ESSAYS ON CORPORATE FRAUD AND GOVERNANCE

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ABSTRACT

A series of high-profile corporate fraud scandals in the early 2000s have drawn the attention from the public, regulators, and academia. These cases of the high-profile corporate fraud imply that the existing institutions are lack of incentives and monitoring. Therefore, this study aims to investigate the effectiveness of different governance mechanisms in limiting the fraud propensity.

Chapter 1 investigates whether monitoring by non-CEO executives can effectively reduce the likelihood of CEOs committing corporate fraud. Controlling for other traditional governance mechanisms, we find that firms with stronger non-CEO executives monitoring have a lower probability of committing fraud. Monitoring by non-CEO executives appears to be a substitute for traditional governance channels, as it is more effective when traditional governance mechanisms are weak. Moreover, we argue that monitoring by non-CEO executives fails to prevent corporate fraud if both CEO and subordinate executives involve in the fraud event. Finally, the strength of such monitoring is larger in more heterogeneous industries, where the human capital of non-CEO executives is less replaceable.

Chapter 2 examines the association between employee relation and the firm's incentive of committing fraud. We find that firms treating their employees fairly (as measured by employee relation ratings) have less incentive in committing fraud. Better employee relation facilitates interest alignment between shareholders and the management. Moreover, we find that the CEO duality weaken the negative association between employee relation and the likelihood of fraud commitment. Furthermore, we find that the negative association is more pronounced in R&D-intensive industries, where human capital is more valuable to firm performance. The results are robust to alternative models and measures.

Chapter 3 examines the association between corporate political connection and corporate fraud, and its detection, in China for 2003-2009. Using the enforcement action data from the Chinese Securities Regulatory Commission (CSRC), we find that corporate political connection is an important determinant of corporate fraud, while the type of ultimate owner is also relevant. Politically connected firms are 27% less likely to be detected by the CSRC conditional on their fraud commitment. Low detection rate in turn implies that politically connected firms have 23% more probability to commit fraud than non-connected firms. Government controlled firms are 21% less likely to be investigated by the CSRC. However, due to the irrelative tie between firm performance and management team's compensation and promotion, government controlled firms are 12% less likely to commit fraud. Furthermore, we find that our results are mostly driven by the local political connection rather than the central political connection. Finally, our results provide information that can inform policy debates among the regulation policy makers.

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CHAPTER 1

CAN MONITORING BY NON-CEO EXECUTIVES REDUCE THE LIKELIHOOD OF CORPORATE FRAUD?

1.1 Introduction

The large number of corporate fraud[1] cases emerged in the United States around early 2000s have drawn the attention from the public, regulators, and academia, leading to some major governance reform and legislation changes (e.g. the passage of the Sarbanes-Oxley Act (SOX)). These cases of the high-profile corporate fraud imply that the existing institutions are lacking of incentives and monitoring.[2] Previous studies in the literature argue that CEOs are self-interested, and hence not the reliable servants for shareholders (Jensen (1986, 1993), Morck, Shleifer, and Vishny (1990), Shleifer and Vishny (1989, 1997). Particularly, in the context of corporate fraud, the CEO is the key person driving the commitment of fraud. Enron had misrepresented the value of its assets by billions of dollars and related party transactions were siphoning value from the firm to the benefit of CEO. In order to meet the expectations of analysts, the CEO of WorldCom involves in a series of fraudulence accounting manipulations. Accounting and Auditing Enforcement Releases (AAERs) suggest that the CEO, rather than the CFO, is more likely to be treated by SEC as the person who orchestrated the accounting manipulation for their own financial gain. Consistent with this, Feng, Ge, Luo, and Shevlin (2011) find that the involvement of the CFOs in a corporate fraud is mainly due to the pressure from the CEOs, but not their own

[1] The Antifraud Rule 10b-5 of Securities Exchange Act of 1934 defines corporate financial fraud as the intent to deceive or manipulate with misstatements or omissions of material information relating to financial condition, solvency, and profitability (see SEC Administrative Proceeding 3-9588, April 27, 1998). McLucas, Taylor and Mathews (1997) find that financial fraud is mostly due to the use of false financial information or the failure to disclose material facts relating to a public company's financial condition.

[2] Bebchuk and Fried (2004) argue that boards treat CEOs friendly and generously. Fich and Shivdasani (2006) document busy boards shirking their responsibility.

personal financial benefits. In this paper, we test whether non-CEO executives monitoring can lower the likelihood of corporate fraud.

Our paper draws the theoretical inference from two recent papers: Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011). The monitoring by non-CEO executives are named differently as "bottom-up governance", and "the internal governance" respectively. Essentially, they argue that the dissent between the CEO and non-CEO executives can serve as another governance mechanism. Landier, Sraer, and Thesmar (2009) develop a model in which subordinate executives (implementers) can foster CEO (decision-maker) to use more "objective" information to make the "right" decision, the one maximizing shareholders' value. Similarly, the CEO needs the cooperation of subordinate executives to implement the decision he made, and, subordinate executives and the CEO may have different preference over the decisions. In order to gain cooperation from subordinate executives, the CEO needs to internalize the preference of subordinate executives. In this model, the more "independent" non-CEO executives are, the stronger this monitoring effect is.

In the model of Acharya, Myers, and Rajan (2011), the subordinate executives can be viewed as important stakeholders who care about the firm's future. By withdrawing their contribution to the firm, those subordinate executives can force the CEO to be more public-oriented and far-sighted, even if the CEO is self-interested and shareholders are powerless. Their model assumes that the CEO and subordinate executives have different horizons, preferences, and chance to misappropriate. In order to misappropriate more in current period, the self-interested CEO needs subordinate executives exert more effort to contribute to the firm. On the other hand, subordinate executives are reluctant to make contributions if the CEO only cares about short-term interest. Thus, they argue that such monitoring should be more effective when the power of the CEO and other executives are balanced. In other words, the relationship between the relative contribution of the two and monitoring strength is hump-shaped.

Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011) argue that non-CEO executives monitoring works through neither exit or voice, nor active whistle-blowing; instead, through an uncoordinated and even implicit strike. Empirically, Dyck, Morse and Zingales (2010) find that employees are one of the important whistle-blowers in detection fraud. They find that 27 cases of employee whistle-blowing cases in their sample from 1996 to 2004. However, in only 37% of those 27 cases, whistle-blowers reveal their identity. In those cases, in only three cases top executives are identified as the whistle-blowers. Thus, non-CEO executives are unlikely to exert monitoring through whistle-blowing.

Given the driving role of CEOs in corporate fraud, and the severe career consequences on other executives once the fraud is detected, we argue that the monitoring effect by other executives should be the most acute under this circumstance. Two empirical papers have separately tested the aforementioned two theory papers. Landier, Sauvagnat, Sraer, and Thesmar (2013) test Landier, Sraer, and Thesmar (2009) and find that a smaller fraction of independent executives is related to a lower level of profitability and lower shareholder returns following large acquisitions. Aggarwal, Fu, and Pan (2012) test Acharya, Myers, and Rajan (2011) and confirm the hump-shaped relations between relative contribution, and firm investment and performance. We borrow the measure from Landier, Sauvagnat, Sraer, and Thesmar (2013) to proxy for the monitoring strength of non-CEO executives in preventing corporate fraud. As the theories imply, the relation between the fraction of independent non-CEO executives (ones that are appointed before the CEO takes power) and the probability of committing fraud should be monotonic. Also we adopt the measure of relative compensation from Aggarwal, Fu, and Pan (2012) as alternative measure in the robustness analysis. The theory predicts that the relation between relative contribution and probability to commit fraud should be of the inverted hump shape (U-shaped).

When we take the theory to the data, one caveat is that we only observe detected fraud. Thus, the probability of committing fraud cannot be simply inferred from observed events. To address the identification problem complicated by undetected fraud, we first follow Dyck, Morse, and Zingales (2010) to limit our sample in large firms, the ones with more intense public scrutiny. Dyck, Morse, and Zingales (2010) and Yu and Yu (2011) argue that due to the intense public scrutiny, and the strong incentives to sue by plaintiff lawyers, large firms have fewer undetected frauds. We then follow Wang, Winton, and Yu (2010) to use a bivariate probit with partial observability model proposed by Poirier (1980) for the fraction of independent executives to account for undetected frauds. We also adopt propensity matching technique to form a 1-3 matching sample based on industry and firm size. Our main finding supports the theories. A higher fraction of independent executives is related to lower propensity of committing fraud.

We further extend the analysis to deepen our understanding of non-CEO executives monitoring. First, we investigate the effectiveness of non-CEO executives monitoring in relation to traditional governance channels such as board size, board independence, and institutional ownership. We find that such monitoring is more effective when the traditional governance is weaker in general. Thus non-CEO executive monitoring can be viewed as a substitute to traditional governance channels. This is consistent with the conjecture of Acharya, Myers, and Rajan (2011) that internal governance works best when it is difficult for external governance to align the interests of CEOs with shareholders.

Second, we study whether the effect of non-CEO executives monitoring varies with the individuals involved in fraud activities. Theory predicts that the dissent between the CEO and non-CEO executives is the driving factor for monitoring by non-CEO executives to work. However, it is often the case that non-CEO executives are involved in committing fraud and sued by shareholders in the class lawsuit. In this situation, non-CEO executives either voluntarily share the same interest as the CEO or are forced to follow the CEO's interest. Hence, non-CEO executives lose their monitoring power over the CEO's self-interest behavior when they are involved in fraud event. Intuitively, non-CEO executives are not willing to monitor themselves if they are responsible for committing fraud. Thus, we find that the effect of non-CEO executives monitoring is less significant in firms where the whole management team is involved in fraud committing.

Finally, we test the relationship between the strength of executive monitoring and the dispensability of non-CEO executives' human capital. The theory infers that the CEO has to take into account the preference of the subordinates since their effort in the project is indispensable to generate cash flows. If other executives can be easily replaced with someone that is more connected to the CEO from outside, this governance channel will not be very effective. We measure the dispensability of executive human capital by industry heterogeneity. If firms within an industry are more heterogeneous, executives' firm-specific human capital should be more valuable and thus less dispensable. We follow the Parrino (1997) measure of the correlation between common stock returns within two-digit SIC as the proxy for industry heterogeneity[3]. By dividing the sample into two subsamples measured by industry heterogeneity, we find that the non-CEO executives monitoring works to prevent fraud committing in firms in the heterogeneous industry, but fails in firms in the homogeneous industry.

The paper is organized as follows. In Section 1.2, we give a brief literature review on the topic of corporate fraud and governance. Section 1.3 presents our hypotheses. In Section 1.4, we describe the data and variable construction. In Section 1.5, we present our main results. Section 1.6 concludes.

1.2 Related Literature

We contribute to the literature of both corporate fraud and corporate governance. Most of the exiting literature on corporate fraud has focused on either the role of the CEO compensation scheme or corporate governance characteristics. A number of papers suggest that equity-based

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[3] See Parrino (1997) for details about how to construct the correlation between common stock returns within two-digit SIC.

compensations provide incentives for CEOs to manipulate accounting numbers (Bergstresser and Philippon (2006), Burns and Kedia (2006), Efendi, Srivastava, and Swanson (2007), Johnson, Ryan, and Tian (2009)). Some other papers link corporate fraud to corporate governance characteristics: board independence, board financial or accounting expertise, and institutional investors (Beasley (1996), Dechow, Sloan, and Sweeney (1996), Agrawal and Chadha (2005)). Limited papers look at the fraud detection process. Dyck, Morse, and Zingales (2010) find that fraud detection does not rely on standard corporate governance actors such as investors, SEC, and auditors, but rather depends on several non-traditional players such as employees, media, and industry regulators. Yu and Yu (2011) find that politically connected firms after committing fraud are less likely to be detected. Karpoff and Lou (2010) find that short sellers are able to help uncover the misconduct and also aware of the severity of misconduct. Some papers try to examine the consequence of corporate fraud. Karpoff, Lee, and Marin (2008a, 2008b) find that both managers and firm will incur substantial reputation loss after corporate fraud is discovered. Our paper is the first one suggesting that monitoring by non-CEO executives can be an effective mechanism to lower the fraud incentives.

There is a large literature regarding the role of corporate governance in limiting the CEO’s self-interest. Gillan (2006) provides an excellent review. Researchers emphasize the role of corporate board (John and Senbet (1998), Hermalin and Weisbach (2003)), institutional investors (Hartzell and Starks (2003), Woidtke (2002)), market for corporate control (Gompers, Ishii, and Metrick (2003), Hartzell, Ofek and Yermack (2004), Holmstrom and Kaplan (2001)), and managerial labor market (Fama and Jensen (1983), Jensen and Meckling (1976)) in the context of corporate governance. Our paper is in line with Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011) to emphasize non-CEO executives monitoring in shaping the firm’s governance.

1.3 Hypothesis Development

Bebchuk and Weisbach (2010) argue that the important and necessary condition for directors to perform effective monitoring function is the amount and nature of the information they possess. Directors who only have public information cannot evaluate management any better than the outside shareholders. The amount of the private information that directors have can be a measure of the potential for the value they add. Similary, Fama and Jensen (1983) argue that agency problem can be mitigated due to the generation of low-cost information of the CEO by other top managers. Ravina and Sapienza (2010) provide evidence that information advantage of independent directors is the key reason for the corporate governance enhancement. There is clear evidence showing that even the highly-talented board members may have limitation in providing direct monitoring due to the information asymmetry (Jensen (1993)). Hence, any control to limit the information asymmetry towards CEOs can provide effective monitoring (Inderst and Mueller (2009)). Non-CEO executives monitoring can be an important control mechanism to mitigate classic agency problems (Jensen and Meckling (1976), Fama (1980), and Fama and Jensen (1983)). Non-CEO executives are very important in monitoring CEOs because they have the authority and the incentive to closely monitor CEOs on a daily basis. It is impossible for the board to fulfill it since the board of directors only meets a few times in a year.

Landier, Sraer, and Thesmar (2009) develop a model called bottom-up governance in which subordinate executives (implementers) can foster the CEO (decision-maker) to use more "objective" information to make the "right" decision, the one maximizing shareholders' value. Similarly, the CEO needs the cooperation of subordinate executives to implement the decision he made. However, subordinate executives and the CEO may have different preferences over the decisions. In order to gain cooperation from subordinate executives, the CEO needs to internalize the preference of subordinate executives. Failure in internalizing those preferences may induce a very large cost (e.g. the story of copper-cooled engine from Sloan's (1963) autobiography[4].) Considering the interest of subordinate executives, the CEO has to adopt more objective information to make decision. Even though the interest of subordinate executives is "wrong", such internalization will successfully force the CEO not to follow his own biased interest.

Acharya, Myers, and Rajan (2011) present a model of internal governance where the self-interest of the CEO is restricted by subordinate executives. In the model, the subordinate executives can be viewed as important stakeholders who care about the firm's future. By withdrawing their contribution to the firm, those subordinate executives can force the CEO to be more public-oriented and far-sighted, even if the CEO is self-interested and shareholders are powerless. Their model assumes that the CEO and subordinate executives have different horizons, preferences and chance to misappropriate. In order to misappropriate more in current period, the self-interested CEO needs subordinate executives exert more effort to contribute to the firm. On the other hand, subordinate executives are reluctant to make contribution if the CEO only cares about short-term interest. Subordinate executives can only misappropriate firm's value in the future once they become the CEO. If the CEO is not future-oriented, the future firm value will be substantially decreased. In order to induce the effort of subordinate executives, the CEO has to compromise to act in a more future-oriented way. Such subordinate executives monitoring provides an effective channel to mitigate agency problems. Accordingly, we propose the first hypothesis based on these two theory papers about monitoring by non-CEO executives.

Hypothesis 1: The propensity of the firm to commit fraud is negatively related to the monitoring imposed by non-CEO executives.

[4] Landier, Sraer, and Thesmar (2009) cites one story from Sloan's (1963) autobiography. The story states that GM's managers have strong enthusiasm in a project about copper-cooled engine. However, the project fails to obtain the support from line engineers in charge of implementing it. Finally, the dissent between decision-makers and implementers results in a huge loss for the company.

The SEC states that currently weak governance system is one of the main reasons for the recent high-profile fraud scandals (Dyck, Morse, and Zingales (2010)). Many boards treat CEOs friendly and generously (Bebchuk and Fried (2004)), institutional investors are reluctant in dealing with costly monitoring activities due to their short investment horizons (Burns, Kedia, and Lipson (2010)), and the market for corporate control is hard to be seen as effective in controlling operation decisions (Acharya, Myers, and Rajan (2011).

Non-CEO executives monitoring is especially crucial when the traditional governance mechanisms cannot closely monitor the CEO or the direct monitoring is costly. Acharya, Myers, and Rajan (2011) argue that monitoring by subordinate executives works well when there is a breakdown in external governance. Firms relying on such monitoring by subordinate executives should be in sectors where it is hard for external governance to play a role. Firms in a country with lower external governance score should heavily rely on the monitoring by subordinate executives. Aggarwal, Fu, and Pan (2010) find that non-CEO executives monitoring is as or more important in mitigating agency problem than the traditional governance mechanisms. Landier, Sauvagnat, Sraer, and Thesmar (2013) argue that to some extent, non-CEO executives monitoring and corporate board are substitute. They find that monitoring by non-CEO executives tends to be better when the board size is large. Thus, monitoring by non-CEO executives can be viewed as a substitute for the traditional governance channels. Hence, we propose hypothesis 2 conditional on traditional governance mechanism.

Hypothesis 2: Monitoring by non-CEO executives is a substitute for traditional governance mechanisms.

Theory predicts that the dissent between the CEO and non-CEO executives is the driving factor for monitoring by non-CEO executives to work. However, it is often the case that non-CEO executives are involved in committing fraud and sued by shareholders in the class lawsuit.

In this situation, non-CEO executives either voluntarily share the same interest as the CEO or are forced to follow the CEO's interest. Hence, non-CEO executives lose their monitoring power over the CEO's self-interest behavior when they are involved in fraud event. Intuitively, non-CEO executives are not willing to monitor themselves if they are responsible for committing fraud. We argue that monitoring by non-CEO executives will fail to prevent corporate fraud if both the CEO and non-CEO executives involve in corporate fraud event. Thus, we propose hypothesis 3 conditional on the individuals involved in fraud activities.

Hypothesis 3: The effect of non-CEO executives monitoring on fraud propensity should be of less significance and magnitude in firms where the whole management team is involved in corporate fraud event.

The effectiveness of non-CEO executives monitoring depends on the condition that CEOs need their subordinate managers to exert effort in order to fulfill their decision (Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011)). Subordinate managers with substantial firm-specific human capital are hard to be replaced due to the limitation of outside labor market. It is hard for CEOs to fire the subordinate managers that are actively monitoring them and hire some others who share the same preference with them or totally controlled by them. Parrino (1997) argues that the cost of hiring a manager from outside in the same industry is more likely to be lower in homogeneous industries. Managers in other firms in homogeneous industries have more human capital that is specific to the firm. Outsiders in homogenous industries already have the specific knowledge about the product technologies and product markets of the hiring firms. To some extent, the cost of replacing subordinate managers is negatively related to the industry heterogeneity. Firms in heterogeneous industries firms are less similar and firm-specific human capital is not transferable.

Parrino (1997) also finds that firms in heterogeneous industry are more likely to have the inside CEO successors. Acharya, Myers, and Rajan (2011) argue that the firm's capacity for internal governance is stronger in an industry emphasizing internal promotion and long-term employment since subordinate managers have more incentive to perform in such industry. Internal promotion encourages managers to invest in firm-specific human capital (Jaggia and Thakor (1994)) and could result in higher incentives to perform (Lazear and Rosen (1981)). Thus, subordinate managers in firms in heterogeneous industries have more firm-specific human capital and have more incentives to perform well. Aggarwal, Fu, and Pan (2010) find that the internal governance effect on firm performance and long-term investment is more pronounced in the firms in heterogeneous industry using abnormal compensation gap as the proxy for internal governance. Thus, we propose our fourth hypothesis conditional on the industry characteristics.

Hypothesis 4: The effect of non-CEO executives monitoring on fraud propensity should be of greater significance and magnitude in firms in heterogeneous industries than that in homogeneous industries.

1.4 Data and Variable Construction

We obtain a sample of large frauds studied in Dyck, Morse, and Zingales (2010), who collect the fraud sample from Stanford Securities Class Action Clearinghouse (SSCAC). [5] To control for frivolous lawsuits, they restrict their sample from 1996 to 2004. In 1995, Private Securities Litigation Reform Act was passed to reduce frivolous lawsuits. They further filter the sample by the following criteria: (i) exclude all cases dismissed during the judicial review process; (ii) the settlement amount is at least \$3 million; (iii) firms assets are higher than \$750 million in the year before the fraud is detected. They argue that this reduces the chance of undetected fraud as large firms face more intense public scrutiny and lawyers have stronger incentives to

[5] For a detailed description about sample construction, please see Dyck, Morse, and Zingales (2010). Their sample is also available on Alexander Dyck's personal website http://www.rotman.utoronto.ca/dyck/.

investigate their fraudulent activities. We follow the same criteria and extend their sample to 2011. The total number of fraud satisfying all above criteria is 392.

For the comparison sample, we aim to obtain a random sample of firms that are litigation free. Thus, we start with all the firms in the CRSP/COMPUSTAT Merged database excluding firms that are in the detected fraud sample. The final sample consists of our detected fraud sample and comparison sample. One concern is that our final sample is extremely unbalanced due to the large number of no-fraud firms. To deal with this problem, we construct a 1-3 matching sample using propensity score method based on size of the firm, and the industry. Within the same industry of the fraud firms, we define a no-fraud firm as the matching firm if it has the smallest propensity matching score on size. The industry is defined by the two-digit SIC code. In order to minimize the problem of ties in propensity matching score, we include three control firms for each fraud firm.

Firm financial data is obtained from CRSP/COMPUSTAT Merged Database. Executive compensation data is collected from the Execucomp Database. We extract the data of corporate board from RiskMetrics Database. Institutional ownership data is acquired from Thomson-Reuters Institutional Holdings (13f) Database. Analyst coverage data is obtained from I/B/E/S Database.

To capture the power of monitoring from non-CEO executives, we adopt the measure from Landier, Sauvagnat, Sraer, and Thesmar (2013). They state that the power of monitoring by non-CEO executives is measured by the fraction of independent executives. Thus, we compute the fraction of top-ranking executives who joined the firm *before* the current CEO was appointed to capture the power of monitoring from non-CEO executives. We denote this measure as *FRBC*. The high *FRBC* is, the stronger the monitoring effect of non-CEO executives. *Board size* is the total number of directors on board. We use the fraction of outside directors to measure *board* *independence*. We obtain data on whether directors sit on other corporate boards. If a majority of outside directors hold three or more directorships, we assume the firm has a busy board (Fich and Shivdasani (2006)). Following Wang (2011), we calculate the firm's *finance need*. *Audit committee size* is measured by the total number of independent directors on the audit committee. *Leverage* is long-term debt over total assets. *Size* is the log value of total assets. *Analyst coverage* is the number of analysts following the firm. We also include the *pay-performance-sensitivity (PPS)* for the CEO as a control variable. Incentive pay should help align the interests of the CEO with shareholders, but could also give the CEO stronger incentives to manipulate stock prices. *Pay-performance-sensitivity (PPS)* is calculated as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. All independent variables are measured as lagged one year before fraud occurs in order to avoid the endogeneity problem.

1.5 Empirical Results

1.5.1 Sample Characteristics

We first examine the characteristics of corporate fraud. Table 1.1 shows the duration of the fraud event. "Starting Year" of fraud is the first year when fraudulent activities happen. The number of fraudulent activities starts increasing monotonically from 1995 to 2001 and reaches its peak in 2000 and 2001. Then the incidence of fraud dropped rapidly from 2002. In 2002, the House approved the Sarbanes–Oxley Act (SOX), an act mainly designed for preventing corporate fraud. The statistics provide evidence that Sarbanes–Oxley Act (SOX) effectively limits the incentive of the firm to commit fraud. The actual duration of the fraud activities depends on firm specific characteristics. Thus, we do not find any pattern in the actual days of fraud duration.

We then compare the characteristics of fraud firms and no-fraud firms and the results are presented in Table 1.2. Fraction of top executives joined *before* the current CEO, our proxy for non-CEO executives monitoring, is qualitatively the same across different samples. Compared with fraud firms, no-fraud firms also have a larger board and larger audit committee, suggesting that no-fraud firms have better governance than fraud firms (Beasley (1996), Jensen (1993)). Moreover, fraud firms appear to be larger firms with higher market-to-book ratio and higher external financing need. Larger firms face tighter scrutiny and closer monitoring by government and public, which reduce the information asymmetry problem. Thus, fraud is more likely to be discovered in larger firms (Cox and Thomas (2003), Dechow, Ge, Larson and Sloan (2007), Dyck, Morse, and Zingales (2010), and Yu and Yu (2011)). Ge, Larson and Sloan (2007) and Dechow, Sloan and Sweeney (1996) argue that firms subject to AAERs are more active in seeking new financing. Leverage is frequently adopted as the proxy for closeness to debt covenant (Dechow, Sloan and Sweeney (1996), Richardson, Tuna and Wu (2003)). Firms close to their debt covenant are more likely to manage earnings (Healy and Wahlen (1999)). Moreover, fraud firms are followed by more financial analysts and institutional investors. Financial analysts are also viewed as traditional outside monitors over the firms. Their specific knowledge about financial statement and routine communication with management make them have higher chances to discover fraud. Analysts are the whistle-blower for some high-profile fraud scandals such as those of Global Crossing and Qwest Communication. Dyck, Morse and Zingales (2010) confirm the active role played by analyst in fraud detection. There is no significant difference in *FRBC* and board independence across samples. We will look at the details in the multivariate analysis.

Table 1.1: Number of fraud cases by year and durations of fraud

We follow Dyck, Morse, and Zingales (2010) and collect fraud cases filed from 1996 to 2011 in Stanford Securities Class Action Clearinghouse. The filing date is the data when shareholders file the federal class action securities fraud litigation, and thus it is after the ending data of fraud activities. *Starting Year* of fraud is the first year when fraudulent activities happen. *Duration* is defined as the number of years from the start of fraud date to the end of the fraud date, as shown in the litigation documents.

			Fraud Duration (Years)				
Starting Year	Count	Percentage (%)	Min	Mean	Median	Max	Standard Deviation
1994	4	1.02	1.25	2.41	2.49	3.42	0.98
1995	11	2.81	0.59	1.98	1.51	3.84	1.16
1996	14	3.57	0.21	1.02	0.87	2.54	0.68
1997	26	6.63	0.01	1.80	1.16	5.90	1.66
1998	34	8.67	0.01	1.87	1.40	5.29	1.56
1999	37	9.44	0.34	2.30	2.81	4.78	1.38
2000	44	11.22	0.01	1.51	1.19	4.21	1.10
2001	36	9.18	0.24	1.47	1.22	4.96	1.26
2002	16	4.08	0.21	1.31	1.02	5.12	1.23
2003	12	3.06	0.39	2.83	3.00	6.00	1.99
2004	12	3.06	0.35	1.47	1.29	3.60	1.01
2005	25	6.38	0.03	1.06	0.69	3.52	0.90
2006	18	4.59	0.31	1.69	1.34	4.82	1.36
2007	27	6.89	0.21	1.25	1.00	3.57	0.87
2008	21	5.36	0.07	0.86	0.63	1.97	0.60
2009	21	5.36	0.10	0.80	0.80	1.41	0.37
2010	23	5.87	0.00	0.47	0.26	1.41	0.39
2011	11	2.81	0.07	0.26	0.21	0.52	0.19
Total	392	100.00	0.00	1.46	1.00	5.12	1.28

Table 1.2: Comparison of fraud firms with non-fraud firms in the COMPUSTAT large firms

FRBC is the fraction of executives who joined the firm before the current CEO was appointed. *Board independence* is the number of outside directors divided the number of directors. *Audit committee size* is the number of directors on the audit committee. *ROA* is calculated as operating income after depreciation divided by total assets. *Finance need* is equal to asset growth rate minus *ROA2/(1-ROA2)*, where *ROA2* is income before extraordinary items divided by total assets. *Leverage* is long-term debt divided by total assets. *Size* is the log value of total assets. *Market-to-book ratio* is market value of equity plus books value of debt divided by book value of assets. *Institutional ownership* is the percentage of shares held by institutional investors from 13-f filings. *Analyst coverage* is the number of analysts following the firm. *Pay performance sensitivity* of the CEO is defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. The table shows the mean values and median values in parenthesis of each variable of the fraud sample and non-fraud sample.

