quality we require an instrument that is correlated with connectedness and uncorrelated with CEO or firm quality. For that, we use a variant on the size of the board. The size of the boars is primarily a function of firm size. In addition, board size also varies across industries. But theoretically, the quality of the CEO should not be related to the size of the board; in fact in most cases CEOs simply inherit it. On the other hand, board size is highly correlated with our *Connectedness* measure which makes it a natural candidate to serve as an instrument in our analysis.

Hence, our instrument for connectedness is the the size of the board, adjusted for firm size and industry. The results of the regression are presented in Table IV, specification (3). The methodological approach of implementing our IV analysis is a two-stage least squares. In the first stage we regress *Connectedness* on our instrument and compute the fitted values from this regression. In the second stage, we regress CEO Compensation on these fitted values, who serve as an instrument to *connectedness*, and a list of control variables. As the table suggests, we get similar results to our basic analysis (Table III). This suggests that endogeneity is not driving our results.

In specifications (4) and (5) we create two proxies for "good" CEOs. *Good CEO - Abs* is a dummy variable that receives the value of one if the CEO's firm has abnormal

stock return (above the value weighted index) for 3 consecutive years. *Good CEO - Ind* is a dummy variable that receives the value of one if the CEO's firm has abnormal industry stock return (above the value weighted industry index) for 3 consecutive years. Both variables show that CEOs that had good past performance are awarded with higher compensation, but this does not alter any of the network effects captured by our *Connectedness* measure. All these tests highlight that our social network measure capture a different aspect of governance of the firm that cannot be dismissed as being a firm or CEO characteristic.

In specification (6) of Table IV, we report the results of a between-effects regression that pools the observations for each firm using the mean values of both the right- and left-hand side variables, and create a cross-section of 1,927 firms. As the table suggests, our results are robust to this alternative specification as well.

In specification (7) we perform a Fama-Macbeth (1973) regression to account for potential cross-sectional correlations of the standard errors; the regression yields similar results to other specifications.

In specification (8) instead of regressing levels, we regress changes in levels. If the fact that a firm becomes a central member of the network has a significant effect on the compensation of the CEO, then we should expect to find that positive changes in network scores over time are associated with an increase in CEO pay. Since the network scores of each firm do not change significantly from year to year as changes in the composition of the board do not occur with great frequency, we analyze changes over a two-year period. Specifically, we regress the two-year change in CEO salary on the two-year change in firm *Connectedness* score, as well the two-year change in the control variables.

The results of this regression show that an increase in the centrality of the social connections of the firm's directors is associated with an increase in CEO compensation. The results are consistent with our previous findings: firms that exhibit an increase in the *Connectedness* score over the sample period also increase their CEO

pay. Moreover, as we noted earlier in relation to Table II, the network measures have not increased over the sample period, while CEO compensation has. Hence, this test is especially important, as it suggests that our results do not simply document a spurious relation between two series that happen to move together over time.

4. CEO Pay-Performance Sensitivity

While the absolute high-levels of CEO pay have drawn a lot of criticism in recent years, an almost equal amount of attention was dedicated to explore whether CEO pay is related to firm performance. In cases where extraordinary pay is granted for great performance, there is usually small opposition; after all, shareholders cannot really complain when they generate superior returns. But in other cases, such as that of Robert Nardelli, the previous CEO of Home Depot who resigned early 2007, the focus was on pay-performance sensitivity.

Nardelli was heavily criticized not only for the size of his pay package during the period in which he served as CEO and for his $210 million severance package, but also for the fact that at the same time, during his 6-year term at Home Depot, shareholders' return was actually negative. The fact that his compensation was not related to his firm performance is viewed as an evidence of poor firm governance.

In the finance literature, Jensen and Murphy (1990) were the first to estimate pay-performance sensitivities provided to mangers. They find that CEO firm-specific wealth increases on average by only $3.25 per $1,000 increase in shareholder wealth, which they interpret as being too small to provide significant incentives. Hall and Liebman (1998) estimate larger pay-performance sensitivities and document that the pay-performance sensitivity has grown since 1980 because of increasing ownership of stock and stock options. On the methodological side, Aggarwal and Samwick (1999) provide evidence that ignoring cross-sectional differences in the volatility of firms can lead to biases estimating pay-performance sensitivity. Lastly, Ortiz-Molina (2007)

shows that capital structure is also important explaining pay-performance sensitivity.

Following Jensen and Murphy (1990), Aggarwal and Samwick (1999) and Ortiz-Molina (2007), we estimate CEO pay-performance sensitivity by the empirical relation between changes in a CEO's firm-specific wealth and changes in shareholder wealth. Our interest is to test whether pay-performance sensitivity depends on the connectedness score of firms in light of our second hypothesis that in firms that have more connected directors, CEO pay-performance sensitivity is lower. Since there is a strong presence of outliers in CEO compensation data, following previous studies, we estimate pay-performance sensitivities using median regressions as the median is more robust to the presence of large outliers than the mean.[6] As a robustness test, we also estimate and report, pay-performance sensitivities using ordinary least squares (OLS), which corresponds to calculating pay-performance sensitivities at the mean of the distribution.

The general form of the model that we estimate is as follows:

$$W_{jt} = \alpha + \beta_1 \times R_{jt} + \beta_2 \times Connectedness_{jt} + \beta_3 \times R_{jt} \times Connectedness_{jt} + \gamma \times Control_{jt} + \delta \times R_{jt} \times Control_{jt} + \sum_{i=1}^{50} \theta_i \times Industry_i + \sum_{t=1997}^{2004} \mu_t \times Year_t + \varepsilon_{jt} \quad (1)$$

where W_{jt} is a general term for the change in CEO firm-specific wealth, R_{jt} is the dollar return to shareholders, $Control_{jt}$ is a vector of control variables, j is a firm index, t is a year index and i is an industry index. Pay-performance sensitivity is then given by the following expression:

$$\partial W / \partial R = \beta_1 + \beta_3 \times Connectedness + \delta \times Control \quad (2)$$

where β_3 captures the effect of the connectivity measure on pay-performance sensitivity and δ is a vector of coefficients corresponds to the list of control variables.

Following previous papers, we provide different proxies for the change in CEO firm-specific wealth. Specifically, we perform our analysis using four different measures:

[6] See Koenker and Hallock (2001) for a discussion on median regressions.

the total change in CEO firm specific wealth, the total change in CEO firm specific wealth excluding options, the change in CEO stock value, and the change in CEO options value. The common way in the literature to examine the sensitivity of CEO pay to firm performance, that we adopt in this paper, is to regress dollar changes in wealth on dollar returns. In addition, we incorporate in the analysis three control variables that have been shown to be important when computing pay-performance sensitivities; these are: *Assets*, defined as the book value of assets, *TDA,* total debt to assets, defined as the book value of long-term debt divided by the book value of assets, and *Volatility*, defined as the 60-months historical standard deviation of the stock price. The coefficient of interest in our regressions is β_3, that captures the effect of the connectedness measure on pay-performance sensitivity.

Table V provides the regression estimates of pay-performance sensitivities. In Panel A, specifications (1) - (4), the dependent variable is the total change in CEO firm-specific wealth, and in specifications (5) - (8), the dependent variable is the total change in CEO firm-specific wealth excluding options. As the table suggests, we find that across all specifications, β_3, the coefficient of the interaction term between *Connectedness* and shareholder return is negative and statistically significant at the 1% level. This strong result is consistent with our second hypothesis that in firms that have more connected directors, CEO pay-performance sensitivity is lower. Following the convention in the literature, we use the empirical cumulative distribution function (CDF) to normalize the continuous control variables to the unit interval. This procedure helps diminish the importance of outliers in the data and makes the economic interpretation of the coefficients much easier. $F(\cdot)$ denotes the empirical CDF of each variable. Since *Connectedness* is by construction a normalized variable, it is not affected by outliers, and we preserve its original variation.

