CEO Connectedness within Executive Suites and Corporate Frauds

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Abstract

This paper identifies an important factor in assessing a firm's likelihood of engaging in wrongdoing--the connection between CEOs and top executives arising from executive appointments during the CEO's tenure. Using a sample of publicly listed firms over the period 1996 - 2006, we find that CEO connectedness within executive suites increases the likelihood of committing frauds by helping to conceal frauds and by reducing the coordination costs of carrying out illegal activities. In addition, the impact of CEO connectedness is even stronger when the fraud involves executives taking advantage of their positions to benefit themselves as compared to when the fraud is either an accounting or operating fraud. Further, the adverse effects of CEO connectedness on frauds do not seem mitigated by standard monitoring mechanisms. The evidence suggests that regulators, investors, and governance specialists should pay particular attention to how closely connected CEOs are to their top executives through personnel decisions.

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I. INTRODUCTION

Accusations of corporate wrongdoing have dominated headlines over the last decade and generated a great deal of research inquiry. Previous studies examine various factors affecting the likelihood of fraud and its detection, such as board structure, executive compensation, general business conditions, corporate lobbying, and market- and regulatory-based institutions.[1] In spite of this abundant scholarly activity, little is known about whether and how CEOs influence over their top executives impacts corporate wrongdoing.

CEOs have significant explicit legal authority and substantial "soft" influence within the firm to direct firm behavior,[2] of which wrongdoing is but one potential outcome. Thus, CEOs are likely to have an important impact on the incidence of fraud. One source of influence is the personal connections CEOs have with their top executives. The connections are important because they facilitate and lower the costs of coordinated activities with top executives. Much corporate wrongdoing can be prevented by, or is the result of, coordinated activities by managers who work with the CEO on a daily basis.[3] Thus, the lower coordination costs due to more

[1] See, for example, Burns and Kedia (2006); Peng and Röell (2008); Hertzberg (2005); Efendi, Srivastava, and Swanson (2007); Beasley (1996); Agrawal and Chadha (2005); Povel, Singh and Winton (2007); Kumar and Langberg (2008); Wang, Winton and Yu (2010); Dyck, Morse, and Zingales (2010); Wang (2011); and Yu and Yu (2011).

[2] Allen, Kraakman, and Subramanian (2011) discuss CEOs' legal authority to contractually bind the firm for ordinary transactions. Evidence for CEOs' important influence on firm behavior and performance can be found in Bertrand and Shoar (2003) who find CEO fixed effects matter for a wide range of firm policies; Bennedsen, Perez-Gonzalez, and Wolfenzon (2006) who document that CEO deaths are strongly negatively correlated with firm profitability and growth; Cronqvist, Makhija, and Yonker (2009) who show differences in corporate financial leverage can be traced to CEOs' personal leverage; and Jenter and Lewellen (2011) who find CEO age approaching retirement has an important impact on the likelihood of their firms being taken over and the takeover premiums their shareholders receive.

[3] We focus on top executives rather than outside board members. In theory, one could argue that outside board members do have a role in corporate wrongdoing because their key role is to monitor management. However, outside board members, who work on a part-time basis, are rarely involved in the day-to-day activities of the firm and, hence, are rarely held liable for failing to monitor behavior at the firm when they are not themselves actively involved in, and benefit from, the wrongdoing (Black, Cheffins and Klausner (2006a), Steven Davidoff, *Despite Worries, Serving at the Top Carries Little Risk*, NEW YORK TIMES, June 7, 2011). Of course, there are the rare and

connectedness may cut both ways: They may help the top executive teams to more effectively deter fraud, or make it easier to collude to commit fraud.

We focus on corporate fraud involving management and ask: Does greater CEO connectedness within executive suites decrease or increase the likelihood of wrongdoing? To examine this question, we proxy CEO connectedness by relationships a CEO develops with top executives through their appointment decisions during her tenure. We find this measure of connections increases the likelihood of fraud involving management by decreasing the expected costs of committing frauds. Specifically, the connections decrease the likelihood of fraud detection and reduce the coordination costs needed to carry out illegal activities. Indeed, the impact of CEO connectedness is even stronger when the fraud involves executives taking advantage of their positions to benefit themselves as compared to when the fraud is either an accounting fraud or operating fraud. We find these effects are not mitigated by standard monitoring mechanisms.

These results imply CEO connectedness within executive suites is a critical factor in assessing a firm's likelihood of engaging in wrongdoing, has adverse effects not mitigated by standard monitoring mechanisms, and thus is a factor to which investors, regulators, and governance specialists should pay particular attention. Further, our results underscore the importance of network connections by illustrating how the relationship between a CEO and his top management team affects corporate wrongdoing.

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notable exceptions, such as the outside board members of Enron and Worldcom who paid substantial penalties. Ben White, *Former Directors Agree To Settle Class Actions,* WASHINGTON POST, January 8, 2005. The rather exceptional circumstances of these settlements are discussed in Black, Cheffins, and Klausner (2006b) and indicate that such settlements are the rare exception, not the norm.

CEO connectedness within executive suites is measured by the fraction of top executives appointed (FTA) during the current CEO's tenure. CEOs are heavily involved in identifying, recruiting, and appointing top executives; hence, the executives are likely to share similar beliefs, preferences, and visions with the CEO who appointed them. They also are likely to be more closely aligned and more loyal, whereas executives who are used to working with a previous CEO are more likely to challenge orders received from a new CEO. Thus, a higher FTA increases a CEO's influence over top executives through social processes akin to what social psychologists refer to as social influence (Cialdini, 1984), which rely on norms of reciprocity, liking, and social consensus to shape management's decision making. However, Landier, Sraer, and Thesmar (2008) point out the number of top executives hired during a CEO tenure at a particular point in time depends on the length of the CEO's and other executives' tenure. Thus, we use the abnormal fraction of top executives appointed (AFTA), the residual of a regression relating FTA to factors correlated to FTA, as an alternative proxy for robustness throughout for the whole paper.

Our full sample covers 17,815 firm-year observations associated with 2,736 unique firms between 1996 and 2006. For this sample, we gather comprehensive data on alleged corporate frauds and apply carefully designed screens to exclude mistaken or frivolous suits, identifying 274 cases of corporate fraud with 641 firm-year fraud observations. The sample period ends after 2006 to allow sufficient time to detect frauds committed during the sample period and to exclude the potential impact of the financial crisis in 2008.

Inherent in any sample construction of frauds, however, is the partial observability problem: we observe only detected frauds, not the population of frauds. Since observed fraud depends on two distinct but latent processes--commitment of fraud and detection of fraud--we follow Wang, Winton, and Yu (2010) and Wang (2011) and employ the bivariate probit model.

We find both FTA and AFTA are positively related to the likelihood of wrongdoing and negatively related to the likelihood of detection given wrongdoing. These relations are significant and robust to alternate measures of FTA and AFTA, sample constructions, and regression specifications. To address endogeneity issues concerning FTA and AFTA, we estimate instrumental variable (IV) regressions using as our IVs the number of non-CEO top executive deaths and permanent retirements at the age of 65 or older. These deaths and retirements automatically increase FTA and AFTA, but our selection criteria of deaths and permanent retirements make them unlikely to be related to fraud. The IV regression estimations demonstrate our results are robust to potential endogeneity issues.

We also examine two possible channels through which CEO connectedness influences wrongdoing – lower probability of detection and lower coordination costs of conducting wrongdoing. Greater CEO connectedness may help conceal fraud more effectively (Khanna, 2003; Arlen and Carney, 1992). This might happen via influencing others to fabricate or obfuscate internal records, thereby making it harder to detect or prove wrongdoing in court. Or by simply pressuring individuals not to reveal instances of wrongdoing out of loyalty to the CEO who appointed them or just out of fear of reprisal.

Bivariate model estimations reveal FTA and AFTA are negatively related to detection, given fraud. FTA and AFTA also are positively related to fraud detection duration, the period from the commencement of fraudulent activity to the filing of the class action litigation, and negatively related to the Cox-hazard ratio of fraud detection. Both results are significant. Further, the duration results are robust to IV regressions using non-CEO top executive deaths and permanent retirements and alternative measures of CEO connectedness. CEO connectedness seems to help conceal frauds.

In addition, coordinating illegal activities may be less costly when CEOs and top executives are more closely connected; for example, greater connectedness may help obtain support to override internal control mechanisms or push through policies or activities that others in the executive team may be reluctant to pursue (Khanna, 2003). Thus, frauds committed by firms with greater CEO connectedness are likely to have more executives involved, and charged, when detected. Consistent with this hypothesis, we find the number of executives charged in fraud is positively and significant related to both FTA and AFTA. Our IV regression estimations demonstrate the robustness of this result to potential endogeneity issues.

How is CEO connectedness related to the types of frauds? We find that the firms with greater CEO connectedness are more likely to commit frauds that benefit executives, implying that social connections among executives are more likely to be used as a tool by executives to take advantage of their positions to profit themselves.

Can these adverse effects of CEO connectedness be contained by standard monitoring mechanisms? We re-estimate the bivariate probit model while interacting FTA or AFTA with proxies for the strength of internal monitoring by the board and audit committee. We also interact with the strength of external monitoring proxied by institutional ownership concentration. None of the interactive effects are significant. This implies that the standard monitoring mechanisms do not seem effective in countering the influence of CEO connectedness on wrongdoing.

This paper is related to multiple areas of research: corporate wrongdoing, network connections among corporate players, and the impact of powerful CEOs. Numerous studies investigate factors related to corporate fraud, such as executive compensation (e.g., Burns and

Kedia, 2006; Peng and Röell, 2008; Hertzberg, 2005; Efendi, Srivastava, and Swanson, 2007),[4] board structure (e.g., Beasley, 1996; Agrawal and Chadha, 2005), [5] and general business conditions (e.g., Povel, Singh, and Winton, 2007; Wang et al,, 2010);[6] and factors related to fraud detection (Dyck, Morse, and Zingales, 2010;Wang, 2011;Yu and Yu, 2011).[7] Our study reveals a new important factor in determining both the incidence of fraud and its detection--CEO connectedness within executive suites.

Our paper is also related to the large and growing literature on social and network connections, which explores the importance of social ties in the selection of the higher levels of the corporate hierarchy (e.g., CEOs, board members) and examines what impact these ties have on various indicia of performance, board composition, and so forth.[8] Some studies explore the effects on interlocking board directorships,[9] yet others explore CEO involvement in selecting board members and the connections between the CEO and board members,[10] while others examine the effects of social connections on fund performance.[11] But to date there is no analysis

[4] Burns and Kedia (2006) find the sensitivity of the CEO's options to stock price is significantly and positively related to the propensity to misreport. Peng and Röell (2008) find incentive pay in the form of options increases the probability of securities fraud class action litigation. However, Efendi et al. (2007) find no consistent evidence that executive equity incentives are associated with fraud.

[5] Beasley (1996) finds non-fraud firms have significantly higher percentages of outside board members than fraud firms, and Agrawal and Chadha (2005) find the probability of restatement is lower in companies whose boards or audit committees have an independent director with a background in accounting or finance, but other governance characteristics (e.g., independent boards, independent audit committees) are unrelated to the probability of fraud.

[6]Povel et al. (2007) model an inverted U-shaped relation between investors' beliefs about underlying business conditions and fraud incidence mediated through investors' monitoring efforts. Wang et al. (2010) find empirical support for this account. Kumar and Langberg (2008) argue that regardless of investors' perceptions about business conditions, greater uncertainty enhances incentives for fraud, assuming managerial empire-building.

[7]Dyck et al. (2010) find market-based institutions play a more significant role in detecting frauds than regulatory-based institutions. Wang (2011) finds that smaller research and development investment and more mergers and acquisitions activity are associated with a higher likelihood of detection. Yu and Yu (2011) investigate the relation between corporate lobbying and corporate governance in the context of fraud detection.

[8] See, for example, Hochberg, Ljungqvist, and Lu (2007, 2010) and Fracassi and Tate (2011).

[9] See, for example, Ferris, Jagannathan, and Pritchard (2003); Larcker, Richardson, Seary, and Tuna (2005); Stuart and Yim (2010).

[10] See, for example, Shivdasani and Yermack (1999), Adams and Ferreira (2007), and Hwang and Kim (2009),

[11] See Cohen, Frazzini and, Malloy (2008, 2010).

of connections between the CEO and top executives who work with her on a daily basis at the firm and the effects of the connections on the incidence of corporate wrongdoing.

Since CEO connectedness over executive suites can be considered an important source of CEO power, this paper also adds new evidence on the impact of CEO power. Adams, Almeida, and Ferreira (2005) find firms with powerful CEOs have greater variation in performance; Landier, et al. (2008) and Bebchuk, Cremers, and Peyer (2011) find CEO power is associated with lower firm performance; Bebchuk and Fried (2004) find powerful CEOs reduce the link between compensation and performance; Morse, Nanda, and Seru (2011) show powerful CEOs often rig incentive contracts. Our paper finds CEO power—stemming from CEO connectedness—also is conducive to corporate wrongdoing.

This paper contributes on several fronts. First, we contribute to the literature on corporate fraud by identifying CEO connectedness as an important factor influencing corporate wrongdoing. Second, we add to the burgeoning "connections" literature by identifying another area in which connections have an effect on firm behavior, corporate wrongdoing. Finally, our paper contributes to the literature on powerful CEO effects by providing evidence that more influential CEOs are also associated with a higher likelihood of wrongdoing and a lower probability of its detection should wrongdoing occur.

The rest of the paper is organized as follows. The next section contains the empirical design, data description, and summary statistics. Section III provides the main results, followed by a battery of robustness tests. Section IV explores the channels through which CEO connectedness may influence the likelihood of wrongdoing. Section V analyzes the relation between CEO connectedness and the types of corporate frauds. Section VI investigates whether

standard monitoring mechanisms help contain the adverse effects of CEO connectedness. Section VII concludes.