	Fraud	#obs	Non-fraud	#obs	t-statistics of difference
FRBC (Fraction of independent non-CEO executives)	0.64(0.50)	236	0.68(0.67)	12580	-2.07*
Board size	10.64(10.00)	192	9.66(10.00)	7749	3.57***
Board Independence	0.71(0.75)	192	0.70(0.72)	7749	0.21
Audit committee size	3.78(4.00)	192	3.69(3.00)	7749	0.98
ROA	0.09(0.08)	357	0.09(0.08)	12570	-0.03
Finance need	1.10(1.02)	267	1.01(0.98)	12113	5.96***
Leverage	0.22(0.19)	356	0.21(0.15)	12536	1.12
Size	8.42(8.27)	358	8.33(8.06)	12575	1.29
Market-to-book ratio	4.48(2.95)	357	2.96(2.12)	12575	8.35***
Institutional ownership	0.66(0.70)	258	0.70(0.71)	9478	-2.89**
Analyst coverage	9.38(8.00)	260	8.39(7.00)	9637	2.81**
Pay-performance-sensitivity of the CEO	24.97(3.21)	267	20.46(3.77)	11713	1.23

1.5.2 Regression Results of the Main Model

The basic probit regression equation is as follows:

$$Fraud = \beta_0 + \beta_1 * \ executives\ monitoring + \theta * Control\ variables + Industy\ dummy + year\ dummy + \varepsilon$$

We find a set of control variables that affect the probability of committing fraud based on the literature of corporate fraud. The control variables include firm characteristics and traditional governance channels such as board characteristics. All explanatory variables in the probit regression are measured in the year before the fraud occurs.

Table 1.3, column (1) shows us the effects of monitoring by non-CEO executives on fraud commitment in the raw sample. *FRBC* is negatively related with the fraud propensity. The higher the value of *FRBC*, the higher monitoring imposed by non-CEO executives. Thus, the non-CEO executives monitoring can significantly mitigate the fraud commitment. *Board size* appears to be positively associated with the fraud propensity of the firm. The agency problem may become more severe in a larger board due to the "free-rider" problem. Beasley (1996) finds that the likelihood of financial statement fraud increases with board size. Jensen (1993) argues that a smaller board plays a controlling function whereas a larger board is more likely to be controlled by the CEO. Surprisingly, *Institutional ownership* is positively related with fraud propensity in raw sample. However, Burs, Kedia, and Lipson (2010) argue that aggregate institutional ownership is associated with higher possibility of financial misreporting. Such finding is due to the short investment horizon of certain institutions, those with little incentive to involve in costly monitoring activities. We also find that large firms are more likely to be associated with fraud commitment (Cox and Thomas (2003)). Large firms face tighter scrutiny and closer monitoring by government and public, which reduce the information asymmetry problem. Thus, fraud is more likely to be discovered in large firms. *Market-to-book ratio* is found to be positively related to fraud committing. *Market-to-book ratio* can be a proxy for firm's growth. It is hard to monitor growth firms due to the information asymmetry, and hence growth firms are more likely to involve in fraud activities.

To deal with the unbalanced sample, we construct a 1-3 matching sample using propensity score based on size of the firm, and the industry[6]. Within the same industry of the fraud firms, we define a no-fraud firm as the matching firm if it has the smallest propensity matching score on size. The industry is defined by the two-digit SIC code. In order to minimize the problem of ties in propensity matching score, we include three control firms for each fraud firm. Then, we re-run the same probit regression for the matching samples and present the results in column (2). We obtain qualitatively the same result from matching samples as that from the raw sample.

[6] Figure 1.1 shows the kernel density plot of size across fraud and non-fraud sample. After matching process, the non-fraud sample is more comparable to the fraud sample.

Table 1.3: Fraction of executives hired *before* current CEO and fraud propensity in probit model

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors in the audit committee. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. Leverage is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. Institutional ownership is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. We use *FRBC* as our measure for non-CEO executive monitoring. Column (1) is the result of simple probit model for raw sample. Column (2) is the result of simple probit model for a 1-3 matching without replacement sample. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	(1) Raw sample	(2) Matching sample
FRBC	-0.34**	-0.53*
	(0.034)	(0.059)
Board size	0.03	0.02
	(0.186)	(0.506)
Board independence	0.09	0.07
	(0.736)	(0.901)
Busy board	0.12	0.29
	(0.609)	(0.479)
Audit committee size	-0.04	-0.04
	(0.355)	(0.616)
ROA	0.42	0.97
	(0.560)	(0.444)
Finance	0.27	0.67*
	(0.269)	(0.090)
Leverage	-0.81**	-0.86
	(0.024)	(0.171)
Size	0.10*	0.06
	(0.039)	(0.499)
Market-to-book ratio	0.04***	0.05**
	(0.000)	(0.010)
Institutional ownership	1.07***	1.84**
	(0.000)	(0.003)
Analyst	0.00	0.01
	(0.771)	(0.528)
PPS	0.001	-0.001
	(0.463)	(0.553)
Constant	-7.37***	-6.41***
	(0.000)	(0.000)

Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Observations	5,443	408
Psudo R-squared	0.13	0.08

However, when we take the theory to the data, one caveat is that we only observe detected fraud. Thus the probability of committing fraud cannot be simply inferred from observed events[7]. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. We specify the model being estimated as the following[8]:

Fraud: F_j =1 if firm j commits fraud. Otherwise, F_j =0

Fraud detection: D_j =1 if the CSRC detects the fraud of firm j. Otherwise, D_j =0

From this we have the following reduced form equations:

$$F_j = x_{1j}\beta_1 + u_j \quad (1)$$

$$D_j = x_{2j}\beta_2 + v_j \quad (2)$$

where x_{1j} is the vector of variables that helps explain a firm's propensity to commit fraud. x_{2j} is the vector of variables that helps explain why fraud is detected. u_j and v_j are error terms.

$$Zj = F_j * D_j \quad (3)$$

Zj=1 indicates a detected fraud.

[7] There is an empirical problem in the fraud literature. We only observe the detected fraud (Z=1), which is not actually the same as the true fraud (F=1) (See Figure 1.2). Thus, result from simple probit model may be contaminated by the undetected fraud cases.
[8] We closely follow Poirier (1980) and Wang, Winton and Yu (2011) in this section.

$$P(Zj=1)= P(F_j=1 \ \& \ D_j=1) =P(F_j=1)*P(D_j=1| F_j=1)=\Phi (x_{1j}\beta_1, x_{2j}\beta_2) \quad (4)$$

$$P(Zj=0)= P(F_j=0 \text{ or } D_j=) = P(F_j=0)+P(F_j=1)*P(D_j=0| F_j=1)=1-\Phi (x_{1j}\beta_1, x_{2j}\beta_2) \quad (5)$$

The above model can be estimated by using maximum likelihood estimator. The log-likelihood function is

$$L(\beta_{1,} \beta_2)=\sum(Zj * \ln(\Phi (x_{1j}\beta_1, x_{2j}\beta_2))+(1-Zj)*\ln(1-\Phi (x_{1j}\beta_1, x_{2j}\beta_2)) \quad (6)$$

According to Poirier (1980), the condition for full identification of the model parameters are (1) x_{1j} and x_{2j} do not contain exactly the same variables; and (2) the explanatory variables exhibit substantial variations in the sample. We have the data for Zj, which is the reported fraud and the data for x_{1j} and x_{2j} , whose elements are somehow different. By minimizing the log-likelihood function over the parameters, we finally can obtain the MLE for all our parameters.

In order to achieve identification, we find two subsets of control variables that affect the probability of committing fraud and fraud detection separately. Both sets of variables are based on the literature of corporate fraud. The first set of variables is fraud propensity factors including board characteristics and firm characteristics. The second set of variables is fraud detection factors including institutional holdings, analyst coverage, and stock returns. Intuitively, bad firm performance drives shareholder dissatisfaction and investigations. All explanatory variables in the fraud propensity equation are measured in the year before the fraud occurs. Explanatory variables in the fraud detection equation are measured in the year after the fraud happens. The variables proxy for the information of directors, audit committee, analyst coverage, and institutional ownership can also be viewed as the proxy for whistle-blowing. Auditor, analysts and institutional investors are viewed as standard whistle-blowers in fraud detection.

Note that a simple probit model, which is frequently used in the literature, is

$$Zj= F_j = x_{1j}\beta_1 +\varepsilon_j$$

$P(Zj=1) = P(F_j = 1) = \Phi(x_{1j}\beta_1, x_{2j}\beta_2)$

If is $D_j = 1$ not always equal to 1, simple probit model will generate biased inferences.

Table 1.4 presents the result from the bivariate probit model with partial observability. P(F) is for the propensity equation. P(D|F) is for the detection equation. We report the result for both raw sample and matching sample. We find that *FRBC* still remains its negative effect on fraud propensity. *Market-to-book ratio* appears to be negatively related to the fraud propensity in the raw sample. *Market-to-book ratio* can be a proxy for firm's growth. It is hard to monitor growth firms due to the information asymmetry, and hence growth firms are more likely to get involved in fraud activities. In addition, we notice that large firms are more likely to be detected if they choose to commit fraud since we have a significant positive sign for size in the detection equation regression. Large firms face tighter scrutiny and closer monitoring by government and public, which reduce the information asymmetry problem. Thus, fraud is more likely to be discovered in larger firms (Cox and Thomas (2003), Dechow, Ge, Larson and Sloan (2007), Dyck, Morse, and Zingales (2010), and Yu and Yu (2011)). *Return volatility* is also positively associated with fraud detection since shareholders are unhappy with their loss and pay more attention on such stocks.

Table 1.4: Fraction of executives hired *before* current CEO and fraud propensity using bivariate probit model with partial observability

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors in the audit committee. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Return volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. We use *FRBC* as our measure for non-CEO executive monitoring. P(F=1) is the equations for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. P(F=1|D=1) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

	Raw sample		Matching sample	
VARIABLES	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)
FRBC	-0.66*		-0.53*	
	(0.084)		(0.099)	
Board size	0.06		0.01	
	(0.207)		(0.792)	
Independent director%	-0.30		0.74	
	(0.707)		(0.261)	
Busy board	0.72		0.17	
	(0.244)		(0.759)	
Audit committee size	-0.001		0.01	
	(0.971)		(0.894)	
ROA	1.40		1.16	
	(0.501)		(0.646)	
Finance need	0.85		0.52	
	(0.145)		(0.354)	
Leverage	-0.23		0.00	

	(0.747)		(0.997)	
Size	-0.03	0.22**	-0.26	0.25
	(0.845)	(0.018)	(0.286)	(0.446)
Market-to-book ratio	0.17*		0.03	
	(0.052)		(0.393)	
Institutional ownership	0.08	1.07	1.29	-0.51
	(0.920)	(0.109)	(0.151)	(0.542)
Analyst	-0.001	0.001	0.08	-0.06
	(0.987)	(0.908)	(0.108)	(0.319)
PPS	0.00		0.00	
	(0.250)		(0.556)	
Return volatility		5.60***		3.56**
		(0.003)		(0.043)
Stock turnover		-0.01		0.05
		(0.913)		(0.261)
Stock return		-0.24		-0.16
		(0.223)		(0.278)
Constant	-2.66	-4.98***	0.001	-1.57
	(0.157)	(0.000)	(0.998)	(0.344)
Observations	4,963	4,963	335	335

1.5.3 Monitoring by non-CEO Executives and Traditional Governance Channels

To test the relationship between the monitoring effectiveness by non-CEO executives and traditional governance channels, we first create three dummy variables for board size, board independence, and institutional ownership. The dummy variable takes the value of one if the corresponding variable is above its sample medium level. We then explore the effect of non-CEO executive monitoring in strong traditional governance sample and weak traditional governance sample by imposing an interactive variable between *FRBC* and the dummy variable in the probit regression. If *FRBC* remains negative significant when traditional governance channel is weak but becomes insignificant when traditional governance channel is strong, we call monitoring by non-CEO executive a substitute for traditional governance mechanism. On the contrary, we call such monitoring a complement for traditional governance mechanism.

Table 1.5 presents the result for the comparison between monitoring by non-CEO executives and traditional monitoring mechanisms in the probit model[9]. In Panel A, we find that *FRBC* is significantly negative when the firm has a large board but loses its significance when the board size is small in both raw sample and matching sample. In Panel B, *FRBC* shows a greater negative effect on limiting the firm's fraud propensity when the firm has lower board independence in both raw sample and matching sample. Similarly, *FRBC* is negatively associated with the fraud propensity when the firm has few institutional investors. Referring to the effect of *FRBC* in different samples, we reach the conclusion that monitoring by non-CEO executives is a substitute for traditional governance mechanism. Monitoring by non-CEO executives works best when the traditional governance mechanism fails (Acharya, Myers, and Rajan (2011), Aggarwal, Fu, and Pan (2010), and Landier, Sauvagnat, Sraer, and Thesmar (2013)).

[9] For simplicity, we only report the main variables in the table.

Then, we perform similar analysis in the bivariate probit model in Table 1.6[10]. In Panel A, we find that *FRBC* is negatively associated with firm's propensity when the firm has a small board in the raw sample. However, the result reverts in the matching sample, where *FRBC* plays an important role in limiting the firm's fraud propensity in the firm with a large board size. Panel B shows the results for the comparison under different degree of board independence. *FRBC* has a stronger effect in limiting the fraud propensity when the firm has lower degree of board independence. *Board independence* is also found to be negatively related to fraud propensity in the raw sample. Similarly, Panel C shows that *FRBC* is related to the fraud commitment when the firm has less institutional ownership. *Institutional ownership* is also found be to negatively associated with fraud propensity in the raw sample.

[10] For simplicity, we only report the main variables in the fraud propensity equation (P(F=1)) in the table.

Table 1.5: Monitoring by non-CEO executives versus traditional governance mechanism in probit model

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Large board dummy* takes one if board size is greater than medium, otherwise zero. *High board independence* takes one if independent director% is greater than medium, otherwise zero. *High Institutional ownership* is institutional ownership is greater than medium, otherwise zero. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors in the audit committee. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. Institutional ownership is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. We use *FRBC* as our measure for non-CEO executive monitoring. Matching sample is a 1-3 matching without replacement sample. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

Panel A: Board size	(1)	(2)	Panel B: Board independence	(3)	(4)	Panel C: Institutional ownership	(5)	(6)
Probit	Raw	Matching	Probit	Raw	Matching	Probit	Raw	Matching
FRBC	-0.30	-0.50	FRBC	-0.39**	-0.62*	FRBC	-0.47***	-0.79**
	(0.126)	(0.134)		(0.043)	(0.071)		(0.009)	(0.014)
FRBC*board	-0.06	-0.06	FRBC*board indep.	0.10	0.18	FRBC* institutional own.	0.26	0.19
	(0.719)	(0.852)		(0.603)	(0.954)		(0.148)	(0.565)
Board size	0.03	0.03	Board independence	-0.06	-0.18	Institutional ownership	0.73*	1.09
	(0.193)	(0.493)		(0.875)	(0.802)		(0.059)	(0.131)
Constant	-7.29***	-6.41***	Constant	-7.56***	-6.33***	Constant	-7.36***	-6.17***
	(0.000)	(0.000)		(0.000)	(0.006)		(0.000)	(0.000)
Year dummy	Yes	Yes	Year dummy	Yes	Yes	Year dummy	Yes	Yes
Industry dummy	Yes	Yes	Industry dummy	Yes	Yes	Industry dummy	Yes	Yes
Observations	5,443	408	Observations	5,443	408	Observations	5,443	408
Psudo R-squared	0.13	0.08	Psudo R-squared	0.13	0.08	Psudo R-squared	0.13	0.08
β(FRBC|large board=1)	-0.36*	-0.56*	β(FRBC|independent board=1)	-0.29*	-0.48	β(FRBC|institutional own. dummy=1)	-0.21	-0.60
	(0.029)	(0.074)		(0.010)	(0.157)		(0.256)	(0.493)

Table 1.6: Monitoring by non-CEO executives versus traditional governance mechanism in bivariate probit model

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Large board dummy* takes one if board size is greater than medium, otherwise zero. *High board independence* takes one if independent director% is greater than medium, otherwise zero. *High Institutional ownership* is institutional ownership is greater than medium, otherwise zero. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors in the audit committee. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. Institutional ownership is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Return volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. We use *FRBC* as our measure for non-CEO executive monitoring. Matching sample is a 1-3 matching without replacement sample. P(F=1) is the equations for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. P(F=1|D=1) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

Panel A: Board size	(1)	(2)	Panel B: Board independence	(3)	(4)	Panel C: Inst. ownership	(5)	(6)
Bivariate probit	Raw	Matching	Bivariate probit	Raw	Matching	Bivariate probit	Raw	Matching
FRBC	-0.75*	-0.49	FRBC	-2.32***	-0.61*	FRBC	-5.42***	-0.66**
	(0.091)	(0.168)		(0.000)	(0.076)		(0.000)	(0.017)
FRBC*board	0.20	-0.06	FRBC*board indep.	1.48***	0.19	FRBC*High institutional own.	5.39***	0.39
	(0.683)	(0.786)		(0.000)	(0.536)		(0.000)	(0.140)
Board size	0.04	0.02	Board independence	-9.57***	0.36	Institutional ownership	-2.27***	0.66
	(0.557)	(0.718)		(0.000)	(0.634)		(0.008)	(0.424)
Constant	-2.55	-0.06	Constant	-0.21	0.22	Constant	-0.55	0.27
	(0.175)	(0.966)		(0.910)	(0.899)		(0.605)	(0.853)
Observations	4,963	335	Observations	4,963	335	Observations	4,963	335
β(FRBC$\mid$large board=1)	-0.55	-0.55*	β(FRBC$\mid$high independent board=1)	-0.84***	-0.48	β(FRBC$\mid$High institutional own. dummy=1)	-0.03	-0.60
	(0.249)	(0.100)		(0.009)	(0.174)		(0.921)	(0.436)

1.5.4 Monitoring by non-CEO Executives and Individuals Involved in Committing Fraud

Theory predicts that the dissent between the CEO and non-CEO executives is the driving factor for monitoring by non-CEO executives to work. However, it is often the case that non-CEO executives are involved in committing fraud and sued by shareholders in the class lawsuit. In this situation, non-CEO executives either voluntarily share the same interest as the CEO or are forced to follow the CEO's interest. Will non-CEO executives still be able to monitor fraud committing when they themselves are involved in it? To answer this question, we scrutinize whether the effect of monitoring by non-CEO executives varies with the individuals involved in the fraud event. We perform the subsample analysis according to the individuals sued in the shareholder class lawsuit. First, we divide the sample into subsamples: CEO&CFO are sued by the shareholders, and the management team is sued by the shareholders[11]. We then run the probit regression across two subsamples. Table 1.7 presents the result from the subsample analysis. We find that *FRBC* remains significantly negative in CEO&CFO sample but lose its significance in management team sample. Such pattern is consistent among raw sample and matching sample. The result confirms our hypothesis that monitoring by non-CEO executives fails if the management team involves in firm's fraudulent activities.

We perform the same analysis in bivariate probit model in Table 1.8 for the matching sample[12]. We confirm the finding that the monitoring by non-CEO executives remains its effect in limiting fraud committing when only CEO and CFO are sued. However, such monitoring does not play any role in limiting fraud propensity if the management team is sued.

[11] Feng, Ge, Luo, and Shevlin (2011) find that the involvement of CFO in corporate fraud is mainly due to the pressure from CEO, but not their own personal financial benefits. Thus, we group CEO and CFO together as one group. Three or more people sued are viewed as the case where the management team is sued. Thus, we can form two groups: CEO and CFO are sued, and the management team is sued.

[12] We only report the result for matching sample due to the computational difficulty in large sample.

Table 1.7: Subsample analysis—sample split by the individuals involved in fraud event

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. We divide the sample into two subsamples according to the individual sued by shareholders: CEO&CFO, and the management team. We use *FRBC* as our measure for non-CEO executive monitoring. The results are drawn from the raw sample and a 1-3 matching sample. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

	Raw sample		Matching sample	
VARIABLES	CEO&CFO	Management	CEO&CFO	Management
FRBC	-0.65***	-0.02	-0.87**	-0.14
	(0.003)	(0.931)	(0.015)	(0.693)
Board size	0.03	0.02	0.01	0.05
	(0.210)	(0.497)	(0.836)	(0.278)
Board independence	0.27	-0.10	0.42	-0.28
	(0.417)	(0.761)	(0.534)	(0.676)
Busy board	0.46	-0.27	0.79*	-0.05
	(0.102)	(0.487)	(0.089)	(0.942)
Audit committee size	-0.03	-0.05	-0.00	-0.04
	(0.624)	(0.332)	(0.964)	(0.697)
ROA	0.62	0.20	1.92	0.16
	(0.389)	(0.848)	(0.181)	(0.916)
Finance need	0.10	0.41	0.58	0.76
	(0.778)	(0.137)	(0.278)	(0.106)
Leverage	-0.76	-0.84*	-0.12	-1.35*
	(0.108)	(0.055)	(0.897)	(0.075)
Size	0.06	0.13*	0.02	0.05

	(0.338)	(0.055)	(0.825)	(0.647)
Market-to-book ratio	0.04***	0.03*	0.07***	0.04
	(0.000)	(0.051)	(0.007)	(0.123)
Institutional ownership	0.65*	1.40***	0.81	2.78***
	(0.073)	(0.000)	(0.292)	(0.000)
Analyst	0.01	-0.001	0.02	0.01
	(0.311)	(0.880)	(0.246)	(0.674)
PPS	0.001	0.001	-0.001	-0.001
	(0.278)	(0.740)	(0.504)	(0.825)
Constant	-6.19***	-7.94***	-6.50***	-3.93**
	(0.000)	(0.000)	(0.000)	(0.005)
Year dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Observations	4,666	4,150	330	328
Pusdo R-squared	0.15	0.12	0.14	0.10

Table 1.8: Subsample analysis—sample split by the individuals involved in fraud event (bivariate probit model)

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. We divide the sample into two subsamples according to the individual sued by shareholders: CEO&CFO, and the management team. . *Stock return* is the annual buy-and-hold stock return. *Return volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. We use *FRBC* as our measure for non-CEO executive monitoring. Matching sample is a 1-3 matching without replacement sample. P(F=1) is the equations for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. P(F=1|D=1) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

	CEO&CFO		Management	
VARIABLES	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)
FRBC	-0.47**		-0.18	
	(0.029)		(0.453)	
Board size	0.04		0.41***	
	(0.268)		(0.008)	
Board independence	0.35		-11.03***	
	(0.289)		(0.000)	
Audit committee size	0.03		0.18	
	(0.645)		(0.201)	
ROA	1.77		2.24*	
	(0.224)		(0.065)	
Finance need	0.20		2.49*	
	(0.595)		(0.033)	
Leverage	0.00		-1.14*	

	(0.996)		(0.093)	
Size	-0.21*	0.32**	-0.07	0.05
	(0.017)	(0.002)	(0.412)	(0.427)
Market-to-book ratio	0.02		-0.02	
	(0.404)		(0.482)	
Institutional ownership	0.86	-0.79	2.38***	1.18*
	(0.147)	(0.186)	(0.000)	(0.078)
Analyst		-0.01		0.02
		(0.582)		(0.226)
Return volatility		3.78**		7.71***
		(0.015)		(0.000)
Stock turnover		0.04		0.09
		(0.449)		(0.166)
Stock return		-0.05		-0.07
		(0.767)		(0.767)
Constant	0.14	-1.96*	-0.36	-3.59***
	(0.909)	(0.064)	(0.791)	(0.000)
Observations	292	292	289	289

1.5.5 Monitoring by non-CEO Executives and Their Firm-specific Human Capital

In this section we investigate whether the dispensability of non-CEO executives' human capital plays a role in their monitoring effectiveness. The theory infers that the CEO has to take into account the preference of the subordinates since their effort in the project is indispensable to generate cash flows. If other executives can be easily replaced with someone that is more connected to the CEO from outside, this governance channel will not be very effective. We measure the dispensability of executive human capital by industry heterogeneity. The industry heterogeneity is measured by using Parrino's (1997) measure of the correlation between stock returns within 2-digit SIC. Such correlation measure is calculated as follows. First, an equally weighted return index is estimated for each industry using the firms with monthly return within the sample coverage. We then regress the monthly return for each firm in each index on an equally weighted market return index and the industry return index. Finally, we average the partial correlation coefficient for the industry return index in this regression across all firms in each industry to obtain a proxy for the similarity of firms within each industry. Then, we divide our sample into heterogeneous industry and homogenous industry according to the median level of sample homogeneity. Table 1.9 presents the regression results in simple probit model. In the probit regression, we find that *FRBC* is negatively associated with fraud propensity only in firms in heterogeneous industry. *ROA* is found to be positively associated with the fraud committing. Dechow, Ge, Larson and Sloan (2007) find that firms manipulating their earnings tend to have a strong financial performance prior to the manipulations. *Finance need* has a positive coefficient in the regression. It seems that firms with higher finance need tend to be more likely to engage in fraud activities. Table 1.10 presents the bivariate probit regression. The bivariate probit model produces a qualitatively the same result as the probit model.