To get a sense of the economic significance of the results, consider the specification presented in column (2) of Panel A that includes all the control variables. Pay-

performance sensitivity is given by the following equation:

$$\partial W/\partial R = \beta_1 + \beta_3 \times Connectedness + \beta_5 \times F(Assets) + \beta_7 \times F(Volatility) + \beta_9 \times F(TDA)$$

It is calculated by adding to the shareholder return coefficient, β_1 (\$17.64), the product of the connectedness interaction term coefficient, β_3 (−\$23.85), and the connectedness score of each firm and the coefficients of the interaction terms of size, β_5 (−\$13.55), volatility, β_7 (−\$0.10), and capital structure, β_9 (\$1.97), multiplied by their corresponding values. A CEO of a firm that is in the top quintile of connected firms, assuming that the firm has no debt, which implies ($F(TDA) = 0$), that the firm is of a median size, which implies ($F(Assets) = 0.5$), and taking into account that the coefficient of $F(Volatility)$ is insignificant, has pay-performance sensitivity of \$6.24 ($= \$17.64 - \$23.85 \times 0.194 - \$13.55 \times 0.5$) per \$1,000 increase in shareholder wealth.[7] On the other hand, a CEO of a firm that is in the bottom quintile of connected firms, using the same assumptions, has pay-performance sensitivity of \$7.89 ($= \$17.64 - \$23.85 \times 0.125 + 0.5 \times -\$13.55$) per \$1,000 increase in shareholder wealth.[8] Hence, pay-performance sensitivity of well connected CEOs is 21% lower than that of CEOs of firms whose boards are not well connected. The result highlights the fact that CEOs of well-connected firms have significantly lower pay-performance sensitivity, an evidence of poor firm governance.

Other specifications in Panel A are also consistent with the above result. For example, when the dependent variable is the total change in CEO firm specific wealth excluding options (columns (5)-(8)), the results are similar. As a robustness test, we also perform our analysis using OLS regressions (columns (3),(4),(7) and (8)) and find significant results of the same magnitude.

In Panel B we further explore the relation between firm connectedness and CEO pay-performance sensitivity. In specifications (1) - (4), the dependent variable is the change in CEO stock value and in specifications (5) - (8), the dependent variable is the

[7] 0.194 is the median connectedness score of the top quintile of connected firms.

[8] 0.125 is the median connectedness score of the bottom quintile of connected firms.

change in CEO options value.[9] Similar to our findings in Panel A, we find that across all specifications, β_3, the coefficient of the interaction term between *Connectedness* and shareholder return is negative and statistically significant. Naturally, since the change in stock value and the change in options value is much lower than that of the total change in firm-specific wealth, the size of the coefficients is smaller. Yet, the results are still economically significant.

Consider, for example, the specification presented in column (2) of Panel B. Pay-performance sensitivity is calculated as the sum of the shareholder return coefficient, β_1 (\$6.67), the product of the connectedness interaction term coefficient, β_3 (−\$9.84), and the connectedness score of each firm, the coefficients of the interaction terms of size, β_5 (−\$4.91), volatility, β_7 (\$0.09),and capital structure, β_9 (\$0.64), multiplied by their corresponding values. A CEO of a firm that is in the top quintile of connected firms, assuming that the firm has no debt and that the firm is of a median size has pay-performance sensitivity with respect to his stock holdings of \$2.31 (= \$6.67 − \$9.84 × 0.194 − \$4.91 × 0.5) per \$1,000 increase in shareholder wealth. On the other hand, a CEO of a firm that is in the bottom quintile of connected firms, using the same assumptions, has pay-performance sensitivity with respect to his stock holdings of 2.99 (= \$6.67−\$9.84×0.125−\$4.91×0.5) per \$1,000 increase in shareholder wealth. Pay performance sensitivity of well connected CEOs is 23% lower than that of CEOs of firms whose boards are not well connected. The result again highlights the fact that CEOs of well-connected have a significantly lower pay-performance sensitivity, an evidence of poor firm governance, consistent with Hypothesis 2.

5. CEO Turnover

The decision whether to retain or fire an incumbent CEO after poor performance of the firm, is one of the most important governance decisions made by the board of

[9]The change in the value of options is the dollar change in the Black and Scholes value of the CEO's "in the money" stock-option holdings.

directors. This is the ultimate governance act exerting the power the board has over management. Thus, investigating this decision provides an insight into the capability of the board to exercise its ultimate rule. There is a large literature analyzing the determinants of CEO turnover and the subsequent performance of the firm. Weisbach (1988) shows that a firm with outsider dominated directors, an indicator for good governance, is more likely to have a CEO resign following bad performance. Weisbach (1995) shows that CEO turnover prompts firms to divest poorly performing business units, an indication that turnover allows the firm to make good investment decisions. Denis and Denis (1995) show that after a CEO leaves, firm performance improves, and it improves more when the CEO is fired. Huson, Malatesta, and Parrino (2004) show that the degree of improvement following CEO turnover depends on the level of governance of the firm. All this illustrates that CEO turnover is a major governance tool in the hands of the board.

As we discuss in Section 1, we hypothesize that a firm with well-connected directors will be more "sympathetic" towards management in several ways including in the way the firm treats poor performance and potential CEO turnover. Specifically, we expect that in firms that have more connected directors, A: forced CEO Turnover is less likely to occur, and B: CEO Turnover is less sensitive to firm performance. Following Weisbach (1988) and others, we perform a Logistic regression of the probability a CEO will be fired. We follow the methodology developed in Parrino (1997) in identifying a firing of a CEO.

We first test Hypothesis 3A, that forced CEO Turnover is less likely to occur in well connected firms. Panel A of Table VI provides the results of such a regression. For each CEO for each firm and every year we assign a value of zero to a dummy variable if the CEO has not been fired and a value of one if the CEO has been fired. We then regress this dummy variable on the *Connectedness* measure and our standard controls: the firm size, investment opportunity, ratio of debt to assets, and the firm age. We also control for the contemporaneous and lagged stock returns. In specifications (1)

- (3) we control for the firm's abnormal return with respect to the market, and in specifications (4) - (6) we control instead for the abnormal stock return with respect to the *industry*. All the different specifications yield a similar result. In firms that have well-connected directors the board is less likely to fire a CEO. Specification (1) is our basic regression with the standard controls, firm abnormal return, and year and industry fixed effects. The results show that stock return and firm age are both negatively related to the probability of having a CEO fired while the ratio of total debt to assets is positively related to the removal of a CEO. Beyond that, consistent with our hypothesis, the connectedness score of firms has an inverse relation with the likelihood the CEO will be fired.

The economic significance of these results is very strong: a CEO in a firm in the top quintile of connected firms is 24.5% less likely to be fired than a CEO in the bottom quintile of connected firms. This is a very significant difference. Hence, a CEO of a well-connected firm is much safer in her position than an equivalent CEO of a less-connected firm. In specification (2) we perform the same test adding the following CEO characteristics to the regression: CEO age, CEO tenure, and the stock holdings of the CEO in the firm. The loadings on the controls are not surprising. Older CEOs are less likely to be fired, and so are CEOs of firms where the CEO has a large ownership stake. Yet, the basic results are not changed, holding all these constant the difference in the probability of firing a CEO, between the top and bottom quintiles of connected firms is 19.2%. In specification (3) we also control for governance variables: the Gompers, Ishii, and Metrick (2003) governance index, the independence of the board, and whether the board is an interlocked board. We find that the more independent the board is the more likely it is to fire a CEO, consistent with Weisbach (1988). Again, our results still hold; the difference between the top and bottom quintiles of connected firm is about 16% in the probability of firing a CEO. In specifications (4) - (6) we perform the same tests, but this time controlling for abnormal industry return, as economic theory would predict that it should be an

important factor in the decision whether to fire a CEO. The results are statistically and economically similar.

