

External Corporate Governance and Financial Fraud: Cognitive Evaluation Theory Insights on Agency Theory Prescriptions

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Abstract

Agency theory suggests that external governance mechanisms (e.g., activist owners, the market for corporate control, securities analysts) can deter managers from acting opportunistically. Using cognitive evaluation theory, we argue that powerful expectations imposed by external governance can impinge on top managers' feelings of autonomy and crowd out their intrinsic motivation, potentially leading to financial fraud. Our findings indicate that external pressure from activist owners, the market for corporate control, and securities analysts increases managers' likelihood of financial fraud. Our study considers external governance from a top manager's perspective and questions one of agency theory's foundational tenets: that external pressure imposed on managers reduces the potential for moral hazard.

Managerial Summary

Many of us are familiar with stories about top managers 'cooking the books' in one way or another. As a result, companies and regulatory bodies often implement strict controls to try to prevent financial fraud. However, cognitive evaluation theory describes how those external controls could actually have the opposite of their intended effect because they rob managers of their intrinsic motivation for behaving appropriately. We find this to be the case. When top managers face more stringent external control mechanisms, in the form of activist shareholders, the threat of a takeover, or zealous securities analysts, they are actually more likely to engage in financial misbehavior.

Running title: External Corporate Governance and Financial Fraud

Strategy scholars and policymakers have devoted renewed attention in recent years to ‘external’ mechanisms of corporate governance, such as the monitoring and control by stakeholders that are not inside the organization. For example, a recent review of this literature seeks to ‘bring external corporate governance into the corporate governance puzzle’ more fully (Aguilera *et al.*, 2015). Governance research has yielded important insights about these external governance mechanisms (Coffee, 2006), but few have considered their potentially adverse ramifications. Toward this end, we incorporate a behavioral perspective of managers into our understanding of external governance to highlight how the expectations imposed by external governance could impose on managers’ motivation, and we thus uncover the potential harm such governance mechanisms might introduce.

Recent developments in agency theory research relax the theory’s assumption of purely economic agents (Wiseman and Gomez-Mejia, 1998). For example, behavioral agency theory reevaluates predictions in view of more realistic assumptions about agent behavior, with particular emphasis on internal governance (Pepper and Gore, 2015). Researchers have incorporated prospect theory (Martin, Gomez-Mejia and Wiseman, 2013) and equity theory (Pepper, Gosling and Gore, 2015) into agency theory predictions about how compensation structures influence managerial behavior. We build on the notion of overlaying cognitive biases onto agency theory prescriptions and extend this approach to external governance mechanisms. In particular, we inquire into how agents feel about external monitoring and control and what this means for their intrinsic motivation to behave ethically.

Cognitive evaluation theory (Boal and Cummings, 1981; Deci, 1971, 1975) is particularly informative in this regard because it explains how external controls can actually be counterproductive. The fundamental tenet of cognitive evaluation theory is that intrinsically motivated behavior is a function of a person’s need to feel self-determining in their decisions (Phillips and Lord, 1981). The theory asserts that external monitoring and controls ‘crowd out’ an

individual's motivation to behave in ways the controls are designed to ensure (Frey and Jegen, 2001). In our context, this would suggest that pressure from external governance lessens managers' feelings of autonomy, thereby decreasing their intrinsic motivation to behave in ways that the governance mechanisms are supposed to safeguard against (Deci and Ryan, 2000). In this study, we ask whether external governance weakens managers' intrinsic motivation to act in the interest of shareholders and behave appropriately in the context of financial reporting.

Managerial financial fraud (e.g., inappropriately booking revenue, improperly valuing assets, not disclosing material information) is a phenomenon that is drawing extensive industry and regulatory attention (Eaglesham and Rapoport, 2015). In fact, in 2014 alone the SEC announced 93 investigations against publicly traded companies for alleged financial misconduct. As a result, governance scholars are acutely interested in how to predict and prevent its occurrence. Agency theory suggests that internal governance reduces information asymmetry between those inside and outside the firm and, consequently, decreases the likelihood of fraud (Dalton *et al.*, 2007). We, however, suggest and find that pressure from external governance may impose hidden agency costs as managers shift their locus of causality outward and lose their intrinsic motivation to ethically report their firms' performance, thus resulting in a greater likelihood of financial fraud.

Our study introduces a key behavioral consideration into agency theory's predictions about external governance, uncovering some counterintuitive relationships. For instance, we found that the 'highest quality' principals (Higgins and Gulati, 2006) are positively associated with the likelihood of fraud. Conversely, organizational provisions that many thought would lead to managerial entrenchment, such as poison pills and golden parachutes (Bebchuk, Cohen and Ferrell, 2009), actually bear a negative association with the likelihood of financial fraud.