II. EMPIRICAL DESIGN, DATA AND SUMMARY STATISTICS

II.1 Empirical Methodology

In estimating the relationship between CEO connectedness and fraud, we are mindful of the partial observability problem: we observe frauds only when they are detected. We employ the bivariate probit model to address this issue, following Wang, Winton, and Yu (2010) and Wang (2011). For each firm *i*, we denote $Fraud_{it}$*and $Detect_{it}^{*}$as the latent variables determining firm *i*'s likelihood of committing a fraud in year *t* and the possibility of detecting it as follow:

$$\text{Fraud}_{it}^{*} = X_{F,it}\delta + \mu_{it} \quad (1a)$$

$$\text{Detect}_{it}^{*} = X_{D,it}\eta + \nu_{it} \quad (1b)$$

$X_{F,it}$ is a vector of variables explaining firm *i*'s likelihood of committing a fraud in year *t*, and $X_{D,it}$ contains variables explaining the firm's likelihood of being detected. μ_{it} and v_{it} are zero-mean disturbances with a bivariate normal distribution. The correlation between μ_{it} and v_{it} is ρ.

We define the following binary variables: $Fraud_{it} = 1$, if $Fraud_{it}^{*} > 0$, and $Fraud_{it} = 0$, otherwise; and $\text{Detect}_{it} = 1$ if $Detect_{it}^{*} > 0$, and $Detect_{it} = 0$, otherwise. We do not directly observe the realizations of $Fraud_{it}$ and $Detect_{it}$; instead, we observe $\text{Observe}_{it} = Fraud_{it}Detect_{it}$, where $Observe_{it} = 1$ if firm *i* has committed fraud and has been detected, and $Observe_{it} = 0$ if firm *i* has not committed a fraud or has committed fraud but has not been detected.

Let Φ denote the bivariate standard normal cumulative distribution function. The empirical model for $Observe_{it}$ is:

$$P(\text{Observe}_{it} = 1) = P(\text{Fraud}_{it}\text{Detect}_{it} = 1) = \Phi(X_{F,it}\delta, X_{D,it}\eta, \rho) \quad (2a)$$

$$P(Observe_{it} = 0) = P(Fraud_{it}Detect_{it} = 0) = 1 - \Phi(X_{F,it}\delta, X_{D,it}\eta, \rho) \quad (2b)$$

Thus, the log-likelihood function for the model is:

$$L(\delta, \eta, \rho) = \Sigma \log(P(Observe_{it} = 1)) + \Sigma \log(P(Observe_{it} = 0)) \quad (3)$$

This model can be estimated using the maximum-likelihood method.

An important assumption of the bivariate probit model is that $X_{F,it}$ and $X_{D,it}$ do not contain the same set of variables such that at least one vector has variables not present in the other vector. As we discuss below, this condition is satisfied in our study because some variables affect fraud incidence directly without affecting the likelihood of detection, yielding variables in $X_{F,it}$ that are not present in $X_{D,it}$. Further, because the bivariate probit model estimation assumes no false detections of fraud, we cull out false detections by exercising great care in assembling our sample of detected frauds, as described in next section.

To account for possible correlations among firms in the same industry, robust standard errors are clustered at the industry level, which are defined as Fama-French 48 industry groupings. Additionally, CEO connectedness is a CEO specific variable. As robustness checks, we cluster standard errors at the CEO-firm level and firm level, respectively. The results are robust. [12]

II.2 Variables

II.2.1 Identifying Fraud

We construct a sample of frauds involving management using federal securities class actions. The data source is the federal class action securities fraud litigation database compiled

[12]We cluster at the industry level as the primary results throughout the paper, because we want to make it consistent with detection duration estimation and the number of executive charged estimation in which clustering at the firm level or at the CEO-firm pair level is not meaningful.

by the Stanford Securities Class Action Clearinghouse (SSCAC).[13] SSCAC is a thorough collection of likely discovered fraud cases, including virtually all frauds with more than a *de minimis* effect on stock price. The filing of a securities class action lawsuit is now a largely automated process whereby law firms file a suit whenever there is a negative stock price movement above a certain *de minimis* level (Choi, Nelson, and Pritchard, 2009).

Using lawsuits as the proxy for detected frauds raises the possibility of false detection (e.g., mistaken or frivolous litigation). For this reason, we begin the sample period from 1996, the year after the passage of the Private Securities Litigation Reform Act, which was designed to reduce frivolous suits by requiring greater and more credible evidence to be provided earlier in the litigation process before a suit would be permitted to proceed to the next stage of litigation, e.g., "discovery" (Johnson, Nelson, and Pritchard, 2007).

The chance of false detection in using the SSCAC database also was of great concern in Dyck, et al. (2010) study on whistle blowers and corporate fraud. They apply careful screening procedures to exclude suits that could potentially be mistaken or frivolous. We follow their screening procedures with some modifications.[14] For the firm-year observations associated with multiple fraud cases, we keep the information on fraud cases having the highest number of

[13] The SSCAC maintains and updates records of federal securities fraud class actions since the 1995 passage of the Private Securities Litigation Reform Act. The database is available at http://securities.stanford.edu/index.html.

[14] We use the following screening criteria that are identical to those used in Dyck et al. (2010): (1) Exclude cases where SSCAC identifies regular agents other than management as initiating the fraud. This is done to identify frauds involving top management. (2) Exclude cases subsequently dismissed by the court. (3) Exclude settled cases where the settlement amounts are less than $3 million. The threshold of $3 million originates from previous studies (Grundfest, 1995; Choi, 2007; and Choi, Nelson, and Pritchard, 2009), which suggest a settlement amount as an indicator to separate frivolous suits from meritorious ones. They find suits settling below a $2.5 -$1.5 million threshold are on average frivolous. The range reflects the cost to the law firm for its effort in filing. A firm settling for less than $1.5 million is almost certainly just paying lawyer fees to avoid negative court exposure. Our screening criteria differ from those of Dyck et al. in that we do not exclude backdating cases, IPO underwriter allocation cases, mutual fund timing and late trading cases, analyst cases involving false provision of favorable coverage, or cases where defendants claim they are settling to avoid negative publicity if the settlement amount exceeds $3 million.

executives charged. Our screening criteria yield 274 fraud cases with 641 fraud firm-year observations.

These cases are alleged frauds and often end in settlements (as do the vast majority of civil suits seeking monetary recovery) without a judicial determination of liability. However, our use of the screens noted above is the standard treatment in the securities fraud literature when addressing the concern of over-inclusion and these screens are generally seen to whittle away the most likely types of frivolous or mistaken suits, leaving us primarily with cases of likely fraud.[15] Moreover, the potential presence of a few non-fraud suits in the fraud sample adds noise, which is likely to weaken the power of test and bias against finding significant results. Our sample period ends after 2006 to give a three-year detection period until 2009, when we started compiling data. This three-year period allows inclusion of frauds that took place during the sample period but were detected after 2006.[16]

II.2.2 Measures of CEO Connectedness

We estimate CEO connectedness by calculating the fraction of top executives appointed, FTA_{it}, during the tenure of firm *i*'s CEO as of year *t*. To prevent changes in the reported number of executives from affecting within-firm variation in FTA_{it}, we drop firm-year observations when ExecuComp reports less than five top executives (including CEO).[17] Thus, FTA_{it} is the number of the top four non-CEO executives appointed during the current CEO's tenure divided by four. To

[15]Further, even if all cases led to judicial determinations with no settlements, one would still not know for certain the total number of actual fraud cases. This is because a judicial determination of liability could also be erroneous given that it often requires assessing whether someone had a particular state of mind – an inherently difficult matter on which to have certainty.

[16] Our sample mean duration from the commencement of fraudulent activity to the filing of a class action is 745 days.

[17]Kim and Lu (2011a) illustrate the importance of keeping the number of executives constant when constructing executive variables for panel regressions with firm fixed effects. Cross-checking against proxy statements shows that missing executives in ExecuComp are due to omission: The firm-year observations with less than five top executives in ExecuComp they examined show five or more top executive in proxy statements.

identify the top executives, we follow the way ExecuComp ranks non-CEO top-executives, by the sum of their salaries and bonuses. We assume the year a non-CEO executive first appears on the list of top four non-CEO executive is the year in which he obtained the position. We compare this year with the year the current CEO took office to determine whether the executive is appointed during the current CEO's tenure.

FTA_{it} may be correlated with the length of the CEO's tenure, the average tenure of non-CEO top executives, and whether the CEO is hired from outside the firm. Thus, for robustness, we use an alternative proxy for CEO connectedness, the abnormal fraction of top executives appointed (AFTA) during a CEO's tenure.[18] $AFTA_{it}$ is the residual of regression (4):

$$FTA_{it} = a_0 + a_1 CEOTenure_{it} + a_2 Execsen_{it} + a_3 Outside_{it} + a_4 Unknown_{it} + a_5 FTA\_1Y_{it} + a_6 FTA\_1Y\_Unknown_{it} + Year_t + \varepsilon_{it} \quad (4)$$

$CEOTenure_{it}$ is the number of years firm i's CEO has been in office by year t.[19] $Execsen_{it}$ is the average number of years firm i's top four non-CEO executives have held their positions by year t. $Outside_{it}$ is an indicator variable equal to one if a CEO is from outside the firm. $Unknown_{it}$ is the fraction of executives whose first year on the list of the top four non-CEO executives cannot be identified based on data provided by ExecuComp. This variable is designed to control for noise in FTA_{it} and $Execsen_{it}$ due to ambiguity about the precise year in which some of the top executives were appointed.[20] FTA_1Y_{it} is the fraction of top executives appointed during a CEO's first year in

[18]Landier et al. (2008) use a similar measure based on new hires only. Since similar connections may arise between a CEO and top executives through promotion decisions within the firm, Kim and Lu (2011b) include all top executives appointed during the CEO's tenure.

[19]If a CEO leaves the position and returns later, ExecuComp reports only the latest appointment date. Thus, simply comparing the CEO appointment date reported by ExecuComp with the current year may generate negative CEO tenure. We correct for this problem by backtracking the previous appointment year using the CEO and company names.

[20]ExecuComp provides appointment dates for CEOs, but not for other top executives, except for the CFO beginning in 2006. Hence, if an executive is already one of the top four non-CEO executives when the firm first appears in

office (a new CEO appointment is sometimes followed by several top executive turnovers). $FTA\_1Y\_Unknown_{it}$ is the fraction of top executives for whom we cannot determine whether the appointment took place during a CEO's first year in office. This is to control for noise in FTA_1Y_{it}.

The regression also controls for year-fixed effects to account for macro-economic factors affecting top-executive hiring, promotion, and retention decisions. The regression estimate is reported in Table A1 in the Appendix. Unsurprisingly, the fraction of executives appointed during a CEO's tenure is positively related to the length of the CEO tenure and negatively related to the average non-CEO executive tenure.

II.2.3 Control Variables

Estimating the bivariate probit model requires two sets of control variables, one each for (1a) and (1b). They may overlap, but should not be identical. At least some of the variables explaining one vector (fraud incidence) should be different than those explaining another vector (fraud detection). The likelihood of fraud detection affects the expected costs of committing fraud, which are the value lost due to penalties, jail terms, and reputational loss multiplied by the probability of being detected. Hence, all variables affecting fraud detection should also affect fraud incidence. However, the reverse may not be true; factors affecting fraud incidence may not have obvious implications on the likelihood of detection. Thus, all control variables for fraud detection are also control variables for fraud incidence, but fraud incidence has additional control variables. We first describe the set of control variables for fraud detection and follow with a second group of control variables that apply only to fraud incidence.

ExecuComp, we cannot determine when he first obtained the position. For such cases, we use the year the executive first appears in ExecuComp as the year of appointment to the top executive position and compare it with the year the current CEO took office to determine whether the executive was appointed during the CEO's tenure. Since this method underestimates *Frac,* we include *Unknown* as a control variable to mitigate the underestimation problem.

- *Fraud Detection*

Internal and external monitoring may play an important role in detecting fraud. Control variables related to internal monitoring include: (1) The percentage of non-independent directors, *%_NonIndepDirectors*. The important monitoring role played by independent directors has been widely documented; for example, Weisbach (1988) finds CEO turnover following poor performance is positively related to the fraction of outside directors. (2) Log of the number of directors on the board, *Ln(BoardSize)*. Prior research indicates larger boards tend to be less effective monitors (Lipton and Lorsch 1992, Jensen 1993, Yermack 1996, and Eisenberg, et al. 1998). (3) Log of the number of board meetings in a given year, *Ln(BoardMeetings)*, which may indicate the strength of board oversight and monitoring (Vafeas, 1999). (4) The percentage of non-independent directors on the audit committee, *%_NonIndepDirectors_Audit,* and the log of the number of directors on the audit committee, *Ln(AuditComSize)*. Audit committees, charged with the oversight of financial reporting, internal controls, and external audits, may play a key role in fraud detection (Deli and Gillan, 2000).

The strength of external monitoring is proxied by institutional ownership concentration (IOC). Previous studies document the important roles institutional investors play in shaping corporate governance (e.g., Hartzell and Starks, 2003; Cremers and Nair, 2005; Del Guercio, Seery, and Woidtke, 2008; Edmans, 2009; Kim and Lu, 2011a). We follow Hartzell and Starks (2003) and estimate *IOC* by the percentage shareholdings of the top five institutional investors.

Because our sample of detected frauds is obtained from lawsuits, we control for firm- or industry-specific litigation risk factors. The securities litigation literature (e.g., Jones and Weingram, 1996; Johnson, Nelson, and Pritchard, 2007) suggests that firm performance and stock return volatility are related to a firm's litigation risk. Firm performance is proxied by

Tobin's Q and *Ebitda/TA*. Tobin's *Q* is measured as the ratio of the market value of common equity plus the book value of total liabilities to the book value of total assets. *Ebitda/TA* is measured as earnings before interest, taxes, depreciation and amortization divided by the book value of total assets. Stock return volatility, *StockVolatilities,* is measured as the standard deviation of daily stock returns over a given year.