Table VI, Panel B reports the results of the test of Hypothesis 3B, that in firms that have more connected directors, CEO Turnover is less sensitive to firm performance. In firms with strong governance one would expect that CEO turnover would be related to firm performance, while in firms with weaker governance one would expect a weaker relationship between the two. The dependent variable in all the regressions in Panel B, is a dummy variable that equals one if the CEO left her job in that year and zero otherwise.

In order to account for firm connectedness, we generate a second dummy variable, *High Connectedness*, that receives the value of one if the CEO's firm is in the top quintile of connected firms in that year. We then interact this variable with the variable *Stock Return*. The prediction of Hypothesis 3B, is that the coefficient of the interaction term, would be negative and significant. That is, that CEO turnover is less sensitive to firm performance in well-connected firms.

As the table suggests the coefficient of the interaction term between $(Stock\ Return)_t$ and $(High\ Connectedness)_t$ is positive and significant at the 10% level or more across all specifications. While, as expected, there is a negative and highly significant relation between $(Stock\ Return)_t$,$(Stock\ Return)_{t-1}$ and CEO turnover, consistent with Hypothesis 3B the relation is weaker for well-connected firms. To illustrate this point consider, for example, column (6) in Panel B where we control for firm, CEO, and governance characteristics. The coefficient of the interaction term between *High Connectedness* and *Stock Return* is positive (0.049) and actually larger in absolute value than the coefficient of *Stock Return* which is (-0.034). In addition, the coefficient of $(Stock\ Return)_{t-1}$ is negative and significant but the coefficient of the interaction term between $(High\ Connectedness)_{t-1}$ and $(Stock\ Return)_{t-1}$ is insignificant. To summarize this result, when a firm performs poorly, its CEO is more likely to be fired, but being well-connected serves as a shield that at least to some extent can prevent

the removal of the CEO.

This result is similar in spirit to the other results in this paper. Being well connected seems to make the board more sympathetic towards the CEO but mostly on the margin. One bad year will not have an effect on the likelihood of CEO turnover in well-connected firms, but two bad years will still have an impact, albeit a lower one.

The tests described in Table VI show another aspect of the effect *Connectedness* has on the capability of the board to perform its governance duty well. The results are statistically significant and economically impressive. The difference between the top and bottom quintiles of connected firms is very significant both in the probability of firing a CEO and in the sensitivity of CEO turnover to firm performance. This, again, highlights the important governance aspect the *Connectedness* measure captures.

6. Director Connectivity and Future Director Appointments

As we discuss above, our main hypothesis is that we expect a friendly approach from a well-connected board towards management. While the board's attitude towards management captures one dimension of the story, the flip side of this prediction is the attitude of management towards well-connected directors. If, indeed, connections affect the behavior of the board, they may also affect the behavior of the CEO. For example, when a CEO is considering a candidate to be appointed as a new director on the board, it stands to reason that a higher priority will be given to nominees who are part of the exclusive milieus of corporate elites. Hence, we expect management to have a preference to appoint better-connected directors to the board.

In Table VII, Panel A, we report the results of a Probit regression that analyzes the probability of a director receiving at least one directorship in year t based on her *Connectedness* score in year $t-1$. Column (1) reports the results of the base

regression; the dependent variable takes a value of 1 if in year t that director was appointed to at least one new board, and a value of 0 otherwise. All the independent variables are calculated in year $t-1$. We include several controls: *CEO Elsewhere*, a dummy that equals 1 if the director served as a CEO in some other firm; *Age Quintile* (due to the nonlinearity effect of age, we generate five indicators); and indicators for both the ethnicity and the gender of the directors. All the regressions include year fixed effects and use robust standard errors, and all the regressions are clustered at the director level. The results of the base regression, (Panel A, column (1)) are not surprising: older directors are less likely to pick up a director seat, and minority directors (Black and Hispanic) are more likely to pick up a director seat.

Earlier we show that connected directors tend to award higher salaries to CEOs. Hence, one concern is that what we could be capturing is not a "reward" for being connected but a reward for being "lenient" in compensation decisions.[10] We directly test these competing explanations in order to identify the effect of connections on the probability of a director receiving more directorships. For each year, we compute each director's *Connectedness* score and we identify all the firms at which the director sits on the board. We then inquire whether the change in CEO pay in these firms is above or below industry averages. This results in two dummy variables for each director: *Highly Connected Director*, a dummy that is equal to 1 if a director had a *Connectedness* value in year $t-1$ above the industry average, and *Approved Above Ind. Ave. Increase*, a dummy that is equal to 1 if in year $t-1$ a director belonged to boards that approved a CEO salary increase that was above the industry average.

Columns (2) and (3) show that being lenient and being connected both have a positive effect on the probability of picking up one more seat: the unconditional probability of a director receiving at least one new seat the following year (holding all the controls constant at their mean) is 2.5%, whereas the same probability for a lenient

[10] We define a director to be "lenient" if the majority of the boards the director serves on, approved a CEO salary increase in the previous year which was above the industry average increase.

director is 4.3% and for a connected director is 4.2%. Column (4) interacts both characteristics simultaneously and finds that the two characteristics are orthogonal, and complement each other in explaining the probability of a director receiving an additional directorship. Further, we see that holding all the control variables constant at their mean, the same probability for a director who is not lenient and not connected is only 1.9%, that for a connected but not lenient director is 3.4%, and that for a lenient but not connected director is 3.6%.

We confirm these effects in columns (6) and (7) where we run the same regression on sub-samples. In column (6) the sub-sample consists of all connected directors, and in column (7) the sub-sample consists of all lenient directors. Note that in these columns the combined effect of being both connected and lenient increases the probability of picking up at least one new seat to 5.1% (compared to an unconditional probability of 2.5%). This illustrates the extent to which connectedness impacts a director's career concerns.

Lastly, column (5) reports the results of an ordered logistic regression where the dependent variable is the *Number of New Directorships* a director receives. The results are both qualitatively and quantitatively similar to those above.

A major concern with these regressions is endogeneity. It is possible, for example, to claim that "good" or "talented" directors will be in high demand. Since many firms would like to use the services of these highly qualified individuals, they will, naturally, sit on multiple boards, and as a consequence, be highly connected. If this were the case, then our connectedness measure would really proxy for the *quality* of directors through their connectivity measure and not purely for their connectedness. In order to control for such a possibility, we construct an additional control variable, that proxies for director quality. Since it is not possible to observe director quality directly, we proxy for it by constructing a variable which is based on the stock performance of firms whose board the director was sitting on. *"Good Director"* is a dummy variables that receives a value of 1 if the majority of the firms the director sits on, achieved

above average return in the previous year.

As the table suggest, our control for director quality is highly significant, statistically and economically. All else equal, being a "good" director, increases the probability of receiving at least one new directorship the following year by 1%. Nevertheless, being highly connected, increases the likelihood of a director to get an additional board seat, *beyond* the effect of being a director who is associated with firm that achieve abnormal returns.

An additional issue to consider in the context of future board appointments is director independence since the independence of the board is now viewed as an important mechanism to enhance firm governance. Hence, it is important to test whether the probability of getting an additional board seat is different when looking only at independent directors. Panel B of Table VII reports the results of regression analysis based only on the sub-sample of directors who are defined as independent by the IRRC database. As one can see from the table, the sample size drops down from 48,394 director-year observations in Panel A, to 30,932 director-year observations in Panel B.