Table 1.9: Monitoring by non-CEO executives and industry homogeneity in simple probit model

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors in the audit committee. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. The industry heterogeneity is measured by using Parrino's (1997) measure of the correlation between stock returns within 2-digit SIC. Such correlation measure is calculated as follows. First, an equally weighted return index is estimated for each industry using the firms with monthly return within the sample coverage. We then regress the monthly return for each firm in each index on an equally weighted market return index and the industry return index. Finally, we average the partial correlation coefficient for the industry return index in this regression across all firms in each industry to obtain a proxy for the similarity of firms within each industry. *Stock return* is the annual buy-and-hold stock return. *Return volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. We use *FRBC* as our measure for non-CEO executive monitoring. Matching sample is a 1-3 matching without replacement sample. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

	Raw sample		Matching sample	
VARIABLES	Homogeneous industry	Heterogeneous industry	Homogeneous industry	Heterogeneous industry
FRBC	-0.14	-0.66**	-0.61	-1.33**
	(0.633)	(0.020)	(0.274)	(0.012)
Board size	0.04	0.03	-0.01	0.05
	(0.256)	(0.468)	(0.919)	(0.603)
Board independence	0.93*	0.12	1.13	-0.91
	(0.081)	(0.774)	(0.321)	(0.414)
Busy board	0.10	0.33	0.46	0.86
	(0.855)	(0.363)	(0.635)	(0.360)
Audit committee size	0.01	-0.12*	0.00	-0.10
	(0.915)	(0.061)	(0.978)	(0.431)

ROA	2.45	0.30	1.70	2.07
	(0.129)	(0.802)	(0.600)	(0.442)
External finance need	1.12**	-0.11	2.33**	-0.00
	(0.029)	(0.807)	(0.017)	(0.996)
Leverage	-0.63	-0.42	0.49	0.56
	(0.495)	(0.433)	(0.746)	(0.708)
Size	-0.02	0.13	-0.17	0.03
	(0.845)	(0.178)	(0.262)	(0.882)
Market-to-book ratio	0.06	0.02	0.05	0.04
	(0.132)	(0.122)	(0.554)	(0.277)
Institutional ownership	1.54***	1.30**	3.38**	1.27
	(0.007)	(0.029)	(0.022)	(0.257)
Analyst	0.03	0.02	0.03	0.04
	(0.212)	(0.295)	(0.442)	(0.181)
PPS	0.00**	0.00	0.01	-0.00
	(0.035)	(0.329)	(0.153)	(0.552)
Constant	-5.75***	-2.47**	-5.55**	-1.36
	(0.000)	(0.033)	(0.010)	(0.556)
Observations	1,432	1,366	131	122
R-squared	0.19	0.13	0.16	0.14

Table 1.10: Non-CEO executive monitoring and industry homogeneity in bivariate probit

The dependent variable is the dummy variable for detected fraud. *Fraud* is a dummy variable equal to one, if a firm commits fraud. *FRBC* is the fraction of top ranking executives who joined the firm *before* the current CEO was appointed. *Board size* is the number of board members on board. *Board independence* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the number of directors in the audit committee. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. The industry heterogeneity is measured by using Parrino's (1997) measure of the correlation between stock returns within 2-digit SIC. Such correlation measure is calculated as follows. First, an equally weighted return index is estimated for each industry using the firms with monthly return within the sample coverage. We then regress the monthly return for each firm in each index on an equally weighted market return index and the industry return index. Finally, we average the partial correlation coefficient for the industry return index in this regression across all firms in each industry to obtain a proxy for the similarity of firms within each industry. *Stock return* is the annual buy-and-hold stock return. *Return volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. We use *FRBC* as our measure for non-CEO executive monitoring. Matching sample is a 1-3 matching without replacement sample. We use *FRBC* as our measure for non-CEO executive monitoring. Matching sample is a 1-3 matching without replacement sample. P(F=1) is the equations for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. P(F=1|D=1) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0

	Raw sample				Matched sample			
	Homogeneous industry		Heterogeneous industry		Homogeneous industry		Heterogeneous industry	
VARIABLES	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)
FRBC	-0.53**		-0.63**		-0.17		-4.89***	
	(0.011)		(0.030)		(0.760)		(0.001)	
Board size	0.16***		0.03		0.13		0.18	
	(0.000)		(0.445)		(0.217)		(0.273)	
Board independence	1.01		-0.25		-1.26		-14.77***	
	(0.179)		(0.488)		(0.261)		(0.000)	

Audit committee size	-0.06		-0.04		-0.01		-0.17	
	(0.286)		(0.544)		(0.961)		(0.469)	
ROA	7.38***		1.38		-5.25		-9.93**	
	(0.000)		(0.178)		(0.136)		(0.033)	
External finance need	1.44***		0.07		0.25		-0.91	
	(0.010)		(0.861)		(0.688)		(0.322)	
Leverage	1.30**		-0.16		2.32**		-1.52	
	(0.033)		(0.724)		(0.025)		(0.347)	
Size	0.09	0.10	-0.02	0.56	-0.14	-0.18	0.38	0.38
	(0.219)	(0.117)	(0.926)	(0.325)	(0.418)	(0.233)	(0.269)	(0.123)
Market-to-book ratio	0.33***		0.02		0.31**		0.29***	
	(0.000)		(0.255)		(0.014)		(0.006)	
Institutional ownership	0.72	0.80	-0.40	2.36	1.38	1.14	3.72*	0.16
	(0.231)	(0.322)	(0.552)	(0.197)	(0.137)	(0.370)	(0.062)	(0.901)
Analyst		0.05**		-0.03		0.11**		0.02
		(0.029)		(0.469)		(0.031)		(0.649)
Stock volatility		15.78***		12.84		5.79*		10.90*
		(0.000)		(0.142)		(0.011)		(0.018)
Stock turnover		-0.16**		0.16		1.30*		0.37
		(0.047)		(0.182)		(0.054)		(0.209)
Stock return		-0.22		-0.41		-0.34		-1.37***
		(0.444)		(0.351)		(0.590)		(0.005)
Constant	-8.34***	-4.91***	-1.05	-7.08	-1.65	-2.20	8.17***	-5.43**
	(0.000)	(0.000)	(0.496)	(0.385)	(0.290)	(0.123)	(0.006)	(0.032)
Observation	1,893	1,893	2,055	2,055	131	131	115	115

1.6 Robustness Analysis

Aggarwal, Fu, and Pan (2010) use the difference in abnormal compensation for the CEO relative to the median of non-CEO executives to proxy for the power of "internal governance". The difference in abnormal compensation can be used to proxy for the relative contribution between the CEO and non-CEO executives. Following Aggarwal, Fu, and Pan (2010), we split sample into two sub-samples: the CEO group and the non-CEO group. For each group, we construct abnormal compensation for each executive using the residual of regressing total compensation on firm size, the market-to-book ratio, year dummies and industry dummies[13]. For each firm-year, we calculate the difference between the CEO's abnormal compensation and the median abnormal compensation of the non-CEO executives. Such compensation gap is used as one proxy for monitoring ability of non-CEO executives. We need to draw attention that our measure compensation gap has a non-linear relationship with monitoring ability of non-CEO executives. Both too high and too low values of compensation gap imply low monitoring ability. Only some level of compensation gap in the middle implies a higher monitoring ability (Archarya, Myers, and Rajan (2011)). In Table 1.11, we do not find such U-shaped relationship in the probit model, however, we find the U-shaped relationship in the bivariate probit model.

[13] Bebchuk, Cremers, and Peyer (2011) adopt a similar way to compute abnormal compensation by regressing the total compensation on log value of total assets with firm and year fixed effects.

Table 1.11: Nonlinearity between abnormal compensation gap and fraud propensity

Abnormal compensation gap is obtained as following: We split sample into two sub-samples: the CEO group and the non-CEO group. For each group, we construct abnormal compensation for each executive using the residual of regressing total compensation on firm size, the market-to-book ratio, year dummies and industry dummies. For each firm-year, we calculate the difference between the CEO's abnormal compensation and the median abnormal compensation of the non-CEO executives. Such compensation gap is used as one proxy for monitoring ability of non-CEO executives. *Board size* is the number of board members on board. *Independent Director%* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size%* is the audit committee divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. Market-to-book ratio is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. Column (1) presents the results of simple probit model for raw sample. Column (2) is for a 1-3 matching without replacement sample. Column (3) and (4) is the result of bivariate probit model with partial obserability by using 1-3 matching sample without replacement. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	Probit	Probit	Bivariate probit	
VARIABLES	Raw	Matching	P(F=1)	P(F=1|D=1)
Abnormal compensation gap	-7.53	-69.47	-321.85***	
	(0.136)	(0.471)	(0.002)	
Abnormal compensation gap^2	0.24	2.24	10.27***	
	(0.150)	(0.469)	(0.003)	
Board size	0.01	0.07	0.24**	
	(0.659)	(0.189)	(0.002)	
Independent director%	0.42	2.16**	-0.81	
	(0.182)	(0.020)	(0.458)	
Busy board	0.23	0.81	-0.29	
	(0.274)	(0.174)	(0.736)	
Audit committee size	0.001	-0.02	-0.02	
	(0.925)	(0.819)	(0.880)	
ROA	0.74	5.30**	6.95*	
	(0.527)	(0.032)	(0.084)	

Finance	1.02***	3.15***	5.65***	
	(0.000)	(0.000)	(0.000)	
Leverage	-0.84*	-1.00	3.93***	
	(0.050)	(0.362)	(0.004)	
Size	0.22***	-0.19	-0.78***	0.72**
	(0.000)	(0.117)	(0.004)	(0.011)
Market-to-book ratio	0.16***	0.28***	0.66***	
	(0.000)	(0.003)	(0.000)	0.57
Institutional ownership	0.63**	0.33	0.38	(0.757)
	(0.044)	(0.639)	(0.754)	0.09
Analyst	0.00	-0.01	0.02	(0.119)
	(0.985)	(0.512)	(0.436)	
PPS	0.00**	0.00	0.00	
	(0.030)	(0.195)	(0.767)	
Return volatility				-4.37
				(0.198)
Stock turnover				0.71***
				(0.001)
Stock return				-1.11***
				(0.005)
Constant	-8.18***	0.43	11.33*	-7.66***
	(0.000)	(0.874)	(0.071)	(0.005)
Year dummy	Yes	Yes	No	No
Industry dummy	Yes	Yes	No	No
Observations	6,259	278	168	168
Psudo R-squared	0.13	0.30	X	X

1.7 Conclusion

Motivated by the fact that the CEO is the driving person for corporate fraud, we show that monitoring by non-CEO executives effectively lowers the probability of corporate fraud. Our finding is very robust across different models and measures. This channel of governance has been neglected in the literature of corporate fraud.

We first provide evidence on the propensity of committing fraud: monitoring by non-CEO executives plays an important role in reducing the propensity of committing fraud, while other traditional governance mechanism fails to curb the fraud commitment.

Second, we divide our sample into weak governance sample and strong governance sample based on board size, board independence, and institutional ownership respectively. We find that monitoring by non-CEO executives maintains the significant effect on fraud propensity in the sample of weak traditional governance but lose the significance in the sample of strong traditional governance. In general, the non-CEO executives monitoring can be viewed as a substitute as the traditional governance channel. Firms mostly rely on the non-CEO executives monitoring when they have a breakdown of traditional governance system. Such result confirms the conjecture of Acharya, Myers, and Rajan (2011).

Moreover, we scrutinize whether the effect of monitoring by non-CEO executives varies with the individuals involved in the fraud event. Sorting the sample by the individuals sued by shareholders, we find that non-CEO executives monitoring works to limit fraud committing when only the CEO and the CFO are involved, but fails when the whole management team is involved in the corporate fraud event.

Finally, we explore the effect of industry heterogeneity on our non-CEO executives monitoring. We find that non-CEO executives monitoring works well to prevent the fraud emergency in the heterogeneous industry but fails in the homogeneous industry. It seems that non-CEO executives in heterogeneous industry possess more firm-specific human capital than those in homogeneous industry.

CHAPTER 2

EMPLOYEE RELATION AND CORPORATE FRAUD

2.1 Introduction

A series of high-profile corporate fraud[14] scandals in the early 2000s resulted in tremendous loss to both shareholders (i.e. the owners of corporations) and stakeholders (i.e. employees, customers, and suppliers). Thus, both shareholders and stakeholders have incentives to reduce the firms' propensity of committing fraud. A large number of literature studies how shareholders can prevent the fraud incidence by either improving the corporate governance quality (Beasley (1996), Dechow, Sloan, and Sweeney (1996), Agrawal and Chadha (2005)) or limiting the CEO's self-interest behaviors (Bergstresser and Philippon (2006), Burns and Kedia (2006)). While these studies enhance the understanding of the interest of shareholders to prevent committing fraud, they pay almost no attention to the stakeholders' incentive to limit fraud commitment. Particularly, little is studied about the role of employees in reducing firms' incentive to commit fraud. This lack of evidence is surprising due to the fact that employees are major stakeholders and their self-benefit is closely tied to firm performance. Anecdotal evidence suggests that employees are one of the major whistle-blowers of the firm fraud activities. For example, Sherron Watkins played an important role in uncovering accounting fraud of Enron. Cynthia Cooper was treated as the whistle-blower of the WorldCom fraud scandal. *TIME* magazine nominated both of them as the 2002 "Persons of the Year".

In this paper, we attempt to fill in the gap by studying whether employee relation is associated with lower likelihood of corporate fraud. There are two potential arguments as for why

[14] The Antifraud Rule 10b-5 of Securities Exchange Act of 1934 defines corporate financial fraud as the intent to deceive or manipulate with misstatements or omissions of material information relating to financial condition, solvency, and profitability (see SEC Administrative Proceeding 3-9588, April 27, 1998). McLucas, Taylor and Mathews (1997) find that financial fraud is mostly due to the use of false financial information or the failure to disclose material facts relating to a public company's financial condition.

employee relation is associated with fraud propensity. These two arguments generate two opposite predictions about employee relation and the firm's propensity to commit fraud.

The first argument states that better employee relation facilitates to align interest between shareholders and the management. Landier, Sraer, and Thesmar (2009) develop a so-called "bottom-up governance" model in which decision-makers (i.e. management) are in charge of selecting projects and implementers (i.e. employees) are in charge of its execution. Implementers can force decision-makers to use more "objective" information to make the "right" decision, the one maximizing shareholders' value since management needs the effort of implements to execute the projects. In order to gain cooperation from implementers, decision-makers need to internalize the preference of implementers. In particular, the model suggests that management internalizes the preference of employees by treating employees fairly or having better employee relation. Such internalization helps to align the interest of the management to that of shareholders.

In the model of Acharya, Myers, and Rajan (2011), the subordinate managers can be viewed as important stakeholders who care about the firm's future. By withdrawing their contribution to the firm, those managers can force the CEO to be more public-oriented and far-sighted, even if the CEO is self-interested and shareholders are powerless. Their model assumes that the CEO and subordinate managers have different horizons, preferences, and chance to misappropriate. In order to misappropriate more in current period, self-interested CEOs need subordinate managers to exert more effort to contribute to the firm. On the other hand, subordinate managers are reluctant to make contributions if the CEO only cares about short-term interest especially when employees hold a stake in the future of the firm. They further argue that the mechanism also works when the "CEO" is a stand-in for top management and "subordinate mangers" stand for critical employees outside the top management suite.

The second argument demonstrates that employee relation aggravates the alignment-of-interests problem between shareholders and the management. Jensen and Meckling (1976) argue that employee relationship facilitates managers to pursue nonpecuniary private benefit at the cost of shareholders. Employee relation improves if employees are overpaid or underworked, under which shareholders bear the cost. Moreover, Cronqvist, Heyman, Nilsson, Svaleryd, and Vlachos (2008) find that entrenched CEOs are more likely to pay more to improve social relations with employees. Finally, Pagano and Volpin (2005) find that CEOs can ensure their job security by offering employees generous long-term contracts to increase their loyalty. The labor-management alliance can serve as an anti-takeover device for entrenched managers to deter value-adding takeover bids.

When we take the theory to the data to empirically test these two arguments, one caveat is that we only observe detected fraud. Thus, the probability of committing fraud cannot be simply inferred from observed events. To address the identification problem complicated by undetected fraud, we first follow Dyck, Morse, and Zingales (2010) to limit our sample in large firms, the ones with more intense public scrutiny. Dyck, Morse, and Zingales (2010) and Yu and Yu (2011) argue that due to the intense public scrutiny, and the strong incentives to sue by plaintiff lawyers, large firms have fewer undetected frauds. We then follow Wang, Winton, and Yu (2010) to use a bivariate probit with partial observability model proposed by Poirier (1980) to account for undetected frauds.

To investigate the extent of a firm's employee relation, we adopt a firm-level measure of employee relation. Our data is drawn from the KLD Research & Analytics, Inc. (Hereafter, KLD) database. This data provides a variety of information on the firms' employee relation and is the most used one in academic research for evaluating firms' employee relation. The KLD database rates the employee relation in the following areas: union relation strength (weakness), cash profit-sharing strength, employee involvement strength, retirement benefit strength (weakness), health and safety strength (weakness), layoff policy strength (weakness), supply chain policy strength (weakness), and other strength (weakness). The KLD database assigns 0/1 in the strength and weakness of each category. Using the total strength score minus the total weakness score, we generate an index to measure firm-level employee relation. A higher score indicates better employee relation.

We first examine whether better employee relation can result in a lower probability of committing fraud. We find that firms with a higher employee relation index (firms that are friendly to employees) have a lower probability of committing fraud. Such negative association between employee relation and fraud propensity is consistent with Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011). The internalization of employees' interest facilitates the interest alignment between managers and shareholders, and enables management to be more public-oriented and far-sighted.

Second, in some degree, the CEO duality is associated with entrenchment since the board's ability to monitor the CEO is reduced (Fama and Jensen (1983), Jensen (1993)). Cronqvist, Heyman, Nilsson, Svaleryd, and Vlachos (2008) find that entrenched CEOs are more likely to pay more to improve social relation with employees. Pagano and Volpin (2005) find that CEOs can ensure their job security by offering employees generous long-term contracts to increase their loyalty. The labor-management alliance can serve as an anti-takeover device for entrenched managers to deter value-adding takeover bids. Hence, we investigate whether the CEO duality weakens the negative association between employee relation and fraud propensity. We find that the negative association disappears when the CEO also serves as chairman of the board (The CEO duality exists).

Third, we test whether such negative association varies with the industry characteristics. As Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011) predict, managers need the effort of employees to implement the projects since their effort is indispensable to generate cash flows. In R&D intensive industries, such cooperation of employees is more important since firms rely on employees' effort and skill to gain technological advantage. Thus, in R&D intensive industries, management is more likely to internalize employees' interests in order to gain technological advantage to generate cash flows. In line with this, we find that the negative association between employee relation and fraud propensity remains significant in the R&D intensive industry but vanishes in the non-R&D intensive industry.

Finally, we perform a robustness analysis using alternative measures for employee relation and other control variables. As Bae, Kang, Wang (2011) suggest, we first employ industry-level wage rate as instrument variable in the probit regression to alleviate the endogeneity problem of employee relation. Then, we adopt the list of "100 Best Companies to Work for in America" published in *Fortune* magazine as an alternative proxy for the employee relation. In sum, all previous findings are robust to the endogeneity issue, the alternative measure, and the alternative model.

The paper is organized as follows. In Section 2.2, we give a brief literature review on the topic of corporate fraud and employee relation. Section 2.3 presents our hypotheses. In Section 2.4, we describe the data and variable construction. In Section 2.5, we present our main results. In Section 2.6, we perform a robustness analysis. Section 2.7 concludes.

2.2 Related Literature

We contribute to the literature of both corporate fraud and employee relations. Most of the existing literature on corporate fraud focuses on the shareholder side. Those studies attempt to find effective mechanisms to align the interests of managers to shareholders' by either examining the CEO compensation scheme or corporate governance system. Bergstresser and Philippon (2006) find that earnings manipulation is more pronounced at firms where the CEO's total compensation is more related to the value of stock and option holdings. Burns and Kedia (2006) argue that the propensity of misreporting is significantly positively related to the sensitivity of the CEO's option portfolio to stock price. Efendi, Srivastava, and Swanson (2007) find that higher likelihood of a misstated financial statement is associated with the CEO's sizeable holdings of in-the-money stock options. Johnson, Ryan, and Tian (2009) state that managerial unrestricted stockholdings is the largest incentive source for firms to commit fraud. Beasley (1996) examines the relation between the board structure and the financial statement fraud. He finds that lower likelihood of financial statement fraud is associated with smaller board size, higher board independence, and smaller number of outside directorships of independent directors. He fails to find any relationship between audit committee and the likelihood of financial statement fraud. Agrawal and Chadha (2005) empirically investigate corporate governance mechanism and earnings restatement. They find that board independence, audit committee, and outside auditors are not related to the probability of a company's earnings restatement. However, they find that the independent director with financial expertise can lower the probability of restatement.

A few papers study how the fraud is detected. Yu and Yu (2011) find that the fraud committed by politically connected firms is less likely to be detected. Karpoff and Lou (2010) find that short sellers can help uncover the misconduct of management. Several other papers examine the consequence after corporate fraud is uncovered. Karpoff, Lee, and Marin (2008a, 2008b) find that both managers and firms suffer substantial reputation loss following detected fraud.

There is a limited literature regarding the role of employee relation in firm performance. Bae, Kang, and Wang (2011) investigate the role of employees on shaping firm's capital structure. They find that firms with better employee relation maintain low debt ratios. They conclude that employee relation plays an important role in shaping firm's financing policy. Edmans (2011) earnings surprises, and announcement returns. He further argues that stock market does not fully value intangibles, and that certain socially responsible investing (SRI) screens have a positive effect on investment returns. Jiao (2010) finds that employees represent intangible assets and better employee relation can enhance firm value substantially. In the literature, there is only one paper relating corporate fraud to employees. Dyck, Morse, and Zingales (2010) find that fraud detection does not rely on standard corporate governance actors such as investors, the SEC, and auditors, but rather depends on several non-traditional players such as employees, media, and industry regulators. However, no paper asks the research question whether employee relation is associated with the fraud incentive of firms.

2.3 Hypothesis Development

Landier, Sraer, and Thesmar (2009) develop a model called bottom-up governance in which implementers (employees) can foster decision-makers (managers) to use more "objective" information to make the "right" decision, the one maximizing shareholders' value. Managers need the cooperation and effort of employees to implement the decision they made. However, managers and employees may have different intrinsic preference over the decisions. In order to gain cooperation from employees, managers need to internalize the preference of employees. Failure in internalizing those preferences may induce a very large cost (e.g. the story of copper-cooled engine from Sloan's (1963) autobiography[15].) Considering the interest of subordinate executives, managers have to adopt more objective information to make decisions. Even though the interest of subordinate executives is "wrong", such internalization will successfully force managers not to follow their own biased interest.

Acharya, Myers, and Rajan (2011) present a model of internal governance where the self-interest of the CEO is restricted by subordinate managers. In the model, the subordinate managers

[15] Landier, Sraer, and Thesmar (2009) cites one story from Sloan's (1963) autobiography. The story states that GM's managers have strong enthusiasm in a project about copper-cooled engine. However, the project fails to obtain the support from line engineers in charge of implementing it. Finally, the dissent between decision-makers and implementers results in a huge loss for the company.

can be viewed as important stakeholders who care about the firm's future. By withdrawing their contribution to the firm, those subordinate managers can force the CEO to be more public-oriented and far-sighted, even if the CEO is self-interested and shareholders are powerless. Their model assumes that the CEO and subordinate managers have different horizons, preferences and chance to misappropriate. In order to misappropriate more in current period, self-interested CEO needs subordinate managers to exert more effort in order to contribute to the firm. On the other hand, subordinate managers are reluctant to make a contribution if the CEO only cares about short-term interests. Subordinate managers' welfare is closely related to the firm's future. If the CEO is not future-oriented, the future firm value will be substantially decreased. In order to induce the effort of subordinate managers, the CEO has to compromise to act in a more future-oriented way. They emphasize that such mechanism works only if subordinate mangers possess a stake in the future firm. They further argue that the mechanism is also applicable when the "CEO" is a stand-in for top management and "subordinate mangers" stand for employees outside the top management suite. If internalization of employees' interest results in employee relationship improvement, as Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011) suggest, better employee relation facilitates to align interests between management and shareholders.

Therefore, employee relation has a significant effect on aligning the interests between management and shareholders. Accordingly, we propose the first hypothesis based on its role in aligning the interests between management and shareholders in the context of corporate fraud.

Hypothesis 1: The propensity of the firm to commit fraud is negatively associated with employee relation.

The CEO duality is associated with entrenchment since the board's ability to monitor the CEO is reduced (Fama and Jensen (1983) and Jensen (1993)). Jensen and Meckling (1976) argue that employee relationship facilitates managers to pursue nonpecuniary private benefit at the cost of shareholders. Moreover, Cronqvist, Heyman, Nilsson, Svaleryd, and Vlachos (2008) find that entrenched CEOs are more likely to pay more to improve social relation with employees. Pagano and Volpin (2005) find that CEOs can ensure their job security by offering employees generous long-term contracts to increase their loyalty. The labor-management alliance can serve as an anti-takeover device for entrenched managers to deter value-adding takeover bids. Thus, we propose the second hypothesis based on the CEO duality.

Hypothesis 2: The negative association between fraud propensity and employee relation disappears when the CEO duality exists.

R&D activities heavily depend on the human capital of the firm. The effort and skills of employees is the major source for firm to perform R&D activities, enabling the firm to gain technological advantage. Thus, R&D intensive firms extensively rely on employees to fulfill the decisions by management. The effectiveness of employee relation on aligning interests among parties depends on the condition that managers need employees to exert effort in order to fulfill their decisions (Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011)). Accordingly, the negative association in *Hypothesis 1* should be more significant in R&D intensive industries and less significant in non-R&D intensive industries. We propose the fourth hypothesis based on the industry R&D intensity.

Hypothesis 3: The negative association between fraud propensity and employee relation is more significant in R&D intensive industries than in non-R&D intensive industries.

2.4 Data and Variable Construction

We obtain a sample of large frauds studied in Dyck, Morse, and Zingales (2010), who collect the fraud sample from Stanford Securities Class Action Clearinghouse (SSCAC).[16] To control for frivolous lawsuits, they restrict their sample from 1996 to 2004. In 1995, Private Securities Litigation Reform Act was passed to reduce frivolous lawsuits. They further filter the sample by the following criteria: (i) exclude all cases dismissed during the judicial review process; (ii) the settlement amount is at least $3 million; (iii) firms assets are higher than $750 million in the year before the fraud is detected. They argue that this reduces the chance of undetected fraud as large firms face more intense public scrutiny and lawyers have stronger incentives to investigate their fraudulent activities. We follow the same criteria and extend their sample to 2011. The total number of fraud satisfying all above criteria is 392.

For the comparison sample, we attempt to obtain a random sample of firms that are litigation free. Thus, we start with all the firms in the CRSP/COMPUSTAT Merged database excluding firms that are in the detected fraud sample and firms that have total asset less than 750 million dollars one year before the fraud happens[17]. Finally, the final sample consists of our detected fraud sample and comparison sample. One concern is that our final sample is extremely unbalanced due to the large number of non-fraud firms. To deal with this problem, we construct a 1-3 matching sample using propensity score method based on size of the firm, and the industry. Within the same industry of the fraud firms, we define a non-fraud firm as the matching firm if it has the smallest propensity matching score on size. The industry is defined by the two-digit SIC

[16] For a detailed description about sample construction, please see Dyck, Morse, and Zingales (2010). Their sample is also available on Alexander Dyck's personal website http://www.rotman.utoronto.ca/dyck/.
[17] Our fraud sample only covers the large firm with total asset greater than 750 million dollars one year before the fraud happens. Thus, we only include large no-fraud firms in our comparison sample.

code. In order to minimize the problem of ties in propensity matching score, we include three control firms for each fraud firm[18].

Employee relation data is obtained from KLD database used in many empirical studies (Bae, Kang, Wang (2011), Landier, Nair, and Wulf (2009)). This data provides a variety of information on the firms' employee relation and is the most used one in academic research for evaluating firms' employee relation. The KLD database rates the employee relation in the following areas: union relation strength (weakness), cash profit-sharing strength, employee involvement strength, retirement benefit strength (weakness), health and safety strength (weakness), layoff policy strength (weakness), supply chain policy strength (weakness), and other strength (weakness). The KLD database assigns 0/1 in the strength and weakness of each category. A firm's employee relation index is measured by using the total employee relation strength score minus total employee relation weakness. The total employee relation strength score is calculated as the total points a firm receives on criteria for employee strength in the KLD database, while the total employee relation weakness score is obtained from the total points a firm receives on criteria for employee relation weakness in the KLD database. A higher score on the employee relation indicates better employee relation. An alternative measure for employee relation in the robustness analysis is the list of "100 Best Companies to Work for in America" published in *Fortune* magazine. If a firm is included in the list, we regard it as having better employee relation and assign one for that firm in that year. However, if a firm is not on that list, we treat it as having poor employee relation and assign zero for that firm in that year.

Firm financial data is obtained from CRSP/COMPUSTAT Merged Database. Executive compensation data is collected from the Execucomp Database. We extract the data of corporate

[18] Figure 2.1 shows the kernel density plot of size across fraud and non-fraud sample. After matching process, the non-fraud sample is more comparable to the fraud sample.

boards from RiskMetrics Database. Institutional ownership data is acquired from Thomson-Reuters Institutional Holdings (13f) Database. Analyst coverage data is obtained from I/B/E/S Database.

We construct main control variables as follows. If half of outside directors hold three or more directorships, we characterize the firm has a *busy board* (Fich and Shivdasani (2006)). Following Wang (2011), we calculate the firm *external finance need*. Teoh, Welch, and Wong (1998a, 1998b) firms are more likely to engage in earnings management before public equity offerings. Dechow, Ge, Larson, and Sloan (2011) find that firms subject to AAERs extensively involve in seeking new financing. *Audit committee size* is measured by the audit committee size divided by the board size. The audit committee has the information advantage in reviewing the corporation's financial statements, audit process, and internal accounting control by regularly meeting with the firm's outsider auditors and internal financial managers. *Leverage* is long-term debt divided by total assets. *Size* is the log value of total assets. Leverage is frequently adopted as the proxy for closeness to debt covenant (Dechow, Sloan and Sweeney (1996), Richardson, Tuna and Wu (2003)). Firms close to their debt covenant are more likely to manage earnings (Healy and Wahlen (1999)). *Analyst coverage* is the number of analysts following the firm. Financial analysts are also viewed as traditional outside monitors over the firms. Their specific knowledge about financial statement and routine communication with management make them have higher chance to discover fraud. We also include the *pay-performance-sensitivity (PPS)* for the CEO as a control variable. Incentive pay should help align the interests of the CEO with shareholders, but could also give the CEO stronger incentives to manipulate stock prices. *Pay-performance-sensitivity (PPS)* is calculated as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. All independent variables are measured as lagged one year before fraud occurs in order to avoid the endogeneity problem. *Industry R&D intensity* is equal to industry aggregate

R&D expenditure over industry aggregate number of employees, where industries are defined by two-digit SIC codes. The industry is defined as high R&D intensive industry if the industry R&D intensity is above the sample median level. The *industry-level wage rate* is measured by total labor and related expenses divided by total employees across firms in the same industry.