Litigation risk can be correlated among firms within the same industry. A fraudulent firm is more likely to get caught when investigators and media are looking closely at the firm's industry; that is, high industry litigation intensity increases firms' litigation risk (Wang, Winton, and Yu, 2010). We control for industry securities litigation intensity, *IndustryLitigation,* by the number of lawsuits against publicly listed firms as reported by the SSCAC for an industry in a given year divided by the number of firms covered by Compustat in the same industry in the same year. The industries are defined by Fama-French (1997) industry groupings.

We also include firm size, sales growth rate, and leverage. Frauds by larger firms are more likely to get caught than frauds by smaller firms (Wang et al., 2010). Larger firms tend to attract more investor attention, leading to greater public scrutiny. Higher growth firms may also attract more attention from security analysts and investors, increasing the possibility of fraud detection. Banks and fixed income investors may monitor firms more closely when firms have high financial leverage. Firm size is measured as log of the book value of total assets, *Ln(TotalAssets)*; sales growth rate, *SalesGrowth_5Yr,* the five-year annual growth rate as reported in ExecuComp; financial leverage, *Leverage,* the sum of short- and long-term debt divided by the book value of total assets.

Finally, we control for CEO age, *Ln(CEO_Age),* whether a CEO also chairs the board, *CEO_Chair*, and an indicator for a founder-CEO, *CEO_Founder*. We follow Bebchuk et al.

(2011) and classify a CEO as a founder if he was the CEO five years prior to going public, where the date of going public is assumed to be the first date the firm appears in the CRSP database. Older CEOs tend to be more experienced, which may help them evade detection. The dual role as CEO and chair of the board and the fact that the CEO is also the founder of the firm may be symptomatic of greater CEO power and/or give a CEO more power over the board, making it easier to hinder monitoring by the board. Additionally, a founder CEO may better know the organization and business of the firm than a non-founder CEO, making detection of wrong doings more difficult.

- *Fraud Incidence*

To the extent these variables affect the likelihood of detection, they will also affect the likelihood of committing frauds by affecting the expected cost of committing fraud. But some of these variables may also directly influence fraud incidence by affecting the incentives to commit fraud. For example, *Tobin's Q* and *Ebitda/TA* may be negatively related to fraud incidence, as fraud is more likely when a firm is suffering operating troubles (Alexander and Cohen 1999, Arlen and Carney 1992); greater litigation risk may have the effect of discouraging frauds ex-ante; higher leverage may increase fraud incidence by providing the incentive for firms to inflate reported earnings and other accounting measures to avoid violation of debt covenants; career concerns may discourage younger CEOs from committing frauds; and founder CEOs may be generally more entrepreneurial and more adventurous with higher levels of risk tolerance than non-founders., and hence affect fraud incidence.

In addition to these factors, there are other variables directly affecting the likelihood of committing frauds without an obvious influence on detection. Wang et al. (2010) argue the

incidence of fraud is related to investor beliefs about industry prospects and provide evidence of a hump shaped relation with industry Tobin's Q. We control for *Industry Q* and *(Industry Q)*^{2}.

CEO characteristics, such as CEO share ownership, may also affect the incidence of frauds. CEO ownership may affect fraud incidence through firm performance and risk taking. Because CEO share ownership, *CEO_OWN,* is related to firm performance and risk taking in a hump shaped relation (Kim and Lu, 2011a), we include *CEO_OWN* and *(CEO_OWN)*^{2}.

Finally, product market competition may affect the strength of governance by reducing managerial slack (Guadalupe and Wulf, 2007; Giroud and Mueller, 2010, 2011; Kim and Lu, 2011a). We control for industry concentration ratio (ICR) as a proxy for the competitiveness of product markets. ICR is the sum of the market share of the four biggest firms in sales among all firms in Compustat in the same industry in a given year.[21] A lower ratio indicates greater competition. Table I provides definitions of all variables.

II.3. Sample Construction

Our investigation is based on panel data from 1996 to 2006. Executive data are taken from ExecuComp; firm characteristics and accounting data, from Compustat; stock return data, from CRSP; board information, from RiskMetrics; and institutional ownership data, from the CDA Spectrum database. Fraud data is manually constructed from the class action securities fraud litigation database by SSCAC. Merging these databases provides a large panel dataset, which allows us to track, through time, detected frauds to analyze the impact CEO connectedness has on committing and detecting frauds.

[21] The Economic Census uses the largest 4, 8, 20, or 50 companies to compute ICRs. Because Compustat covers only public firms, we rely on the four largest companies to minimize the possibility of excluding private firms.

Table II reports the sample distribution of all firms with *FTA* available (Column 1) and of firms with both *FTA* and identified fraud (Column 2). Panel A shows the distribution by year; Panel B, the distribution by *FTA*. The total number of sample firms is relatively stable over time, while the number of firms with frauds varies considerably. In the first few observation years, fraud firms are small both in number and percentage, but increase as the year progresses. The peak number of fraud firms is 83 (5.31%) occurring in 2001, the year of an unusually large number of business scandals. The year of fraud is defined as the year when fraud took place, not the year of detection. When a fraud lasts more than one year, we have multiple firm-year observations associated with that fraud.

The sample distribution by *FTA,* reported in Panel B, suggests that the percentage of firms with fraud increases with *FTA*, hinting at a positive correlation between fraud and *FTA*.

II.4 Summary Statistics

Table III contains summary statistics for all key variables. The statistics for the full sample are reported in Panel A. The mean Fraud is 0.036, indicating fraud observations account for 3.6% of all firm-year observations. On average it took about 752 days from the commencement of fraudulent activity at the firm to the filing of the class action. The mean and median *FTA* is 0.41 and 0.5, suggesting that at a typical firm-year, about half of the top four executives are appointed during the current CEO's tenure. Importantly, the mean and median of the regression residual, *AFTA*, are close to zero.

Panel B reports the mean of each variable separately for the fraud and non-fraud sample in Columns (6) and (7). Columns (8) and (9) show the difference in the means and the P-value of the t-test for the difference. The fraud sample shows significantly higher values of all CEO connectedness variables than the non-fraud sample. The differences in the control variables

between the fraud and non-fraud sample are largely consistent with the reasons for including them as control variables. For example, the fraud sample shows significantly lower *Ebitda/TA*, higher leverage, higher sales growth rate, larger firm size, a higher fraction of founders, less institutional ownership concentration, greater stock return volatility, and more industry litigation. However, the fraud sample also shows higher Tobin's Q, greater industry Q, greater fraction of independent directors, more frequent board meetings, and larger audit committee.

Table IV presents pair-wise correlations between the variables of main interest. Panel A is based on panel data of all firm-year observations. *FTA, AFTA,* and identified frauds are all positively correlated with each other. Panel B is based on cross sectional data on fraud. Here *FTA* and *AFTA* are firm-year averages over the fraud duration period. *FTA* is positively and significantly related to both the number of executives charged in litigation and fraud duration. *AFTA* is also significantly related to the number of executives charged but its correlation with the duration, though positive, is insignificant.

III. CEO CONNECTEDNESS AND CORPORATE FRAUDS

III.1 Main Results

Table V reports the bivariate model estimation results. Columns (1) and (3) show the results for the likelihood of committing fraud; Column (2) and (4), the probability of detection, given fraud. The coefficients on the variables of main interest, *FTA* and *AFTA*, show the predicted signs and are statistically significant. CEO connectedness is associated with greater fraud incidence and lower likelihood of detection both at the 1% level. The estimated coefficient of *FTA* in the fraud regression suggests that a firm with all top four executives appointed during the CEO tenure (FTA=100%) has 20.1% higher fraud incidence than a firm without any top four

executives appointed during the CEO tenure (i.e. FTA=0). A fraud conducted by a firm without any of the top four executive appointed during the CEO tenure (i.e. FTA=0) is 20.5% more likely to be detected than a fraud engaged in by a firm with all top four executives appointed during the CEO tenure (FTA=100%).

Control variables exhibiting significant relations to fraud incidence and detection are mostly firm business conditions, characteristics, and litigation risk. Better performing firms as measured by Q, larger firms, firms with higher leverage, and firms with greater stock return volatility are associated with a lower likelihood of committing frauds and a higher likelihood of detection, while firms experiencing faster sales growth rates are associated with a higher likelihood of committing frauds and a lower likelihood of detection. Firms belonging to industries subject to more litigation risk are also associated with a higher incidence of fraud and a lower probability of detection. Governance mechanisms and CEO characteristics are mostly unrelated to corporate frauds.

III.2 Robustness Tests

III.2.1 Instrumental Variables Regressions

To infer causality from the regression estimates in Table V, we need to address endogeneity concerns because CEO connectedness may be endogenous. Thus, we construct instrumental variables (IVs) related to *FTA* and *AFTA* but unrelated to corporate wrong doing. Our IVs are the number of top non-CEO executive turnovers due to death and permanent retirement during the current CEO's tenure as of year t, denoted as *Num_Death* and *Num_Retire,* respectively.[22]

[22]Fracassi and Tate (2010) use a similar approach to construct IVs for social ties between CEO and independent directors.

Executive turnovers due to death and retirement tend to automatically increase *FTA* and *AFTA*. To ensure deaths are unrelated to fraud, we searched media articles from Factiva on the cause of executive deaths at fraud firms and find none can be attributed to suicide. Retirement may be less exogenous; an executive who committed fraud or is afraid of being tainted by scandals due to others may resign to disassociate himself from the firm. Thus, we impose stringent conditions to prevent fraud-related retirements from entering our IV constructions. Specifically, we require that (1) an executive is 65 years or older at the time of retirement and (2) the retirement is permanent by excluding those whose names later reappear as executives in any firms covered by ExecuComp. For a number of executives, ExecuComp shows time lag between the year their names last appear as an executive and the year of their departure from the company—i.e., a number of executives are dropped from the list of top executives before they actually leave the firm. If the time lag is two years or longer, we assume the executive was demoted and do not attribute the turnover to death or retirement.

The first-stage estimation results of the IV regressions are reported in Table A2 in the Appendix. The dependent variable is *FTA* in Columns (1) and (2); *AFTA* in Columns (3) and (4). The regressions in Columns (1) and (3) correspond to the fraud incidence regressions, and hence include the IV variables and all control variables used in the fraud incidence regressions in Table V. The regressions in Columns (2) and (4) correspond to the fraud detection regressions, and hence include the IV variables and all control variables used in detection regressions. When we estimate the bivariate model in the second stage, the error terms of the fraud incidence regression and detection regression are allowed to be correlated. Thus, Columns (1) & (2) and Columns (3) & (4) and are estimated together as a system of simultaneous equations, respectively. As expected, both death and retirement related turnovers are positively and significantly related to

both *FTA* and *AFTA*. F-statistics (IVs) representing F statistics for an F-test that all the instrumental variables are jointly zero are all greater than 10. The second-stage estimation results are presented in Table VI. The results are robust. *FTA_Hat* and *AFTA_Hat*, the predicted values of *FTA* and *AFTA* are both positively related to the incidence of fraud and negatively related to fraud detection. All the relations are significant.

III.2.2 Other Robustness Checks

We also conduct a battery of other robustness checks. They include checking the sensitivity of our main results to clustering at different levels, to alternative sample construction and alternative proxies for CEO connectedness. The results are all reported in the Appendix.

In Table A5 we re-estimate the bivariate model clustering at a different level. As we mentioned before, CEO connectedness is a CEO-firm specific variable; as such, we cluster standard errors at the CEO-firm level, and the results are reported in Panel A. Observations associated with one firm tend to also be correlated. To address this concern, we also cluster standard errors at the firm level, and the results are reported in Panel B. Both panels demonstrate robustness to alternative sample constructions.

In Table A6 we re-estimate the bivariate model with alternative sample constructions: an industry-matched sample. In this sample, we exclude all non-fraud firm year observations that do not have a fraud firm-year observation in the same industry. Although the size of this alternative sample is smaller, it may reduce noise arising from unmatched non-fraud firm-year observations, because the number of non-fraud firms is much larger than the number of fraud firms, and some non-fraud firms may not becomparable to the fraud firms. The results demonstrate robustness to this alternative sample construction.

In Table A7 we re-estimate the bivariate probit model with the alternative measures of *FTA* and *AFTA*. The way that we construct *FTA* and *AFTA* does not account for the rank of top executives and simply treats all top executives identically. However, CEO's connectedness with the top 2 executives and CEO's connection with the top 4 executives may lead to a different level of CEO internal influence. Thus, to address this concern, we introduce two alternative measures of CEO connectedness.

The first measure is *FTA_W*, the same as *FTA*, except that the fraction of top four non-CEO executives appointed during the current CEO's tenure is weighted by the executives' salaries and bonuses. Following the definition provided by ExecuComp, we employ the summation of salaries and bonuses to proxy for the rank of executives because executives with greater compensation may have more influence among their colleagues. The second is *AFTA_W*, the residual based on *FTA_W*.

The summary of statistics of *FTA_W* and *AFTA_W* are also reported in Table III. The means of *FTA_W* and *AFTA_W* of the fraud sample are shigher than those of the non-fraud sample and significant at the 5% level. The pair-wise correlation between FTA_W (AFTA_W) and the fraud indicator is significantly positive at least at the 5% level. We re-estimate the bivariate probit model with these alternative measures of CEO connectedness, and report the results in Panel A. The results demonstrate robustness to both alternative proxies of CEO connectedness.

IV. Channels Through Which CEO Connectedness Affects Fraud

Thus far, we have shown *FTA* and *AFTA* significantly affect the incidence of fraud. In this section we examine the channels through which these relations may materialize. We rely on

a purely economic rationale of fraud; people engage in wrongdoing if the expected benefits exceed the expected costs of wrongdoing. How might CEO connectedness reduce the costs or increase the benefits to CEOs of engaging in wrongdoing? In this section we identify two channels through which CEO connectedness reduces the costs of committing frauds.[23]

IV.1 Detection Likelihood

CEO connectedness may reduce the expected costs of wrongdoing by lowering the likelihood of detection. A more connected CEO may be more able to influence those who record internal information to make detection less likely. Top executives are often in an excellent position to both receive information about wrongdoing and to do something to interdict it (Dyck et al., 2010; Bowen, Call, and Rajgopal, 2010).[24] If the executives owe their current positions to the CEO, they might be less enthusiastic about revealing information about wrongdoing. Favors can go the other way as well. When a connected executive commits wrong doing, the CEO may be more forgiving and help conceal the fraud.