The results reported in Panel B are remarkably similar to those in Panel A. It turns out that being lenient and being connected both have a positive effect on the probability of picking up one more seat also when looking only at independent directors. The unconditional probability of an independent director receiving at least one new seat the following year is 2.5%, whereas the same probability for a lenient director is 4.3% and for a connected director is 4.2%. These results are in the spirit of the results of Kuhnen (2005) who finds that mutual fund directors who are more connected are more likely to earn additional seats in the future when new funds are offered by management.

Lastly, when an independent director is "good", that is, he sits on boards of firms that achieved above average return in the previous year, he is more likely to be awarded additional directorships in the future. All else equal, being a "good" inde-

pendent director, increases the probability of receiving at least one new directorship the following year by 1%.

7. Robustness tests

As discussed in Section 2.2, the network measure we employ in this study is standard in the social network literature. However, one concern that could arise from our analysis is that this measure aggregates information on a firm's board members into a single firm observation by averaging the individual scores of each director for each firm-year. A potential problem is that if there is high disparity in network connections among a firm's different board members, that is, if most of the firm's connections are derived by one or a few members of the board, the interpretation of our analysis could be different.

In order to account for such a possibility, we generate several variants of our network measures and test the effect of these measures on CEO compensation. Instead of averaging the measure for each firm we generate measures that take the median, maximum, and minimum of the measure across all board members. Such measures would underweight a firm's connectivity if its connections are generated by one or a few board members. We find that both statistically and economically, the results are similar to those in Table III. This indicates that the results are not driven by a few highly connected directors, but rather by the connectedness of **all** board members.

Lastly, we also construct a measure which is a function of the centrality of firms in the network as opposed to the centrality of the directors.Again, we find that the results are similar in size and magnitude to the main results presented in Table III. Thus, the results highlight how robust the social connections are: both at the director level and at the firm level, being a central figure in the network seems to be an important factor in explaining CEO pay.

8. Conclusion

In this paper we explore whether social networks among directors of the corporate elite impact firm governance. Specifically, we inquire whether firms' decisions with respect to CEO compensation, CEO pay-performance, and CEO turnover are different when firms are governed by more connected directors.

Using data on firms in the S&P 1,500 index between 1996 and 2004, each year we map board members' networks and derive from these networks measures of the connectivity of each firm's board. We find strong empirical evidence that firms that have more connected board members, and whose board members are connected to better connected firms, exhibit weaker governance. Our results are statistically and economically significant.

Controlling for firm size, investment opportunities, industry, and observable CEO and board characteristics, firms that have more connected boards grant higher pay to their CEOs. *Ceteris paribus*, a CEO of a firm that is in the top quintile of connected firms receives 11% higher salary and 13% higher total compensation than a CEO of a firm that is in the bottom quintile of connected firms.

Pay-performance sensitivity is \$6.24 per \$1,000 increase in shareholder return for a CEO in the top quintile of connected firms compared to \$7.89 per \$1,000 increase in shareholder return for a CEO of a firm that is in the bottom quintile of connected firms. Hence, pay-performance sensitivity of well connected CEOs is 21% lower than that of CEOs of firms whose boards are not well connected. This result highlights the fact that firms that have well-connected directors are less effective in aligning CEO pay with firm performance, an evidence for poor governance.

We also document those cases in which a CEO is forced out of the firm and find that the connectedness of the board is strongly and negatively correlated with these events. We find that a CEO in a firm that is in the top quintile of connected firms is 24.5% less likely to be fired that a CEO of a firm in the bottom quintile of connected firms.

Lastly, well-connected directors are more likely to be awarded more directorships in the future. We find that even after controlling for director characteristics, the probability of a connected director receiving one more director seat the following year is 68% higher than that of an unconnected board member (4.2% vs. 2.5%).

These results continue to hold when looking only at the connectivity level of independent directors. Our results suggest that social networks among directors weakens firm governance and that these social connections are an important board characteristic.

In this paper, we analyze several aspects of networks that together capture the connections board members have with other firms, and we show that these connections affect firm governance. In doing so, our paper complements previous studies by adding a new dimension to our understanding of the characteristics that affect board decisions and its ability to perform its governance duty well – how central it is in the overall director network.

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Table I
Summary Statistics: Firm and CEO Characteristics

This table provides descriptive statistics of firm and CEO characteristics for our sample firms. The total sample consists of 10,057 firm-year observations between 1996 and 2004. The table presents the number of observations, the mean, the median, the 1st and 9th deciles, and the standard deviation for each variable. *Assets* ($ millions) is the book value of assets. *Tobin's q* is equal to the market value of assets divided by the book value of assets following Kaplan and Zingales (1997). *Stock Return* is defined as the annual stock return of the firm including dividends. *TDA,* total debt to assets, is defined as the book value of long-term debt divided by the book value of assets. *Firm Age* is the age of the firm (years) based on the date in which a firm's share price first appeared on the CRSP tape. *CEO Age* is the age of the CEO. *CEO Gender* is a dummy variable that equals 1 if the CEO is male. *CEO Tenure* is the number of years since the individual joined the firm. *CEO Salary* ($ thousands) is the dollar value of the base salary (cash and non-cash) earned by the CEO during the fiscal year. *CEO Total Comp* ($ thousands) is the CEO's total compensation, which comprises: salary, bonus, other annual components, total value of restricted stock granted, total value of stock options granted (using Black and Scholes (1973)), and long-term incentive payout (ExecuComp data item TDC1). Δ*CEO Firm-Specific Wealth* ($ thousands) is defined as the annual dollar change in the CEO's (Total Direct Compensation + Value of Stock Ownership + Value of Options). Δ*CEO Firm-Specific Wealth ex-Options* ($ thousands) is defined as Δ*CEO Firm-Specific Wealth* excluding the annual dollar change in the CEO's value of options. Δ*CEO Stock Value* ($ thousands) is the annual dollar change in the value of the CEO's stock holdings. Δ*CEO Options Value* ($ thousands) is the annual dollar change in the value of the CEO's "in the money" options using the Black and Scholes formula.

	N	Mean	Median	1st Decile	9th Decile	Std
PANEL A: Firm Characteristics						
Assets	9,889	13,927	1,953	335	23,921	60,169
Tobin's q	9,889	1.879	1.398	0.906	3.301	1.76
Stock Return	9,889	0.16	0.11	-0.36	0.67	0.60
TDA	9,889	0.243	0.238	0.005	0.457	0.18
Firm Age	9,889	26.35	24	6	58	19.74
PANEL B: CEO Characteristics						
CEO Age	5,586	57.83	58	49.00	67.00	7.42
CEO Gender (Male=1)	9,889	0.986	1	1.000	1.000	0.12
CEO Tenure	5,363	16.61	14	2.00	35.00	12.41
CEO Salary	9,889	690	639	346	1,028	344
CEO Total Comp	9,851	5,484	2,681	734	11,864	12,763
Δ CEO Firm-Specific Wealth	6,766	30,924	4,299	-8,293	42,225	717,614
Δ CEO Firm-Specific Wealth ex-Options	6,767	28,556	4,012	-3,170	30,282	699,795
Δ CEO Stock Value	6,788	22,852	469	-7,890	18,261	696,963
Δ CEO Options Value	6,946	2,066	55	-4,316	9,871	38,611

Table II

Connectedness: Summary Statistics and Correlations

PANEL A: Summary Statistics

This panel presents the mean and the number of observations for each network variable by year. *Ave # of Director Links* is the average number of direct connections to other directors of the firm's board members. *Connectedness* is our network measure that weights connections by their centrality in the network. *Ave # of Firm Links* is the number of other firms that are directly connected to each firm by joint directorships.