2.5 Empirical Results

2.5.1 Sample Characteristics

Table 2.1 shows the number of fraud cases by the year and durations of fraud. The litigation documents from Stanford Securities Class Action Clearinghouse record when fraud activities start and end. *Starting Year* is the first year when fraudulent activities happen. The table shows that the number of fraudulent cases starts increasing monotonically from 1996 to 2001 and reached its peak in 2000 and 2001. Then it dropped rapidly from 2002. In 2002, the House approved Sarbanes–Oxley Act (SOX), an act mainly designed for preventing corporate fraud. The statistics provide evidence that Sarbanes–Oxley Act (SOX) effectively discourages firms to commit fraud. The duration of fraud activities varies significantly from case to case, with a sample mean of 1.46 years and standard deviation of 1.28 years.

Table 2.1: Number of fraud cases by year and durations

We follow Dyck, Morse, and Zingales (2010) and collect fraud cases filed from 1996 to 2011 in Stanford Securities Class Action Clearinghouse. The filing date is the data when shareholders file the federal class action securities fraud litigation, and thus it is after the ending data of fraud activities. *Starting Year* of fraud is the first year when fraudulent activities happen. *Duration* is defined as the number of years from the start of fraud date to the end of the fraud date, as shown in the litigation documents.

			Fraud Duration (years)				
Starting Year	Count	Percentage (%)	Min	Mean	Median	Max	Standard Deviation
1994	4	1.02	1.25	2.41	2.49	3.42	0.98
1995	11	2.81	0.59	1.98	1.51	3.84	1.16
1996	14	3.57	0.21	1.02	0.87	2.54	0.68
1997	26	6.63	0.01	1.80	1.16	5.90	1.66
1998	34	8.67	0.01	1.87	1.40	5.29	1.56
1999	37	9.44	0.34	2.30	2.81	4.78	1.38
2000	44	11.22	0.01	1.51	1.19	4.21	1.10
2001	36	9.18	0.24	1.47	1.22	4.96	1.26
2002	16	4.08	0.21	1.31	1.02	5.12	1.23
2003	12	3.06	0.39	2.83	3.00	6.00	1.99
2004	12	3.06	0.35	1.47	1.29	3.60	1.01
2005	25	6.38	0.03	1.06	0.69	3.52	0.90
2006	18	4.59	0.31	1.69	1.34	4.82	1.36
2007	27	6.89	0.21	1.25	1.00	3.57	0.87
2008	21	5.36	0.07	0.86	0.63	1.97	0.60
2009	21	5.36	0.10	0.80	0.80	1.41	0.37
2010	23	5.87	0.00	0.47	0.26	1.41	0.39
2011	11	2.81	0.07	0.26	0.21	0.52	0.19
Total	392	100.00	0.00	1.46	1.00	5.12	1.28

We then compare the characteristics of fraud firms with non-fraud firms with total asset greater than 750 million dollars in COMPUSTAT. The results are presented in Table 2.2. Non-fraud firms treat employees more fairly compared with fraud firm. However, the difference is not statistically significant. Compared with non-fraud firms, fraud firms have larger boards as predicted by Beasley (1996). Large board incurs free-rider problem among board members, which lowers the monitoring power. Fraud firms have a larger size compared with non-fraud firms. Large firms face tighter scrutiny and closer monitoring by government and public, which reduce the information asymmetry problem. Thus, fraud is more likely to be discovered in large firms (Cox and Thomas (2003), Dyck, Morse, and Zingales (2010), and Yu and Yu (2011)). Furthermore, fraud firms have higher external financing need. Dechow, Ge, Larson and Sloan (2011) and Dechow, Sloan and Sweeney (1996) argue that firms subject to AAERs are more active in seeking new financing. Moreover, fraud firms also have better accounting performance and market-to-book ratio. Dechow, Ge, Larson and Sloan (2011) find that firms engaging in accounting manipulations showed strong financial performance prior to their manipulations. Crutchley, Jensen and Marshall (2007) argue that fraud firms are more likely to have significant growth before committing fraud. The findings show that the fraud commitment is motivated by the incentive to meet expectation of better performance. Finally, fraud firms are followed by more financial analysts. Financial analysts are also viewed as traditional outside monitors over the firms. Their specific knowledge about financial statement and routine communication with management make them have higher chance to discover fraud. Analysts are the whistle-blower for some high-profile fraud scandals such as those of Global Crossing and Qwest Communication. Dyck, Morse and Zingales (2010) confirm the active role played by analyst in fraud detection.

Table 2.2: Fraud firms and non-fraud firms in the large COMPUSTAT firms

Employee relation is calculated by using A firm's total employee relation strength score minus its total employee relation weakness score. The total employee relation strength score is formed by adding the points a firm receives on criteria for employee relation strength in the KLD database, and the total employ relation weakness score is formed by adding the points the firm receives on criteria for employee relation weakness. *Board size* is the number of board members. *Independent director* is the number of outside directors divided the number of directors. *Audit committee size* is the audit committee size divided by board size. *ROA* is calculated as operating income after depreciation divided by total assets. *Finance need* is equal to asset growth rate minus *ROA2/(1-ROA2)*, where *ROA2* is income before extraordinary items divided by total assets. *Leverage* is long-term debt divided by total assets. *Size* is the log value of total assets. *Market-to-book ratio* is market value of equity plus books value of debt divided by book value of assets. *Institutional ownership* is the percentage of shares held by institutional investors from 13-f filings. *Analyst coverage* is the number of analysts following the firm. *Pay-performance-sensitivity (PPS)* of the CEO is defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. The table shows the mean values and median values in parenthesis of each variable of the fraud sample and non-fraud sample.

	Fraud	#obs	Non-fraud	#obs	t-statistics of difference	Wilcoxon Z
Employee relation	-0.06(0.00)	105	-0.03(0.00)	7848	-0.27	-0.001
Board size	11.02(11.00)	105	10.14(10.00)	7848	3.55***	2.85**
independent director	0.73(0.75)	105	0.74(0.75)	7848	-0.63	-0.75
Audit committee size	0.35(0.33)	105	0.38(0.375)	7848	-2.64**	-2.815**
ROA	0.11(0.10)	105	0.09(0.08)	7847	2.43*	1.74*
Finance need	0.01(-0.04)	104	-0.04(-0.9)	7551	1.97*	2.69**
Leverage	0.19(0.15)	104	0.20(0.19)	7827	-0.89	-1.17
Size	9.10(8.87)	105	8.58(8.35)	7847	3.93***	3.465***
Market-to-book ratio	1.81(1.04)	105	1.20(0.84)	7846	4.79***	1.94*
Institutional ownership	0.76(0.77)	105	0.75(0.76)	7848	0.92	0.45
Analyst coverage	10.10(9.00)	105	8.37(7.00)	7848	3.22**	3.41***
Pay-performance-sensitivity of the CEO	16.77(2.49)	105	13.72(3.13)	7848	0.77	-2.15*

2.5.2 Regression Results of the Main Model

The basic probit regression equation is as follows:

$$Fraud = \beta_0 + \beta_1 * employee\ relation + \theta * Control\ variables + Industy\ dummy + year\ dummy + \varepsilon$$

We find a set of control variables that affect the probability of committing fraud based on the literature of corporate fraud. The control variables include firm characteristics and traditional governance channels such as board characteristics. All explanatory variables in the probit regression are measured in the year before the fraud occurs.

Table 2.3 shows the investigation between employee relation and the firm's incentive to commit fraud in probit model. In column (1), we report the regression result by using the raw sample. We find that our *Employee relation index* is negatively associated with the likelihood of committing fraud. The result is consistent with the argument in Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011). Better employee relation facilitates interest alignment between management and shareholders. The interest alignment decreases the likelihood of fraud commitment. *Finance need* is found to be positively related with the probability of committing fraud. In order to facilitate their financing activities, firms are more likely to engage in committing fraud. Dechow, Ge, Larson and Sloan (2011) and Dechow, Sloan and Sweeney (1996) argue that firms subject to AAERs are more active in seeking new financing. We also find that large firms are more likely to be associated with fraud commitment in the raw sample (Cox and Thomas (2003)). Large firms face tighter scrutiny and closer monitoring by government and public, which reduce the information asymmetry problem. Thus, fraud is more likely to be discovered in large firms. *Market-to-book ratio* can be a proxy for firm's growth. In order to keep the high growth rate, firms have more incentive to commit fraud. Crutchley, Jensen and Marshall (2007) argue that fraud firms are more likely to have significant growth before committing fraud. Surprisingly, *Institutional ownership* is positively related with fraud propensity in raw sample. Burns, Kedia, and Lipson (2010) argue that aggregate institutional ownership is associated with higher possibility of financial misreporting. Such finding is due to the short investment horizon of certain institutions, those with little incentive to involve in costly monitoring activities. Institutions are more likely to rely on the information in earnings reports if they are reluctant to engage in costly monitoring activities. Thus, firms with short-horizon institutional ownership are more likely to employ aggressive financial reporting practices in order to forestall the departure of such institutions. Other control variables remain insignificant in the regression.

Since we have an unbalanced sample due to the small sample of fraud firms, we construct a 1-3 matching sample using propensity score based on size of the firm, and the industry. Within the same industry of the fraud firms, we define a no-fraud firm as the matching firm if it has the smallest propensity matching score on size. The industry is defined by the two-digit SIC code. In order to minimize the problem of ties in propensity matching score, we include three control firms for each fraud firm. Then, we rerun the same probit regression for the matching samples and present the results in column (2). We obtain qualitatively the same result as that from the raw sample.

Table 2.3: Employee relation and corporate fraud

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable, and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation* is defined as a firm's total employee strength score minus its total employee weakness score. The total employee strength score is formed by adding the points a firm receives on criteria for employee strength in the KLD database, and the total employee weakness score is formed by adding the points the firm receives on criteria for employee weakness. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. Column (1) is the regression result for raw sample. Column (2) is the regression result for the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	(1)	(2)
Probit model	Raw sample	Matched sample
Employee relation	-0.08**	-0.19**
	(0.047)	(0.025)
Board size	0.03	0.05
	(0.178)	(0.209)
Independent director	0.32	0.57
	(0.328)	(0.356)
Busy board	0.20	0.48
	(0.357)	(0.224)
Audit committee size	-0.24	-0.85
	(0.582)	(0.294)
ROA	0.68	1.29
	(0.264)	(0.408)
External finance need	0.15	0.09
	(0.164)	(0.644)
Leverage	0.53	0.61

	(0.146)	(0.347)
Size	0.12**	0.04
	(0.018)	(0.717)
Market-to-book ratio	0.11***	0.16**
	(0.000)	(0.018)
Institutional ownership	0.99***	2.27***
	(0.002)	(0.001)
Analyst	0.01	0.01
	(0.617)	(0.462)
Pay-for-performance	0.00	0.00
	(0.332)	(0.983)
Constant	-7.15***	-3.66**
	(0.000)	(0.012)
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Observations	6,249	395
Psudo R-squared	0.13	0.09

However, when we take the theory to the data, one caveat is that we only observe detected fraud. Thus the probability of committing fraud cannot be simply inferred from observed events[19]. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. We specify the model being estimated as the following[20]:

Fraud: F_j =1 if firm j commits fraud. Otherwise, F_j =0

Fraud detection: D_j =1 if the CSRC detects the fraud of firm j. Otherwise, D_j =0

From this we have the following reduced form equations:

$$F_j = x_{1j}\beta_1 + u_j \quad (1)$$

$$D_j = x_{2j}\beta_2 + v_j \quad (2)$$

where x_{1j} is the vector of variables that helps explain a firm's propensity to commit fraud. x_{2j} is the vector of variables that helps explain why fraud is detected. u_j and v_j are error terms.

$$Zj = F_j * D_j \quad (3)$$

Zj=1 indicates a detected fraud.

$$P(Zj=1) = P(F_j=1 \;\&\; D_j=1) = P(F_j=1)*P(D_j=1 | F_j=1) = \Phi(x_{1j}\beta_1, x_{2j}\beta_2) \quad (4)$$

$$P(Zj=0) = P(F_j=0 \text{ or } D_j=) = P(F_j=0) + P(F_j=1)*P(D_j=0 | F_j=1) = 1 - \Phi(x_{1j}\beta_1, x_{2j}\beta_2) \quad (5)$$

[19] There is an empirical problem in the fraud literature. We only observe the detected fraud (Z=1), which is not actually the same as the true fraud (F=1) (See Figure 1.2). Thus, result from simple probit model may be contaminated by the undetected fraud cases.

[20] We closely follow Poirier (1980) and Wang, Winton and Yu (2011) in this section.

The above model can be estimated by using maximum likelihood estimator. The log-likelihood function is

$$L(\beta_{1,}\ \beta_2)=\sum(Zj * \ln(\ \Phi\ (x_{1j}\,\beta_1,\ x_{2j}\,\beta_2\,))+(1\text{-}Zj)*\ln(1\text{-}\Phi\ (x_{1j}\,\beta_1,\ x_{2j}\,\beta_2\,)) \qquad (6)$$

According to Poirier (1980), the condition for full identification of the model parameters are (1) x_{1j} and x_{2j} do not contain exactly the same variables; and (2) the explanatory variables exhibit substantial variations in the sample. We have the data for Zj, which is the reported fraud and the data for x_{1j} and x_{2j} , whose elements are somehow different. By minimizing the log-likelihood function over the parameters, we finally can obtain the MLE for all our parameters.

In order to achieve identification, we find two subsets of control variables that affect the probability of committing fraud and fraud detection separately. Both sets of variables are based on the literature of corporate fraud. The first set of variables is fraud propensity factors including board characteristics and firm characteristics. The second set of variables is fraud detection factors including institutional holdings, analyst coverage, and stock returns. Intuitively, bad firm performance drives shareholder dissatisfaction and investigations. All explanatory variables in the fraud propensity equation are measured in the year before the fraud occurs. Explanatory variables in the fraud detection equation are measured in the year after the fraud happens. The variables proxy for the information of directors, audit committee, analyst coverage, and institutional ownership can also be viewed as the proxy for whistle-blowing. Auditor, analysts and institutional investors are viewed as standard whistle-blowers in fraud detection.

Note that a simple probit model, which is frequently used in the literature, is

$$Zj= F_j = x_{1j}\,\beta_1 +\varepsilon_j$$

$$P(Zj=1)= P(F_j =1)=\Phi\ (x_{1j}\,\beta_1,\ x_{2j}\,\beta_2\,)$$

If is D_j =1 not always equal to 1, simple probit model will generate biased inferences.

Table 2.4 presents the result from the bivariate probit model with partial observability. P(F) is for the propensity equation. P(D|F) is for the detection equation. Due to the computation difficulty for large sample, we only perform the bivariate probit study in matching sample[21]. We find that *Employee relation* is negatively related to the fraud propensity, confirming the result we got from the simple probit model. *Board size* appears to be positively associated with the fraud propensity of the firm. Agency problem may become more severe in large board due to the "free-rider" problem. Beasley (1996) finds that the likelihood of financial statement fraud increases with board size. Jensen (1993) argues that a smaller board plays a controlling function whereas a larger board is more likely to be controlled by CEO. *Leverage* is found to be positively related to the fraud propensity. Leverage is frequently adopted as the proxy for closeness to debt covenant (Dechow, Sloan and Sweeney (1996), Richardson, Tuna and Wu (2003)). Firms close to their debt covenant are more likely to manage earnings (Healy and Wahlen (1999)). *Institutional ownership* is positively related to the fraud propensity. Burns, Kedia, and Lipson (2010) find that aggregate institutional ownership is associated with higher possibility of financial misreporting. The finding is consistent with Burns, Kedia, and Lipson (2010). In the detection equation, we find that both institutional investors and financial analyst work as fraud detector. We also find that higher stock return is associated with a lower detection rate and higher stock volatility results in a higher detection rate. Wang (2011) argues that poor stock performance triggers the fraud detection due to the dissatisfaction of shareholders. The paper further finds that higher stock volatility is related to higher lawsuit rate by shareholders due to the higher probability of big investment loss of shareholders.

[21] Bivariate probit model adopts the maximum likelihood estimator to estimate the coefficient in the regression. However, if we have a large sample, the bivariate probit model has difficulty in reaching convergence.

Table 2.4: Employee relation and fraud propensity in bivariate probit model with partial observability

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation index* is defined as a firm's total employee strength score minus its total employee weakness score. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. Market-to-book ratio is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. Analyst is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Stock volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. Column (1) is for the equation for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. Column (2) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. The regression is conducted using the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	Matched sample	
Bivariate probit	P(F=1)	P(F=1|D=1)
Employee relation	-0.29**	
	(0.013)	
Board size	0.29***	
	(0.001)	
Independent director	-0.60	
	(0.560)	
Audit commit size	1.46	
	(0.198)	
ROA	-7.90***	
	(0.003)	
External finance need	-0.33	
	(0.229)	
Leverage	4.76***	
	(0.000)	
Size	0.22**	0.02
	(0.050)	(0.698)
Market-to-book ratio	1.33***	
	(0.000)	
Institutional ownership	1.86**	0.96

	(0.030)	(0.119)
Analyst	-0.10***	0.03*
	(0.008)	(0.082)
Pay-for-performance	0.00	
	(0.714)	
Return volatility		4.52***
		(0.005)
Stock turnover		0.03
		(0.688)
Stock return		-0.36
		(0.109)
Constant	-7.54***	-2.20**
	(0.001)	(0.014)
Observations	339	339

2.5.3 Employee Relation and Management Characteristics

The CEO duality is associated with entrenchment since the board's ability to monitor the CEO is reduced (Fama and Jensen (1983) and Jensen (1993)). Jensen and Meckling (1976) argue that employee relationship facilitates managers to pursue nonpecuniary private benefit at the cost of shareholders. Moreover, Cronqvist, Heyman, Nilsson, Svaleryd, and Vlachos (2008) find that entrenched CEOs are more likely to pay more to improve social relations with employees. Pagano and Volpin (2005) find that CEOs can ensure their job security by offering employees generous long-term contract to increase their loyalty. The labor-management alliance can serve as anti-takeover device for entrenched managers to deter value-adding takeover bids. We interact the CEO duality with our employee relation index and re-run the probit regression to examine the CEO entrenchment effect. Table 2.5 indicates that the negative relation between employee relation and fraud propensity exists when CEO duality does not exist. However, when CEO duality exists, such negative relation disappears since the coefficient of employee relation becomes insignificant. Both raw sample and matching sample present the same pattern in the probit regression.

In Column (3) and (4) of Table 2.5, we perform the same analysis in the bivariate probit model with partial observability. We find that our *Employee relation* is still negatively related to the fraud propensity when CEO duality does not exit. However, better employee relation increases the fraud likelihood if CEO duality exits. The finding is in line with Jensen and Meckling (1976). *Board size* appears to be positively associated with the fraud propensity of the firm. Agency problem may become more severe in large board due to the "free-rider" problem. Beasley (1996) finds that the likelihood of financial statement fraud increases with board size. Jensen (1993) argues that a smaller board plays a controlling function whereas a larger board is more likely to be controlled by the CEO. *Finance need* has a positive coefficient in the regression. Teoh, Welch, and Wong (1998a, 1998b) firms are more likely to engage in earnings management before public equity offerings. Dechow, Ge, Larson, and Sloan (2011) find that firms subject to AAERs extensively involve in seeking new financing. *Market-to-book ratio* is found to be positively related to fraud committing. *Market-to-book ratio* can be a proxy for firm's growth. It is hard to monitor growth firms due to the information asymmetry, and hence growth firms are more likely to involve in fraud activities. *PPS* is negatively related to fraud committing since it helps align the interest between shareholders and management. In the detection equation, we find that *Stock turnover* and *Return volatility* are positively associated with fraud detection due to the widespread attention by the investors (Wang (2011)). *Stock return* is negatively associated with the detection process since investors pay more attention to the firms' activities when they are not satisfied with their investment loss.

Table 2.5: Employee relation and CEO duality

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *CEO duality* is one if CEO serves as chairman of the board, otherwise zero. *Employee relation index* is defined as a firm's total employee strength score minus its total employee weakness score. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Stock volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. Column (1) is the probit regression results for raw sample. Column (2) is the probit regression result for the 1-3 matching sample without replacement based on size and industry. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. Column (3) is for the equation for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. Column (4) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. The regression is conducted using the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.001, ** p<0.01, * p<0.1

VARIABLES	Probit	Probit	Bivariate probit	
	Raw sample	Matched sample	Matched sample	
			P(F=1)	P(F=1|D=1)
Employee relation	-0.10**	-0.19**	-0.36***	
	(0.035)	(0.050)	(0.008)	
Employee relation*CEO duality	0.07	-0.04	0.50**	
	(0.431)	(0.842)	(0.025)	
CEO duality	-0.12	-0.13	-0.77**	
	(0.479)	(0.685)	(0.040)	
Board size	0.03	0.05	0.30***	
	(0.179)	(0.219)	(0.001)	
Independent director	0.34	0.56	0.23	
	(0.307)	(0.361)	(0.776)	
Busy board	0.19	0.49		
	(0.367)	(0.212)		
Audit committee size	-0.24	-0.85	0.07	
	(0.579)	(0.293)	(0.935)	
ROA	0.68	1.28	-4.07	
	(0.255)	(0.409)	(0.170)	

External finance need	0.14	0.10	2.22*	
	(0.178)	(0.636)	(0.012)	
Leverage	0.51	0.60	3.69**	
	(0.162)	(0.364)	(0.001)	
Size	0.12**	0.03	-0.22*	0.05
	(0.015)	(0.773)	(0.093)	(0.444)
Market-to-book ratio	0.11***	0.17**	0.61***	
	(0.000)	(0.016)	(0.002)	
Institutional ownership	0.98***	2.21***	0.33	0.76
	(0.002)	(0.001)	(0.600)	(0.158)
Analyst	0.00	0.01	0.02	0.01
	(0.627)	(0.428)	(0.517)	(0.479)
Pay-for-performance	0.00	-0.00	-0.005*	
	(0.546)	(0.760)	(0.027)	
Return volatility				2.40*
				(0.053)
Stock turnover				0.11*
				(0.088)
Stock return				-0.55***
				(0.005)
Constant	-6.73***	-3.52**	-2.83**	-2.08**
	(0.000)	(0.017)	(0.036)	(0.014)
Year dummy	Yes	Yes	No	No
Industry dummy	Yes	Yes	No	No
Observations	6,249	395	339	339
Psudo R-squared	0.13	0.09	X	X

2.5.4 Employee Relation and Industry Characteristics

The effectiveness of employee relation on aligning interests among parties depends on the condition that managers need to internalize employees' interest in order to induce their effort (Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011)). However, whether management needs to induce the effort of employees is closely related to the firm's characteristics. In R&D intensive industries, the operation heavily depends on the human capital of the firm. The effort and skills of employees is the major source for firms to perform R&D activities, enabling them to gain technological advantage (i.e. Google, and Microsoft). However, in non-R&D intensive industries, employees perform unskilled tasks and have no special status. Thus, firms in R&D intensive industries have greater desire to induce the effort of employees.

Table 2.6 investigates the alignment effect of employee relation in industries with different level of R&D activities. We first perform the regressions using the raw sample. We find that negative association between employee relation and fraud propensity still exists in the R&D intensive industry. However, such negative association vanishes in the non-R&D intensive industry. These findings suggest that employee relation can help to align the interest between parties only when the management needs the effort of employees to implement projects. If the effort of employees is not related to the success of the projects, employee relation does not have any effect on interest alignment. The bivariate probit model in Table 2.7 confirms the finding in Table 2.6. However, we find that *Analyst* has positive sign in the fraud propensity equation. Financial analysts are blamed for exacerbating managerial myopia since they put excessive pressure on managers. Graham, Harvey, and Rajgopal (2005) show that the majority of CFOs in the survey declared that they are willing to sacrifice long-term firm value to meet the analysts' expectation due to their own wealth, career, and external reputation concerns. Thus, managers may have more incentive to commit fraud in order to meet the expectation of analysts for their own benefit.

Table 2.6: Employee relation in R&D intensive industry

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *Industry R&D intensity* is equal to industry aggregate R&D expenditure over industry aggregate number of employees, where industries are defined by two-digit SIC codes. The industry is defined as high R&D intensive industry if the industry R&D intensity is above the sample median level. *Employee relation index* is defined as a firm's total employee strength score minus its total employee weakness score. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. Column (1) and (2) are the probit regression results for raw sample. Column (3) and (4) are the probit regression result for the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	Raw sample		Matched sample	
	Industry R&D intensity		Industry R&D intensity	
Probit model	High	Low	High	Low
Employee relation	-0.13***	-0.04	-0.31**	-0.12
	(0.007)	(0.613)	(0.016)	(0.405)
Board size	0.02	0.03	-0.01	0.14**
	(0.506)	(0.224)	(0.909)	(0.014)
Independent director	0.15	0.53	0.62	0.86
	(0.761)	(0.225)	(0.483)	(0.369)
Busy board	0.23	0.06	0.99	0.38
	(0.433)	(0.864)	(0.104)	(0.504)
Audit committee size	-0.03	-0.41	-1.26	0.22
	(0.965)	(0.442)	(0.297)	(0.845)
ROA	0.98	-1.09	2.92	-7.71*
	(0.217)	(0.362)	(0.114)	(0.070)

External finance need	-0.14	0.42***	-0.11	0.04
	(0.306)	(0.006)	(0.682)	(0.923)
Leverage	0.66	0.42	1.37	1.51
	(0.143)	(0.437)	(0.157)	(0.197)
Size	0.15**	0.09	0.23	-0.10
	(0.017)	(0.251)	(0.159)	(0.485)
Market-to-book	0.11***	0.16	0.13*	0.79**
	(0.002)	(0.108)	(0.092)	(0.005)
Institutional ownership	0.86*	1.22***	2.40**	3.37***
	(0.077)	(0.003)	(0.037)	(0.001)
Analyst	0.01	-0.01	0.03	-0.04
	(0.444)	(0.732)	(0.261)	(0.225)
Pay-for-performance	0.001	-0.001	0.001	-0.001
	(0.355)	(0.567)	(0.882)	(0.264)
Constant	-7.43***	-2.73**	-5.57**	-3.88**
	(0.000)	(0.017)	(0.028)	(0.035)
Year dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Observations	2,765	2,799	189	200
Psudo R-squared	0.12	0.15	0.12	0.14

Table 2.7: Employee relation in R&D intensive industry in bivariate probit model with partial observability

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation index* is defined as a firm's total employee strength score minus its total employee weakness score. *Industry R&D intensity* is equal to industry aggregate R&D expenditure over industry aggregate number of employees, where industries are defined by two-digit SIC codes. The industry is defined as high R&D intensive industry if the industry R&D intensity is above the sample median level. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. Market-to-book ratio is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. Analyst is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Stock volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. Column (1) and (3) are for the equation for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. Column (2) and (4) are for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. The regression is conducted using the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	R&D intensive industry		R&D non-intensive industry	
	Matched sample		Matched sample	
VARIABLES	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)
Employee relation	-0.27**		-0.04	
	(0.019)		(0.784)	
Board size	0.09		0.91***	
	(0.382)		(0.000)	
Independent director	1.16		-5.84***	
	(0.266)		(0.001)	
Audit committee size	-0.14		1.90	
	(0.900)		(0.171)	
ROA	4.83		6.27	
	(0.183)		(0.239)	
External finance need	0.43		2.05***	
	(0.404)		(0.000)	
Leverage	4.12**		1.34	
	(0.025)		(0.204)	

Size	-0.33	0.27	0.02	0.07
	(0.151)	(0.111)	(0.926)	(0.361)
Market-to-book ratio	0.10		0.92*	
	(0.581)		(0.039)	
Institutional ownership	-3.59*	4.93***	9.12***	0.45
	(0.051)	(0.008)	(0.000)	(0.542)
Analyst	0.08*	-0.01	-0.14***	0.001
	(0.078)	(0.712)	(0.006)	(0.858)
Pay-for-performance	-0.001		-0.001	
	(0.141)		(0.446)	
Return volatility		3.66		6.89***
		(0.309)		(0.010)
Stock turnover		0.08		0.01
		(0.174)		(0.912)
Stock return		-2.60***		0.31
		(0.000)		(0.282)
Constant	1.17	-6.31***	-13.26**	-2.15*
	(0.558)	(0.004)	(0.001)	(0.061)
Observations	156	156	183	183

2.6 Robustness Analysis

2.6.1 Endogeneity of the Employee Relation

The potential endogeneity of employee relation caused by omitted variables or reverse causality may drive our results away. For example, if some omitted variable affect both employee relation and fraud propensity, then our employee relation will not be exogenous to the fraud propensity. The management in fraud firms is more likely to be entrenched and cares about private benefit at the cost of shareholders and stakeholders. Thus, such firms are more likely to offer lower employee relation. In this kind of situation, the causation goes from high fraud propensity to poor employee relation, and not vice versa. When the endogeniety problem arises, the coefficient estimated from ordinary least squares (OLS) tests will be biased and inconsistent. To alleviate the endogeneity problem, we perform a two-state least squares regression (2SLS). Following Bae, Kang and Wang (2011), we adopt industry-level wage rate as the instrumental variable. The industry-level wage rate is measured by total labor and related expenses divided by total employees across firms in the same industry. They argue that firms are more likely to treat employees fairly when employees perform higher productivity. The wage rate can be viewed as reward to productivity. Thus, firms with better employee relation are more likely to offer higher wage rate. The industry level data is used for two reasons. First, data on firm-level is missing for a large number of firms in the sample. Second, the industry level data is unlikely to affect the individual firm's propensity to commit fraud. Moreover, the industry-level data reduces the possibility that the instrumental variable is affected by unobservable firm characteristics related to the fraud propensity. Table 2.8 presents the result of 2SLS regression[22]. The negative association between employee relation and fraud propensity still remains in the 2SLS regression.