THEORETICAL DEVELOPMENT

Agency theory

Recent agency theory formulations focus on how agents behave in boundedly rational ways (Wiseman and Gomez-Mejia, 1998). The behavioral agency model (BAM) was developed largely to overcome criticisms regarding static assumptions about executives' risk preferences (Wiseman and Gomez-Mejia, 1998). Empirical research on behavioral agency theory to date has focused mainly on behavioral risk propensities and internal governance using prospect theory arguments (Chrisman and Patel, 2012). For instance, this line of study re-examines compensation risk, highlighting the importance of individual problem framing to explain how risk influences executive behavior (Larraza-Kintana *et al.*, 2007; Martin *et al.*, 2013).

Following this model, we extend agency theory by applying behavioral considerations to three forms of external governance (we define 'external' as being those forms of governance that operate without full access to the firm's inside information). Within agency theory, one form of external governance is a firm's *owners*, which serves as a market-based governance mechanism (Baysinger, Kosnik and Turk, 1991). From an agency perspective, managers are also subject to the *market for corporate control*, which researchers sometimes describe as a governance mechanism of last resort (Jensen and Ruback, 1983). More recently, agency theory scholars have begun to investigate *rating agencies* (i.e., securities analysts) as another form of external governance (Chen, Harford and Lin, 2015; Wiersema and Zhang, 2011). There are other external forces that act on firms beyond the three mentioned here (e.g., legal institutions, social activists), but we limit our investigation to these three because they are the most central and influential forms of external governance within the agency framework.

We also add to agency theory by considering a key cognitive bias that challenges the theory's economic assumptions. Specifically, we theorize about how to incorporate trade-offs between intrinsic and extrinsic motivation into agency theory models (c.f., Boivie, Graffin and Pollock, 2012; Pepper and Gore, 2015). We use cognitive evaluation theory (Deci and Ryan, 1985) to explain how

external governance mechanisms introduce high expectations on managers that serve as an extrinsic motivational force, which could crowd out intrinsic motivation, so that the combined effect is actually the opposite of what was intended with respect to preventing fraudulent behavior.

Cognitive evaluation theory

The concepts underlying cognitive evaluation theory emerged from the study of how external pressure affects internal motivation to do what is right. Some described this in terms of a ‘crowding-out effect,’ wherein excessive external rewards and punishments can subvert intrinsic motivation to behave ethically (Bertelli, 2006; Georgellis, Iossa and Tabvuma, 2011). Originators of the theory predicated their ideas on the assumption that individuals have innate needs for autonomy and competence (Ryan and Deci, 2000). Autonomy concerns ‘the experience of acting with a sense of choice, volition and self-determination’ and competence is about ‘the belief that one has the ability to influence important outcomes’ (Stone, Deci and Ryan, 2009, p.77). The level of autonomy and competence that individuals perceive they have is a powerful determinant of their intrinsic motivation (Deci and Ryan, 2012; Gagne and Deci, 2005).

In the cognitive evaluation theory framework, when external mechanisms of control impinge on an individual’s sense of autonomy and control, it could thereby decrease his or her internal motivation to behave in ways that the external controls were supposed to ensure (Osterloh, Frost and Frey, 2002). Consistent with these ideas, a number of studies in management support the notion that external consequences could potentially reduce individuals’ motivation to behave in ways that are consistent with their responsibilities to the firm (e.g., Barkema, 1995; Jacquart and Armstrong, 2013). For example, Osterloh and Frey (2000) argued that high levels of extrinsic motivators can curtail employees’ intrinsic motivation to engage in organizational citizenship behavior, thus hindering them from transferring tacit knowledge. Similarly, Sundaramurthy and Lewis (2003) contended that top managers oftentimes perceive external controls as coercive, reducing their desire

to put forth effort. Our study builds on these ideas to develop specific hypotheses about how some of the most commonly investigated mechanisms of external corporate governance affect the likelihood of managerial financial fraud.

HYPOTHESES

Financial fraud

Financial fraud occurs when managers take actions that deceive investors or other key stakeholders (Gande and Lewis, 2009; Shi, Connelly and Sanders, 2016). It often involves corruption, lying about facts, failure to disclose material information, falsifying information about the firm's performance, or covering up systematic problems (Baucus and Near, 1991). There may be benefits to financial fraud that motivate managers to engage in such actions, such as the appearance of improved performance or increases in contingent compensation. However, financial fraud harms investors, and especially those who hold the firm's stock over long periods.