If connectedness reduces the likelihood of fraud detection, the more connected a CEO within executive suites, the longer it would take to detect a fraud and the lower is the probability of detection. Thus, our first test relates CEO connectedness to fraud detection duration, using cross-sectional data covering the 274 unique fraud cases identified. The dependent variable is the

[23] We do not examine the benefits channels because there are a number of studies providing indirect evidence consistent with the notion that CEO power increases benefits of committing frauds. Studies have shown that more powerful CEOs are associated with poor firm performance (Landier et al., 2008; Bebchuk et al., 2011; Kim and Lu, 2011b) and that poor firm performance, in turn, is associated with the incidence of wrongdoing (Arlen and Carney 1992; Alexander and Cohen, 1999). If wrongdoing allows a poorly performing firm to survive longer, then CEOs may have the incentive to engage in fraud to retain their positions, as the revelation of poor performance may lead to CEO dismissal. Further, more powerful CEOs tend to have more financial and private benefits and, hence, may benefit more from engaging in wrongdoing to cover up poor performance and keep their positions. Thus, CEO power may indirectly influence wrongdoing by adversely affecting firm performance, and poor performance, in turn, creates an environment in which powerful CEOs see more benefits in engaging in fraudulent activities.

[24] Dyck et al., (2010) find that access to information is very important for fraud detection. Having access to inside information rather than relying on only public information increases the probability of detecting fraud by 15 percentage points.

logged value of the number of days from the commencement of fraudulent activity at the firm to the class action filing. The independent variables, *FTA, AFTA*, and control variables, are their averages over each case's fraud duration period.

The control variables used in this analysis are the control variables shown to be statistically significant in the detection regression in Table V except *%_NonIndepDirectors.* We do not include *%_NonIndepDirectors*, even though it is significant in the detection regression in Table V, because it becomes insignificant after addressing the endogeneity problem shown in Table VI, and also comparing to other variables, it has more missing observations, which would further reduce sample size. Thus, our control variables include only Tobin's Q, leverage, sales growth rate, firm size, stock volatilities, and industry litigation risk. We do not control for year fixed effects because of small sample size; instead, we include the year of the commencement of fraudulent activity, *Year_FB*, and its square as controls. These year variables control for the overall litigation and business environment. Because the inclusion of the year variable alone would impose a linear time trend, we negate it by including the square term. This method is often used to control for year fixed effects when sample size is small (e.g., Almond, 2006). To account for possible correlations among frauds taking place for firms in the same industry, robust standard errors are clustered at the industry level, which are defined as Fama-French 48 industry groupings. The results are robust to clustering at the year of the commencement of fraudulent activity.

Table VII, Panel A, Columns (1) and (3) contain the estimation results, which show positive relations between the proxies for CEO connectedness and the number of days frauds remain undetected. In panel B, the dependent variable is the hazard ratio for the Cox regression,

the probability of detection in the next unit of time. Consistent with OLS estimates, Columns (5) and (7) show the hazard ratio is negatively related to both *FTA* and *AFTA*.

To address potential endogeneity in *FTA* and *AFTA*, we again estimate two-stage IV regressions, where the IVs are average *Num_Death* and average *Num_Retire* during the fraud duration. The first-stage estimation results are reported in Table A3 in the Appendix. Even numbered columns in Panels A and B of Table VII report the second stage IV regression estimation results. *FTA_Hat* and *AFTA_Hat*, the predicted values of *FTA* and *AFTA,* are significantly positively related to fraud duration at the five percent level. High CEO connectedness seems to lengthen the period in which frauds remain undetected, suggesting that CEO connectedness within executive suites helps hide fraud.

Finally, we also re-estimate the detection duration regressions and the Cox regressions with the alternative measure of CEO connectedness, *FTA_W* and *AFTA_W*. The results reported in Panel B of Table A7 are mostly robust.

IV.2 Coordination Costs and the Number of Executives Charged

When CEOs are more connected with top executives, the environment in executive suites may become friendlier for wrongdoing that requires coordinated action amongst multiple players. Because more connected CEOs are surrounded by more closely aligned executives, the coordination costs are likely to be lower, making it less costly to commit frauds requiring coordination.

To test this hypothesis, we relate the number of executives named in a suit to *FTA* and *AFTA* in Table VIII. The rationale is that if coordination costs of wrongdoing are lower in firms

with high CEO connectedness, then it is less costly to get more executives involved in frauds and, hence, we might witness more top executives being involved with, and charged in, wrongdoing.

The dependent variable, *Num_Charged*, takes the value of zero if no fraud is detected in a given year for a given firm (N = 0); one if the number of executives charged in a litigation is one or two (N ≤ 2); two if the number of executives charged is greater than two but less than 6 (3 ≤ N ≤ 5); and three if the number of executives charged is greater than six (N > 6). We rely on these indicators because when fraud requires coordinated action (or inaction) on the part of executives, the likelihood of fraud may not rise linearly with the number of executives charged. For example, if a fraud needs acquiescence from a majority of top executives, then we would expect non-linearity around the majority threshold. An analogous approach is used in Ferris, Jagannathan, and Pritchard (2003) when examining the impact of multiple directorships on monitoring.

For this analysis, it is important to control for some other factors also affecting the number of executives charged. These factors include the types of fraud and the magnitude of the consequences of the fraud. Some misbehavior may require coordination with more people than others, and hence lead to more executives being involved. For example, inflating earnings requires a number of people to agree to the earnings figures (or at least not oppose them), such as the CEO, CFO, accountant, lawyers and so forth, compared to insider trading which may only require one person. To control for this factor, the regression includes three dummy variable indicating three different types of frauds: *Accounting*, *Operating* and *Executive*. Accounting frauds are defined as misleading information about financial condition, expected growth, financial statements; misleading information causing artificial stock increase; violation of GAAP, and having to restate financial statements in the past. Operating frauds include the cases related to real corporate business activities. For example, a pharmaceutical company ignored dangerous

side effects when issuing a new drug. The company violated environmental management regulations. A bank misleads customers when issuing a new security. Executive frauds are defined as the cases where executives take advantage of their positions to profit themselves, for example insider trading, related party transactions etc. One fraud case may involve more than one type of fraud.

The number of executives charged also tends to be related to the magnitude of the consequences of the fraud, which can be proxied for by firm performance and financial situation. Thus, the regression also controls for firm performance and financial situation measured by Tobin's Q and leverage. Finally, the regression also controls for business environments measured as *IndustryQ*, *Year_FB*, and $Year\_FB^2$ and also related to the type of frauds and how serious the outcome of the fraud.

Our test is again based on cross-sectional data using the 274 fraud cases. As before, the CEO connectedness variables and the control variables are their averages over each case's fraud duration, and robust standard errors are clustered at the industry level.

Table VIII reports estimation results using OLS in Columns (1) and (3), which show the number of executives charged is positively and significantly related to *FTA* and *AFTA*. Columns (2) and (4) report the second stage IV regression results. The first-stage results are reported in Table A4 in the Appendix. The endogenous variables are still *FTA* and *AFTA*, but we use only *Num_Retire,* not *Num_Death,* as an IV because it is less likely that dead people would be charged, which creates a correlation between the number of deaths and the number of executives charged.[25] The predicted values, *FTA_Hat* and *AFTA_Hat* are both positively and significantly

[25] Technically, a dead person can be sued in that his/her estate can be sued, but probably far less often than living people.

related to the number of executives charged in frauds. The low coordination costs due to high CEO connectedness seem to be an important facilitator of corporate wrongdoing.

Finally, we re-estimate the number of executives charged in the litigation with the alternative measure of *FTA* and *AFTA*, *FTA_W* and *AFTA_W*. The results reported in Panel C of Table A7 are unchanged.

V. CEO CONNECTEDNESS AND THE TYPE OF FRAUDS

Thus far, we have shown that CEO connectedness may lead to greater fraud incidence by raising detection difficulties and reducing cooperation costs of wrongdoing. As we mentioned in the last section, different types of frauds may have different primary motivations. For example, accounting frauds may sometimes be designed to cover up poor performance or sometimes to artificially inflate stock price (so that executives directly benefit), whereas insider trading is designed to primarily benefit the executives. Thus, we might expect that the impact of CEO connectedness varies with the type of fraud. In this section, we examine how CEO connectedness is related to each type of fraud.

Pair-wise correlations between fraud variables and CEO connectedness variables reported in Table IV show that all CEO connectedness variables are positively related to the fraud type indicators. However, among these three fraud type indicators, CEO connectedness variables are only significantly related to the accounting fraud indicator and the executive fraud indicator, and they are insignificantly related to the operating fraud indicator.

To further analyze the relation between CEO connectedness and the incidence of each type of frauds, we use the fraud sample and draw Figures 1 and 2. Figures 1 and 2 present the mean of *FTA* and the mean of *AFTA* by the types of frauds, respectively. We group all frauds

into two types; the fraud activities which may directly benefit executive themselves denoted as Executive fraud and other types of fraud denoted as Accounting & Operating fraud. Both figures show that firms identified to have conducted executive frauds have higher values of *FTA* and *AFTA* than the firms identified to have Accounting & Operating frauds. All the above evidence suggests that the firms with greater CEO connectedness over executive suites will be more likely to engage in executive frauds, and the social connection among executives is more likely to be used as a tool by the executives to take advantage of their positions to profit.

VI. INTERACTIVE EFFECTS WITH MONITORING MECHANISMS

Because deterring and detecting frauds are an important purpose of monitoring, a natural question follows: Do monitoring mechanisms mitigate the adverse effects of CEO connectedness? In this section we address this question by estimating the interactive effect of CEO connectedness with internal and external monitoring mechanisms.

We proxy for the strength of internal monitoring by the board and audit committee composition: the fraction of non-independent directors, *%_NonIndepDirectors,* and the fraction of non-independent directors on the audit committee, *%_NonIndepDirectors_Audit.* Table IX, Panel A repeats the bivariate probit model estimation while interacting the internal monitoring proxies with *FTA* or *AFTA* in both fraud incidence and detection regressions. The estimated coefficients of FTA and AFTA are mostly unchanged, but none of the interaction terms is significant.

Panel B repeats the same exercise for external monitoring mechanisms, the strength of which is proxied by institutional ownership concentration, *IOC*. Again, no interaction terms are significant. These results suggest that the adverse influence of CEO connectedness on corporate

wrongdoing cannot be easily countered by improving the standard internal and external monitoring measures, underscoring the importance of CEO connectedness as a factor in assessing the risk of firm wrongdoing.

VII. CONCLUSION

Allegations of corporate wrongdoing have been peppered across the headlines over the last decade, capturing the attention of the public, the business community, and regulatory agencies. The increased attention has led scholarly inquiry into understanding how corporate wrongdoing arises and ways to deter and prevent it. The collective behavior of corporate leaders is often critical in corporate wrongdoing, and the CEO often plays the central role. Yet there are no studies exploring how CEOs and their influence within executive suites impact corporate wrongdoing. This paper empirically examines the effects of CEO connectedness accumulated during their tenure through top executive appointment decisions.

We find CEO connectedness is positively related to the likelihood of corporate fraud and negatively related to the likelihood of detecting it. These results are statistically significant, robust to instrumental variables regressions using top executive deaths and permanent retirements as IVs, and robust to alternate proxies for CEO connectedness, alternate sample constructions, and clustering standard errors at different levels. We also identify two likely channels through which CEO connectedness influences wrongdoing—by reducing the expected costs of wrongdoing by helping to conceal frauds and by reducing coordination costs of conducting frauds. Further, we also find that the impact of CEO connectedness is stronger when the fraud involves executives taking advantage of their positions to benefit themselves as

compared to when the fraud involves either accounting or operating fraud. Finally, our analysis reveals that the adverse effects are not mitigated by standard measures of internal and external monitoring mechanisms.

Taken together, these results imply that CEO connectedness (1) is a critical factor in assessing a firm's likelihood of engaging in wrongdoing, (2) has effects that are not mitigated by standard monitoring mechanisms, and thus (3) is something to which investors, regulators, and governance specialists should pay close attention. Further, our results underscore the importance of network connections in the quality of governance. Our focus on the connections between a CEO and his top executives helps identify how connectedness may magnify the risk of corporate fraud, especially for the types of fraud where executives take advantage of their positions to profit.