[22] We only report the results for matching samples since the results for raw sample generate missing standard error for one variable. The negative relation still holds, however such result might be biased due to the missing standard error.

Table 2.8: Employee relation and corporate fraud using two-stage least squares regression

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation* is defined as a firm's total employee strength score minus its total employee weakness score. The total employee strength score is formed by adding the points a firm receives on criteria for employee strength in the KLD database, and the total employee weakness score is formed by adding the points the firm receives on criteria for employee weakness. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. The *industry-level wage rate* is measured by total labor and related expenses divided by total employees across firms in the same industry. The regression is conducted using the 1-3 matching sample based on the size and industry P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	Matched sample	
VARIABLES	First Stage	Second Stage
Employee relation		-1.26***
		(0.000)
Board size	-0.04*	-0.03
	(0.073)	(0.743)
Independent director	-0.44	-0.37
	(0.238)	(0.688)
Busy board	0.15	0.28
	(0.504)	(0.496)
Audit committee size	-0.65	-0.95
	(0.152)	(0.270)
ROA	0.37	0.91
	(0.638)	(0.682)
External finance need	0.06	0.10
	(0.603)	(0.578)
Leverage	0.68*	0.99
	(0.083)	(0.178)
Size	0.08	0.11
	(0.147)	(0.118)
Market-to-book ratio	0.07*	0.13
	(0.068)	(0.441)
Institutional ownership	-0.06	0.46
	(0.863)	(0.850)
Analyst	0.01	0.01
	(0.461)	(0.472)
Pay-for-performance	-0.001	-0.001

	(0.536)	(0.562)
Industry wage rate	0.001	
	(0.831)	
Constant	-0.12	-1.18
	(0.884)	(0.788)
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Observations	378	378

2.6.2 Alternative Measures for Variables

Edmans (2011) examines the relationship between employee satisfaction and long-run stock returns. The paper adopts the list of "100 Best Companies to Work For in America" published in *Fortune* magazine as the proxy for employee satisfaction. We define the firms with better employ satisfaction if they are included in the list. Then, we assign one to those firms, otherwise assign zero. The correlation between our *Employee relation index* from KLD and the employee satisfaction is 0.2514 (p-value is 0.000) in the raw sample and 0.2122 (p-value is 0.000) in the matching sample. The highly significant correlation between employee relation and employ satisfaction indicate that employee satisfaction is another good proxy for the employee relation. We re-run the regression in Table 2.3 and present the results in Table 2.9. Column (1) shows the result for the raw sample. The employee satisfaction is still negatively related to the fraud propensity. The control variables show the same pattern as in Table 2.3. The matching samples provide qualitatively the same result as the raw sample. We further report the result of bivariate probit model in Table 2.9. We find that the employee satisfaction index is still negatively related to the fraud propensity. Other control variables in the regression remain the qualitatively the same as previous analysis except *PPS*. *PPS* appears to be positively related to the fraud propensity, which is consistent with Burns and Kedia (2006). They find that the sensitivity of the CEO's option portfolio to stock price is significantly positively related to the likelihood of financial misreporting.

Table 2.9: Employee satisfaction and corporate fraud

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *Employee satisfaction* is obtained from the list of "100 Best Companies to Work in America". The list of "100 Best Companies to Work in America" has been published in *Fortune* magazine each January since 1998. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. Size is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Stock volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. Column (1) is the probit regression results for raw sample. Column (2) is the probit regression result for the 1-3 matching sample without replacement based on size and industry. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. Column (3) is for the equation for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. Column (4) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. The regression is conducted using the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	Probit	Probit	Bivariate probit	
VARIABLES	Raw	Matched	Matched	
			P(F=1)	P(F=1|D=1)
Employee satisfaction	-0.50*	-0.71*	-1.65***	
	(0.059)	(0.078)	(0.000)	
Board size	0.02	0.05	0.24***	
	(0.283)	(0.205)	(0.000)	
Independent director	0.28	0.61	0.66	
	(0.407)	(0.340)	(0.172)	
Busy board	0.19	0.51		
	(0.387)	(0.209)		
Audit committee size	-0.34	-0.87	1.27	
	(0.441)	(0.283)	(0.196)	
ROA	0.58	1.43	3.48*	
	(0.326)	(0.359)	(0.087)	
External finance need	0.15	0.20	-0.23	
	(0.166)	(0.402)	(0.414)	

Leverage	0.48	0.60	2.60***	
	(0.192)	(0.369)	(0.000)	
Size	0.13***	0.04	0.24**	0.02
	(0.010)	(0.715)	(0.020)	(0.756)
Market-to-book ratio	0.12***	0.17**	0.57***	
	(0.000)	(0.020)	(0.003)	
Institutional ownership	1.00**	2.09***	1.04	1.28**
	(0.003)	(0.002)	(0.254)	(0.014)
Analyst	0.00	0.01	-0.04	0.03*
	(0.738)	(0.547)	(0.161)	(0.079)
Pay-for-performance	0.001	-0.001	0.01***	
	(0.630)	(0.656)	(0.000)	
Return volatility				7.66***
				(0.000)
Stock turnover				-0.001
				(0.905)
Stock return				-0.24
				(0.129)
Constant	-6.81***	-3.69*	-7.81***	-2.69**
	(0.000)	(0.014)	(0.000)	(0.001)
Year dummy	Yes	Yes	No	No
Industry dummy	Yes	Yes	No	No
Observations	5,518	385	329	329
Psudo R-squared	0.12	0.08	X	X

The negative relation between employee relation and fraud propensity might be driven by some other firm characteristics such as corporate reputation for social responsibility and ethics. We obtain the corporate social responsibility index from KLD database. In addition, we collect the reputation index data from "The World's Most Respected Companies" published from *Barron.com*. We report the regression result in Table 2.10. However, we did not find the social responsibility and the reputation index play any role in limiting the firm's fraud incentive. Reputation index even has a positive effect on fraud propensity in the probit regression[23].

Financial constraint might be related to firm's fraud incentive. Thus, we add additional control variables for financial constraint in our regression. Kaplan and Zingales (2000) develop a KZ index to measure the firm's financial constraint. Hadlock and Pierce (2010) develop a similar SA index to measure the firm's financial constraint in order to correct the KZ index. Meanwhile, we also add financial flexibility in our regression. The regression results are reported in Table 2.11 and Table 2.12. Our employee relation still keeps significant effect on the fraud propensity.

Our employee relation may be also proxy for the power of labor union. Thus, we include two additional variables for labor union in our regression. One is the union coverage at the industry level. Another one is the collective bargaining coverage at the industry level[24]. The results are presented in 2.13. Our results do not vary.

[23] We do not report the bivariate probit model for reputation index since the bivariate probit model does not report any result for the reputation index.
[24] Both data is from http://www.unionstats.com/.

Table 2.10: Corporate social responsibilty and corporate fraud

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable and it is a dummy variable equal to one, if a firm commits fraud. *Corporate social responsibility* is obtained from KLD database. The *reputation index* data from "The World's Most Respected Companies" published from *Barron.com*. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by the board size. *ROA* is calculated by (Operating income after depreciation)/Assets. Finance need is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. Size is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Stock return* is the annual buy-and-hold stock return. *Stock volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. P(F=1) is for the equation for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. P(F=1|D=1) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. The regression is conducted using the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Probit	Probit	Bivariate probit	
	Raw sample	Matched sample	Matched sample	
			P(F=1)	P(F=1|D=1)
Employee relation	-0.11***	-0.26***	-0.16**	
	(0.006)	(0.008)	(0.040)	
Social responsibility	0.02	0.05	0.06**	
	(0.244)	(0.216)	(0.018)	
Board size	0.03	0.04	0.27***	
	(0.200)	(0.267)	(0.000)	
Independent director	0.30	0.53	-0.47	
	(0.364)	(0.387)	(0.339)	
Busy board	0.21	0.47		
	(0.339)	(0.232)		
Audit committee size	-0.23	-0.78	1.61	
	(0.597)	(0.329)	(0.159)	
ROA	0.62	1.02	-7.00***	
	(0.310)	(0.511)	(0.002)	
External finance need	0.15	0.10	1.25***	
	(0.160)	(0.634)	(0.000)	

Leverage	0.52	0.58	5.30***	
	(0.156)	(0.374)	(0.000)	
Size	0.11**	0.02	0.14**	0.04
	(0.022)	(0.874)	(0.029)	(0.452)
Market-to-book ratio	0.11***	0.17**	1.33***	
	(0.000)	(0.013)	(0.000)	
Institutional ownership	0.99***	2.19***	1.71**	0.77
	(0.002)	(0.001)	(0.047)	(0.111)
Analyst	0.01	0.01	-0.09**	0.02
	(0.606)	(0.433)	(0.004)	(0.185)
Pay-for-performance	0.00	-0.00	-0.00	
	(0.619)	(0.644)	(0.127)	
Return volatility				4.08***
				(0.006)
Stock turnover				0.07
				(0.170)
Stock return				-0.47**
				(0.026)
Constant	-7.00***	-2.99*	-6.90***	-2.19***
	(0.000)	(0.051)	(0.000)	(0.001)
Year dummy	Yes	Yes	No	No
Industry dummy	Yes	Yes	No	No
Observations	6,249	395	339	339
Psudo R-squared	0.13	0.08	X	X

Table 2.11: Employee relation and corporate fraud with additional controls in financial constraint in simple probit model

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable, and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation index* is defined as a firm's total employee strength score minus its total employee weakness score. The total employee strength score is formed by adding the points a firm receives on criteria for employee strength in the KLD database, and the total employee weakness score is formed by adding the points the firm receives on criteria for employee weakness. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *KZ index* is calculated as Kaplan and Zingales (2000). *SA index* is calculated as Hadlock and Pierce (2010). *Financial flexibility* is calculated as Ang and Smedema (2011). P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

Simple probit	(1) Raw sample	(2) Raw sample	(3) Matched sample	(4) Matched sample
Employee relation	-0.10**	-0.08**	-0.10**	-0.08**
	(0.024)	(0.050)	(0.024)	(0.050)
Board size	0.03	0.03	0.03	0.03
	(0.168)	(0.219)	(0.168)	(0.219)
Independent director	0.49	0.30	0.49	0.30
	(0.202)	(0.358)	(0.202)	(0.358)
Busy board	0.37*	0.20	0.37*	0.20
	(0.095)	(0.340)	(0.095)	(0.340)
Audit committee size	-0.09	-0.25	-0.09	-0.25
	(0.861)	(0.574)	(0.861)	(0.574)
ROA	0.69	0.64	0.69	0.64
	(0.260)	(0.285)	(0.260)	(0.285)
External finance need	0.17	0.16	0.17	0.16
	(0.122)	(0.112)	(0.122)	(0.112)
Leverage	0.65	0.56	0.65	0.56
	(0.125)	(0.125)	(0.125)	(0.125)
Size	0.12**	0.10**	0.12**	0.10**
	(0.038)	(0.041)	(0.038)	(0.041)
Market-to-book ratio	0.13***	0.11***	0.13***	0.11***
	(0.000)	(0.000)	(0.000)	(0.000)
Institutional ownership	0.93**	1.01***	0.93**	1.01***
	(0.016)	(0.002)	(0.016)	(0.002)
Analyst	0.001	0.01	0.001	0.01

	(0.767)	(0.538)	(0.767)	(0.538)
Pay-for-performance	0.001	0.001	0.001	0.001
	(0.395)	(0.565)	(0.395)	(0.565)
SA index		-0.11		-0.11
		(0.296)		(0.296)
KZ index	0.001		0.001	
	(0.693)		(0.693)	
Constant	-7.09***	-7.37***	-7.09***	-7.37***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	5,237	6,249	5,237	6,249
Psudo R-squared	0.13	0.13	0.13	0.13

Table 2.12: Employee relation and corporate fraud with additional controls in financial constraint in bivariate probit model

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable, and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation* is defined as a firm's total employee strength score minus its total employee weakness score. The total employee strength score is formed by adding the points a firm receives on criteria for employee strength in the KLD database, and the total employee weakness score is formed by adding the points the firm receives on criteria for employee weakness. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *KZ index* is calculated as Kaplan and Zingales (2000). *SA index* is calculated as Hadlock and Pierce (2010). *Stock return* is the annual buy-and-hold stock return. *Stock volatility* is the standard deviation of monthly returns in a year. *Stock turnover* is the average monthly turnover in a year. Poirier (1980) presents a bivariate probit model to address the partial observability problem. Feinstein (1990) also develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition to account for undetected corporate fraud. P(F=1) is for the equation for likelihood of committing fraud. All independent variables in fraud propensity equation are measured one year before fraud happens. P(F=1|D=1) is for the equation of fraud detection. All independent variables in fraud detection equation are measured one year after fraud happens. The regression is conducted using the 1-3 matching sample without replacement based on size and industry. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

	Matched sample		Matched sample	
VARIABLES	P(F=1)	P(F=1|D=1)	P(F=1)	P(F=1|D=1)
Employee relation	-0.16*		-0.73***	
	(0.095)		(0.000)	
Board size	0.07		0.14***	
	(0.185)		(0.003)	
Independent director	0.76		0.24	
	(0.242)		(0.488)	
Audit committee size	-0.15		2.04***	
	(0.880)		(0.006)	
ROA	1.49		0.67	
	(0.404)		(0.485)	
External finance need	-0.01		-0.90***	
	(0.983)		(0.007)	
Leverage	2.50**		2.02***	
	(0.003)		(0.002)	

Size	0.10	-0.23*	0.29***	-0.02
	(0.318)	(0.086)	(0.008)	(0.734)
Market-to-book ratio	0.25**		0.30**	
	(0.004)		(0.033)	
Institutional ownership	0.84	-1.02	0.39	0.74
	(0.316)	(0.376)	(0.454)	(0.166)
Analyst	-0.01	0.11*	-0.05*	0.04***
	(0.505)	(0.055)	(0.079)	(0.009)
Pay-for-performance	-0.001		-0.001	
	(0.785)		(0.512)	
KZ index	0.001			
	(0.481)			
SA index			0.53**	
			(0.019)	
Return volatility		-0.45		0.91
		(0.911)		(0.354)
Stock turnover		1.47***		0.12***
		(0.001)		(0.007)
Stock return		-6.08***		-0.56***
		(0.001)		(0.000)
Constant	-4.17***	0.71	-3.82**	-1.56**
	(0.006)	(0.673)	(0.002)	(0.047)
Observations	268	268	339	339

Table 2.13: Employee relation and corporate fraud with additional controls in labor union power

The dependent variable is the dummy variable for detected fraud. *Fraud* is the dependent variable, and it is a dummy variable equal to one, if a firm commits fraud. *Employee relation index* is defined as a firm's total employee strength score minus its total employee weakness score. The total employee strength score is formed by adding the points a firm receives on criteria for employee strength in the KLD database, and the total employee weakness score is formed by adding the points the firm receives on criteria for employee weakness. *Board size* is the number of board members on board. *Independent Director* is the number of outside director over the number of directors. *Busy Board* is a dummy variable denoting a majority of outside directors holding more than two directorships. *Audit committee size* is the audit committee size divided by board size. *ROA* is calculated by (Operating income after depreciation)/Assets. *Finance need* is obtained from Asset growth rate – ROA2/(1-ROA2), *ROA2* = (income before extraordinary items)/Assets. *Leverage* is long-term debt/total asset. *Size* is the log value of total asset. *Market-to-book ratio* is market value over book value of the firm. *Institutional ownership* is the percentage of shares held by institutions. *Analyst* is the number analysts following the firm. *PPS*, pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio. *Union coverage* is the percentage of employees covered by the labor union at the industry level. *Collective bargain* is the percentage of employees covered by the collective bargaining at the industry level. P-value is in parentheses and robust standard error is adopted. *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	Probit	Probit	Bivariate probit	
	Raw sample	Matched sample	Matched sample	
			P(F=1)	P(D=1|F=1)
Employee relation	-0.09**	-0.20**	-0.31***	
	(0.038)	(0.022)	(0.010)	
Board size	0.03	0.04	0.22**	
	(0.212)	(0.272)	(0.018)	
Independent director	0.36	0.54	0.96	
	(0.295)	(0.398)	(0.297)	
Busy board	0.22	0.56		
	(0.312)	(0.162)		
Audit committee size	-0.25	-0.92		
	(0.571)	(0.262)		
ROA	0.41	1.16	-6.65***	
	(0.533)	(0.464)	(0.007)	
External finance need	0.12	0.09	-0.38	
	(0.252)	(0.655)	(0.130)	
Leverage	0.41	0.34	4.75***	
	(0.282)	(0.608)	(0.006)	
Size	0.12**	0.05	0.14	0.04
	(0.023)	(0.635)	(0.197)	(0.493)
Market-to-book ratio	0.11***	0.18**	1.15***	
	(0.000)	(0.011)	(0.001)	
Institutional ownership	1.10***	2.53***	0.99	0.93
	(0.001)	(0.000)	(0.267)	(0.166)
Analyst coverage	0.01	0.01	-0.09**	0.03**

	(0.629)	(0.558)	(0.022)	(0.083)
Pay-for-performance	0.00	-0.00	-0.00	
	(0.811)	(0.525)	(0.827)	
Union coverage	-3.10	-11.19	4.97	
	(0.777)	(0.699)	(0.710)	
Collective bargain	3.12	11.95	-7.74	
	(0.780)	(0.661)	(0.539)	
Stock volatility				3.91**
				(0.022)
Stock turnover				0.06
				(0.383)
Stock return				-0.43**
				(0.047)
Constant	-7.20***	-3.95***	-5.87***	-2.35***
	(0.000)	(0.005)	(0.001)	(0.005)
Industry dummy	Yes	Yes	No	No
Year dummy	Yes	Yes	No	No
Observations	6,134	383	328	328
R-squared	0.13	0.09	X	X

2.7 Conclusion

Motivated by the theoretical papers Landier, Sraer, and Thesmar (2009) and Acharya, Myers, and Rajan (2011), we find that better employee relation can effectively lower the likelihood of corporate fraud. The finding is robust across different models and measures. The effect of employee relation is neglected in the literature of corporate fraud.

Moreover, we find that the CEO duality weakens the negative association between employee relation and likelihood of fraud commitment. The results indicate that the CEO entrenchment weakens the alignment-of-interest effect of employee relation.

Finally, we investigate whether the effect of employee relation varies with the industry characteristics. We find that the negative relation between employee relation and fraud propensity still exists in R&D intensive industries but it disappears in non-R&D intensive industries. The finding suggests that employee relation can facilitate the interest alignment between shareholders and management when the employees are important in implementing projects to create value to the firm.

CHAPTER 3

POLITICAL CONNECTION AND CORPORATE FRAUD—EVIDENCE FROM CHINA

3.1 Introduction

The large and numerous corporate fraud[25] cases emerged in United States in the early 2000s have drawn attention of the public, regulator and academia. By examining the recent fraud cases, Yu and Yu (2011) find that many of them are politically connected firms such as Enron and WorldCom[26]. Both Enron and WorldCom are actively involved in lobbying activities by spending millions of dollars every year. They document that among the detected fraud cases, firms involved in lobbying activities can effectively delay the detection process. Correia (2009) finds that politically connected firms have lower probability to restate their earnings by a common letter from SEC, are less likely to be involved in an SEC enforcement, and face lower penalties on average. Those findings suggest that political connection directly or indirectly affects economic agents who are designed to uncover fraud. Thus, to some extent, political connection and corporate fraud are interrelated.

It is interesting to study the relationship between political connection and corporate fraud in China due to the weak legal environment, inadequate social monitoring, and strong political connection. First, China lacks of a legal environment and public scrutiny when compared to the U.S. Civil litigation significantly impacts a firm’s choice of committing fraud and provides another layer of monitoring over fraud commitment in the U.S. In addition, public media in the

[25] The Antifraud Rule 10b-5 of Securities Exchange Act of 1934 defines corporate financial fraud as the intent to deceive or manipulate with misstatements or omissions of material information relating to financial condition, solvency, and profitability (see SEC Administrative Proceeding 3-9588, April 27, 1998). McLucas, Taylor and Mathews (1997) find that financial fraud is mostly due to the use of false financial information or the failure to disclose material facts relating to a public company’s financial condition.

[26] Enron had misrepresented the value of its assets by billions of dollars, and related party transactions were siphoning value from the firm to the benefit of CEO. In order to meet the expectations of analysts, CEO of WorldCom involves in a series of fraudulence accounting manipulations. Enron and WorldCom fraud scandal are the top two fraud cases in U.S. history. The settlement amount between Enron and SEC is $ 7185.5 million and for WorldCom the number is $ 6128.26 million.

U.S. can be a major fraud whistle-blower, reporting the first revealing of a majority of fraud scandals and further digging up the story such as Enron and WorldCom (Dyck, Morse, and Zingales (2010)). However, civil litigation is very rare in China due to the weak legal environment. The public media fails to provide enough social monitoring over fraud commitment in China either.

Second, China is still in the transitional period from plan economy to free market economy. The Chinese government has a strong influence on the economy and resources allocation among individual corporations when compared with the U.S. government. The powerful Chinese government promotes firms' interests in obtaining political connection for favorable treatment. Unlike U.S. firms, they employ a more direct way to establish political connection by hiring former government officials[27] (Fan, Wong, and Zhang (2007), Firth, Lin, and Wong (2008)). Political connection is strong and widespread in China among corporations.

The China Securities Regulatory Commission (CSRC) is in charge of enforcing the implementation of the securities laws in the country. The CSRC was established following the structure and function of the SEC in the U.S. The CSRC is the corporate fraud detection authority and has the right to make enforcement actions against cases where fraud and malpractices happens. However, the CSRC is strongly influenced by political pressures since it is a ministry-level commission directly controlled by the state. Hence, politically connected firms are more likely to evade detection by the CSRC.

This paper examines whether political connection has any impact on the firms' propensity to commit fraud and the fraud detection in China. The study makes the following contributions to the literature. First, one challenge of the existing empirical approach in corporate

[27] The government officials and their relatives are forbidden to take any position in any firms in China. Thus, the public listed firms only can hire the government officials when they retire. The former government officials still keep substantial human network in the government, which is an important source for the firms to gain political connection.

fraud literature is that we only observe the detected fraud cases but not the undetected fraud. I adopt the bivariate probit with partial observability model to analyze the multivariate relationship between political connection and corporate fraud to solve for the incomplete detection problem. Second, by using the econometric model, this paper is able to explicitly test the relation among political connection, fraud propensity, and its detection, which is *never* tested in the literature. Furthermore, the ownership structure of Chinese firms is unique. For example, the state controls a large number of public listed firms via the partial privatization. This paper examines whether the government control has any influence on the corporate fraud.

Using data from the enforcement actions of the Chinese Securities Regulatory Commission (CSRC) between 2003 and 2009, I find that politically connected firms are less likely to be detected given that they actually commit fraud compared with their counterpart. Political connected firms are 27% less likely to be detected by the CSRC if they actually commit fraud. Politically connected firms face lower detection rate that in turn has a feedback effect on their propensity of committing fraud. Thus, those firms have higher propensity to commit fraud compared to the unconnected firms. The feedback effect of the low detection rate gives connected firms 23% more incentive to commit fraud. Government controlled firms have a lower probability of being caught if they actually commit fraud. Government controlled firms are 21% less likely to be investigated by the CSRC. However, since the heads of government controlled firms are usually appointed by the government, their promotions are not necessarily tied to their performance. Thus, government controlled firms intrinsically have less incentive to commit fraud. Government controlled firms are 12% less likely to commit fraud.

The rest of the paper is organized as follows. Section 3.2 provides a review of literature. Section 3.3 introduces the institutional background and develops hypotheses. Section 3.4 describes the construction of my data sample. Section 3.5 illustrates the empirical methodology and model specification. Section 3.6 describes the regression results. Section 3.7 presents the robustness analysis. Section 3.8 concludes the paper.

3.2 Literature Review

Various variables are used to proxy for the political connection: family ties, personal relationship with officials, geographical proximity, and the appointment of the ex-officials (Faccio, Masulis, and McConnell (2006), Fan, Wong, and Zhang (2007), Faccio and Parsley (2009)). Some papers study the association between political connection and firm value. Faccio and Parsley (2009) argue that sudden death of certain politician has a negative effect on the firm value if the firm's headquarter is in the politician's hometown. Using Indonesia data, Leuz and Oberholzer-Gee (2009) find that political connection is related to the long-term performance of the firm. Another set of studies finds that there is a relationship between a firm's political contribution and its future return (Ansolabehere, Snyder, and Ueda (2004), Cooper, Gulen, and Ovtchinnikov (2006), Aggarwal, Meschke, and Wang (2007)). Fan, Wong, and Zhang (2007) document that connected CEOs are associated with lower post-IPO stock returns in China since the connected CEOs are not competent in running the firm.

Additional papers focus on the political connection and firm characteristics. Politically connected firms tend to have a higher leverage level (Johnson and Mitton (2003), Chiu and Joh (2004), Cull and Xu (2005), Khwaja and Mian (2005), Faccio (2006)). Faccio, Masulis, and McConnell (2006) find that politically connected firms are more likely to be bailed out compared to similar non-connected firms. Agrawal and Knoeber (2001) find that politically connected outside directors are crucial in firms dealing with the government in terms of sales to government and exports. Gupta and Swenson (2003) document that firm's political contribution helps it to gain tax benefits. Fan, Wong, and Zhang (2007) show that Chinese public firms with politically connected CEOs are more likely to have boards lack of professionalism.

This paper is also related to the literature of corporate fraud. Karpoff, Lee, and Vendrzyk (1999) find that firms experience negative abnormal returns at announcement if they are indicted with procurement fraud. However, large defense contracts can help firms to have less negative abnormal returns. Goldman, Peyer, and Stefanescu (2007) find that fraud discovery has a negative and contagious effect on the rival firms' stocks, especially if the industry is highly competitive. A number of papers focus on the factors that affect the propensity of the firm to commit fraud, such as high executive incentives (Burns and Kedia (2003), Peng and Röell (2008)) and weak board structure (Beasley (1996), Agrawal and Chadha (2005)). Dyck, Morse, and Zingales (2006b, 2010) examine the role of different monitoring devices in fraud detection and find that market-based institutions play a more significant role than regulatory-based institutions.

In the literature, there are only two papers examining the relation between political connection and corporate fraud. Correia (2009) develops two theoretical models and finds that politically connected firms are less likely to make a restatement initiated by a common letter from the SEC, have lower probability to be involved in an SEC enforcement action and face lower penalties on average. Yu and Yu (2011) evaluate the efficiency of fraud detection over politically connected firms. They restrict their sample in the detected fraud cases and find that politically connected firms can delay the detection process. Unfortunately, neither of those two studies takes the undetected fraud into their consideration. They ignore the contamination effect of undetected fraud, which generates biased and unreliable results.

Only limited papers employ the bivariate probit with partial observability model to solve for the empirical challenge of imperfect detection in studying corporate fraud. Li (2010) provides an application of this model in the study of corporate financial fraud. Wang, Winton, and Yu (2010) study the business condition of the corporation and the fraud propensity. They argue that a firm's incentive to commit fraud when going public varies with investor beliefs about industry business conditions. Fraud propensity increases with the level of investor beliefs about industry prospects but decreases in the presence of extremely high beliefs. Wang (2011) shows that firms having more M&A and smaller R&D investment are associated with a higher likelihood of detection. Chen, Firth, Gao, and Rui (2006) demonstrate that board characteristics are important, while the characteristics of ownership is less relevant in the corporate fraud in China. Particularly, the incidence of fraud is associated with the proportion of outside directors, the number of board meetings, and the tenure of the chairman.