Year	N	Ave # of Director Links	Connectedness	Ave # of Firm Links
1996	953	18.39	0.1771	8.46
1997	1,087	17.20	0.1662	7.74
1998	1,171	17.02	0.1685	7.81
1999	1,169	16.88	0.1659	7.73
2000	1,184	15.83	0.1565	6.97
2001	1,203	15.35	0.1522	6.68
2002	1,116	14.93	0.1471	6.18
2003	1,134	14.77	0.1465	6.09
2004	1,040	13.41	0.1380	6.44
All years	10,057	15.96	0.1574	7.11

PANEL B: Correlation Matrix

This panel presents the correlation between the main variables in this paper. *Connectedness (firm)*, is our network measure at the firm level. *Connectedness (CEO)*, is our network measure only for the CEO of the firm. *Salary*, is the total salary of the CEO in a specific year. *Total Direct*, is the total direct compensation of the CEO including stock options and bonuses. *Size*, is the market capitalization of the firm in billions of Dollars. *GIM Index*, is the governance index proposed by Gompers, Ishii, and Metrick (2003). *Stock Return*, the same year stock return. *Iterlock*, is a dummy that gets a value of 1 if a firm has at least one interlocked director.

	Connectedness (firm)	Connectedness (CEO)	Salary	TDC	Size	GIM	Stock return	Interlock
Connectedness (firm)	1.000	.	.	.	.	.	.	.
Connectedness (CEO)	0.971	1.000	.	.	.	.	.	.
Salary	0.293	0.299	1.000	.	.	.	.	.
Total direct	0.250	0.256	0.597	1.000	.	.	.	.
Size	0.159	0.154	0.270	0.285	1.000	.	.	.
GIM index	0.158	0.158	0.098	0.087	-0.062	1.000	.	.
Stock return	-0.011	-0.010	-0.004	0.059	-0.003	-0.028	1.000	.
Interlock	0.090	0.119	0.083	0.048	0.093	0.014	-0.008	1.000

Table III

CEO Compensation and Director Networks

This table presents regressions of CEO compensation on our network measure. In Panel A: the dependent variable is *CEO Salary,* which is defined as the dollar value ($ thousands) of the base salary (cash and non-cash) earned by the CEO during the fiscal year. In Panel B: the dependent variable is *CEO Total Comp*, which is the natural log of CEO total compensation (ExecuComp data item TDC1). *Degree* is the average number of direct connections of the firm's board members. *Connectedness* is the firm-level network score described in Section 2.2. In column (6) in both Panel A and Panel B, *Connectedness* is calculated based on the connectivity scores of independent directors only. *Assets* is the natural log of the book value of assets. *Tobin's q* is equal to the market value of assets divided by the book value of assets following Kaplan and Zingales (1997). *Stock Return* is defined as the firm's annual stock return including dividends. *TDA,* total debt to assets, is defined as the book value of long-term debt divided by the book value of assets. *Firm Age* is the natural log of the age of the firm (years) based on the date in which a firm's share price first appeared on the CRSP tape. *GIM Index* is the governance index proposed by Gompers, Ishii, and Metrick (2003). *BCF Index* is the entrenchment index proposed by Bebchuk, Cohen, and Ferrell (2004). *Staggered Board* is a dummy variable that equals 1 if the shareholders of the company cannot replace a majority of the board of directors without the passage of at least two annual elections. *Board Size* is the number of board members. *Independent Board* is a dummy variable that equals 1 if the majority of the directors in a firm are classified as independent. *Interlocked Board* is a dummy variable that equals 1 if one of the following cases applies: 1) the CEO serves on the board committee that makes his compensation decisions; 2) the CEO serves on the board of another company that has an executive officer serving on the compensation committee of the indicated CEO's company; or 3) the CEO serves on the compensation committee of another company that has an executive officer serving on the board of the indicated CEO's company. *Busy board* is a dummy variable that equals 1 if the majority of outside directors hold three or more directorships following Fich and Shivdasani (2006). *CEO Age* is the age of the CEO. *CEO Tenure* is the number of years since the individual joined the firm. *CEO Gender* is a dummy variable that equals 1 if the CEO is male. All specifications include year fixed effects, industry fixed effects, and state fixed effects. All t-statistics are calculated using White (1981) robust standard errors.

PANEL A: CEO Salary

	All Directors					Independent Directors
	(1)	(2)	(3)	(4)	(5)	(6)
Connectedness	457.43	450.33	417.93	415.49	420.87	445.85
	(7.32)***	(4.56)***	(5.57)***	(5.56)***	(5.63)***	(5.99)***
Assets	130.56	128.06	131.01	131.15	130.99	130.71
	(47.47)***	(24.12)***	(39.53)***	(40.07)***	(39.62)***	(39.24)***
Tobin's q	2.93	0.20	6.74	6.85	6.70	6.52
	-(1.53)	-(0.07)	(2.59)***	(2.62)***	(2.57)**	(2.51)**
Stock Return	-2.64	0.42	-3.25	-3.26	-3.26	-2.83
	-(0.62)	-(0.09)	-(0.70)	-(0.70)	-(0.70)	-(0.62)
TDA	-19.23	-1.85	-7.28	-8.10	-6.88	-6.34
	-(1.09)	-(0.05)	-(0.37)	-(0.41)	-(0.35)	-(0.32)
Firm Age	30.60	64.13	31.82	31.70	32.42	32.29
	(8.93)***	(8.96)***	(8.17)***	(8.08)***	(7.53)***	(7.50)***
GIM Index					-0.78	-0.83
					-(0.56)	-(0.60)
BCF Index				1.67		
				-(0.62)		
Staggered Board			9.43	6.70	11.49	11.89
			(1.71)*	-(0.99)	(1.80)*	(1.86)*
Board Size			0.78	0.74	0.82	0.66
			-(0.52)	-(0.49)	-(0.55)	-(0.44)
Independent Board			-31.53	-33.07	-30.27	-31.47
			(1.74)*	(1.80)*	-(1.64)	(1.70)*
Interlocked Board			19.53	19.65	19.52	18.80
			(3.14)***	(3.16)***	(3.14)***	(3.02)***
Busy Board			2.62	2.63	2.75	3.70
			-(0.35)	-(0.35)	-(0.36)	-(0.49)
CEO Age		1.12				
		(2.41)**				
CEO Tenure		-48.55				
		(2.00)**				
CEO Gender		4.16				
(Male=1)		(5.91)***				
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.54	0.60	0.53	0.53	0.53	0.53
Observations	9,889	2,901	8,080	8,080	8,080	8,072

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

PANEL B: CEO Total Compensation

	All Directors					Independent Directors
	(1)	(2)	(3)	(4)	(5)	(6)
Connectedness	0.19	0.20	0.16	0.14	0.14	0.17
	(5.80)***	(3.49)***	(4.07)***	(3.69)***	(3.67)***	(4.48)***
Assets	0.05	0.05	0.05	0.05	0.05	0.05
	(60.15)***	(31.78)***	(49.56)***	(50.38)***	(49.58)***	(49.20)***
Tobin's q	0.01	0.01	0.01	0.01	0.01	0.01
	(5.67)***	(5.78)***	(9.98)***	(10.27)***	(10.08)***	(10.07)***
Stock Return	0.01	0.00	0.00	0.00	0.00	0.00
	(2.03)**	-(0.16)	-(1.18)	-(1.17)	-(1.20)	-(1.22)
TDA	-0.01	0.00	0.00	-0.01	0.00	0.00
	-(1.48)	-(0.29)	-(0.02)	-(0.67)	-(0.28)	-(0.24)
Firm Age	0.00	0.00	-0.01	-0.01	-0.01	-0.01
	(3.47)***	-(0.29)	(4.01)***	(4.53)***	(5.90)***	(5.95)***
GIM Index					0.00	0.00
					(7.99)***	(7.93)***
BCF Index				0.01		
				(9.96)***		
Staggered Board			0.01	-0.01	0.00	0.00
			(3.42)***	(3.42)***	-(1.11)	-(1.05)
Board Size			0.00	0.00	0.00	0.00
			-(0.47)	-(1.00)	-(0.95)	-(1.17)
Independent Board			0.05	0.04	0.04	0.04
			(6.83)***	(5.48)***	(5.91)***	(5.67)***
Interlocked Board			0.00	0.00	0.00	0.00
			-(1.03)	-(1.32)	-(1.06)	-(0.92)
Busy Board			0.00	0.00	0.00	0.00
			-(0.29)	-(0.30)	-(0.06)	-(0.03)
CEO Age		0.00				
		(6.76)***				
CEO Tenure		0.00				
		-0.30				
CEO Gender		0.00				
(Male=1)		-0.40				
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.49	0.52	0.51	0.51	0.51	0.51
Observations	9,851	2,892	8,053	8,053	8,053	8,045