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Table I. Variable Descriptions

Variables	Definitions	Sources
Panel A: Fraud Variables		
Fraud	An indicator equal to one, if a firm-year observation shows a fraud record.	Stanford Securities Class Action Clearinghouse
Duration	The number of days from the commencement of fraudulent activity to the filing of the class action litigation.	SSCAC
Num_Charged	A variable equal to zero if no fraud is detected in a given year for a given firm ($N = 0$); one if the number of executives charged in the litigation is one or two ($N \leq 2$); two if the number of executives charged is greater than two but less than 6 ($3 \leq N \leq 5$); and three if the number of executives charged is greater than six ($N > 6$).	SSCAC
Accounting	Indicator equal to one, if a fraud is identified to involve accounting fraud.	SSCAC
Operating	Indicator equal to one, if a fraud is identified to involve operating fraud.	SSCAC
Executive	Indicator equal to one, if a fraud is identified to involve executive fraud.	SSCAC
Panel B: CEO Connectedness Variables		
FTA	Fraction of top four non-CEO executives appointed during the current CEO's tenure.	ExecuComp
AFTA	Abnormal fraction of top four non-CEO executives appointed during the current CEO's tenure.	ExecuComp
FTA_W	Fraction of top four non-CEO executives appointed during the current CEO's tenure, weighted by the executives' salaries and bonuses.	ExecuComp
AFTA_W	Abnormal fraction of top four non-CEO executives appointed during the current CEO's tenure, weighted by the executives' salaries and bonuses.	ExecuComp
Panel C: Variables to Construct AFTA		
CEO_Tenure	The number of years a CEO has been in office.	ExecuComp
Outside	Indicator equal to one, if a CEO comes from outside the firm; and zero otherwise.	ExecuComp
Execsen	The average number of years four top non-CEO executives have been in office.	ExecuComp
FTA_1Y	The fraction of top four non-CEO executives appointed within the year of a new CEO appointment.	ExecuComp
FTA_1Y_Unknown	The fraction of top four non-CEO executives whose information on whether they are promoted or hired within the year of a new CEO appointment is unknown.	ExecuComp
Unknown	The fraction of executives whose first year on the list of top four non-CEO executives cannot be identified with data in ExecuComp.	ExecuComp
Panel D: Firm Business Condition Variables		
Tobin's Q	The market value of common equity plus the book value of total liabilities divided by the book value of total assets.	Compustat
Ebitda/TA	Earnings before interest, taxes, depreciation and amortization divided by the book value of total assets.	Compustat
Leverage	Sum of short- and long-term debt divided by the book value of total assets.	Compustat
SalesGrowth_5Yr	The 5-year least squares annual growth rate of sales in percentage.	Compustat
Ln(TotalAssets)	Logged value of the book value of total assets.	Compustat
IndustryQ	The median Tobin's Q of an industry in a given year. Industries are defined by Fama-French (1997) industry groupings.	Compustat
ICR	Industry concentration ratio, as measured by the sum of the percentage market share (in sales) of the four biggest firms among all firms in Compustat in each industry in each year as defined by Fama-French (1997).	Compustat

Table I: Variable Descriptions (Continued)

Variables	Definitions	Sources
Panel E: Corporate Governance Variables		
Ln(BoardSize)	Logged value of one plus the number of directors on the board.	IRRC/ Risk Metrics
%_NonIndepDirectors	The number of non-independent directors, as defined by IRRC, divided by the total number of directors on the board.	IRRC/ Risk Metrics
Ln(BoardMeetings)	Logged value of the number of board meetings held during the indicated year plus one.	ExecuComp
%_NonIndepDirectors_Audit	The number of non-independent directors on the audit committee divided by the total number of audit committee members. Inside directors are defined based on the definition provided by IRRC.	IRRC/ Risk Metrics
Ln(AuditComSize)	Logged value of one plus the number of audit committee members.	IRRC/ Risk Metrics
IOC	The sum of percentage share ownership held by the top five institutional investors.	CDA Spectrum Database
Panel F: Litigation Risk Variables		
StockVolatilities	Standard deviation of daily stock returns in a given year.	CRSP
IndustryLitigation	Number of lawsuits against publicly listed firms, as reported by SSCAC for an industry in a given year, divided by the number of firms in Compustat for the same industry and the same year. Industries are defined by Fama-French (1997) industry groupings.	SSCAC
Panel G: CEO Characteristics Variables		
CEO_OWN	The percentage of outstanding common shares held by a CEO.	ExecuComp
CEO_Founder	An indicator equal to one, if a CEO was the CEO five years prior to the first date the firm appears in CRSP or Compustat.	ExecuComp
CEO_Chair	Indicator for CEO also chairing the board; and zero otherwise.	ExecuComp
Ln(CEO_Age)	Logged value of CEO age.	ExecuComp
Panel H: Instrumental Variables for CEO Connectedness		
Num_Death	The number of top four non-CEO executives who left the position due to death during the CEO tenure up to the current year. To be included, the identified reason for leaving the company is death and the identified year of leaving the firm is the same as or one year after the last year in which the executive's name appears on ExecuComp.	ExecuComp and Factiva
Num_Retire	The number of top four non-CEO executives who left the position due to permanent retirement during the CEO tenure up to the current year. To be included, (i) an executive is 65 years or older at the time of retirement; (ii) the executive's name does not later appear as an executive in firms covered by the ExecuComp; (iii) the identified reason for leaving the company is death; and (iv) the identified year of leaving the firm is the same as, or one year after, the last year in which the executive's name appears on ExecuComp.	ExecuComp and Factiva
Panel I: Other Variables		
Year_FB	The year in which fraudulent activity is started.	SSCAC

Table II: Sample Distribution by Year and by Fraction of Executives Appointed during a CEO's Tenure.

This table describes the sample firm years. Panel A lists the sample distribution by year; Panel B lists the sample distribution by the fraction of executives appointed (FTA) during a CEO's tenure. Column (1) shows the total number of firms with FTA available; Column (2) reports the number of firms committing fraud among the sample firms; and Column (3) reports the percentage of firms committing fraud.

Panel A: Sample Distribution by Years			
	(1)	**(2)**	**(3)**
Year	**# of Firms**	**# of Firms with Frauds**	**%_Fraud**
1996	1,518	20	1.318
1997	1,552	37	2.384
1998	1,609	37	2.300
1999	1,687	63	3.734
2000	1,672	74	4.426
2001	1,563	83	5.310
2002	1,575	78	4.952
2003	1,630	57	3.497
2004	1,637	56	3.421
2005	1,630	65	3.988
2006	1,742	71	4.076
Total	17,815	641	
Panel B: Sample Distribution by FTA			
FTA	**# of Firms**	**# of Firms with Frauds**	**%_Fraud**
0	4,989	157	3.147
0.25	3,590	107	2.981
0.5	4,039	148	3.664
0.75	3,273	138	4.216
1	1,924	91	4.730
Total	17,815	641	

Table III: Summary Statistics of Key Variables for the Full Sample and the Fraud and Non-Fraud Sample.

This table reports the summary of statistics of key variables. Panel A contains mean, median, standard deviation, minimum, and maximum of each variable for the full sample. Panel B reports the mean of each variable separately for the fraud and non-fraud sample. Columns (8) and (9) show for each variable the difference in mean between the fraud and non-fraud sample and the P-value of the difference, respectively. The difference marked with *, **, and *** are significant at 10%, 5%, 1%, respectively. The definitions of all variables are given in Table I.

	Panel A: Full Sample					Panel B: Fraud and Non-Fraud Firm Sample			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variable	Mean	Median	Std. Dev.	Min	Max	Fraud Sample	Non-Fraud Sample	Fraud Sample - Non-Fraud Sample	P-value
Fraud Variables									
Fraud	0.036	0.000	0.186	0.000	1.000	1.000	0.000		
Accounting	0.026	0.000	0.159	0.000	1.000	1.000	0.000		
Operating	0.009	0.000	0.094	0.000	1.000	1.000	0.000		
Executive	0.008	0.000	0.090	0.000	1.000	1.000	0.000		
Duration	752.091	597.500	529.278	13.000	2301.000	752.091			
Num_Charged	2.404	2.750	0.681	1.000	3.000	2.404			
CEO Connectedness Variables									
FTA	0.410	0.500	0.336	0.000	1.000	0.461	0.408	0.053***	(0.000)
AFTA	0.000	0.005	0.307	-1.202	0.738	0.020	-0.001	0.021*	(0.084)
FTA_W	1.556	1.497	1.343	0.000	4.000	1.795	1.547	0.249***	(0.000)
AFTA_W	-0.001	-0.062	1.224	-4.688	3.029	0.113	-0.006	0.119**	(0.016)
Business Condition Variables									
Tobin's Q	2.097	1.502	2.603	0.298	105.090	2.689	2.075	0.614***	(0.000)
Ebitda/TA	0.129	0.127	0.123	-2.948	0.991	0.109	0.129	-0.021***	(0.000)
Leverage	0.223	0.214	0.175	0.000	0.959	0.246	0.222	0.024***	(0.001)
SalesGrowth_5Yr	17.664	10.302	57.413	-74.682	3559.292	35.676	16.993	18.683***	(0.000)
Log(TotalAssets)	0.642	0.463	1.746	-5.419	7.541	1.393	0.614	0.779***	(0.000)
IndustryQ	1.508	1.344	0.491	0.842	3.497	1.603	1.505	0.098***	(0.000)
ICR	0.326	0.293	0.143	0.087	0.981	0.320	0.327	-0.007	(0.227)
CEO Characteristics Variables									
CEO_OWN	0.025	0.003	0.062	0.000	0.761	0.025	0.025	-0.001	(0.774)
CEO_Founder	0.137	0.000	0.344	0.000	1.000	0.179	0.135	0.044***	(0.002)
CEO_Chair	0.801	1.000	0.399	0.000	1.000	0.836	0.800	0.036*	(0.076)
Ln(CEO_Age)	3.313	3.367	0.290	0.000	4.159	3.229	3.316	-0.087***	(0.000)
Governance Variables									
Ln(BoardSize)	2.351	2.303	0.267	0.693	3.689	2.377	2.350	0.028**	(0.044)
%_NonIndepDirectors	0.336	0.308	0.174	0.000	1.000	0.320	0.337	-0.017*	(0.051)
Ln(BoardMeetings)	2.070	2.079	0.351	0.000	4.220	2.195	2.065	0.130***	(0.000)
%_NonIndepDirectors_Audit	0.033	0.000	0.068	0.000	0.778	0.031	0.033	-0.003	(0.430)
Ln(AuditComSize)	1.262	1.386	0.604	0.000	2.485	1.385	1.258	0.127***	(0.000)
IOC	0.413	0.386	0.139	0.162	1.000	0.392	0.414	-0.022***	(0.000)
Litigation Risk Variables									
StockVolatilities	0.028	0.024	0.016	0.000	0.231	0.034	0.028	0.006***	(0.000)
IndustryLitigation	0.019	0.015	0.021	0.000	0.140	0.026	0.019	0.008***	(0.000)
Instrumental Variables for CEO ConnectednessVariables									
Num_Death	0.019	0.000	0.167	0.000	2.000	0.005	0.020	-0.015**	(0.022)
Num_Retire	0.033	0.000	0.202	0.000	3.000	0.016	0.033	-0.018**	(0.028)

Table IV: Pair-wise Correlations between Fraud Variables and CEO Connectedness

This table reports the pair-wise correlations among fraud variables and CEO connectedness variables. Panel A reports the pair-wise correlations among the fraud indicator variable and CEO connectedness variables based on firm-year observations. Panel B reports the pair-wise correlations among fraud detection duration, the number of executives charged in litigation, and the CEO connectedness variables based on the case level data. The definitions of all variables are given in the Table I. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

Panel A: Firm-Level Data

	Fraud	Accounting	Operating	Executive	FTA	AFTA	FTA_W	AFTA_W
Fraud	1							
Accounting	0.8455***	1						
Operating	0.4896***	0.1877***	1					
Executive	0.4689***	0.2876***	0.0847***	1				
FTA	0.0294***	0.0240***	0.0059	0.0304***	1			
AFTA	0.0129*	0.0107	0.0012	0.0227***	0.9193***	1		
FTA_W	0.0345***	0.0289***	0.0095	0.0308***	0.9849***	0.9021***	1	
AFTA_W	0.0181**	0.0157**	0.0053	0.0227***	0.9029***	0.9821***	0.9184***	1

Panel B: Case-Level Data

	Duration	Num_Charged	Accounting	Operating	Executive	FTA	AFTA	FTA_W	AFTA_W
Duration	1								
Num_Charged	0.2392***	1							
Accounting	-0.0507	0.0095	1						
Operating	-0.0719	0.0868	-0.5042***	1					
Executive	0.1432**	-0.0269	-0.1962***	-0.1668***	1				
FTA	0.1473**	0.1708***	-0.018	0.0061	0.045	1			
AFTA	0.062	0.1600***	-0.0009	0.0321	0.0566	0.9254***	1		
FTA_W	0.1199**	0.1690***	-0.0119	0.0162	0.0198	0.9894***	0.9131***	1	
AFTA_W	0.0341	0.1585***	0.0057	0.0432	0.0305	0.9157***	0.9883***	0.9255***	1

Table V: Bivariate Model Estimation Results for CEO Connectedness and Corporate Fraud

This table reports the bivariate model estimation results. Columns (1) and (3) report the relation between CEO connectedness and the incidence of fraud, and Columns (2) and (4) report the estimation results for detection of fraud, given fraud. Definitions of all variables are in Table I. All regressions include year fixed effects. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Estimated marginal effects of CEO connectedness variables are reported in parentheses. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Model 1		**Model 2**	
	Fraud	**Detect|Fraud**	**Fraud**	**Detect|Fraud**
	(1)	**(2)**	**(3)**	**(4)**
FTA	0.746***	-0.658***		
	[0.271]	[0.239]		
	(0.201)	(-0.205)		
AFTA			0.931***	-0.833***
			[0.335]	[0.295]
			(0.248)	(-0.258)
Tobin's Q	-0.304***	0.268***	-0.307***	0.270***
	[0.074]	[0.083]	[0.072]	[0.083]
Ebitda/TA	-1.143	0.652	-1.134	0.630
	[1.063]	[0.868]	[1.064]	[0.855]
Leverage	-2.199***	2.149***	-2.207***	2.153***
	[0.723]	[0.640]	[0.743]	[0.662]
SalesGrowth_5Yr	0.010***	-0.003**	0.010***	-0.004**
	[0.002]	[0.002]	[0.002]	[0.002]
Log(TotalAssets)	-0.353***	0.371***	-0.350***	0.368***
	[0.096]	[0.090]	[0.096]	[0.089]
IndustryQ	0.212		0.223	
	[0.249]		[0.251]	
$(IndustryQ)^2$	-0.019		-0.022	
	[0.054]		[0.054]	
ICR	0.090		0.093	
	[0.097]		[0.100]	
Ln(BoardSize)	-0.440	0.430	-0.593	0.566
	[0.769]	[0.711]	[0.812]	[0.749]
%_NonIndepDirectors	-2.092**	1.954**	-2.139**	1.987**
	[0.849]	[0.852]	[0.856]	[0.855]
Ln(BoardMeetings)	0.061	0.053	0.044	0.068
	[0.225]	[0.212]	[0.236]	[0.223]
%_NonIndepDirectors_Audit	-1.197	0.612	-1.121	0.541
	[2.640]	[2.295]	[2.681]	[2.318]
Ln(AuditComSize)	0.428	-0.241	0.410	-0.223
	[0.385]	[0.309]	[0.382]	[0.305]
IOC	-1.540	1.398	-1.427	1.297
	[1.049]	[0.992]	[1.024]	[0.965]
StockVolatilities	-23.503**	28.432***	-23.246**	28.258***
	[9.972]	[8.425]	[10.060]	[8.438]
IndustryLitigation	14.943***	-9.743***	14.312***	-9.186***
	[3.622]	[2.208]	[3.713]	[2.174]
CEO_OWN	0.087		0.025	
	[0.795]		[0.798]	
$(CEO\_OWN)^2$	-1.809		-1.594	
	[2.501]		[2.469]	
CEO_Founder	-0.385	0.356	-0.221	0.211
	[0.411]	[0.364]	[0.408]	[0.363]
CEO_Chair	0.125	-0.115	0.138	-0.124
	[0.224]	[0.201]	[0.217]	[0.198]
Ln(CEO_Age)	-0.312	0.176	-0.275	0.143
	[0.480]	[0.436]	[0.484]	[0.436]
Constant	4.164**	-4.374**	4.548**	-4.719***
	[1.930]	[1.747]	[1.912]	[1.732]
Year FE	Y	Y	Y	Y
Observations	7873	7873	7873	7873
Wald Chi2	-940.40309		-939.63834	
Prob> Chi2	0.00		0.00	