3.3 Institutional Background and Hypothesis Development

3.3.1 Political Connections in China

In the 1980s, the Chinese government began to delegate the managerial decision right of state-owned enterprise (SOEs) to the firm itself. In the 1990s, SOEs are allowed for partial privatization by transferring a minority of shares to individual investors. Chinese economy starts to transit from plan economy to free market economy through partial privatization. However, a key characteristic for the partial privatization is that the state still controls a significant ownership stake after the SOEs go public. Moreover, stakes held by the state are not tradable in the market, which guarantees the control power of the state over the firm. The central government usually appoints some officials as the top executives to the affiliated listed SOEs such as China Sinopec Group and Petroleum China (Fan, Wong, Zhang (2007), Chen, Firth, and Xu (2009)).

Meanwhile, a certain amount of state officials chose to resign and restart their life in the business area in the mid-1990s. Many of them choose to list their firms on the stock market later. On the other hand, some ex officials may be hired by some firms as top executives after they retire from the government. Therefore, political connection is widespread in China.

3.3.2 The China Securities and Regulatory Commission (CSRC)

To stabilize the securities market, the CSRC is the major regulator of securities markets in China since 1998. The CSRC has the option to delegate some work to the stock exchanges[28]. For those delegated works, the stock exchanges must report back to the CSRC later. The Securities Law also gives more power to the CSRC to become the fraud detection authority to investigate and sanction firms and individuals over corporate fraud. For example, expropriation of assets that hurt minority investors, false and inadequate financial disclosures, embezzlement by company officials and securities firms, and stock market manipulation are all regarded as fraud or malpractice and are subjected by the investigation of the CSRC. The CSRC function as the SEC in the U.S. The investigation of the CSRC becomes the major fraud detection device to corporate fraud in China[29].

3.3.3 Hypothesis Development

Hypothesis 1: Politically connected firms have a lower probability of being detected on the condition that they actually have committed fraud.

Despite numerous red flags raised regarding Bernard Madoff's Ponzi scheme, the SEC still fails to detect it. The main reason for the failure of detection is the political connection of Bernard Madoff. Bernard Madoff himself made substantial political contribution and his company spent millions of dollars on lobbying activities since 1979. Furthermore, Madoff himself and his family members are the board members of Securities Industry and Financial Markets Association (SIFMA). The husband of Shanan Madoff, his niece, worked as the former assistant director in the SEC's Office of Compliance, Inspections and Examinations. Yu and Yu

[28] China has two stock exchanges: SHENZHEN stock exchange and SHANGHAI stock exchange.
[29] Chinese firms are less likely to be threatened by the civil lawsuit and till now there have been very few successful prosecutions. China's first successful civil lawsuit against a listed company was concluded in November 2002.

(2011) argue that the lobbying activity has a strong influence on the fraud detection: detected fraud firms that lobby on average have a significantly lower hazard rate of being detected for fraud compared with those without lobby activities. Detected fraud firms with lobby activities can evade fraud detection 117 days longer than those without lobby activities. Correia (2009) develops a theoretical model to state that politically contributing firms have a lower probability of investigation by SEC compared with the non-contributing firms in some situations. In other situations, politically contributing firms are even immune from investigation or enforcement[30]. Allan, Qiao, and Qian (2005) point out that the legal system in China is not well developed and the government has certain powers to influence the regulation execution. In China, the power of the CSRC is highly affected by political pressures since it is a ministry-level commission directly controlled by the state. If the investigated target is politically connected, the CSRC officials may deflect numerous phone calls from the upper-level politicians, which may induce additional time or cost on the investigation. Moreover, the CSRC officials may have damaged their career prospects since the future careers of the CSRC officials are completely directed by the upper level state officials. The CSRC officials cannot disobey the direction of the upper level state officials. Thus, in China, politically connected firms are less likely to be detected by the CSRC.

Hypothesis 2: Politically connected firms have a higher propensity of committing fraud than their unconnected counterpart.

The propensity of committing fraud depends on the expected benefits the firms can obtain, higher valuation or higher stock return (Jayachandran (2006), Aggarwal, Meschke, and Wang (2007), the cost the firm needs to pay like penalties if being caught, and the probability of being caught by the government authority. Political connection should have a significant effect on the probability of being caught by the government authority, if *Hypothesis 1* is correct. The

[30] Correia (2009) builds up two simple models: signaling model and quid pro quo model. The two models share a similar timeline but differ both on the information that is observed by the SEC and on the impact of contributions on enforcement costs.

expected cost should be lower for politically connected firms since the lower probability of being detected. In this sense, political connection will have a feedback effect on the firm’s propensity of committing fraud. The feedback effect means that if a factor can affect a firm's probability of getting caught, and if this effect can be anticipated by the firm's insiders, then this factor should affect the firm's ex ante incentive to commit fraud in the opposite direction (Wang (2011), Yu, Winton and Wang (2010)). According to the Fraud Triangle (Wells (1997)), those politically connected firms will have more opportunistic behavior to commit fraud.

Hypothesis 3: Government controlled firms have a lower probability of being detected on the condition that they actually have committed fraud.

As stated in the institutional background section, a key feature of Chinese partial privatization is that the state retains a significant ownership stake after listing. Chen, Firth, Gao, and Rui (2006) demonstrate that board characteristics are important, while the characteristics of ownership is less relevant in the corporate fraud in China. Their result might be biased empirically since it is hard to distinguish how much percent of the ownership is owned by the government in China. The firm may be indirectly held by the government, which is hard to be identified. Moreover, for the listed SOEs affiliated to the central government, the central government usually appoints some officials as the top executives of the firms such as China Sinopec Group and Petroleum China (Fan, Wong, and Zhang (2007), Chen, Firth, and Xu (2009)). On the contrary, if the government is the minority shareholder instead of the ultimate owner of the firm, the government does not have the authority to make any appointment. We argue that there is significant difference in political connection between government controlled firms and non-government controlled firms. Thus, we propose that the real driving factor in fraud detection is the ultimate owner of the firm instead of the percentage of government ownership. Empirically, the ultimate owner of the firm can also be identified precisely.

Hypothesis 4: Government control has a negative effect on the firm's propensity of committing fraud.

As stated above, government has the power to appoint top executives to the listed firms they own. The promotion of the executives in the government controlled firms mainly depends on how well they follow the instruction of the central and local government but not on how much they contribute to create firm value. The well-being of the officials is not tied to the performance of the firms since they do not have any right to use dividend revenues. Those executives will be appointed to other positions in other government controlled firms or back to the office of the government, if the firm goes bankrupt eventually. Those officials will not be hurt in any way. However, if the government controlled firm was caught for committing fraud, the head of the firm will be regarded as disobeying the instruction of the central or local government. He may lose the trust of the government and furthermore ruin his career prospect. To some extent, the gain of the fraud for the management of the firm is quite small or nearly zero, but the loss is quite large. Therefore, rational managers of the government controlled firm have no incentive to commit fraud although facing lower detection rate.

3.4 Data and Sample Selection

First, I collect the CSRC enforcement actions data from 2003 to 2009, and also collect firm's ownership and financial data from China Stock Market and Accounting Research (CSMAR) database. The CSRC does not announce the cases that are not proven. Therefore, there is no false detection case in our sample. To describe the process in an enforcement action, I draw a timeline that highlights major events in Figure 3.1[31]. The sample contains 198 CSRC enforcement action cases over a 7 year period, including the date of violation, the date of

[31] The timeline is taken from Chen, Firth, Gao and Rui (2005).

enforcement action[32], type of violation and so on. Following Beasley (1996), I adopt a propensity matching method to match my fraud sample with a control group sample on the criteria: size of the firm, listing age, stock exchange listed, and industry and time period. In order to minimize the problem of ties in propensity matching score, I include two control firms for each fraud firm. After dropping the ones without financial data or ownership data, I have 426 firms left in total.

Afterwards, I collect board member's profile data for each firm in the sample from Resset financial research database. The profile typically contains information on age, gender, education, professional background, and employment history. Following Faccio (2006) and Fan, Wong, and Zhang (2007), I define a firm as politically connected firm if its board member includes: (1) a former government official[33]; (2) a current or former member of the People's Congress; and (3) a current or former member of the People's Political Consultative Conference. The People's Congress and the People's Political Consultative Conference are influential quasi-government organizations in the Chinese political system, the former being the lawmaker and the latter being the sole official advisory body. As the appointments of the main government officials must be approved by the People's Congress and are often influenced by comments from members of the Consultative Conference, these two organizations have a significant influence on, and a close relation with, key government officials. To avoid ambiguity in defining the variables, only appointments of ex-government officials and members of the People's Congress or the Consultative Conference at the provincial level or above are considered. Finally, around one third of the firms in the sample are treated as politically connected firms. The regional legal index data is obtained from Fan, Wang, and Zhu (2010). The index captures the regional market development of legal environment such as the protection of property rights.

[32] Chen, Firth, Gao and Rui (2005) mentioned that CSRC sometimes disclose the time period over which the fraud took place, however the dates of the initiation of the actions (event 2 and 3 in Figure 3.1) are not disclosed. Another limitation of the CSRC disclosure is that the fraud dates (if announced) are typically in terms of year rather than a specific date. Moreover, CSRC does not disclose whilst-blower for the investigation initiation (e.g. the report by the media).

[33] Government officials in office in China are barred from acting as directors or executives of listed companies by law.

3.5 Empirical Methodologies and Model Specifications

3.5.1 Methodology

The simple probit model is adopted in the literature (Beasley (1996), Agrawal and Chadha (2005)). However, the empirical research on corporate fraud encounters a challenge: the partial observability problem. I only observe the detected fraud cases but not the undetected ones. Thus, if the detection process is not perfect (i.e., the probability of fraud detection is not one), the probability of detected fraud (what I observe) will be different from the probability of fraud (what I want to examine). It is possible that the undetected fraud firms exist in our sample of no-fraud firms.

Poirier (1980) proposes a bivariate probit model to address the problem of partial observability. Feinstein (1990) independently develops a similar model to address the problem of incomplete detection in the analysis of noncompliance. Wang, Winton, and Yu (2010) use this model to solve the relation between corporation fraud and its own business condition. Here, I model detected fraud as a function of the joint realizations of two variables: fraud and fraud detection[34]:

Fraud: F_j =1 if firm j commits fraud. Otherwise, F_j =0

Fraud detection: D_j =1 if the CSRC detects the fraud of firm j. Otherwise, D_j =0

From this I have the following reduced form equations:

$$F_j = x_{1j}\beta_1 + u_j \quad (1)$$

$$D_j = x_{2j}\beta_2 + v_j \quad (2)$$

[34] The following part draws heavily on Poirier (1980) and Yu, Winton, and Wang (2011)

where x_{1j} is the vector of variables that helps explain a firm's propensity to commit fraud. x_{2j} is the vector of variables that helps explain why fraud is detected. u_j and v_j are error terms.

$$Zj = F_j * D_j \quad (3)$$

Zj=1 indicates a detected fraud.

$$P(Zj=1) = P(F_j=1 \,\&\, D_j=1) = P(F_j=1)*P(D_j=1|\, F_j=1) = \Phi\,(x_{1j}\beta_1, x_{2j}\beta_2) \quad (4)$$

$$P(Zj=0) = P(F_j=0 \text{ or } D_j=) = P(F_j=0)+P(F_j=1)*P(D_j=0|\, F_j=1) = 1-\Phi\,(x_{1j}\beta_1, x_{2j}\beta_2) \quad (5)$$

The above model can be estimated by using maximum likelihood estimator. The log-likelihood function is

$$L(\beta_{1,}\, \beta_2) = \sum(Zj * \ln(\,\Phi\,(x_{1j}\beta_1, x_{2j}\beta_2)) + (1-Zj)*\ln(1-\Phi\,(x_{1j}\beta_1, x_{2j}\beta_2)) \quad (6)$$

According to Poirier (1980), the condition for full identification of the model parameters are (1) x_{1j} and x_{2j} do not contain exactly the same variables; and (2) the explanatory variables exhibit substantial variations in the sample. I have the data for Zj, which is the reported fraud and the data for x_{1j} and x_{2j} , whose elements are somehow different. By minimizing the log-likelihood function over the parameters, I finally can obtain the MLE for all my parameters.

Note that a simple probit model, which is frequently used in the literature, is

$$Zj = F_j = x_{1j}\beta_1 + \varepsilon_j$$

$$P(Zj=1) = P(F_j=1) = \Phi\,(x_{1j}\beta_1, x_{2j}\beta_2)$$

If is $D_j=1$ not always equal to 1, simple probit model will generate biased inferences.

3.5.2 Model Specification

Beasley (1996) finds that no-fraud firms have boards with significantly higher percentages of outside members than fraud firms. Board acts as the corporate monitor should be a major deterrence of the corporation fraud. The percentage of the independent board members is the key factor influencing the efficiency of monitoring.

Wang (2011) argues that accounting data is often used to help enforce contracts between the firms and the stakeholders. Those contracts can create incentives for earnings management. One important type of contracts is the debt contract between the firm and its creditors. A number of studies have examined whether firms that are close to debt covenants tend to manage earnings (Healy and Wahlen (1999)). Leverage is a frequently used proxy for closeness to covenants in the accounting literature (Dechow, Sloan, and Sweeney (1996), Richardson, Tuna, and Wu (2003)).

Large and sophisticated institutional investors should have both incentive and power to impose effective monitoring on the management (Shleifer and Vishny (1997)). Effective monitoring should increase the detection rate of fraudulent activities. Chung, Firth and Kim (2002) find that firms with a larger institutional ownership have less earnings management.

Financial analysts are also viewed as traditional outside monitors over the firms. Their specific knowledge about financial statement and routine communication with management make them have higher chances to discover fraud. Yu (2007) finds evidence that analyst coverage leads to less earnings management. Dyck, Morse, and Zingales (2010) examine large class action lawsuits filed between 1996 and 2004 and show evidence of the active role of analysts in fraud detection.

Auditors play an important role in detecting the corporate fraud. Independent auditors have just been introduced in China. The auditing standard is hard to be fully implemented due to the lack of trained personnel. In China, it is hard to find a clear definition for high quality auditor.

However, I attempt to categorize auditors on the international brand name. International Big Four auditing companies[35] have a good reputation (Chen, Firth, Gao, and Rui (2006)).

A unique characteristic of China's reform process is the uneven distribution of wealth and growth across the different provinces (Demurger, Sachs, Woo, Bao, Chang, and Mellinger (2002)). In provinces with higher legal environment, firms may have better self-regulation. In turn, the CSRC may allocate fewer resources on that province for fraud detection. Since the budget and time of CSRC is limited, CSRC has to allocate its investigation resources efficiently. As the degree of market development could have an effect on the fraud detection, it is important that I account for this in my model. To accomplish this, I use a comprehensive index compiled by Fan and Wang (2003) as a proxy of the market development of a province. The index captures the regional market development in legal environment such as property rights. Higher scores equate to greater market development in legal environment.

Several studies of financial statement fraud find that larger firms are more likely to get involved in securities litigation (Cox and Thomas (2003), Dechow, Ge, Larson and Sloan (2007)). Industry patterns may also matter. Thus, I control for firm size (log value of total asset), age (as listing age in the exchange), and industry.

Note that all independent variables in fraud detection equation are measured in one year after the fraud happens since those variables will perform the function of fraud detection only when fraud happens. All independent variables in fraud propensity equation are measured in one year before the fraud happens since the decision of committing fraud is made before the fraud actually happens.

3.6 Empirical Results

[35] The international Big 4 companies include PricewaterhouseCoopers, Deloitte Touche Tohmatsu, Ernst & Young, and KPMG.

3.6.1 Details of Enforcement Action and Political Connection

Table 3.1 shows the descriptive statistics for the CSRC enforcement actions during 2003-2009 by year, stock exchange (Panel A), industry (Panel B) and province (Panel C). In Panel A, enforcement cases are randomly distributed across year and stock exchange. The year and the stock exchange do not determine the choice of corporate fraud. However, Panel B shows that firms within certain industries have higher probability of committing fraud. Materials, Industrial and Manufacturing, and Consumption have much more fraud cases compared to other industry[36]. Panel C shows fraud cases distribution across province. There is no clear pattern in Panel C. Province with higher legal index does not automatically mean it has less fraud cases. For example, Beijing has a legal index of 7.958, but it has 5 fraud cases which account for 0.0311 of the total listed firms in Beijing. However, Anhui has a legal index of 4.358, but it has 2 fraud cases which accounts for 0.0313 of the total listed firms in Anhui. Beijing and Anhui have similar ratio of fraud but with quite different legal index. Fraud does not necessarily happen in the provinces with higher legal index or in the ones with lower legal index.

Table 3.2 presents the breakdown of enforcement actions by the type of fraud (The classification is provided by the CSRC). There are 216 fraud cased cited in the 142 enforcement actions since some firms have multiple frauds. I separate the fraud cases into three subsamples: cases due to untruthful acts, cases due to misrepresentation information, and cases due to unlawful activities. The main type of fraud is the misrepresentation of information including "Postponement/delay in disclosure", "False statements", and "Major failure to disclose information". Those three types of fraud take account for more than one half of the full fraud sample. In the untruthful acts and unlawful activities, "Major shareholders embezzlement" and "Illegal share buybacks" are also major fraud cases.

[36] The industry classification is according to the Global Industry Classification Standard (GICS), adopted by the CSRC.

Table 3.1: Descriptive statistics for CSRC enforcement during 2003-2009

Panel A: By year and stock exchange

Year	Shanghai(%)	Shenzhen(%)	Total(%)
2003	14(9.86)	12(8.45)	26(18.31)
2004	9(6.34)	9(6.34)	18(12.68)
2005	2(1.41)	13(9.15)	15(10.56)
2006	5(3.52)	10(7.04)	15(10.56)
2007	17(11.97)	17(11.97)	34(23.94)
2008	7(4.93)	12(8.45)	19(13.38)
2009	2(1.41)	13(9.15)	15(10.56)
Total	56(39.44)	86(40.56)	42(100.00)

Panel B: By industry (Global Industry Classification Standard, GICS)

Industry	Number of Fraud	Percentage of fraud%
Energy	2	1.4
Materials	37	26.06
Industrial and manufacturing	25	17.61
Consumption	31	21.83
Medical & Health	12	8.45
Finance	10	7.04
Information Tech	19	13.38
Utilities	6	4.23
Total	142	100.00

Panel C: Enforcement action description by province

Province	Number of fraud	Percentage	Ratio of frauds	Legal index
Anhui	2	1.41	0.0313	4.358
Beijing	5	3.52	0.0311	7.958
Fujian	7	4.93	0.0909	6.094
Gansu	6	4.23	0.2500	2.866
Guangdong	16	11.27	0.0537	10.402

Guangxi	4	2.82	0.1481	3.62
Guizhou	2	1.41	0.1053	2.84
Hainan	1	0.7	0.0400	3.69
Hebei	4	2.82	0.0870	4.578
Henan	1	0.7	0.0192	4.124
Heilongjiang	4	2.82	0.1111	4.982
Hubei	2	1.41	0.0270	4.646
Hunan	6	4.23	0.0909	3.938
Jilin	6	4.23	0.1429	4.544
Jiangsu	6	4.23	0.0355	8.308
Jinagxi	2	1.41	0.0645	3.948
Liaoning	4	2.81	0.0588	6.148
Neimenggu	3	2.11	0.1364	4.184
Ningxia	1	0.7	0.0833	3.172
Qinghai	2	1.41	0.2000	1.944
Shandong	8	5.63	0.0635	6.004
Shanxi	1	0.7	0.0370	4.096
Shan'xi	5	3.52	0.1316	3.718
Shanghai	9	6.34	0.0497	13.306
Sichuan	11	7.75	0.1209	4.876
Tianjin	1	0.7	0.0294	8.37
Xinjiang	3	2.11	0.0833	3.23
Xizang	0	0	0.0000	4.576
Yunnan	2	1.41	0.0667	3.57
Zhejiang	14	9.86	0.0769	10.586
Chongqing	4	2.82	0.1176	4.588
Total	142	100	0.0673	5.266

Note: Ratio of frauds is the number of fraud cases divided by the number of listed firms in a province. Legal index is a comprehensive index to capture the legal environment of regional market.

Table 3.2: Breakdown of enforcement action by type of fraud

Type of fraud	Number of Occurrence	Percentage%
Untruthful activities	24	
Inflated profit	3	1.39
Major shareholders embezzlement	14	6.48
Price manipulation	7	3.24
Misrepresentation of information	120	
Postponement/delay in disclosure	64	29.63
False statements	18	8.33
Major failure to disclose information	38	17.59
Unlawful activities	31	
Illegal share buybacks	21	9.72
Illegal guarantee	7	3.24
Illegal speculation	3	1.39
Others	39	18.06
Total	214	100

Note: The table provides the breakdown of enforcement action by type of fraud (classification provided from CSRC). There are 216 fraud cases cited in the enforcement actions as many firms have multiple types of frauds.

Table 3.3 shows the distribution of political connections across fraud sample and no-fraud sample. Interestingly, fraud sample shows that the detected fraud is more likely to be the firm without political connection. In addition, in both samples, local connection is more likely to be established due to several reasons such as the physical distance, social network, and familiarity. I compare the percentage of the political connection across fraud sample and no-fraud sample. From 2003 to 2005, no-fraud sample has a much higher rate of political connections than the fraud sample. In 2006 and 2009, both samples have the same political connection rate. Surprisingly, in 2007 and 2008, fraud sample has a higher political connection rate, which seems that politically connected firms even experience more fraud investigations. Table 3.3 shows a mix result about the effect of political connection on the fraud detection. Table 3.4 also presents a mix result for the effect of government control on the fraud detection. The reason of the mix result may be the imperfect fraud detection process. I may include the undetected fraud cases in the no-fraud sample.

For the univariate analysis, I compare the firm's characteristics across the fraud sample and no-fraud sample to see whether there is significant difference in the characteristics of the firms. I use both t-test and Wilcoxon test to check for the significant difference in means and medians (See Table 3.5). Among all the characteristics, only *Leverage* is significant different across two samples. The *Leverage* in the fraud sample is significantly higher than the non-fraud sample in both mean and median tests. A large number of studies in accounting literature test whether firms close to the debt covenant are more likely to manage earnings (See Healy and Wahlen (1999) for a review). *Leverage* is frequently regarded as a proxy for the closenss to covenant in accounting literature (Dechow, Sloan, and Sweeney (1996), Dechow, Sloan, and Hutton (1996)). Intuitively, it also means that firms with higher risk of being default would be more inclined to commit fraud.

Table 3.3: Political connection in fraud firms and non-fraud firms

Connection is denoted as 1 if the firm is politically connected. Local is denoted as 1 if the firm has local political connection. Central is denoted as 1 if the firm has central political connection.

Year	Fraud with connection			Fraud without connection	Non-fraud with connection			Non-fraud without connection	Total
	Connection	Local	Central		Connection	Local	Central		
2003	1	1	0	25	10	8	6	42	78
2004	7	5	3	11	18	16	4	18	54
2005	0	0	0	15	4	3	1	26	45
2006	6	5	2	9	12	11	3	18	45
2007	20	19	9	14	31	26	14	37	102
2008	8	8	2	11	12	10	4	26	57
2009	3	2	1	12	6	4	3	24	45
Total	45	40	17	97	93	78	35	191	426

Note: Firms may have both local connection and central connection.

Table 3.4: Distribution of government controlled firms across fraud and non-fraud sample

Control is denoted as 1 if the firm is government controlled. Others is denoted as 1 if the firm is not government controlled.

	Fraud sample			Non-fraud sample		
Year	Control	Others	Total	Control	Others	Total
2003	15	11	26	41	11	52
2004	12	6	18	25	11	36
2005	8	7	15	21	9	30
2006	8	7	15	23	7	30
2007	18	16	34	41	27	68
2008	9	10	19	15	23	38
2009	3	12	15	11	19	30
Total	73	69	142	177	107	284

Table 3.5: Comparison of fraud firms and non-fraud firms

Total asset is the log value of total asset. *Board* represents the board Size of the firm. *Outside director%* is the percentage of the independent director in the board. *Age* is the number of year since the firm listed in the stock market. *Leverage* is the ratio of long-term debt over total asset. *Legal index* is the legal environment index of the province where the firm is located. *Institution ownership* is total number of shares held by institution over the total number outstanding shares of the firm. *Return* is the annual buy-and-hold return. *Volatility* is the Standard deviation of monthly stock returns in a year. *, ** and *** indicate statistical significance at the 10%, 5%, and 1%

	Fraud	#obs	Non-fraud	#obs	t-statistics	Wilcoxon Z
Total Asset	1.76 (1.20)	142	1.72 (1.23)	284	-0.19	-0.091
Board size	9.50 (9.00)	142	9.30 (9.00)	284	-0.76	-0.524
Outside Director%	0.33(0.33)	142	0.34 (0.33)	284	0.51	-0.346
Leverage	0.61 (0.55)	142	0.49 (0.50)	284	-2.48**	-1.946*
Age	7.92 (8.00)	142	7.67 (8.00)	284	-0.57	-0.642
Market-to-book ratio	1.79 (1.24)	142	1.46 (1.19)	284	-1.15	-0.027
Institutional ownership	0.28 (0.20)	142	0.28 (0.19)	284	0.15	0.368
Legal Index	6.10 (4.97)	142	6.49 (5.27)	284	0.84	1.057
Return	0.27(-0.09)	120	0.36(-0.03)	267	0.43	0.926
Volatility	0.03(0.03)	120	0.03(0.03)	267	0.77	0.770

3.6.2 Multivariate Analysis

In order to test the effectiveness of the fraud detection, we first adopt a simple probit model to test my hypothesis, which is similar to Beasley (1996), and Agrawal and Chadha (2005) in the literature. The simple probit model is as follows:

Detected Fraud=β_0+ β_1**Connection* + θ**Controls* + Industry Dummy + Year Dummy + ε

The result of the simple probit model is reported in Column (1) in Table 3.6. Among the independent variables only *Government control* and *Leverage* are significant. The sign of *Connection* predicts that firms with political connection are more likely to have a detected fraud, although the effect is insignificant. Fraud committed by the politically connected firm is more likely to be discovered, which is counterintuitive. Such counterintuitive result may be due to the fact that we treat some undetected fraud firm as the no-fraud firm in the simple probit regression.

To solve the inherent problem of treating undetected fraud as no-fraud, I perform a bivariate probit regression. The result is shown in Column (2) and (3) of Table 3.6. More variables turn to be significant in the bivariate probit model. The result in bivariate probit model shows that simple probit model is not reliable due to the existence of undetected fraud.

In the detection equation, column (3), both *Connection* and *Government control* play a negative role in fraud detection. The result supports *Hypothesis 1* and *Hypothesis 3*. Due to the political connection with the government, politically connected firms face lower probability of detection. Similarly, those government controlled firms have a lower likelihood of fraud detection. The politically connected firms are 27% less likely to be detected than the unconnected firms. Meanwhile, government controlled firms are 21% less likely to be detected than the non-government controlled firms. *Institutional ownership* and *Analyst coverage* both have positive effect on the fraud detection. One standard deviation (0.28) increase of *Institutional ownership* would lead to 21% (0.28*0.74) increase in the fraud detection. Large and sophisticated institutional investors are found to have power and incentive to monitor the management effectively and closely (Shleifer and Vishny (1997)). Wang (2011) and Wang, Winton, and Yu (2011) argue that institutional ownership would be related to a higher likelihood of fraud detection. Stock analysts are important external monitors of the firms due to their substantial knowledge about corporate financial statement and their regular interaction with management. Analysts are viewed as the people who should be sensitive to fraud commitment. Dyck, Morse, and Zingales (2010) show that stock analysts play an important role in fraud detection using the sample of large class action lawsuit filed between 1996 and 2004. Older firms are more transparent than the younger firms, which may ease the fraud detection. Hence, significantly negative coefficient of *Age* is expected in the detection equation. Interestingly, *Legal index* also shows a negative effect in detection equation. This result implies that the CSRC allocates less resource for investigation in the area with better legal environment. The CSRC believes that firms in a better legal environment have a lower probability to commit fraud either because of the self-regulation or due to the restrictions imposed by the local government. Thus, regions with better legal environment are less likely to face the screening of CSRC.