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table IV

Endogeneity: Firm FE, CEO FE, IV, Between Effects, Fama-MacBeth, Changes on Changes, and CEO Ability

This table presents regressions of CEO pay on our network measure using firm fixed effects, CEO fixed effects, instrumental-variable, between effects, Fama-MacBeth specification, changes on changes, and a proxy for "CEO ability". The dependent variable is *CEO Salary*. *Connectedness* is the firm-level network score described in Section 2.2. *Assets* is the natural log of the book value of assets. *Tobin's q* is equal to the market value of assets divided by the book value of assets following Kaplan and Zingales (1997). *Stock return,* is defined as the annual stock return of the firm including dividends. *TDA,* debt to assets, is defined as the book value of long-term debt divided by the book value of assets. *Firm Age* is the natural log of the age of the firm (years) based on the date in which a firm's share price first appeared on the CRSP tape. *Good CEO - Abs* is a dummy variable that receives the value of one if the CEO's firm had abnormal stock return (above the value weighted index) for 3 consecutive years. *Good CEO - Ind* is a dummy variable that receives the value of one if the CEO's firm had abnormal industry stock return (above the value weighted industry index) for 3 consecutive years. Specification (1) includes firm fixed effects as well as year fixed effects. Specification (2) includes CEO fixed effects as well as year fixed effects. In specification (3) we perform an instrumental variable analysis as described in Section 3.1. Specifications (4) and (5) use different proxies for "CEO ability". In Specification (6) we perform a between effects analysis in which all observations are averaged for each firm across all years that it is present in the sample and a cross-section of all firms is created. This specification includes year fixed effects as well as industry fixed effects. In specification (7) we perform a Fama-MacBeth (1973) regression. Specification (8) regresses the change of the CEO's salary between years t and $t-2$ on the change of the the board's average *Connectedness* and control variables in the same time period. All t-statistics are calculated using White (1981) robust standard errors. Specifications (1) and (2) are also clustered by year.

	Firm Fixed Effects	CEO Fixed Effects	IV	OLS	OLS	Between Effects	Fama-MacBeth	Changes on Changes
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Closeness	149.09	132.34	2487.79	656.64	656.64	487.94	351.20	150.27
	(2.52)**	(2.30)**	(3.65)***	(4.81)***	(4.81)***	(3.15)***	(8.65)***	(4.32)***
Assets	104.67	75.19	107.15	136.31	136.31	132.67	139.49	10.54
	(10.63)***	(12.43)***	(12.72)***	(26.42)***	(26.42)***	(29.02)***	(50.71)***	(4.16)***
Tobin's q	1.28	3.12	2.25	-0.14	-0.14	-0.72	6.57	3.45
	-(1.02)	(3.14)**	-1.15	-(0.03)	-(0.03)	-(0.18)	(1.98)*	-(1.29)
Stock Return	186.06	183.64	-2.37	1.75	1.75	-31.49	107.55	94.82
	(3.56)***	(6.08)***	-0.55	-(0.32)	-(0.32)	-(0.57)	(2.02)*	(2.93)**
TDA	-80.87	-72.16	-27.94	-55.33	-55.33	-56.50	-28.84	-30.99
	(3.59)***	(-6.01)***	-1.57	(1.95)*	(1.95)*	-(1.59)	(-1.89)*	-(1.87)
Firm Age	-80.87	-72.16	24.72	37.01	37.01	-56.50	-28.84	-11.02
	(3.59)***	(-6.01)***	(6.09)***	(5.13)***	(5.13)***	-(1.59)	(-1.89)*	(2.15)*
Good CEO - Abs				33.09				
				(1.95)*				
Good CEO - Ind					31.20			
					(2.24)**			
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	-	-
Industry FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	No	No	No	No	No	No
CEO FE	No	Yes	No	No	No	No	No	No
R^2	0.89	0.94	0.54	0.55	0.55	0.52	0.44	0.05
Observations	9,889	9,889	9,889	3,905	3,905	9,889	9,889	9,889
Number of Groups	-	-	-	-	-	1,914	-	-

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table V

Pay-Performance Sensitivity and Director Networks

The table reports median regression (MR) and ordinary lest squares (OLS) estimates of the equation:

$$W_{jt} = \alpha + \beta_1 \times R_{jt} + \beta_2 \times Connectedness_{jt} + \beta_3 \times R_{jt} \times Connectedness_{jt} + \gamma_1 \times F(Assets_{jt}) + \delta_1 \times R_{jt} \times F(Assets_{jt}) + \gamma_2 \times F(Volatility_{jt}) + \delta_2 \times R_{jt} \times F(Volatility_{jt}) + \gamma_3 \times F(TDA_{jt}) + \delta_3 \times R_{jt} \times F(TDA_{jt}) + \sum_{i=10}^{50} \theta_i \times Industry_i + \sum_{t=1997}^{2004} \mu_t \times Year_t + \varepsilon_{jt}$$

where W_{jt} ($ thousands) is a general term for the change in CEO firm-specific wealth. In Panel A, specifications (1)-(4), $W_{jt} = \Delta$*CEO Firm-Specific Wealth*, defined as the annual dollar change in the CEO's (Total Direct Compensation + Value of Stock Ownership + Value of Options). In Panel A, specifications (5)-(8), $W_{jt} = \Delta$*CEO Firm-Specific Wealth ex-Options*, defined as Δ*CEO Firm-Specific Wealth* excluding the annual dollar change in the CEO's value of options. In Panel B, specifications (1)-(4), $W_{jt} = \Delta$*CEO Stock Value* is the annual dollar change in the value of the CEO's stock holdings. In Panel B, specifications (5)-(8), $W_{jt} = \Delta$*CEO Options Value* is the annual dollar change in the value of the CEO's "in the money" options using the Black and Scholes formula. R_{jt} is the dollar return to shareholders. *Connectedness* is the firm-level network score described in Section 2.2. *Assets* is the natural log of the book value of assets. $Volatility$ is the 60 month historical standard deviation of the stock price. *TDA* is the book value of long-term debt divided by the book value of assets. $F(\cdot)$ denotes the empirical CDF of the variable. All regressions include year and industry fixed effects. t-statistics reported for OLS regressions are calculated using White (1981) robust standard errors. t-statistics reported for MR regressions are constructed using bootstrapped standard errors based on 100 replications. The R^2 reported for each median regression is a $Pseudo\ R^2$.