Table VI: Instrumental Variable Regressions for CEO Connectedness and Corporate Fraud

This table reports the second-stage estimation results of IV regressions to addresses potential endogeneity in CEO connectedness. The endogenous variables are FTA in Model 1; AFTA in Model 2. The instrumental variables are Num_Death and Num_Retire. All regressions control for year fixed effects. The first stage regression estimation results for Columns (1) - (4) are reported in Columns (1) - (4) in Table A2 in the Appendix. Definitions of all variables are in Table I. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	Model 1		**Model 2**	
	Fraud	**Detect|Fraud**	**Fraud**	**Detect|Fraud**
	(1)	**(2)**	**(3)**	**(4)**
FTA_Hat	15.731*	-18.073*		
	[9.058]	[9.512]		
AFTA_Hat			33.997	-32.808***
			[36.824]	[10.204]
Tobin's Q	-0.262***	0.223**	-0.172	0.100
	[0.093]	[0.101]	[0.308]	[0.258]
Ebitda/TA	-2.578*	2.233*	-5.795***	4.821
	[1.513]	[1.306]	[1.291]	[3.971]
Leverage	-2.821***	2.844***	-1.637	1.921
	[0.850]	[0.741]	[6.883]	[3.645]
SalesGrowth_5Yr	0.015***	-0.009***	0.029	-0.018***
	[0.004]	[0.004]	[0.020]	[0.006]
Log(TotalAssets)	-0.421***	0.454***	-0.024	0.202
	[0.076]	[0.079]	[1.143]	[0.610]
IndustryQ	0.199		0.191	
	[0.254]		[0.790]	
$(IndustryQ)^2$	-0.017		0.035	
	[0.054]		[0.150]	
ICR	0.076		0.223	
	[0.101]		[0.340]	
Ln(BoardSize)	-0.413	0.391	-2.938	2.462
	[0.666]	[0.623]	[4.590]	[2.762]
% NonIndepDirectors	2.647	-3.569	10.274**	-9.531
	[2.939]	[3.030]	[4.267]	[9.610]
Ln(BoardMeetings)	-0.264	0.388	-1.111	1.172***
	[0.287]	[0.279]	[1.027]	[0.230]
% NonIndepDirectors_Audit	-6.625	6.873	-8.950	8.283*
	[4.813]	[4.871]	[7.573]	[4.474]
Ln(AuditComSize)	0.227	0.021	-1.299	1.461*
	[0.377]	[0.322]	[1.113]	[0.783]
IOC	-1.816*	1.716*	0.500	-0.332
	[1.093]	[1.035]	[3.700]	[2.640]
StockVolatilities	-44.712***	52.832***	-25.037	37.610
	[16.817]	[15.436]	[112.682]	[61.162]
IndustryLitigation	14.666***	-8.607***	15.858	-6.780
	[3.919]	[2.697]	[43.371]	[22.597]
CEO_OWN	-0.122		-0.379	
	[0.753]		[1.944]	
$(CEO\_OWN)^2$	-1.264		-1.320	
	[2.392]		[7.266]	
CEO_Founder	-1.615**	1.782**	3.923	-3.613***
	[0.761]	[0.810]	[5.314]	[1.359]
CEO_Chair	-0.687	0.807	-1.803	1.613**
	[0.574]	[0.552]	[2.204]	[0.664]
Ln(CEO_Age)	-1.788**	1.842**	-0.424	0.346
	[0.881]	[0.896]	[0.881]	[1.158]
Constant	4.799**	-4.770***	6.620	-7.389
	[2.033]	[1.800]	[21.477]	[11.094]
Observations	7873	7873	7873	7873
Wald Chi2	-940.29889		-952.64048	
Prob> Chi2	0.00		0.00	

Table VII: CEO Connectedness and Fraud Detection Duration

This table reports estimated relations between CEO connectedness and fraud detection duration. The sample covers 274 fraud cases detected over the period 1996 to 2006. Panel A and B report the results estimated by the OLS and the Cox regressions. The dependent variable is the logged value of the number of days from the commencement of fraudulent activity to the filing of the class action litigation in Panel A; the hazard ratio for the Cox regression in Panel B. Columns (1) and (3) report the results estimated by OLS. Columns (2) and (4) report the second-stage instrumental variables regression estimation results. Columns (5) and (7) report the results estimated by the Cox regression. Columns (6) and (8) report the results estimated by instrumental variables Cox regressions. The endogenous variables are FTA and AFTA, respectively. The instrumental variables are Num_Death and Num_Retire. The first-stage results are reported in Columns (1) and (2) in Table A3 in the Appendix. CEO connectedness and all control variables are their average values over the fraud period. Definitions of all variables are in Table I. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Panel A: Duration				**Panel B: _t**			
	OLS	**IV**	**OLS**	**IV**	**Cox**	**Cox with IV**	**Cox**	**Cox with IV**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
FTA	0.361**				-0.562***			
	[0.172]				[0.195]			
FTA_Hat		1.342**				-2.174		
		[0.508]				[1.512]		
AFTA			0.153				-0.161	
			[0.172]				[0.203]	
AFTA_Hat				1.597**				-3.609**
				[0.733]				[1.729]
Log(TotalAssets)	-0.047	-0.084**	-0.039	-0.099**	0.011	0.060	-0.009	-0.187***
	[0.031]	[0.038]	[0.031]	[0.046]	[0.036]	[0.078]	[0.037]	[0.066]
Tobin's Q	0.016*	0.009	0.018*	0.007	-0.034	-0.023	-0.037	-0.065
	[0.009]	[0.012]	[0.009]	[0.013]	[0.035]	[0.048]	[0.039]	[0.047]
Leverage	0.737***	0.775***	0.712***	0.676***	-0.587	-0.538	-0.499	-0.416
	[0.219]	[0.205]	[0.211]	[0.200]	[0.422]	[0.424]	[0.420]	[0.415]
SalesGrowth_5Yr	0.001***	0.001***	0.001***	0.001***	-0.001	-0.001	-0.000	0.001
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.001]	[0.001]
StockVolatilities	-19.204***	-18.028***	-19.370***	-17.450***	18.883***	15.249**	17.817***	22.316***
	[3.757]	[3.807]	[3.711]	[3.932]	[5.605]	[6.268]	[5.699]	[6.169]
IndustryLitigation	-4.230	-4.849*	-4.028	-4.794	0.818	1.093	-0.026	-2.790
	[2.859]	[2.840]	[2.908]	[2.853]	[4.127]	[4.500]	[4.511]	[4.551]
Year_FB	70.603***	67.114***	72.030***	77.368***	0.036	0.031	0.035	0.101***
	[20.871]	[20.564]	[21.307]	[19.422]	[0.028]	[0.031]	[0.030]	[0.037]
$Year\_FB^2$	-0.018***	-0.017***	-0.018***	-0.019***	0.000	0.000	0.000	0.000
	[0.005]	[0.005]	[0.005]	[0.005]	[0.000]	[0.000]	[0.000]	[0.000]
Constant	-70,596.947***	-67,111.316***	-72,024.470***	-77,387.878***				
	[20,884.357]	[20,575.851]	[21,323.460]	[19,433.732]				
Observations	249	249	249	249	249	249	249	249
Adj-Rsquare	0.11	0.10	0.10	0.10				
Wald Chi2					71.23	47.30	32.69	41.47

Table VIII: CEO Connectedness and the Number of Executives Charged in Litigation

This table reports estimated relations between CEO connectedness and the number of executives charged in litigation. The dependent variable Ln(Num_Charged) is the logged value of Num_Charged, which takes the value of zero, if no fraud is detected in a given year for a given firm (N = 0); one if the number of executives charged in the litigation is one or two (N ⩽ 2); two if the number of executives charged is greater than two but less than 6 (3 ⩽ N ⩽ 5); and three if the number of executives charged is greater than six (N > 6). The sample includes 274 fraud cases. Columns (1) and (3) report the results estimated by the OLS and Columns (2) and (4) report the second-stage instrumental variable regression estimation results. The endogenous variables are FTA and AFTA. The instrumental variable is Num_Retire. The first-stage estimation results are reported in Table A4 in the Appendix. The CEO connectedness variables and the control variables are their average value over each case's fraud period. Definitions of all variables are in Table I. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Ln(Num_Charged)			
	(1)	**(2)**	**(3)**	**(4)**
FTA	0.109***			
	[0.033]			
FTA_Hat		0.678***		
		[0.190]		
AFTA			0.118***	
			[0.039]	
AFTA_Hat				0.785***
				[0.221]
Tobin's Q	-0.001	-0.001	-0.001	-0.000
	[0.001]	[0.001]	[0.001]	[0.001]
Leverage	0.161**	0.215***	0.151**	0.150**
	[0.063]	[0.078]	[0.064]	[0.068]
Accounting	0.031	0.033	0.027	0.006
	[0.029]	[0.029]	[0.028]	[0.031]
Operating	0.047	0.030	0.043	0.002
	[0.031]	[0.032]	[0.032]	[0.034]
Executive	-0.008	-0.029	-0.010	-0.043
	[0.033]	[0.037]	[0.034]	[0.039]
IndustryQ	-0.007	0.039*	-0.008	0.031
	[0.023]	[0.022]	[0.022]	[0.022]
Year_FB	2.530	4.227	3.129	8.347
	[6.140]	[6.442]	[6.247]	[6.990]
$Year\_FB^2$	-0.001	-0.001	-0.001	-0.002
	[0.002]	[0.002]	[0.002]	[0.002]
Constant	-2,549.068	-4,243.328	-3,149.398	-8,372.204
	[6,143.630]	[6,444.309]	[6,250.342]	[6,993.450]
Observations	270	270	270	270
Adj-Rsquare	0.10	0.08	0.10	0.08

Table IX: Interactive Effects of CEO Connectedness and Internal and External Monitoring Mechanisms on Corporate Frauds

This table reports the bivariate model estimation results on interactive effects of CEO connectedness and monitoring mechanisms on corporate frauds. Panel A and B report the results on the interactive effects for internal and external monitoring mechanisms, respectively. Columns (1), (3), (5) and (7) report the results of the fraud incidence regressions. Control variables are identical with those in Columns (1) and (3) of Table V but their coefficients are not reported. Columns (2), (4), (6) and (8) report the results of the fraud detection regressions. Control variables are identical with those in Columns (2) and (4) of Table V but their coefficients are not reported. Definitions of all variables are in the Table I. All regressions include year fixed effects. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

Panel A: Interaction with Internal Monitoring Mechanisms								
	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Fraud	**Detect|Fraud**	**Fraud**	**Detect|Fraud**	**Fraud**	**Detect|Fraud**	**Fraud**	**Detect|Fraud**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
A.1. Interaction with %_NonIndepDirectors								
FTA	0.908**	-0.709***			0.806***	-0.624***		
	[0.355]	[0.262]			[0.292]	[0.239]		
FTA*%_NonIndepDirectors	-0.308					-0.262		
	[0.360]					[0.346]		
AFTA			0.916**	-0.828***			0.932***	-0.832***
			[0.415]	[0.314]			[0.357]	[0.290]
AFTA*%_NonIndepDirectors			0.028					-0.005
			[0.398]					[0.383]
%_NonIndepDirectors	-2.106**	2.073**	-2.221***	2.174***	-2.131**	1.979**	-2.141***	1.988**
	[0.826]	[0.812]	[0.804]	[0.800]	[0.834]	[0.828]	[0.825]	[0.820]
Observations	7873	7873	7873	7873	7873	7873	7873	7873
Wald Chi2	-939.92183		-939.97036		-939.63506		-939.6382	
Prob> Chi2	0.00		0.00		0.00		0.00	
A.2. Interaction with %_NonIndepDirectors_Audit								
FTA	0.732**	-0.651***			0.743***	-0.657***		
	[0.285]	[0.245]			[0.277]	[0.241]		
FTA*%_NonIndepDirectors_Audit	0.187					0.057		
	[0.580]					[0.496]		
AFTA			0.911***	-0.824***			0.925***	-0.832***
			[0.348]	[0.302]			[0.339]	[0.297]
AFTA*%_NonIndepDirectors_Audit			0.241					0.108
			[0.653]					[0.568]
%_NonIndepDirectors_Audit	-1.177	0.527	-1.160	0.557	-1.006	0.445	-1.063	0.492
	[2.692]	[2.417]	[2.814]	[2.584]	[2.818]	[2.423]	[2.809]	[2.431]
Observations	7873	7873	7873	7873	7873	7873	7873	7873
Wald Chi2	-940.36743		-940.39908		-939.59112		-939.62642	
Prob> Chi2	0.00		0.00		0.00		0.00	
Panel B: Interaction with External Monitoring Mechanisms								
FTA	0.713**	-0.656***			0.745***	-0.664**		
	[0.352]	[0.236]			[0.269]	[0.330]		
FTA*IOC	0.082					0.019		
	[0.669]					[0.557]		
AFTA			0.943**	-0.832***			0.931***	-0.803**
			[0.419]	[0.296]			[0.334]	[0.373]
AFTA*IOC			-0.034					-0.080
			[0.712]					[0.598]
IOC	-1.560	1.383	-1.535	1.385	-1.430	1.301	-1.438	1.310
	[1.120]	[0.977]	[1.011]	[0.963]	[1.002]	[0.946]	[0.990]	[0.938]
Observations	7873	7873	7873	7873	7873	7873	7873	7873
Wald Chi2	-940.38361		-940.40176		-939.63574		-939.62055	
Prob> Chi2	0.00		0.00		0.00		0.00	

Appendix

This Appendix contains regression estimates to construct AFTA and AFTA_W in Table A1; first stage IV regression results in tables A2, A3, and A4; sensitivity tests for clustering standard errors at alternative levels in Table A5, sensitivity tests for alternative sample construction in Table 6, and alternative proxies for CEO Connectedness in Table A7.