As a result, external stakeholders attempt to curtail executive misbehavior in the form of financial fraud by increasing their levels of monitoring and control (Davidoff, 2013). Standard economic approaches, including agency theory, consider the relative costs and benefits of fraud to determine the extrinsic motivation necessary to ensure that individuals will not engage in such scandalous behavior (Becker, 1976). Working within these theoretical frames, a large body of empirical work has found external governance mechanisms that focus on monitoring and disciplining managers for misbehavior can reduce the likelihood of financial fraud (Beasley *et al.*, 2000; Chen *et al.*, 2006). Few, however, have considered the psychological impact of these external corporate controls.

Mechanisms of external governance

The first external governance mechanism we consider is the firm's owners (Brav *et al.*, 2008; Hoskisson, Castleton and Withers, 2009). Researchers examining shareholder influence on firm

outcomes focus largely on institutional investors, such as mutual funds, hedge funds, pension funds, banks, insurance companies, and endowments (Goranova, Dharwadkar and Brandes, 2010). One type of investor resides at the extreme with respect to their ability to monitor and control: dedicated institutional investors (Bushee, 1998, 2004). Porter (1992) described dedicated owners as being those that maintain large, long-term holdings concentrated in a small number of firms. These owners have incentive to monitor executive behavior and are able to understand rich and complex information about firms in which they invest (Higgins and Gulati, 2006). As such, they introduce high expectations on managers because they are closely attuned to managerial performance.

Dedicated institutional investors have a unique variety of tools at their disposal to control managers and demand results, which makes them an unusually potent force of external governance (Connelly *et al.*, 2010a; Goranova and Ryan, 2014). By definition, dedicated institutional investors own substantial portions of firms in their portfolios. Thus, they are endowed with immense power over top managers because their exit would almost certainly be followed by a sizeable drop in the firm's stock price (Bushee, 2004). Under the threat of exit, this class of investors can demand that managers offer consistently high performance maintained over time (Koh, 2007; Maffett, 2012). Dedicated institutional investors also affect managerial expectations by exercising voice-based governance (Filatotchev and Toms, 2006; Goranova and Ryan, 2014). Dedicated owners frequently undertake shareholder resolutions, launch proxy contests, and initiate media campaigns to coerce managers (Wahal and McConnell, 2000). This group of owners is particularly adept at leading activism activities among shareholders (Gaspar, Massa and Matos, 2005). They often support activist shareholders who push managers to maximize performance, which can give rise to excess pressure faced by managers (Martin, 2011).

Traditional agency theory predicts that a higher level of dedicated institutional ownership should be associated with a reduced likelihood of moral hazard (Sharma, 2004). One of the main

reasons is that managers should be fearful of the negative repercussions of being caught, which they might know is more likely to occur when the firm has high levels of dedicated institutional ownership. Information asymmetry between principals and agents should be lower for dedicated owners as compared to other types of owners (Weiss and Beckerman, 1995). This is because dedicated owners have extensive resources to devote to monitoring managerial behavior and, given the nature of their holdings, are motivated to monitor managers carefully (Connelly *et al.*, 2010a). Close monitoring and low levels of information asymmetry should constrain self-serving managerial manipulations of financial information by increasing the risk of detection (Hadani, Goranova and Khan, 2011). In other words, agency theory highlights the notion that dedicated investors could heighten managerial concerns about being caught for wrongdoing, thus mitigating the likelihood of financial fraud.

Incorporating cognitive evaluation theory, on the other hand, uncovers a hidden problem with this agency theory prediction by accounting for how CEOs might feel about the external expectations that come with high levels of dedicated ownership. As one observer noted: ‘The perception that activism creates greater value for all shareholders has won the sympathy and support of major institutional investors that traditionally have remained passive when it comes to engaging with the companies in their portfolios’ (Duffy, 2015). The heavy hand of dedicated institutional investors could prompt managers to shift from an internal to an external locus of causality, making them potentially less concerned with doing business honestly than they are with outward perceptions of compliance (Osterloh and Frey, 2004). This shift in managers’ locus of causality helps explain why traditional agency theory predictions about external governance may not apply, and in fact we expect to see results that are more consistent with stewardship arguments with a focus on intrinsic motivation (Arthurs and Busenitz, 2003; Sundaramurthy and Lewis, 2003).

In the cognitive evaluation theory framework, external intervention could crowd out

managers' intrinsic motivation to act ethically. This is especially so, given that such monitoring is often focused on continually positive financial returns, so managers may become more likely to compromise their ideals by engaging in financial fraud that appears to meet dedicated owners' persistent external expectations, even though managers know it is wrong. Argyris (1964) was one of the first to recognize the potential for this phenomenon when he noticed that strict governance has a paradoxical effect: it leads to continuously expanding control but at the same time reduces managerial loyalty. When dedicated institutional ownership is high, top managers, subject to unrelenting external expectations from dedicated institutional investors and activists, may feel compelled to make financial reporting decisions not from their own beliefs but merely to satisfy the expectations of the firm's owners. Therefore, we suggest the following hypothesis:

Hypothesis 1: A firm's level of dedicated institutional ownership is positively associated with the likelihood of financial fraud.