In the fraud propensity equation, column (2), political connection has a significantly positive effect on the firm's choice of committing fraud. Politically connected firms have higher propensity of committing fraud than the unconnected firms. If the firm changes from politically unconnected to connected, the probability of committing fraud will increase by 23%. Clearly, political connection plays an important role in determining the propensity of the firm to commit fraud, which confirms the *Hypothesis 2*. The feedback effect of fraud detection makes politically connected firms have higher propensity of committing fraud. Furthermore, both *Size* and *Leverage* have significantly positive effect on the fraud commitment. One standard deviation (0.821) increase of *Size* corresponds to 7.39% (0.821*0.09) increase in the fraud probability. Meanwhile, one standard deviation (0.22) increase of *Leverage* corresponds to 7.48% (0.22*0.34) increase in the fraud probability. Cox and Thomas (2003) and Dechow, Ge, Larson, and Sloan (2007) argue that larger firms are more likely to be listed in the detected fraud cases. Wang, Winton, and Yu (2011) and Wang (2011) study the business conditions and corporate fraud by using the same bivariate probit model. They both find that larger firms have a higher propensity of committing fraud, which is in line with my finding. *Government control* plays a significantly negative role in fraud commitment. Government controlled firms are 12% less likely to commit fraud than the non-government controlled firms. The result is consistent with the *Hypothesis 4* that government controlled firms are less likely to commit fraud. The top executives are reluctant to commit fraud due to the irrelevant tie between their own well-being and firm performance. Due to the feedback effect, firms with higher institutional ownership have lower propensity of committing fraud. As expected, *Analyst coverage* also has a significantly negative effect on the propensity of fraud. In some degree, analysts should play a similar role as institutional investors since analysts tend to follow stocks with high institutional interests (Wang (2011)). The feedback effect of older firms induces a lower propensity to commit fraud, which is the reason for negative coefficient of *Age* in column (2).

Furthermore, I divide *Connection* into *Local connection* and *Central connection*. Then, I run the same regressions to figure out whether the result in Table 3.6 is mainly driven by the local political connection or the central political connection. Column (1) and (4) in Table 3.7 are for the probit regression of *Local connection* and *Central connection* respectively. The result in column (1) and (4) are mostly the same as column (1) in Table 3.6, showing that probit model is not reliable. Column (2) and column (3) in Table 3.7 present the results of bivariate probit for *Local connection*. Column (4) and column (5) present the result for *Central connection*. The result in *Local connection* is qualitatively the same as the result in Table 3.6. In column (4) and (5), although the coefficient of the control variable is qualitatively the same as Table 3.6, *Central connection* and *Government control* become insignificant. Therefore, the result shown in Table 3.6 is mainly driven by the *Local connection* but not the *Central connection*. In each province, the CSRC has its local office performing the fraud detection duty delegated by the CSRC. The local political connection will have a direct influence on the local CSRC office, while the central political connection will have an indirect impact on the local CSRC office. The direct link between local political connection and local CSRC office will be more effective on detection impedance than the indirect link between central political connection and local CSRC office.

Table 3.6: The effect of political connection and government control in fraud propensity and fraud detection process

Connection is a dummy variable taking the value of one if firm has political connection. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. "Firm size" is the log value of total asset of the firm. *Age* is the Firm's listing age. *Legal index* is the legal environment index of the province where the firm is located. *Market to book* is the market to book value of the firm. *Foreign Auditor* is a dummy variable taking the value one if the firm has a foreign auditor. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) is for simple probit model. Column (2) is for fraud propensity equation and column (3) is for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	(1)	(2)	(3)
	$P(Z_i=1)$	$P(F_i=1)$	$P(D_i=1 \mid F_i=1)$
Connection	0.072/0.03	0.72/0.23	-0.69/-0.27
	(0.644)	(0.008) ***	(0.003)***
Government control	-0.377/-0.14	-0.35/-0.12	-0.55/-0.21
	(0.017) **	(0.079)*	(0.009)***
Institutional ownership	0.055/0.02	-2.67/-0.93	1.88/0.74
	(0.882)	(0.003)***	(0.001)***
Analyst	-0.218/-0.08	-0.96/-0.36	0.56/0.21
	(0.224)	(0.001)***	(0.029)**
Firm size	0.035/0.01	0.25/0.09	-0.04/-0.02
	(0.709)	(0.039) **	(0.722)
Age	0.0006/0.0002	-0.09/-0.03	0.104/0.04
	(0.967)	(0.008)***	(0.000)***
Legal index	-0.027/-0.01	0.007/0.002	-0.1/-0.04
	(0.24)	(0.563)	(0.004)***
Leverage	0.8/0.29	0.972/0.34	
	(0.006)***	(0.001)***	
Board size	0.035/0.01	0.085/0.03	

	(0.304)	(0.144)	
Outside director%	-0.464/-0.17	0.92/0.32	
	(0.605)	(0.648)	
Market to book	-0.071/-0.03		0.035/0.01
	(0.258)		(0.277)
Foreign auditor	-0.275/-0.09		-0.336/-0.13
	(0.402)		(0.338)
Constant	-1.19	-2.76	0.278
	(0.547)	(0.258)	(0.91)
Year dummy	yes	yes	yes
Industry dummy	yes	yes	yes
Pseudo R-squared	0.04		
Observations	426	426	426

Table 3.7: Examination of local political connection and central political connection in fraud propensity and fraud detection process respectively

Local connection is a dummy variable taking the value of one if firm has local political connection. *Central connection* is a dummy variable taking the value of one if firm has central political connection. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is the total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. "Firm size" is the log value of total asset of the firm. *Age* is the Firm's listing age. *Legal index* is the legal environment index of the province where the firm is located. *Market to book* is the market to book value of the firm. *Foreign auditor* is a dummy variable taking the value one if the firm has a foreign auditor. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) and (4) are for simple probit model. Column (2) and (5) are for fraud propensity equation. Column (3) and (6) are for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	(1)	(2)	(3)	(4)	(5)	(6)
	$P(Z_j=1)$	$P(F_j=1)$	$P(D_j=1\|F_j=1)$	$P(Z_j=1)$	$P(F_j=1)$	$P(D_j=1\|F_j=1)$
Local connection	0.12/0.04	0.592/0.2	-0.4/-0.16			
	(0.468)	(0.015)**	(0.064)**			
Central connection				0.001/0.0004	0.179/0.063	-0.318/-0.13
				(0.996)	(0.523)	(0.205)
Gov. control	-0.391/-0.14	-0.185/-0.07	-0.69/-0.27	-0.354/-0.13	-1.182/-0.66	-0.66/-0.26
	(0.014)**	(0.397)	(0.003)***	(0.019)**	(0.33)	(0.000)***
Institutional own	0.055/0.02	-2.583/-0.93	1.693/0.67	0.052/0.02	-2.68/-0.98	1.9/0.76
	(0.881)	(0.013)**	(0.007)***	(0.887)	(0.005)***	(0.005)***
Analyst	-0.215/-0.08	-0.89/-0.33	0.405/0.16	-0.213/-0.07	-0.943/-0.36	0.61/0.23
	(0.23)	(0.002)***	(0.152)	(0.236)	(0.000)***	(0.1)*
Firm size	0.036/0.01	0.261/0.09	-0.106/-0.04	0.039/0.01	0.242/0.09	-0.081/-0.03

	(0.697)	(0.061)*	(0.358)	(0.681)	(0.029)**	(0.553)
Age	0.004/0.0001	-0.1/-0.04	0.1/0.04	0.001/0.0005	-0.078/-0.03	0.084/0.03
	(0.979)	(0.02)**	(0.000)***	(0.938)	(0.024)**	(0.002)***
Legal index	-0.026/-0.01	0.007/0.003	-0.076/-0.03	-0.028/-0.01	-0.019/-0.007	-0.061/-0.02
	(0.263)	(0.822)	(0.027)**	(0.236)	(0.504)	(0.051)*
Leverage	0.806/0.29	1.352/0.49		0.805/0.29	0.926 /0.34	
	(0.006)***	(0.016)**		(0.006)***	(0.038)**	
Board size	0.035/0.01	0.035/0.01		0.035/0.01	0.079/0.03	
	(0.308)	(0.353)		(0.308)	(0.083)*	
Outside director%	-0.486/-0.18	0.742/0.27		-0.483/-0.17	1.95/0.71	
	(0.589)	(0.69)		(0.591)	(0.244)	
Market to book	-0.071/-0.03		0.03/0.01	-0.072/-0.03		0.103/0.04
	(0.267)		(0.396)	(0.266)		(0.613)
Foreign auditor	-0.271/-0.09		0.151/0.06	-0.283/-0.1		-0.39/-0.15
	(0.409)		(0.725)	(0.389)		(0.154)
Constant	-1.22	-2.88	1.62	-1.28	-2.86	-1.002
	(0.538)	(0.268)	(0.496)	(0.52)	(0.231)	(0.728)
Year dummy	yes	yes	yes	yes	yes	yes
Industry dummy	yes	yes	yes	yes	yes	yes
Pseudo R-squared	0.04			0.04		
Observations	426	426	426	426	426	426

Furthermore, I test the effect of *Local connection* and *Central Connection* jointly in Table 3.8. *Local connection* still maintains the same sign and significance as in Table 3.7. *Central connection* remains insignificant. Other control variables are qualitatively the same as in Table 3.7. The result further supports my finding that political connection to the local government is the key for the corporate financial fraud.

Aside from the type of connection, the type of fraud may also matter. Table 3.2 illustrates the breakdown of enforcement action by type of fraud. Misrepresentation of information accounts more than half of all fraud cases. Hence, I divide all fraud cases into two sub-groups: Misrepresentation of information and the rest. Column (1) and (2) in Table 3.9 are for the misrepresentation of information. Column (3) and (4) in Table 3.9 are for the rest of fraud cases. *Connection* still keeps the same sign and significance as in Table 3.6 in both two subgroups of fraud cases. In the column (3) and (4), *Government control* maintains the same significance as in Table 3.6. *Government control* keeps significantly negative in column (2), while it becomes insignificant in column (1). All other control variables remain qualitatively the same as in Table 3.6. One exception is “Foreign auditor” in column (4). Its coefficient becomes significantly positive. The firm with foreign auditor will be 36% more likely to be detected if it chooses to commit untruthful and unlawful activities. It seems that the effect of political connection and government control does not vary with the type of fraud.

Table 3.8: Examination of local political connection and central political connection in fraud propensity and fraud detection process jointly

Local connection is a dummy variable taking the value of one if firm has local political connection. *Central connection* is a dummy variable taking the value of one if firm has central political connection. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is the total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. *Firm size* is the log value of total asset of the firm. *Age* is the Firm's listing age. *Legal index* is the legal environment index of the province where the firm is located. *Market to book* is the market to book value of the firm. *Foreign auditor* is a dummy variable taking the value one if the firm has a foreign auditor. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) is for simple probit model. Column (2) is for fraud propensity equation. Column (3) is for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	(1)	(2)	(3)
	$P(Z_j=1)$	$P(F_j=1)$	$P(D_j=1 \mid F_j=1)$
Local connection	0.122/0.04	0.663/0.22	-0.387/-0.15
	(0.459)	(0.004)***	(0.06)**
Central connection	-0.03/-0.01	-0.217/-0.08	0.068/0.03
	(0.884)	(0.387)	(0.799)
Government control	-0.39/-0.14	-0.234/-0.08	-0.626/-0.24
	(0.014)**	(0.19)	(0.001)***
Institutional ownership	0.059/0.02	-2.63/-0.95	1.66/0.66
	(0.237)	(0.011)**	(0.005)***
Analyst	-0.213/-0.07	-0.782/-0.3	-0.304/0.12
	(0.237)	(0.002)***	(0.209)
Firm size	0.038/0.01	0.3/0.11	-0.114/-0.05
	(0.687)	(0.042)**	(0.348)
Age	0.0002/0.0001	-0.106/-0.34	0.102/0.04
	(0.986)	(0.013)**	(0.000)***
Legal index	-0.026/-0.009	-0.006 /-0.002	-0.063/-0.03

	(0.268)	(0.802)	(0.029)**
Leverage	0.809/0.29	1.51 /0.54	
	(0.006)***	(0.013)**	
Board size	0.035/0.01	0.022/0.008	
	(0.308)	(0.502)	
Outside director%	-0.5/-0.18	-0.413/-0.15	
	(0.58)	(0.719)	
Market to book	-0.071/-0.03		0.027/0.01
	(0.271)		(0.294)
Foreign auditor	-0.271/-0.09		-0.106/-0.04
	(0.408)		(0.794)
Constant	-1.25	-3.826	1.715
	(0.53)	(0.21)	(0.484)
Year dummy	yes	yes	yes
Industry dummy	yes	yes	yes
Pseudo R-squared	0.04		
Observations	426	426	426

Table 3.9: The effect of political connection and government control on fraud propensity and detection in different types of fraud

Connection is a dummy variable taking the value of one if firm has political connection. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is the total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. *Firm size* is the log value of total asset of the firm. *Age* is the Firm's listing age. *Legal index* is the legal environment index of the province where the firm is located. *Market to book* is the market to book value of the firm. *Foreign auditor* is a dummy variable taking the value one if the firm has a foreign auditor. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) and column (3) are for fraud propensity equation. Column (2) and column (4) is for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	Misrepresentation of information		Untruthful and unlawful activities	
	(1)	(2)	(3)	(4)
	$P(F_i=1)$	$P(D_i=1\|F_i=1)$	$P(F_i=1)$	$P(D_i=1\|F_i=1)$
Connection	1.28/0.38	-0.875/-0.34	0.836/0.32	-0.814/-0.31
	(0.002) ***	(0.002)***	(0.002)***	(0.018)***
Government control	0.103/0.04	-0.78/-0.3	-0.409/-0.16	-0.73/-0.28
	(0.666)	(0.001)***	(0.085)*	(0.012)**
Institutional ownership	-0.404/-0.14	2.12/0.84	-2.08/-0.81	1.44/0.57
	(0.615)	(0.002)***	(0.022)**	(0.052)*
Analyst	-0.257/-0.1	-0.25/-0.1	-0.902/-0.31	0.903/0.33
	(0.386)	(0.312)	(0.003)***	(0.035)**
Firm size	-0.105/-0.04	-0.092/-0.04	0.204/0.08	0.014/0.006
	(0.598)	(0.581)	(0.12)	(0.923)
Age	0.072/0.03	0.024/0.01	-0.097/-0.04	0.16/0.06
	(0.045)**	(0.426)	(0.017)**	(0.001)***
Legal index	0.119/0.042	-0.18/-0.07	0.005/0.002	-0.081/-0.03
	(0.056)*	(0.000)***	(0.869)	(0.038)**
Leverage	1.58/0.567		1.28/0.49	
	(0.023)**		(0.03)**	

Board size	0.224/0.08		0.057/0.02	
	(0.000)***		(0.203)	
Outside director%	-1.95/-0.7		1.68/0.65	
	(0.13)		(0.313)	
Market to book		0.247/0.1		0.029/0.01
		(0.229)		(0.383)
Foreign auditor		-0.144/-0.06		1.04/0.36
		(0.766)		(0.055)*
Constant	-1.043	3.51	-4.75	-1.8
	(0.796)	(0.53)	(0.096)*	(0.542)
Year dummy	yes	yes	yes	yes
Industry dummy	yes	yes	yes	yes
Observations	285	285	378	378

3.7 Robustness Analysis

First, I use survival analysis suggested by Yu and Yu (2011) to test whether political connection and fraud duration have a certain relationship (See Table 3.10). I define “year taken to be detected” as the length of the period from the firm’s IPO to the detection of a fraud. Following Yu and Yu (2011), I include *Connection*, *Government control*, *Size* and *Market-to-book ratio* in the right hand side of the regression. Within the detected fraud sample, both Cox and Weibull regression show that political connection remains significantly negative. The result suggests that political connection is associated with a lower hazard rate of being detected for fraud. However, the full sample (including detected fraud, undetected fraud and no-fraud firms) fails to confirm the result in Yu and Yu (2011). All independent variables in Cox and Weibull regression remain insignificant whether they are separately or not. The result presents the limitation of the survival analysis suggested by Yu and Yu (2011). Survival analysis generates a biased result if undetected fraud is not considered.

Moreover, executive equity incentives are regarded as an important factor related to the high incidence fraud in a variety of papers (Burns and Kedia (2006), Peng and Roell (2007), Wang (2009)). Furthermore, in the literature, log value of GDP per capita is usually adopted as a proxy for the geographical inequality. In Table 3.11, we run the same regression including those two additional control variables. It shows qualitatively the same result as the regression conducted above.

Table 3.10: Survival analysis for fraud duration

Connection is a dummy variable taking the value of one if firm has political connection. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Size* is the log value of total asset of the firm. *Market to book* is the market to book value of the firm.

	Cox Regression		Weibull Regression	
Dependent variable: Log Hazard Ratio	Fraud Sample	Full Sample	Fraud Sample	Full Sample
Connection	-0.615	-0.24	-0.56	-0.23
	(0.000)***	(0.179)	(0.000)***	(0.194)
Government control	0.166	-0.207	0.09	-0.28
	(0.185)	(0.273)	(0.482)	(0.144)
Size	0.01	-0.05	0.015	-0.036
	(0.905)	(0.637)	(0.859)	(0.739)
Market to Book	-0.02	-0.004	-0.014	-0.0007
	(0.003)***	(0.691)	(0.023)**	(0.953)
industry dummy	yes	yes	yes	yes
Observations	142	426	142	426
Prob > chi2	0.000	0.152	0.000	0.177

Note: P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively.

Table 3.11: The effect of political connection and government control in fraud propensity and fraud detection process with additional control variables

Connection is a dummy variable taking the value of one if firm has political connection. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. "Firm size" is the log value of total asset of the firm. *Age* is the Firm's listing age. *Legal index* is the legal environment index of the province where the firm is located. *Market to book* is the market to book value of the firm. *Foreign Auditor* is a dummy variable taking the value one if the firm has a foreign auditor. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) is for fraud propensity equation and column (2) is for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	(1)	(2)
	$P(F_j=1)$	$P(D_j=1 \mid F_j=1)$
Connection	1.016/0.243	-0.973/-0.355
	(0.024)**	(0.044)**
Government control	-0.353/-0.097	-0.464/-0.159
	(0.219)	(0.082)*
Institutional ownership	-2.825/-0.798	2.509/0.883
	(0.074)*	(0.015)**
Analyst	-1.099/-0.375	0.754/0.227
	(0.018)**	(0.064)*
Firm size	0.38/0.107	-0.186/-0.066
	(0.016)**	(0.384)
Age	-0.097/-0.027	0.106/0.038
	(0.098)*	(0.089)*

Ln(GDP)	0.146/0.041	-0.453/-0.159
	(0.519)	(0.088)*
Leverage	1.082/0.306	
	(0.106)	
Board size	0.093/0.026	
	(0.276)	
Executive holding	-1.889/-0.534	
	(0.411)	
Outside director%	1.785/0.504	
	(0.437)	
Market to book		0.012/0.004
		(0.682)
Foreign auditor		-0.337/-0.126
		(0.532)
Constant	-6.426	6.979
	(0.096)*	(0.222)
Year Dummy	yes	yes
Industry Dummy	yes	yes
Observations	426	426

In addition, Wang, Winton, and Yu (2011) mentioned that stock returns and return volatility are related to a firm's litigation risk. Firms with large negative returns and high return volatility are more likely to be sued by shareholders since they are not happy with their investment loss. Following their study, I compute *Volatility* as the standard deviation of daily stock returns and *Return* as the annual buy and hold return. Table 3.12 reports the result for adding those additional variables in the regression. The result does not deviate from the one we achieve in the previous tables.

Finally, Chen, Li, Su, Sun (2011) study the incentive for Chinese private firms to obtain political connection. They find that firms have a higher probability of establishing certain political connection if they are in the regions where the local economy is less market-oriented or where the government has more discretion in controlling economy. I regress my political connection measure on *regional market development*, *market allocation*, *government impact*, *loan market development*, *government control* and other financial controls. Then, I run the regression again with the predicted connection as the dependent variable. The result is reported in Table 3.13. Table 3.13 implies that the predicted political connection is related to the fraud detection process although I lose the significance in the fraud equation.

Table 3.12: The effect of political connection and government control in fraud propensity and fraud detection process with other additional control variables

Connection is a dummy variable taking the value of one if firm has political connection. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. *Firm size* is the log value of total asset of the firm. *Age* is the Firm's listing age. *Ln(GDP)* is the natural log value of GDP per capital. *Executive holding* is the percentage of shares held by the top executives. *Market to book* is the market to book value of the firm. *Foreign auditor* is a dummy variable taking the value one if the firm has a foreign auditor. *Volatility* is the standard deviation of daily stock returns and *Return* is the annual buy and hold return. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) is for fraud propensity equation and column (2) is for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	(1)	(2)
	$P(F_j=1)$	$P(D_j=1 \mid F_j=1)$
Connection	1.369/0.077	-0.734/-0.285
	(0.021)**	(0.183)
Government control	-0.206/-0.015	-0.424/-0.162
	(0.595)	(0.178)
Institutional ownership	-6.775/-0.500	3.024/1.175
	(0.072)*	(0.001)***
Analyst	-1.849/-0.347	0.589/0.214
	(0.008)***	(0.261)
Firm size	0.741/0.054	0.035/0.014
	(0.013)**	(0.825)
Age	-0.224/-0.017	0.078/0.030
	(0.022)**	(0.073)*
Ln(GDP)	0.212/0.016	-0.366/-0.142
	(0.567)	(0.090)*
Leverage	1.775/0.131	
	(0.196)	
Board size	0.190/0.077	
	(0.115)	
Executive holding	-2.531/-0.187	
	(0.473)	
Outside director%	3.096/0.229	
	(0.362)	
Market to book		0.044/0.017
		(0.054)*
Foreign auditor		-0.641/-0.251
		(0.242)

Volatility		41.523/16.142 (0.087)*
Return		-0.021/-0.008 (0.931)
Constant	-11.964 (0.081)*	0.509 (0.896)
Year Dummy	yes	yes
Industry Dummy	yes	yes
Observations	387	387

Table 3.13: Predicted political connection and corporate fraud

Predicted connection is the predicted value from the regression political connection on regional market development, market allocation, government impact, loan market development, government control and other financial controls. *Board size* represents the board size of the firm. *Outside director%* is the percentage of the independent director in the board. *Government control* is a dummy variable taking the value one if government is the ultimate owner of the firm. *Institution ownership* is the total number of shares held by institution over the total number outstanding shares of the firm. *Analyst* is a dummy variable taking the value one if the firm has an analyst following. *Firm size* is the log value of total asset of the firm. *Age* is the Firm's listing age. *Ln(GDP)* is the natural log value of GDP per capital. *Market to book* is the market to book value of the firm. *Foreign auditor* is a dummy variable taking the value one if the firm has a foreign auditor. The number before "/" is the coefficient of the independent variable. The number after "/" is the marginal effect of the independent variable. P-value is reported in the bracket. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level respectively. Column (1) is for fraud propensity equation and column (2) is for detection equation. All independent variables in the fraud propensity equation are measured as the year before the fraud commence. All independent variables in the fraud detection equation are measured as the year after the fraud commence.

	(4)	(5)
	$P(F_i=1)$	$P(D_i=1\|F_i=1)$
Predicted connection	0.76	-3.40*
	(0.572)	(0.014)
Board size	-0.01	
	(0.935)	
Outside director%	0.10	
	(0.969)	
Government control	-0.14	-0.23
	(0.762)	(0.603)
Institutional holding	-1.89*	2.48
	(0.065)	(0.128)
Analyst coverage	-0.73*	0.60
	(0.063)	(0.335)
Size	0.08	-0.16
	(0.652)	(0.570)
Age	-0.08*	0.07
	(0.051)	(0.664)
Leverage	1.07*	
	(0.043)	
Ln (GDP)	-0.06	-0.22
	(0.831)	(0.706)
Market-to-book		-0.04
		(0.913)
Foreign auditor		-0.41
		(0.550)
Constant	1.78	4.70
	(0.727)	(0.599)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Observations	337	337

3.8 Conclusion

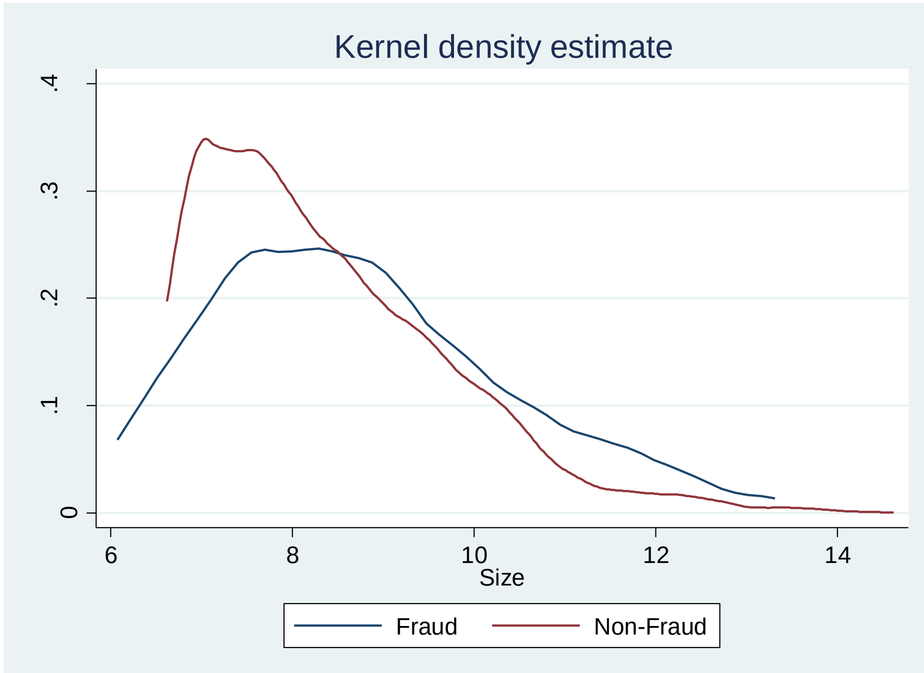
This study employs bivariate probit with partial observability model to solve for the empirical problem of incomplete detection in corporate fraud. Using the CSRC enforcement action data from Chinese firm between 2003 and 2009, I find that politically connected firms are 23% more likely to commit fraud compared to those unconnected firms. Meanwhile, they are 27% less likely to be detected given that they actually committed fraud compared to their counterpart. Politically connected firms face lower probability of being detected and the low detection rate has a feedback effect on their propensity of committing fraud.

Second, government controlled firms are 21% less likely to be detected by the CSRC than the non-government controlled firms. Furthermore, government controlled firms are 12% less likely to commit fraud than the non-government controlled firms due to the irrelevant tie between top executives' well-being and firm performance.

Furthermore, the link between political connection and corporate fraud is mainly driven by the local political connection. Firms with local political connection are 16% less likely to be investigated than their counterpart. Meanwhile, they are 20% more likely to commit fraud. The effect of political connection on corporate fraud does not seem to vary across different type of fraud.

The feedback effect exists in most of the regressions. It seems that whenever firms make decision to commit fraud, they would like to consider their probability of being caught by the CSRC first. Therefore, if the CSRC can substantially increase its efficiency and effectiveness in fraud identification and prosecution, corporate fraud commitment can be largely reduced.