Table A1: Regressions to Construct AFTA and AFTA_W

This table reports the regression estimation results to construct AFTA and AFTA_W. AFTA is the residual of the regression relating the fraction of top executives appointed (FTA) during a CEO's tenure. AFTA_W is the residual of the regression relating the value weighted fraction of top executives appointed (FTA_W) during a CEO's tenure, where the weight is the sum of salaries and bonuses each top four non-CEO executives earns in a given year. Definitions of all variables are in Table I. All regressions control for year fixed effects. Robust standard errors are in brackets. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	FTA	**FTA_W**
	(1)	**(2)**
CEO_Tenure	0.016***	0.062***
	[0.000]	[0.001]
Outside	0.005	0.037
	[0.006]	[0.025]
Execsen	-0.043***	-0.182***
	[0.001]	[0.005]
FTA_1Y	-0.076***	-0.317***
	[0.006]	[0.025]
FTA_1Y_Unknown	0.397***	1.681***
	[0.063]	[0.253]
Unknown	0.328***	1.273***
	[0.021]	[0.082]
Constant	0.612***	2.433***
	[0.010]	[0.039]
Observations	21599	21599
Year FE	Y	Y
Adjusted R-squared	0.16	0.16

Table A2: First-stage IV Regressions for the Instrumental Variable Regression in Table VI

This table reports the first-stage instrumental variable regression results for the IV regression results reported in Table VI. The dependent variable is FTA in Columns (1) and (2); AFTA in Columns (3) and (4). The samples used in Columns (1)-(4) cover from 1996 through 2006 and include all observations with necessary variables in each regression. The instrumental variables are Num_Death and Num_Retire. Columns (1) and (2) are estimated together as a system of simultaneous equations. Columns (3) and (4) are estimated together as a system of simultaneous equations. Definitions of all variables are in Table I. All regressions control for year fixed effects. Robust standard errors are reported in brackets. F-statistics (IVs) represents F statistics for an F-test that all the instrumental variables are jointly zero. Coefficients marked with *, **, and *** are significant at 10%, 5%, and 1%, respectively.

	FTA		**AFTA**	
	(1)	**(2)**	**(3)**	**(4)**
Num_Death	0.063***	0.063***	0.059***	0.059***
	[0.018]	[0.018]	[0.016]	[0.017]
Num_Retire	0.028	0.028	0.015	0.015
	[0.032]	[0.032]	[0.029]	[0.029]
Tobin's Q	-0.000	-0.000	0.000	0.000
	[0.002]	[0.002]	[0.002]	[0.002]
Ebitda/TA	0.074*	0.074*	0.082**	0.082**
	[0.044]	[0.044]	[0.039]	[0.039]
Leverage	0.040*	0.040*	0.050**	0.050**
	[0.022]	[0.022]	[0.020]	[0.020]
SalesGrowth_5Yr	-0.000***	-0.000***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]
Log(TotalAssets)	0.007**	0.007**	0.010***	0.010***
	[0.003]	[0.003]	[0.003]	[0.003]
IndustryQ	0.000		0.001	
	[0.003]		[0.004]	
$(IndustryQ)^2$	-0.000		-0.000	
	[0.001]		[0.001]	
ICR	0.000		0.001	
	[0.002]		[0.002]	
Ln(BoardSize)	-0.000	-0.000	0.011	0.011
	[0.018]	[0.018]	[0.016]	[0.016]
%_NonIndepDirectors	-0.317***	-0.317***	-0.272***	-0.273***
	[0.025]	[0.025]	[0.023]	[0.023]
Ln(BoardMeetings)	0.011	0.011	0.013	0.013
	[0.011]	[0.011]	[0.010]	[0.010]
%_NonIndepDirectors_Audit	0.356***	0.356***	0.313***	0.313***
	[0.063]	[0.063]	[0.056]	[0.056]
Ln(AuditComSize)	0.017	0.017	0.028*	0.028*
	[0.018]	[0.018]	[0.016]	[0.016]
IOC	0.028	0.028	0.006	0.006
	[0.035]	[0.035]	[0.031]	[0.031]
StockVolatilities	1.359***	1.361***	0.558	0.562
	[0.399]	[0.400]	[0.357]	[0.359]
IndustryLitigation	0.091	0.091	0.002	0.002
	[0.183]	[0.184]	[0.164]	[0.165]
CEO_OWN	-0.002		-0.006	
	[0.011]		[0.013]	
$(CEO\_OWN)^2$	-0.000		0.003	
	[0.028]		[0.036]	
CEO_Founder	0.080***	0.080***	-0.104***	-0.105***
	[0.011]	[0.011]	[0.010]	[0.010]
CEO_Chair	0.049***	0.049***	0.031***	0.031***
	[0.009]	[0.009]	[0.008]	[0.009]
Ln(CEO_Age)	0.090***	0.090***	0.039***	0.039***
	[0.014]	[0.014]	[0.013]	[0.013]
Constant	0.010	0.010	-0.100	-0.099
	[0.072]	[0.072]	[0.064]	[0.064]
Observations	7873	7873	7873	7873
Chi2	692.32	688.46	587.93	580.94
F-statistics (IVs)	12.41	12.34	13.06	12.92
Prob > F (IVs)	0.0020	0.0021	0.0015	0.0016

Table A3: First-stage IV Regressions for Instrumental Variable Regressions in Table VII

This table reports the first-stage instrumental variable regression results for the IV regressions in Table VII. The dependent variable is FTA in Column (1) and AFTA in Column (2). The instrumental variables are Num_Death and Num_Retire. Column (1) reports the first-stage results for the IV regressions in Columns (2) and (6) in Table VII; Column (2), for the IV regressions in Columns (4) and (8) in Table VII. F-statistics (IVs) represent F statistics for an F-test that all the instrumental variables are jointly zero. The sample covers 274 fraud cases detected over 1996 to 2006. CEO connectedness and all control variables are their average values over the fraud period. Definitions of all variables are in Table I. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	FTA	**AFTA**
	(1)	**(2)**
Num_Death	0.349***	0.260***
	[0.045]	[0.049]
Num_Retire	0.109**	0.094**
	[0.046]	[0.044]
Log(TotalAssets)	0.040***	0.044***
	[0.010]	[0.009]
Tobin's Q	0.007	0.007
	[0.008]	[0.009]
Leverage	-0.053	0.017
	[0.128]	[0.141]
SalesGrowth_5Yr	-0.000*	-0.000
	[0.000]	[0.000]
StockVolatilities	-0.847	-1.071
	[1.352]	[1.263]
IndustryLitigation	0.868	0.689
	[1.117]	[1.024]
Year_FB	1.943	-4.822
	[7.306]	[7.353]
$Year\_FB^2$	-0.000	0.001
	[0.002]	[0.002]
Constant	-1,938.060	4,840.173
	[7,312.282]	[7,357.542]
Observations	248	248
Adj-Rsquare	0.06	0.09
F-statistics (IVs)	30.21	13.97
Prob > F (IVs)	0.0000	0.0000

Table A4: First-stage IV Regressions for Instrumental Variable Regressions Table VIII

This table reports the first-stage instrumental variable regression results for the IV regressions in Table VIII. The dependent variable is FTA in Column (1) and AFTA in Column (2). The instrumental variable is Num_Retire. Column (1) reports the first-stage results for the IV regression in Column (2) in Table VIII; Column (2), for the IV regression in Columns (4) in Table VIII. F-statistics (IVs) represents F statistics for an F-test that all the instrumental variables are jointly zero. The sample covers 274 fraud cases detected over 1996 to 2006. CEO connectedness and all control variables are their average values over the fraud period. Definitions of all variables are in Table I. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	FTA	**AFTA**
	(1)	**(2)**
Num_Retire	0.144***	0.124***
	[0.038]	[0.044]
Tobin's Q	0.000	-0.001
	[0.004]	[0.004]
Leverage	-0.086	0.008
	[0.111]	[0.121]
Accounting	-0.003	0.031
	[0.077]	[0.067]
Operating	0.028	0.060
	[0.057]	[0.051]
Executive	0.038	0.050
	[0.044]	[0.045]
IndustryQ	-0.082**	-0.061*
	[0.032]	[0.032]
Year_FB	-3.475	-8.250
	[7.516]	[7.291]
$Year\_FB^2$	0.001	0.002
	[0.002]	[0.002]
Constant	3,470.574	8,257.444
	[7,519.518]	[7,293.431]
Observations	270	270
Adj-Rsquare	-0.00	-0.00
F-statistics (IVs)	13.97	7.79
Prob > F (IVs)	0.0006	0.0083

Table A5: Robustness to Alternative Cluster Level.

This table reports robustness test results for the relation between CEO connectedness and corporate frauds estimated by the bivariate model to clustering the standard errors at the different level. Panel A and B report the estimation results after clustering at CEO-firm pair level and the results after clustering at the firm level, respectively. The speciations of the fraud and detection regression are identical to those in Table V. All regressions include year fixed effects. Coefficients marked with *, ** and *** are significant at 10%, 5%, 1%, respectively.

	Panel A: Cluster by CEO-Firm Pair Level				**Panel B: Cluster by Firm Pair Level**			
	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Fraud	**Detect|Fraud**	**Fraud**	**Detect|Fraud**	**Fraud**	**Detect|Fraud**	**Fraud**	**Detect|Fraud**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
FTA	0.746**	-0.658**			0.746**	-0.658**		
	[0.372]	[0.331]			[0.372]	[0.331]		
AFTA			0.931**	-0.833**			0.931**	-0.833**
			[0.458]	[0.410]			[0.458]	[0.409]
Tobin's Q	-0.304***	0.268***	-0.307***	0.270***	-0.304***	0.268***	-0.307***	0.270***
	[0.079]	[0.082]	[0.079]	[0.083]	[0.077]	[0.081]	[0.078]	[0.082]
Ebitda/TA	-1.143	0.652	-1.134	0.630	-1.143	0.652	-1.134	0.630
	[1.082]	[0.896]	[1.070]	[0.889]	[1.085]	[0.901]	[1.067]	[0.891]
Leverage	-2.199***	2.149***	-2.207***	2.153***	-2.199***	2.149***	-2.207***	2.153***
	[0.689]	[0.620]	[0.688]	[0.625]	[0.698]	[0.632]	[0.694]	[0.635]
SalesGrowth_5Yr	0.010***	-0.003**	0.010***	-0.004**	0.010***	-0.003**	0.010***	-0.004**
	[0.002]	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]	[0.002]
Log(TotalAssets)	-0.353***	0.371***	-0.350***	0.368***	-0.353***	0.371***	-0.350***	0.368***
	[0.090]	[0.084]	[0.087]	[0.081]	[0.090]	[0.084]	[0.087]	[0.081]
IndustryQ	0.212		0.223		0.212		0.223	
	[0.232]		[0.233]		[0.233]		[0.234]	
$(IndustryQ)^2$	-0.019		-0.022		-0.019		-0.022	
	[0.052]		[0.052]		[0.052]		[0.053]	
ICR	0.090		0.093		0.090		0.093	
	[0.144]		[0.146]		[0.144]		[0.147]	
Ln(BoardSize)	-0.440	0.430	-0.593	0.566	-0.440	0.430	-0.593	0.566
	[0.788]	[0.711]	[0.798]	[0.722]	[0.795]	[0.721]	[0.809]	[0.734]
%_NonIndepDirectors	-2.092**	1.954**	-2.139**	1.987**	-2.092**	1.954**	-2.139**	1.987**
	[0.986]	[0.960]	[0.979]	[0.950]	[0.997]	[0.974]	[0.989]	[0.963]
Ln(BoardMeetings)	0.061	0.053	0.044	0.068	0.061	0.053	0.044	0.068
	[0.292]	[0.265]	[0.293]	[0.266]	[0.296]	[0.267]	[0.297]	[0.268]
%_NonIndepDirectors_Audit	-1.197	0.612	-1.121	0.541	-1.197	0.612	-1.121	0.541
	[2.348]	[2.110]	[2.304]	[2.064]	[2.355]	[2.125]	[2.321]	[2.086]
Ln(AuditComSize)	0.428	-0.241	0.410	-0.223	0.428	-0.241	0.410	-0.223
	[0.386]	[0.307]	[0.384]	[0.305]	[0.388]	[0.311]	[0.386]	[0.309]
IOC	-1.540	1.398	-1.427	1.297	-1.540	1.398	-1.427	1.297
	[1.019]	[0.990]	[1.042]	[1.002]	[1.023]	[0.993]	[1.047]	[1.007]
StockVolatilities	-23.503**	28.432***	-23.246**	28.258***	-23.503**	28.432***	-23.246**	28.258***
	[9.963]	[8.253]	[9.816]	[8.093]	[9.782]	[8.144]	[9.636]	[7.986]
IndustryLitigation	14.943***	-9.743***	14.312***	-9.186**	14.943***	-9.743***	14.312***	-9.186**
	[4.716]	[3.575]	[4.888]	[3.606]	[4.701]	[3.554]	[4.855]	[3.576]
CEO_OWN	0.087		0.025		0.087		0.025	
	[1.047]		[1.049]		[1.044]		[1.047]	
$(CEO\_OWN)^2$	-1.809		-1.594		-1.809		-1.594	
	[3.183]		[3.148]		[3.167]		[3.135]	
CEO_Founder	-0.385	0.356	-0.221	0.211	-0.385	0.356	-0.221	0.211
	[0.410]	[0.364]	[0.419]	[0.372]	[0.412]	[0.367]	[0.424]	[0.376]
CEO_Chair	0.125	-0.115	0.138	-0.124	0.125	-0.115	0.138	-0.124
	[0.321]	[0.287]	[0.314]	[0.280]	[0.324]	[0.293]	[0.317]	[0.286]
Ln(CEO_Age)	-0.312	0.176	-0.275	0.143	-0.312	0.176	-0.275	0.143
	[0.491]	[0.445]	[0.497]	[0.447]	[0.491]	[0.448]	[0.498]	[0.451]
Constant	4.164**	-4.374***	4.548**	-4.719***	4.164**	-4.374**	4.548**	-4.719***
	[1.921]	[1.698]	[1.858]	[1.661]	[1.937]	[1.713]	[1.877]	[1.680]
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	7873	7873	7873	7873	7873	7873	7873	7873
Wald Chi2	937.80		1140.85		922.83		1105.27	
Prob> Chi2	0.00		0.00		0.00		0.01	

Table A6: Relation between CEO Connectedness and Corporate Frauds with Industry-matched Sample.