PANEL A: Change in CEO Firm Specific Wealth

	Δ (Firm Specific Wealth)				Δ (Firm Specific Wealth Ex-Options)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	MR	MR	OLS	OLS	MR	MR	OLS	OLS
R	10.76	17.64	5.93	18.41	5.18	7.52	4.27	11.61
	(4.84)***	(12.85)***	(3.42)***	(10.63)***	(5.32)***	(8.89)***	(3.78)***	(10.27)***
$Connectedness$	33291.32	6159.64	81474.86	9310.65	29869.61	4474.44	65311.76	4452.25
	(9.21)***	(2.60)***	(8.03)***	-(0.85)	(2.49)**	(1.96)*	(7.90)***	-(0.49)
$R \times Connectedness$	-47.51	-23.85	-24.96	-24.67	-22.63	-10.03	-18.61	-15.76
	(4.27)***	(3.61)***	(2.96)***	(3.45)***	(4.54)***	(3.52)***	(3.32)***	(3.43)***
$F(Assets)$		9341.99		22394.21		8524.49		19423.18
		(16.56)***		(11.35)***		(20.50)***		(12.20)***
$R \times F(Assets)$		-13.55		-14.55		-5.71		-9.03
		(11.15)***		(10.35)***		(8.11)***		(9.88)***
$F(Volatility)$		-85.82		-249.49		-16.50		-804.86
		-(0.27)		-(0.17)		-(0.06)		-(0.69)
$R \times F(Volatility)$		-0.10		0.02		0.23		0.01
		-(0.20)		-(0.06)		-(0.82)		-(0.06)
$F(TDA)$		-742.60		-7844.85		-674.35		-7097.00
		(2.06)**		(4.09)***		(2.61)***		(4.48)***
$R \times F(TDA)$		1.97		2.62		0.65		1.32
		(4.41)***		(6.74)***		(1.97)**		(5.26)***
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.13	0.20	0.19	0.31	0.09	0.13	0.15	0.23
Observations	6,889	6,395	6,889	6,395	6,890	6,396	6,890	6,396

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

PANEL B: Change in CEO Stock and Options Value

	Δ (CEO Stock Value)				Δ (CEO Options Value)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	MR	MR	OLS	OLS	MR	MR	OLS	OLS
R	3.87	6.67	3.86	11.04	2.57	4.61	0.99	3.49
	(5.19)***	(13.73)***	(3.70)***	(10.69)***	(3.70)***	(10.79)***	(2.52)**	(5.17)***
$Connectedness$	3331.23	1533.65	19040.82	-4331.08	2135.40	705.12	12802.43	3499.89
	-(1.36)	(1.93)*	(2.51)**	-(0.50)	(3.91)***	-(1.08)	(5.25)***	-(1.34)
$R \times Connectedness$	-16.82	-9.84	-16.62	-14.04	-10.93	-3.53	-3.70	-4.39
	(4.41)***	(4.36)***	(3.22)***	(3.37)***	(3.14)***	(1.65)*	(1.92)*	(2.82)***
$F(Assets)$		861.22		7468.28		441.69		2663.77
		(4.92)***		(5.02)***		(3.50)***		(5.06)***
$R \times F(Assets)$		-4.91		-8.75		-4.11		-2.85
		(10.05)***		(10.18)***		(9.05)***		(4.12)***
$F(Volatility)$		-145.37		-1020.06		37.64		484.74
		-(1.23)		-(0.93)		-(0.54)		-(1.49)
$R \times F(Volatility)$		0.09		-0.01		-0.05		0.00
		-(0.38)		-(0.04)		-(0.44)		-(0.01)
$F(TDA)$		-37.99		-5748.02		35.42		-477.81
		-(0.26)		(3.82)***		-(0.37)		-(1.04)
$R \times F(TDA)$		0.64		1.31		0.76		0.74
		(2.43)**		(5.83)***		(4.95)***		(6.47)***
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.07	0.09	0.13	0.21	0.10	0.16	0.19	0.30
Observations	6,914	6,418	6,914	6,418	7,080	6,570	7,080	6,570

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table VI

CEO Turnover and Director Networks

This table presents Probit regressions estimating the probability of CEO turnover. Panel A investigates the probability of forced CEO turnover, while Panel B investigates the probability of any CEO turnover (forced or voluntary). In Panel A the dependent variable is a dummy variable that equals one if a CEO was forced to leave her position in that year and zero otherwise. In Panel B the dependent variable is a dummy variable that equals one if a CEO left her position in that year and zero otherwise. *Connectedness* is the firm-level network score described in Section 2.2. *Assets* is the natural log of the book value of assets. *Tobin's q* is equal to the market value of assets divided by the book value of assets following Kaplan and Zingales (1997). *TDA,* debt to assets, is defined as the book value of long-term debt divided by the book value of assets. *Firm Age* is the natural log of the age of the firm (years) based on the date in which a firm's share price first appeared on the CRSP tape. $(\textit{Stock Return})_t$ and $(\textit{Stock Return})_{t-1}$ are the stock returns at year t and $t-1$, respectively. $(\textit{Industry Adjusted Stock Return})_t$ and $(\textit{Industry Adjusted Stock Return})_{t-1}$ are the industry adjusted stock returns at year t and $t-1$, respectively, based on 49 industry classifications suggested by Fama and French (1997). *CEO Age* is the age of the CEO. *CEO Tenure* is the number of years since the individual joined the firm. *CEO Ownership* is the number of shares held by the CEO divided by the total number of shares outstanding. *GIM Index* is the governance index proposed by Gompers, Ishii, and Metrick (2003). *Independent Board* is a dummy variable that equals 1 if the majority of the directors in a firm are classified as independent. *Interlocked Board* is a dummy variable that equals 1 if one of the following cases applies: 1) the CEO serves on the board committee that makes his compensation decisions; 2) the CEO serves on the board (and possibly compensation committee) of another company that has an executive officer serving on the compensation committee of the indicated CEO's company; or 3) the CEO serves on the compensation committee of another company that has an executive officer serving on the board (and possibly compensation committee) of the indicated CEO's company. In Panel B, *High Connectedness* is a dummy variable that receives the value of one if the CEO's firm in year t was ranked in the top quintile of connected firms and zero otherwise. All regressions include year and industry fixed-effects (not reported). Robust z-statistics are reported in parenthesis.

PANEL A: Forced CEO Turnover

	(1)	(2)	(3)	(4)	(5)	(6)
Connectedness	-1.568	-0.964	-0.970	-2.030	-1.205	-1.094
	(4.05)***	(2.06)**	(1.96)**	(4.20)***	(2.12)**	(1.90)*
Assets	-0.014	-0.003	0.001	-0.004	-0.001	-0.001
	(1.39)	(0.26)	(0.06)	(0.33)	(0.07)	(0.09)
Tobin's q	0.014	0.022	0.014	0.006	0.016	0.012
	(1.27)	(1.49)	(0.94)	(0.47)	(1.07)	(0.74)
TDA	0.200	0.093	0.090	0.258	0.136	0.157
	(2.63)***	(0.98)	(0.95)	(2.95)***	(1.38)	(1.57)
Firm Age	-0.005	-0.004	-0.003	-0.005	-0.004	-0.003
	(6.41)***	(4.48)***	(3.38)***	(5.67)***	(4.09)***	(3.33)***
$(Stock\ Return)_t$	-0.090	-0.083	-0.095			
	(2.60)***	(2.03)**	(2.20)**			
$(Stock\ Return)_{t-1}$	-0.017	-0.015	-0.019			
	(0.61)	(0.61)	(0.62)			
$(Ind\ Adj\ Return)_t$				-0.111	-0.087	-0.076
				(3.70)***	(2.58)***	(2.17)**
$(Ind\ Adj\ Return)_{t-1}$				-0.046	-0.034	-0.022
				(1.57)	(1.12)	(0.71)
CEO Age		-0.039	-0.039		-0.036	-0.037
		(13.28)***	(12.40)***		(11.79)***	(11.78)***
CEO Tenure		0.000	0.000		-0.002	-0.001
		(0.17)	(0.09)		(0.55)	(0.50)
CEO Ownership		-0.007	-0.005		-0.003	-0.006
		(2.37)**	(1.65)*		(1.15)	(1.74)*
GIM Index			-1.080			-1.300
			(0.47)			(0.45)
Independent Board			0.498***			0.463***
			(0.04)			(0.05)
Interlocked Board			-0.990			-1.130
			0.00			0.00
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.16	0.30	0.32	0.16	0.30	0.32
Observations	1,972	1,491	1,384	1,473	1,307	1,271