Figure 1.1: Kernel density plot of size across fraud and non-fraud sample



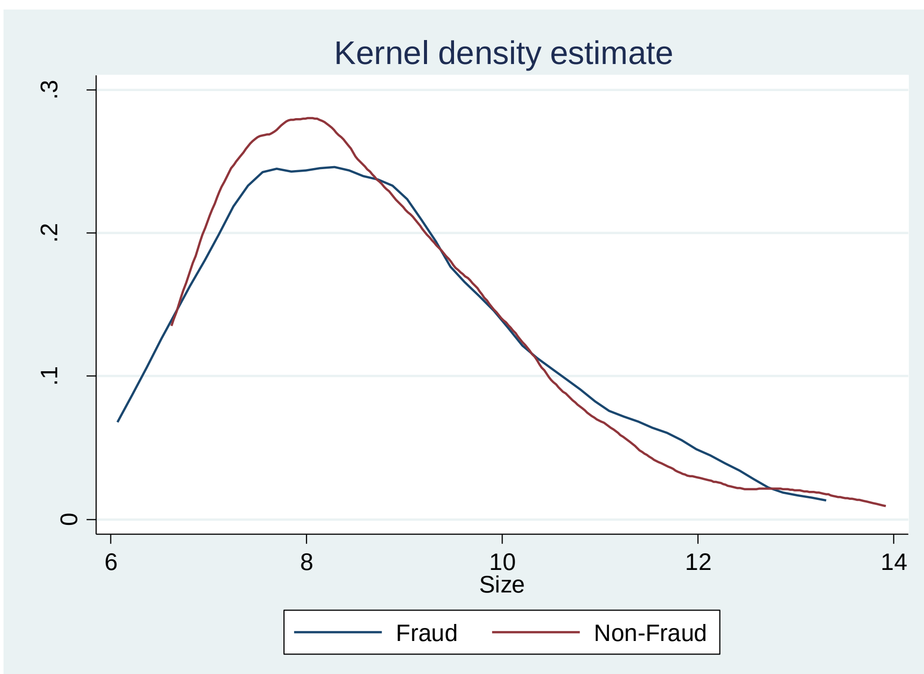
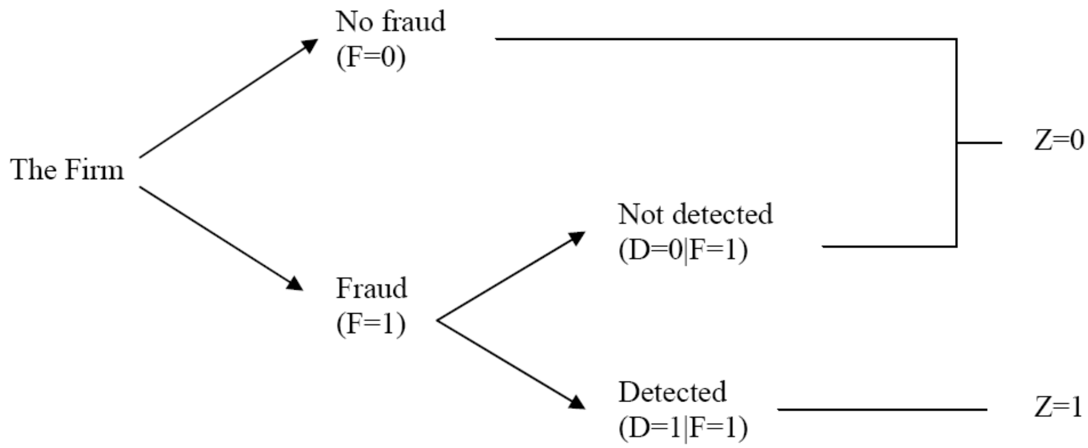


Figure 1.2: Partial observability problem



Note: We only observe the detected fraud (Z=1), which is not actually the same as the true fraud (F=1). The reason for the bias is from the undetected fraud (D=0|F=1).

Figure 2.1: Kernel density plot of size across fraud and non-fraud sample (Employee relation)

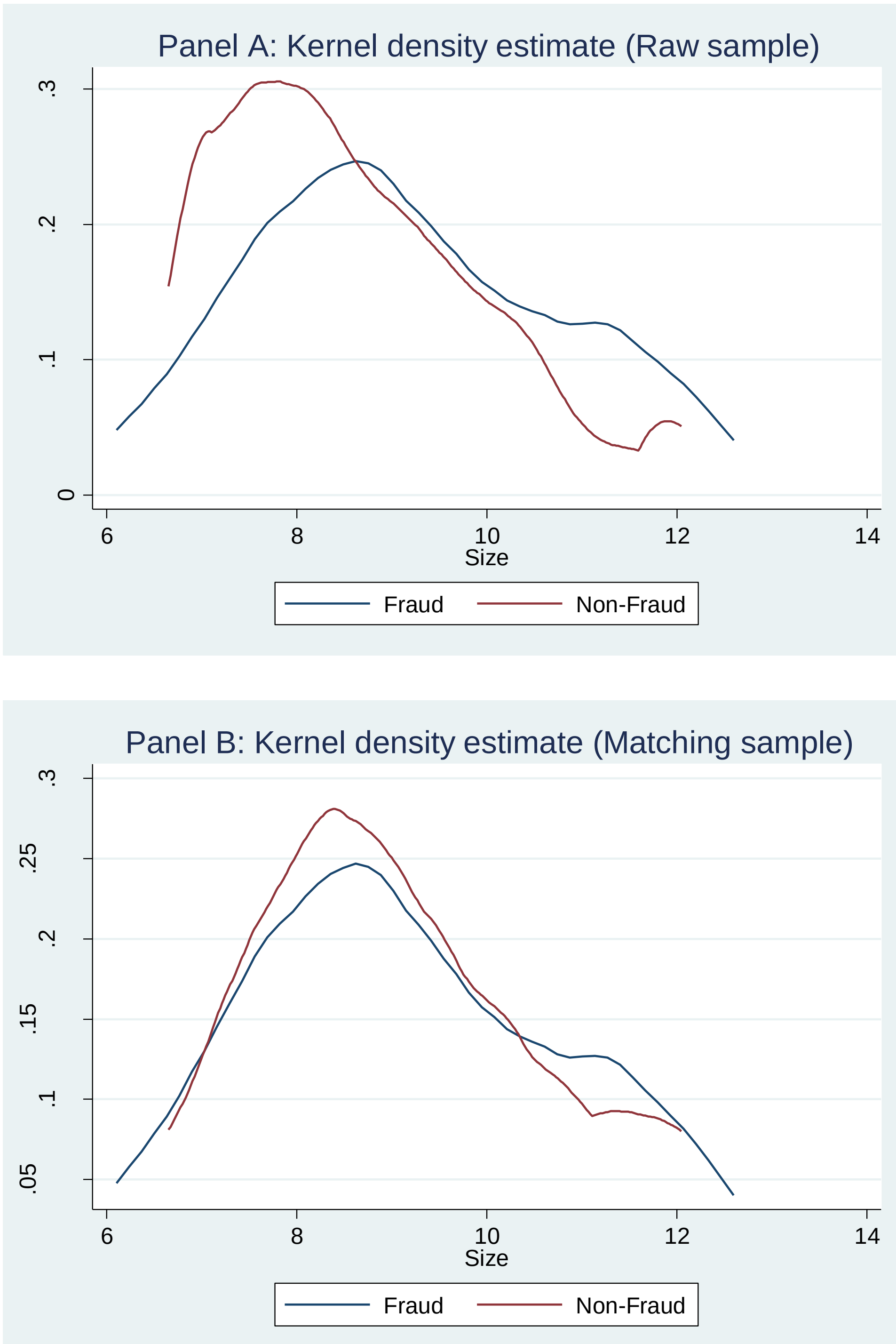


Figure 3.1: Timeline for major stages in an enforcement action by CSRC

Event 1	Event 2	Event 3	Event 4
A firm commits fraud	The CSRC learns of a possible fraud and makes an initial assessment of whether to proceed	The CSRC begins an enforcement investigation	The CSRC publishes an enforcement action

REFERENCES CITED

Acharya, Viral V., Stewart C. Myers, and Raghuram R. Rajan, 2011, The internal governance of firms. *Journal of Finance* 66, 689–720.

Aggarwal, Rajesh K., Felix Meschke, and Tracy Wang, 2012, Corporate political donation: investment or agency? *Business and Politics* 14.

Aggarwal, Rajesh K., Yihui Pan and Huijing Fu, 2010, An empirical investigation of internal governance. Working Paper, University of Minnesota.

Agrawal, Anup, and Sahiba Chadha, 2005, Corporate governance and accounting scandals. *Journal of Law and Economics* 48, 371-406.

Agrawal, Anup, and Charles R. Knoeber, 2001, Do some outside directors play a political role? *Journal of Law and Economics* 44, 179-198.

Allen, Franklin, Jun Qian, and Meijun Qian, 2005, Law, finance, and economic growth in China. *Journal of Financial Economics* 77, 57–116.

Ang, James, and Adam Smedema, 2011, Financial flexibility: Do firms prepare for recession? *Journal of Corporate Finance* 17, 774-787.

Ansolabehere, Stephen, James M. Snyder, Jr., and Michiko Ueda, 2004, Did firms profit from soft money? *Election Law Journal* 3, 193-198.

Bae, Kee-Hong, Jun-Koo Kang, and Jin Wang, 2010, Employee treatment and firm leverage: A test of the stakeholder theory of capital structure. *Journal of Financial Economics* 100, 130-153.

Beasley, Mark, 1996, An Empirical Analysis of the relation between the board of director composition and financial statement fraud. *Accounting Review* 71, 443-465.

Bebchuk, Lucian A., and Jesse M. Fried, 2004, *Pay without Performance: The unfilfilled Promise of executive compensation.* Harvard University Press, Cambridge, MA.

Bebchuk, Lucian A, and Michael S. Weisbach, 2010, The state of corporate governance research. *Review of Financial Studies* 23, 939-961.

Bergstresser, Daniel B., and Thomas Philippon, 2006, CEO incentives and earnings management. *Journal of Financial Economics* 66, 511-529.

Burns, Natasha, and Simi Kedia, 2006, The impact of performance-based compensation on misreporting. *Journal of Financial Economics* 79, 35-67.

Burns, Natasha, Simi Kedia, and Marc Lipson. 2010. Institutional ownership and monitoring: Evidence from financial misreporting. *Journal of Corporate Finance* 16, 443–455.

Chen, Charles J. P., Zengquan Li, Xijia Su, and Zheng Sun, 2011, Rent-seeking incentives, corporate political connections, and the control structure of private firms: Chinese evidence. *Journal of Corporate Finance* 17, 229-243.

Chen, Gongmeng, Michael Firth, and Liping Xu, 2009, Does the type of ownership control matter? Evidence from China's listed companies. *Journal of Banking and Finance* 33, 171–181.

Chen, Gongmeng, Michael Firth, Daniel Gao and Zhao Rui, 2005, Is China's securities regulatory agency a toothless tiger? Evidence from enforcement actions. *Journal of Acccounting and Public Policy* 26, 451–488.

Chen, Gongmeng, Michael Firth, Daniel Gao and Zhao Rui, 2006, Ownership structure, corporate governance, and fraud: Evidence from China. *Journal of Corporate Finance* 12, 424–448.

Chiu, Ming Ming, and Sung Wook Joh, 2004, Loans to distressed firms: Political connections, Related lending, Business Group Affiliation and Bank Governance. Working Paper, The Chinese University of Hong Kong.

Chung, Richard, Michael Firth, Jeong-Bon Kim, 2002, Institutional monitoring and opportunistic earnings management. *Journal of Corporate Finance* 8, 29-48.

Cooper, Michael J., Huseyin Gulen, and Alexei V. Ovtchinnikov, 2006, Corporate political contributions and stock returns. Working Paper, University of Utah.

Correia, Maria, 2009, Political connections, SEC enforcement, and accounting quality. Working paper, Available on SSRN: http://ssrn.com/abstract=1458478.

Cox, James D., and Randall S. Thomas, 2003, SEC enforcement heuristics: An empirical inquiry. *Duke Law Journal* 53, 737-780.

Cull, Robert, and Lixin Colin Xu, 2005, Institutions, ownership and finance: The determinants of profit reinvestment among Chinese firms. *Journal of Financial Economics* 77, 117-146.

Cronqvist, Henrik, Fredrik Heyman, Mattias Nilsson, Helena Svaleryd, and Jonas Vlachos, 2009, Do entrench managers pay their works more? *Journal of Finance* 64, 309-339.

Crutchley, Claire E, Marlin R. H. Jensen, and Beverly B. Marshall, 2007, Climate for scandal: corporate environments that contribute to accounting fraud. *Financial Review* 42, 53–73.

Dechow, Patricia M.,Weili Ge, Chad R. Larson, and Richard G. Sloan, 2011, Predicting material accounting misstatements. *Contemporary Accounting Research* 28, 17–82.

Dechow, Patricia, Richard G. Sloan, and Amy Sweeney, 1996, Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement actions by the SEC. Contemporary Accounting Research 13, 1-36.

Demurger, Sylvie, Jeffrey D. Sachs, Wing T. Woo, Shuming Bao, Gene Chang, and Andrew Mellinger, 2002, Geography, economic policy, and regional development in China. *Asian Economic Papers* 1, 146-197.

Dyck, Alexander, Adair Morse, and Luigi Zingales, 2006b, The nature of corporate fraud. Working Paper, University of Chicago.

Dyck, Alexander, Adair Morse, and Luigi Zingales, 2010, Who blows the whistle on corporate fraud? *Journal of Finance 65*, 2213–2253.

Edmans, Alex, 2011, Does the stock market fully value intangibles? Employee satisfaction and equity prices. *Journal of Financial Economics* 101 (3), 621-640.

Efendi, Jap, Anup Srivastava, and Edward P. Swanson, 2007, Why do corporate managers misstate financial statements? The role of in-the-money options and other incentives. *Journal of Financial Economics* 85, 667-708.

Erickson, Merle, Michelle Hanlon, and Edward Maydew, 2006, Is there a link between executive equity incentives and accounting fraud? *Journal of Accounting Research* 44, 113-143.

Faccio, Mara, 2006, The characteristics of politically connected firms. Working Paper, Vanderbilt University.

Faccio, Mara, Ronald W. Masulis, and John J. McConnell, 2006, Political connections and corporate bailouts. *Journal of Finance* 61, 2597-2635.

Faccio, Mara, and David C. Parsley, 2009, Sudden deaths: Taking stock of political connections. *Journal of Financial and Quantitative Analysis* 44: 683-718.

Fama, Eugene F., and Michael C. Jensen, 1983, Separation of ownership and control. *Journal of Law and Economics* 26, 301–325.

Fan, Joseph P.H., T. J. Wong, and Tianyu Zhang, 2007, Politically-connected CEOs, corporate governance and post-IPO performance of China's partially privatized firms. *Journal of Financial Economics* 84, 330-357.

Fan, Gang, and Xiaolu Wang, 2003, NERI Index of Marketization of China's Provinces. Economics Science Press, Beijing (in Chinese).

Feinstein, Jonathan S., 1990, Detection controlled estimation. *Journal of Law and Economics* 33, 233-276.

Feng, Mei, Weili Gi, Shuqing Luo, and Terry Shevlin, 2011, Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics* 51, 21-36.

Fich, Eliezer and Anil Shivdasani, 2006, Are busy boards effective monitors? *Journal of Finance* 61, 689-724.

Firth, Michael, Chen Lin, and Sonia Wong, 2008, Leverage and investment under a state-owned bank lending environment: Evidence from China. *Journal of Corporate Finance* 14, 642-653.

Gillan, Stuart L., 2006, Recent developments in corporate governance: An overview. *Journal of Corporate Finance* 12, 381–402.

Goldman, Eitan, Urs Peyer, and Irina Stefanescu, 2007, Industry competition and the revelation of fraud. Working Paper, Indiana University.

Gompers, Paul A., Joy L. Ishill, and Andrew Metrick, 2003, Corporate governance and equity prices. *Quarterly Journal of Economics* 118, 107-15.

Gupta, Sanjay, and Charles W. Swenson, 2003, Rent-seeking by agents of the firm. *Journal of Law and Economics* 46, 253-268.

Hadlock, Charles J., and Joshua R. Pierce, 2010, New evidence on measuring financial constraints: moving beyond the KZ index. *Review of Financial Studies* 23, 1909-1940.

Hartzell, Jay, Eli Ofek and David Yermack, 2004, What's in it for me? CEOs whose firms are acquired. *Review of Financial Studies* 17, 37-61.

Hartzell, Jay, and Laura T. Starks, 2003, Institutional investors and executive compensation. *Journal of Finance* 58, 2351– 2374.

Healy, Paul M., and James M. Wahlen, 1999, A review of the earnings management literature and its implications for standard setting. Accounting Horizons 13, 365-383.

Holmstrom, Bengt, and Steven N. Kaplan, 2001, Corporate governance and merger activity in the United States: making sense of the 1980s and 1990s. *Journal of Economic Perspectives* 15, 121–144.

Inderst, Roman and Holger M. Mueller, 2010, CEO replacement under private information. *Review of Financial Studies* 23, 2935-2969.

Jaggia, Butt and Anjan Thakor, 1994, Firm-specific human capital and optimal capital structure. *International Economic Review*, 283-308.

Jayachandran, Seema, 2006, The Jeffords effect. *Journal of Law and Economics* 49, 397-425.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review* 76, 323–329.

Jensen, Michael C., 1993, The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance* 48, 831–880.

Jensen, Michadel, and William Meckling, 1976, Theory of the firm: managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, 3, 305-360.

Jiao, Yawen, Stakeholder welfare and firm value. *Journal of Banking and Finance* 34 (10), 2549-2561.

John, Kose, and Lemma W. Senbet, 1998, Corporate governance and board effectiveness. *Journal of Banking and Finance*, 22, 371-403.

Johnson, Simon, and Todd Mitton, 2003, Cronyism and capital controls: Evidence from Malaysia. *Journal of Financial Economics* 67, 351-382.

Johnson, Shane A., Harley E. Ryan, and Yisong Tian, 2009, Executive compensation and corporate fraud: The sources of incentives matters. *Review of Finance* 13, 115–145.

Kaplan, N. Steven, and Luigi Zingales, 2000, Investment–cash flow sensitivities are not valid measures of financial constraints. *Quarterly Journal of Economics* 115, 707–12.

Karpoff, Jonathan M., D. Scott Lee, and Gerald S. Martin, 2008a, The consequences to managers for financial misrepresentation. *Journal of Financial Economics* 88, 193–215.

Karpoff, Jonathan M., D. Scott Lee, and Gerald S. Martin, 2008b, The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis* 43, 581–612.

Karpoff, Jonathan, D. Scott Lee, and Valaria P. Vendrzyk, 1999, Defense procurement fraud, penalties, and contractor influence. *Journal of Political Economy* 107, 809-842.

Karpoff, Jonathan M. and Xiaoxia Lou, 2010, Short sellers and financial misconduct. *Journal of Finance* 65, 1879-1913.

Khwaja, Asim Ijaz and Atif R. Mian, 2005, Do lenders favor politically connected firms? Rent provision in an emerging financial market. *Quarterly Journal of Economics* 120, 1371-1411.

Klein, April, 2002, Audit committee, board of director characteristics, and earnings management. *Journal of Accounting and Economics* 33, 375-400.

Landier, Augustin, David Sraer, and David Thesmar, 2009, Optimal dissent in organizations. *Review of Economic Studies* 76, 761–794.

Landier, Augustin, Julien Sauvagnat, David Sraer, and David Thesmar, 2013, Bottom-up corporate governance. *Review of Finance* 17, 161-201.

Lazear, Edward P., and Sherwin Rosen, 1981, Rank-order tournaments and optimum labor contracts. *Journal of Political Economy*, 841-864.

Leuz, Christian, and Felix Oberholzer-Gee, 2006, Political relationships, global financing, and corporate transparency: Evidence from Indonesia. *Journal of Financial Economics* 81, 411-439.

Li, Si, 2010, Corporate financial fraud: An application of decision controlled estimation. Working paper, Wilfrid Laurier University.

Loughran, Tim, and Jay Ritter, 2004, Why has IPO underpricing changed over time? *Financial Management*, 5-37.

McLucas, William R., Lynn Taylor, and Susan A. Mathews, 1997, Practitioner's guide to the SEC's invesitigative and enforcement process. *Temple Law Review* 70, 53.

Morck, Randall, Andrei Shleifer, and Robert W. Vishny, 1990, Do managerial objectives drive bad acquisitions? *Journal of Finance* 45, 31–48.

Parrino, Robert, 1997, CEO Turnover and outside succession: A cross-sectional analysis. *Journal of Financial Economics* 46, 165-197.

Peng, Lin, and Ailsa Röell, 2008, Executive pay and shareholder litigation. *Review of Finance* 12, 141-184.

Poirier, Dale J., 1980, Partial observability in bivariate probit models. *Journal of Econometrics* 12, 209-217.

Richardson, Scott, Irem Tuna, Min Wu, 2003, Predicting earnings management: The case of earnings restatements. Unpublished working paper, University of Michigan.

Ravina, Enrichetta, and Paola Sapienza, 2010, What do independent directors know? Evidence from their trading. Review of Financial Studies 23, 962-1003.

Shleifer, Andrei, and Robert W. Vishny, 1989, Management entrenchment: The case of manager specific investments. *Journal of Financial Economics* 25, 123–139.

Shleifer, Andrei, and Robert Vishny, 1994, Politicians and firms. *Quarterly Journal of Economics* 109, 995–1025.

Shleifer, Andrei, and Robert W. Vishny, 1997, A survey of corporate governance. *Journal of Finance* 52, 737–783.

Sloan, Alfred P., 1963, My years with general motors. Garden City, NY: Doubleday & Co.

Teoh, Siew Hong, Ivo Welch, and T. J. Wong, 1998a, Earnings management and the Long-run market performance of initial public offerings. *Journal of Finance* 53, 1935-1974.

Teoh, Siew Hong, Ivo Welch, and T. J. Wong, 1998b, Earnings management and the underperformance of seasoned equity offerings. *Journal of Financial Economics* 50, 63-99.

Wang, Tracy Yue, 2011, Corporate securities fraud: Insights from a new empirical framework. *Journal of Law, Economics and Organizations*, forthcoming.

Wang, Tracy Yue, Andrew Winton, and Xiaoyun Yu, 2010, Corporate fraud and business conditions: Evidence from IPOs. *Journal of Finance* 65, 2255–2292.

Wells, Joseph T., 1997, Occupational Fraud and Abuse, Obsidian Publishing Co.: Austin, TX.

Woidtke, Tracie, 2002, Agents watching agents? Evidence from pension fund ownership and firm value. *Journal of Financial Economics* 63, 99–131.

Yu, Frank, and Xiaojun Yu, 2011, Corporate lobbying and fraud detection. *Journal of Financial and Quantitative Analysis* 46, 1865-1891.

APPENDICES

APPENDIX A

VARIABLE DEFINITION FOR CHAPTER 1

Variables	Definition	Data Source
Fraud variables[t=0]		
Fraud	A dummy variable equal to one, if a firm commits fraud	SSCAC
Duration	The number of days from the start of fraud date to the end of the fraud date	SSCAC
Ex-ante variables [t=-1]		
FRBC	Fraction of top ranking executives who joined the firm *before* the current CEO was appointed	Execucomp
Abnormal compensation gap	We split sample into two sub-samples: the CEO group and the non-CEO group. For each group, we construct abnormal compensation for each executive using the residual of regressing total compensation on firm size, the market-to-book ratio, year dummy and industry dummy. For each firm-year, we calculate the difference between the CEO's abnormal compensation and the median abnormal compensation of the non-CEO executives. Such compensation gap is used as one proxy for monitoring ability of non-CEO executives.	ExecuComp and COMPUSTAT
Board size	The number of board members on board	RiskMetrics
Board independence	The number of outside director is divided by total number of directors	RiskMetrics
Busy board	Takes 1 if a majority of outside directors hold three or more directorships	RiskMetrics
Audit committee size	The number of independent directors on audit committee	RiskMetrics
ROA	(Operating income after depreciation)/Assets	COMPUSTAT

Finance need	Asset growth rate – ROA2/(1-ROA2), ROA2 = (income before extraordinary items)/Assets	COMPUSTAT
Leverage	Long-term debt/total asset	COMPUSTAT
Size	Log value of total asset	COMPUSTAT
Market-to-book ratio	Market value over book value of the firm	COMPUSTAT
Institutional holding	The percentage of shares held by institutions	Thomson-Reuters Institutional Holdings (13f)
Analyst coverage	The number of analysts following the firm	I/B/E/S
PPS	Pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio.	Execucomp
Family ownership	Takes 1 if firm is a family firm	Anderson et al. (2012)
SOX	Takes 1 if year is after 2002, otherwise 0	
Internal governance	Takes 1 if middle quartiles of abnormal comp. gap, otherwise 0	
Ex-post variables [t=1]		
Stock return	Annual buy-and-hold stock return	CRSP
Return volatility	Standard deviation of monthly stock returns in a year	CRSP
Stock Turnover	Average monthly turnover in a year	CRSP

APPENDIX B

VARIABLE DEFINITION FOR CHAPTER 2

Variables	Definition	Data Source
Fraud variables[t=0]		
Fraud	A dummy variable equal to one, if a firm commits fraud	SSCAC
Duration	The number of days from the start of fraud date to the end of the fraud date	SSCAC
Ex-ante variables [t=-1]		
Employee relation	A firm's total employee relation strength score minus its total employee relation weakness score. The total employee relation strength score is formed by adding the points a firm receives on criteria for employee relation strength in the KLD database, and the total employ relation weakness score is formed by adding the points the firm receives on criteria for employee relation weakness.	KLD
Employee satisfaction	Takes 1 if the firm is included in the list of "100 Best Companies to Work in America". published in *Fortune* magazine, otherwise zero	*Fortune* magazine
Corporate social responsibility	A firm's total social responsibility strength score minus its total social responsibility weakness score.	KLD
Board size	The number of board members on board	RiskMetrics
Independent director	The number of outside director is divided by total number of directors	RiskMetrics
Busy board	Takes 1 if a majority of outside directors hold three or more directorships	RiskMetrics
Audit committee size	Audit committee size divided by the board size	RiskMetrics
ROA	(Operating income after depreciation)/Assets	COMPUSTAT
Finance need	Asset growth rate – ROA2/(1-ROA2), ROA2 = (income before extraordinary items)/Assets	COMPUSTAT
Leverage	Long-term debt/total asset	COMPUSTAT
Size	Log value of total asset	COMPUSTAT

Market-to-book ratio	Market value over book value of the firm	COMPUSTAT
Institutional ownership	The percentage of shares held by institutions	Thomson-Reuters Institutional Holdings (13f)
Institutional ownership concentration	The herfindahl index across all institutions of institutional ownership.	Thomson-Reuters Institutional Holdings (13f)
Analyst coverage	The number of analysts following the firm	I/B/E/S
PPS	Pay-for-performance sensitivity, defined as the proportion of shares outstanding owned by the executive plus the proportion of shares outstanding in options awarded to the executive times the Black-Scholes hedge ratio.	Execucomp
R&D intensive industry	The industry is defined as high R&D intensive industry if the industry R&D intensity is above the sample median level. Industry R&D intensity is equal to industry aggregate R&D expenditure over industry aggregate number of employees, where industries are defined by two-digit SIC codes.	COMPUSTAT
KZ index	Index for financial constraint	Kaplan and Zingales (2000)
SA index	Index for financial constraint	Hadlock and Pierce (2010)
Financial flexibility	Cash and short-term investments/Net asset	Ang and Smedema (2011)
High-tech industry	Takes 1 if the industry is those having SIC code as defined in Loughran and Ritter (2004).	Loughran and Ritter (2004)
Industry-level wage rate	The industry-level wage rate is measured by total labor and related expenses divided by total employees across firms in the same industry.	COMPUSTAT
Ex-post variables [t=1]		
Stock return	Annual buy-and-hold stock return	CRSP
Return volatility	Standard deviation of monthly stock returns in a year	CRSP
Stock Turnover	Average monthly turnover in a year	CRSP

APPENDIX C

VARIABLE DEFINITION FOR CHAPTER 3

Variables	Definition	Data Source
Fraud variables[t=0]		
Fraud	1 for firms with CSRC enforcement action, otherwise 0	CSMAR
Duration	The number of days from the start of fraud date to the end of the fraud date	CSMAR
Ex-ante variables [t=-1]		
Political connection	1 for firms with board member satisfying: (1) a former government official; (2) a current or former member of the People's Congress; and (3) a current or former member of the People's Political Consultative Conference, otherwise 0.	Resset
Local political connection	1 for firms with connection with local government, otherwise 0	Resset
Central political connection	1 for firms with connection with central government, otherwise 0	Resset
Board size	The number of board members on board	Resset
Outsider director%	The number of outside director is divided by total number of directors	Resset
Leverage	Long-term debt/total asset	CSMAR
Size	Log value of total asset	CSMAR
Market-to-book ratio	Market value over book value of the firm	CSMAR
Institutional ownership	The percentage of shares held by institutions	CSMAR
Analyst coverage	1 for firms with analyst covering, otherwise 0	CSMAR
Legal index	The index captures the regional market development of legal environment	Fan, Wang, and Zhu (2010)

Age	The number of years since publicly listed	CSMAR
Ex-post variables [t=1]		
Stock return	Annual buy-and-hold stock return	CSMAR
Return volatility	Standard deviation of monthly stock returns in a year	CSMAR
Foreign auditor	1 for firms with auditor which has jointly venture with international Big Four auditing companies, otherwise 0	CSMAR