This table reports robustness test results for the relation between CEO connectedness and corporate frauds estimated by the bivariate model to alternative sample constructions. The estimation results are based on the industry matched sample and the sample excluding founder-CEO observations. Columns (1) and (3) report the results of the fraud regressions. Control variables are identical to those in Columns (1) and (3) of Table V. Columns (2) and (4) report the results of the fraud detection regressions. Control variables are identical to those in Columns (2) and (4) of Table V. All regressions include year fixed effects. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, ** and *** are significant at 10%, 5%, 1%, respectively.

	Model 1		**Model 2**	
	Fraud	**Detect|Fraud**	**Fraud**	**Detect|Fraud**
	(1)	**(2)**	**(3)**	**(4)**
FTA	0.774***	-0.671***		
	[0.280]	[0.245]		
AFTA			0.955***	-0.840***
			[0.343]	[0.301]
Tobin's Q	-0.314***	0.274***	-0.318***	0.276***
	[0.076]	[0.086]	[0.074]	[0.085]
Ebitda/TA	-1.227	0.754	-1.225	0.736
	[1.191]	[0.943]	[1.192]	[0.927]
Leverage	-2.301***	2.257***	-2.314***	2.264***
	[0.734]	[0.643]	[0.755]	[0.666]
SalesGrowth_5Yr	0.010***	-0.004**	0.011***	-0.004**
	[0.002]	[0.002]	[0.002]	[0.002]
Log(TotalAssets)	-0.348***	0.366***	-0.344***	0.363***
	[0.098]	[0.091]	[0.098]	[0.091]
IndustryQ	0.232		0.244	
	[0.263]		[0.266]	
$(IndustryQ)^2$	-0.024		-0.026	
	[0.057]		[0.058]	
ICR	0.145		0.149	
	[0.112]		[0.116]	
Ln(BoardSize)	-0.477	0.453	-0.635	0.592
	[0.781]	[0.715]	[0.833]	[0.761]
%_NonIndepDirectors	-2.038**	1.888**	-2.086**	1.920**
	[0.881]	[0.873]	[0.889]	[0.876]
Ln(BoardMeetings)	0.079	0.039	0.061	0.054
	[0.235]	[0.223]	[0.247]	[0.233]
%_NonIndepDirectors_Audit	-1.229	0.597	-1.153	0.527
	[2.586]	[2.198]	[2.640]	[2.234]
Ln(AuditComSize)	0.409	-0.208	0.393	-0.193
	[0.439]	[0.342]	[0.432]	[0.336]
IOC	-1.613	1.467	-1.488	1.358
	[1.051]	[0.985]	[1.031]	[0.961]
StockVolatilities	-24.843**	29.666***	-24.572**	29.479***
	[10.233]	[8.478]	[10.359]	[8.544]
IndustryLitigation	15.039***	-10.032***	14.332***	-9.429***
	[3.885]	[2.250]	[4.027]	[2.227]
CEO_OWN	0.090		0.012	
	[0.848]		[0.847]	
$(CEO\_OWN)^2$	-1.776		-1.512	
	[2.671]		[2.630]	
CEO_Founder	-0.404	0.370	-0.238	0.225
	[0.417]	[0.364]	[0.416]	[0.366]
CEO_Chair	0.100	-0.086	0.114	-0.096
	[0.232]	[0.203]	[0.226]	[0.201]
Ln(CEO_Age)	-0.253	0.113	-0.215	0.079
	[0.488]	[0.436]	[0.493]	[0.437]
Constant	4.125**	-4.333**	4.517**	-4.682***
	[1.911]	[1.730]	[1.890]	[1.712]
Observations	7181	7181	7181	7181
Wald Chi2	-928.19427		-927.49812	
Prob> Chi2	0.00		0.00	

Table A7: Alternative Measures of CEO Connectedness

Panel A: Fraud Regressions

This table reports robustness test results for the relation between CEO Connectedness and corporate frauds estimated by the bivariate model to alternative measures of CEO connectedness variables. Alternative measures of CEO connectedness include compensation weighted fraction of top executives appointed during the CEO tenure, FTA_W, in Columns (1) and (2); the residuals based on FTA_W, AFTA_W in Columns (3) and (4). Columns (1) and (3) report the results for the fraud regressions. Control variables are identical to those in Columns (1) and (3) of Table V. Columns (2) and (4) report the results for fraud detection regressions. Control variables are identical to those in Columns (2) and (4) of Table V. All regressions include year fixed effects. Robust standard errors clustered at the industry level are reported in brackets. Industries are classified by Fama-French 48 industry groupings. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Model 1		**Model 2**	
	Fraud	**Detect|Fraud**	**Fraud**	**Detect|Fraud**
	(1)	**(2)**	**(3)**	**(4)**
FTA_W	0.190***	-0.160**		
	[0.073]	[0.063]		
AFTA_W			0.233**	-0.199**
			[0.091]	[0.078]
Tobin's Q	-0.301***	0.265***	-0.304***	0.266***
	[0.075]	[0.085]	[0.074]	[0.085]
Ebitda/TA	-1.204	0.703	-1.214	0.693
	[1.075]	[0.887]	[1.071]	[0.869]
Leverage	-2.175***	2.121***	-2.178***	2.117***
	[0.716]	[0.636]	[0.738]	[0.657]
SalesGrowth_5Yr	0.010***	-0.003**	0.010***	-0.003**
	[0.002]	[0.002]	[0.002]	[0.002]
Log(TotalAssets)	-0.355***	0.370***	-0.352***	0.367***
	[0.095]	[0.089]	[0.094]	[0.088]
IndustryQ	0.206		0.218	
	[0.248]		[0.251]	
$(IndustryQ)^2$	-0.018		-0.021	
	[0.054]		[0.054]	
ICR	0.081		0.080	
	[0.095]		[0.099]	
Ln(BoardSize)	-0.396	0.392	-0.538	0.516
	[0.764]	[0.703]	[0.801]	[0.735]
%_NonIndepDirectors	-2.029**	1.900**	-2.069**	1.922**
	[0.879]	[0.876]	[0.896]	[0.889]
Ln(BoardMeetings)	0.073	0.043	0.051	0.061
	[0.235]	[0.221]	[0.248]	[0.231]
%_NonIndepDirectors_Audit	-1.217	0.623	-1.165	0.575
	[2.630]	[2.270]	[2.691]	[2.307]
Ln(AuditComSize)	0.400	-0.220	0.380	-0.202
	[0.381]	[0.303]	[0.382]	[0.301]
IOC	-1.608	1.446	-1.507	1.356
	[1.060]	[1.000]	[1.037]	[0.977]
StockVolatilities	-23.501**	28.220***	-23.040**	27.864***
	[10.255]	[8.615]	[10.415]	[8.668]
IndustryLitigation	14.493***	-9.409***	13.740***	-8.749***
	[3.521]	[2.153]	[3.593]	[2.135]
CEO_OWN	0.126		0.066	
	[0.802]		[0.796]	
$(CEO\_OWN)^2$	-1.874		-1.627	
	[2.498]		[2.426]	
CEO_Founder	-0.375	0.343	-0.215	0.207
	[0.402]	[0.355]	[0.402]	[0.357]
CEO_Chair	0.124	-0.115	0.139	-0.126
	[0.217]	[0.197]	[0.210]	[0.193]
Ln(CEO_Age)	-0.315	0.176	-0.290	0.154
	[0.485]	[0.439]	[0.487]	[0.437]
Constant	4.120**	-4.316**	4.520**	-4.661***
	[1.931]	[1.720]	[1.920]	[1.704]
Observations	7873	7873	7873	7873
Wald Chi2	-940.36718		-939.85547	
Prob> Chi2	0.00		0.00	

Panel B: Detection Duration Regressions

This table reports robustness test results for the relation between CEO Connectedness and fraud detection duration to alternative measures of CEO connectedness variables. Alternative measures of CEO connectedness include compensation weighted fraction of top executives appointed during the CEO tenure, FTA_W, in Columns (1) and (3); the residuals based on FTA_W, AFTA_W in Columns (2) and (4). Columns (1) and (2) report the results for the OLS estimation. Columns (3) and (4) report the results for the Cox regressions. Control variables are identical to those in Table VII. All regressions include year fixed effects. Robust standard errors clustered at the industry level are reported in brackets. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Duration		**_t**	
	(1)	**(2)**	**(3)**	**(4)**
FTA_W	0.074*		-0.123**	
	[0.044]		[0.051]	
AFTA_W		0.020		-0.022
		[0.044]		[0.053]
Log(TotalAssets)	-0.043	-0.036	0.006	-0.013
	[0.031]	[0.031]	[0.036]	[0.037]
Tobin's Q	0.017*	0.018*	-0.035	-0.038
	[0.009]	[0.010]	[0.036]	[0.040]
Leverage	0.736***	0.712***	-0.584	-0.493
	[0.219]	[0.207]	[0.429]	[0.420]
SalesGrowth_5Yr	0.001***	0.001***	-0.000	-0.000
	[0.000]	[0.000]	[0.000]	[0.001]
StockVolatilities	-19.352***	-19.468***	18.775***	17.813***
	[3.731]	[3.670]	[5.607]	[5.654]
IndustryLitigation	-4.219	-3.987	0.789	-0.111
	[2.863]	[2.903]	[4.130]	[4.512]
Year_FB	70.568***	71.596***	0.037	0.036
	[20.774]	[21.115]	[0.028]	[0.030]
$Year\_FB^2$	-0.018***	-0.018***	0.000	0.000
	[0.005]	[0.005]	[0.000]	[0.000]
Constant	-70,561.409***	-71,589.441***		
	[20,787.369]	[21,130.493]		
Observations	249	249	249	249
Adj-Rsquare	0.11	0.10		
Wald Chi2			51.74	25.14

Panel C: Estimating the Number of Executives Charged Regression

This table reports robustness test results for estimating the number of executives charged to alternative measures of CEO connectedness variables. Alternative measures of CEO connectedness include compensation weighted fraction of top executives appointed during the CEO tenure, FTA_W, in Columns (1); the residuals based on FTA_W, AFTA_W in Columns (2). Control variables are identical to those in Table VIII. All regressions include year fixed effects. Robust standard errors clustered at the industry level are reported in brackets. Coefficients marked with *, **, and *** are significant at 10%, 5%, 1%, respectively.

	Ln(Num_Charged)	
	(1)	**(2)**
FTA_W	0.027***	
	[0.009]	
AFTA_W		0.030***
		[0.010]
Tobin's Q	-0.001	-0.001
	[0.001]	[0.001]
Leverage	0.163**	0.153**
	[0.063]	[0.063]
Accounting	0.030	0.026
	[0.029]	[0.028]
Operating	0.046	0.042
	[0.031]	[0.032]
Executive	-0.007	-0.008
	[0.034]	[0.034]
IndustryQ	-0.007	-0.009
	[0.023]	[0.022]
Year_FB	2.343	2.927
	[6.167]	[6.254]
$Year\_FB^2$	-0.001	-0.001
	[0.002]	[0.002]
Constant	-2,361.578	-2,946.927
	[6,169.765]	[6,257.560]
Observations	270	270
Adj-Rsquare	0.10	0.10

Figure 1: Mean of FTA by the Types of Fraud

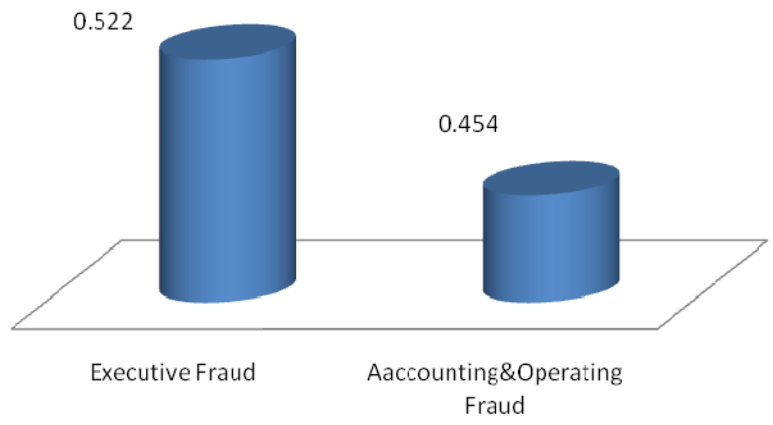

Figure 2: Mean of AFTA by the Types of Fraud