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

PANEL B: CEO Turnover

	(1)	(2)	(3)	(4)	(5)	(6)
$(High\ Connectedness)_t$	-0.008	-0.021	-0.022			
	(2.11)**	(1.90)*	(1.86)*			
$(High\ Connectedness)_t \times (Stock\ Return)_t$	0.015	0.041	0.048	0.017	0.042	0.049
	(1.76)*	(1.75)*	(1.88)*	(1.90)*	(1.86)*	(1.99)**
$(Stock\ Return)_t$	-0.012	-0.035	-0.033	-0.013	-0.036	-0.034
	(2.49)**	(2.59)***	(2.28)**	(2.52)**	(2.62)***	(2.32)**
$(High\ Connectedness)_{t-1} \times (Stock\ Return)_{t-1}$	0.003	0.011	0.008	0.001	0.007	0.004
	(0.41)	(0.63)	(0.41)	(0.15)	(0.42)	(0.21)
$(Stock\ Return)_{t-1}$	-0.013	-0.035	-0.037	-0.013	-0.034	-0.036
	(3.66)***	(3.81)***	(3.65)***	(3.46)***	(3.63)***	(3.49)***
Assets	0.001	-0.004	-0.006	0.002	-0.002	-0.004
	(1.00)	(1.17)	(1.64)	(1.60)	(0.70)	(1.19)
Tobin's q	0.001	0.006	0.008	0.001	0.006	0.008
	(1.07)	(1.98)**	(2.17)**	(1.05)	(1.96)*	(2.16)**
TDA	0.005	0.030	0.035	0.007	0.032	0.038
	(0.60)	(1.23)	(1.39)	(0.68)	(1.32)	(1.49)
Firm Age	0.000	0.000	0.000	0.000	0.000	0.000
	(1.33)	(0.04)	(0.45)	(1.51)	(0.10)	(0.53)
CEO Age		0.030	0.035		0.032	0.038
		(1.23)	(1.39)		(1.32)	(1.49)
CEO Tenure		0.000	0.000		0.000	0.000
		(0.04)	(0.45)		(0.10)	(0.53)
CEO Ownership		0.009	0.010		0.010	0.010
		(13.64)***	(13.60)***		(13.70)***	(13.66)***
GIM Index			-0.001			-0.001
			(0.61)			(0.48)
Independent Board			0.023			0.027
			(0.91)			(1.07)
Interlocked Board			0.002			0.003
			(0.26)			(0.28)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.16	0.30	0.32	0.16	0.30	0.32
Observations	7,670	6,578	6,033	7,670	6,578	6,033

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table VII

The Probability of Getting a New Directorship and Director Networks

This table presents Probit regressions of the probability of a director getting at least one more director seat in year t based on director characteristics in year $t-1$. Panel A uses the full sample of directors. Panel B uses only the sub-sample of directors that are defined as independent (outsiders). *Highly Connected Director* is a dummy that equals 1 if a director had a *Connectedness* score in year $t-1$ above the industry average. *Approved Above Ind. Ave. Increase* is a dummy that equals 1 if a director in year $t-1$ was on boards that approved (on average) an increase in CEO salary that was above the industry average. *"Good" Director* is a dummy that receives a value of 1 if the majority of the firms the director sits on achieved above average return in the previous year. *CEO Elsewhere* is a dummy that receives a value of 1 if the director is a CEO in some firm. *Age Quintile* is a series of indicators representing the age of the directors. *Ethnicity* represents the ethnicity of each director. *Gender* equals 1 if the director is male. Specifications (1)-(4) and (6)-(7) are Probit Regressions where the dependent variable equals 1 if in year t the director added at least one more directorship. All the coefficients represent the dF/dX which is the discrete change of a dummy variable from 0 to 1 and can be interpreted as probabilities. Specification (5) is an Ordered Logistic regression where the dependent variable is the *Number of New Directorships* a director added in year t. Specification (6) is on the sub-sample of directors that are highly connected (Connected Directors) and specification (7) is on the sub-sample of directors that approved high salaries (Lenient Directors). All z-statistics are calculated with robust standard errors and are clustered by directors.

	Full Sample			Independent Directors		
	(1)	(2)	(3)	(4)	(5)	(6)
Connected - Quintile 1	0.006	0.005	-0.004	0.006	0.005	-0.006
	(1.99)**	(1.70)*	-1.010	-1.440	-1.220	-1.220
Connected - Quintile 3	0.010	0.011	0.002	0.010	0.011	0.002
	(3.41)***	(3.58)***	-0.430	(2.72)***	(2.85)***	-0.420
Connected - Quintile 4	0.021	0.021	0.013	0.021	0.022	0.014
	(6.80)***	(7.10)***	(3.79)***	(5.34)***	(5.55)***	(3.13)***
Connected - Quintile 5	0.031	0.033	0.027	0.026	0.028	0.021
	(9.19)***	(9.85)***	(7.59)***	(6.01)***	(6.46)***	(4.56)***
"Good" director		0.012			0.013	
		(7.12)***			(5.55)***	
(Connected - Quintile 1)*("Good)			0.0172			0.0211
			(3.62)***			(3.33)***
(Connected - Quintile 3)*("Good)			0.0172			0.0174
			(4.06)***			(3.17)***
(Connected - Quintile 4)*("Good)			0.0137			0.0136
			(3.56)***			(2.75)***
(Connected - Quintile 5)*("Good)			0.0053			0.0096
			-(1.46)			(1.87)*
CEO elsewhere	0.02	0.02	0.02	0.02	0.02	0.02
	(11.02)***	(11.13)***	(11.10)***	(8.59)***	(8.72)***	(8.69)***
Age (53-57)	0.0003	0.0005	0.0006	-0.0026	-0.0023	-0.0023
	-(0.15)	-(0.23)	-(0.24)	-(0.81)	-(0.73)	-(0.72)
Age (58-62)	0.0008	0.0011	0.0010	-0.0048	-0.0046	-0.0046
	-(0.32)	-(0.45)	-(0.42)	-(1.53)	-(1.47)	-(1.50)
Age (63-67)	-0.0095	-0.0091	-0.0092	-0.0170	-0.0166	-0.0167
	(3.92)***	(3.77)***	(3.78)***	(5.48)***	(5.40)***	(5.40)***
Age (68+)	-0.0184	-0.0180	-0.0181	-0.0275	-0.0272	-0.0273
	(7.17)***	(7.05)***	(7.09)***	(8.51)***	(8.49)***	(8.51)***
Ethnicity:						
Asian	0.0092	0.0090	0.0091	0.0167	0.0169	0.0167
	-(1.03)	-(1.02)	-(1.04)	-(1.26)	-(1.27)	-(1.26)
Black	0.0075	0.0077	0.0077	0.0029	0.0030	0.0030
	-(1.55)	-(1.59)	-(1.59)	-(0.53)	-(0.55)	-(0.54)
Caucasian	-0.0049	-0.0048	-0.0048	-0.0030	-0.0028	-0.0028
	(2.46)**	(2.43)**	(2.40)**	-(1.11)	-(1.06)	-(1.07)
Hispanic	0.0074	0.0071	0.0072	-0.0072	-0.0071	-0.0072
	-(0.95)	-(0.93)	-(0.93)	-(0.84)	-(0.83)	-(0.85)
Gender (Man)	-0.0001	0.0001	0.0000	-0.0059	-0.0059	-0.0060
	-(0.02)	-(0.02)	-(0.01)	(1.89)*	(1.90)*	(1.92)*
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.03	0.04	0.04	0.04	0.03	0.03
Observations	48,394	48,394	48,394	30,932	30,932	30,932

Note: *** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.