Another commonly considered form of external governance is the market for corporate control (Weir, 2013). The market for corporate control imposes external pressure on managers to deliver consistently positive financial earnings reports because, if they do not, other management teams may attempt to gain control of the company (Hitt *et al.*, 1996). It is difficult to directly measure the extent to which this governance mechanism is at work because it is an unobservable force until it is activated (i.e., until the poor performing firm is acquired). However, we can view the extent to which executives are exposed to the market for corporate control by looking at the firm's takeover defense provisions (Humphery-Jenner, 2014). Although takeover defenses are internal, researchers often use them as a means of examining the extent to which managers are subject to the external governance of the market for corporate control (Humphery-Jenner, 2014; Kabir, Cantrijn and Jeunink, 1997).

Common takeover defenses include supermajorities, staggered board appointments, poison pills, and golden parachutes. Kini, Kracaw and Mian (2004) argued that the disciplinary function of

the market for corporate control is largely ineffective when firms have takeover defenses such as these. As a result, external expectations to perform that arise from the market for corporate control are likely to be less dogged when managers enjoy more and better takeover protections. In contrast, managers experience greater pressure and higher expectations from the market for corporate control when their company has fewer, or weak, takeover defenses (Mahoney, Sundaramurthy and Mahoney, 1997).

Traditional agency theory predicts that a higher level of takeover defenses (and thus an ineffective market for corporate control) should be associated with a greater likelihood of moral hazard (McGurn, 2002). Agency theorists would argue that these types of provisions give rise to managerial entrenchment and increase agency costs (Bebchuk *et al.*, 2009; Gompers, Ishii and Metrick, 2003). As a result, though managers generally want takeover defenses, most existing studies focus on how they can be bad for shareholders (Mahoney *et al.*, 1997; Sundaramurthy, Mahoney and Mahoney, 1997). From a purely economic view of the agent, takeover defenses can reduce or even eliminate the potentially negative outcomes associated with committing financial fraud. If they are less concerned about the consequences of being caught, managers may be more likely to inflate numbers or adjust financial reports to garner private benefits.

Cognitive evaluation theory, on the other hand, offers a different perspective. Top managers of firms with strong takeover defense protection may not be overly concerned about employment safety, even if their companies fail to meet external performance expectations and thereby become takeover targets. Put differently, top managers are more likely to make decisions that reflect their own values and beliefs when the company has ample takeover defenses in place. In the absence of those provisions, though, failing to meet performance expectations would increase top managers' employment risk (Kacperczyk, 2009). Without takeover defenses, the threat of a takeover could alter the risk propensity of top managers, potentially leading them to make short-term financial

reporting decisions. Takeover defense provisions protect top managers from the external pressure of the market for corporate control, affording managers an extra measure of decision autonomy and allowing them to think about the long term when reporting their performance (Wang, Zhao and He, forthcoming).

The imposing presence of external expectations from the market for corporate control could crowd out managers' intrinsic motivation to behave ethically and, vice versa, removing those external expectations could activate managers' intrinsic sense of duty to do what is right (Kanfer, 1990), as is consistent with stewardship theory (Sundaramurthy and Lewis, 2003). In fact, being vulnerable to the market for corporate control may be particularly salient to the problem of financial fraud. Financial fraud encompasses a range of actions that are almost universally harmful to shareholders and generally have one thing in common: failure to disclose material financial information. Takeover defenses could make managers more willing to disclose critical information simply because they know it is the right thing to do. Stated formally,

Hypothesis 2: The number of a firm's takeover defense provisions is negatively associated with the likelihood of financial fraud.

Researchers in management, law, finance, and accounting have through the years explored how the expectations of external financial markets via rating agencies influence firm behaviors (Benner and Ranganathan, 2012; Chen *et al.*, 2015). Securities analysts raise questions with top managers about firm performance and strategies during conference calls and distribute information to investors through reports and media outlets (Lang, Lins and Miller, 2004). These reports generally include forecasts of the firm's expected future stock price and the analysts' recommendations about whether to 'buy,' 'hold,' or 'sell' the firm's stock (Bradshaw, 2004; Schipper, 1991).

This line of research has shown that analysts play an important role in shaping the expectations imposed on managers to undertake actions (Gentry and Shen, 2013). One way analysts

impose pressure on managers is via their effects on stock price (Zuckerman, 2000). This occurs even when analysts make recommendations based on stock repurchase plans that could have vague or indeterminate stock price effects (Zhu and Westphal, 2011). Positive or negative recommendations have implications for stock purchase behavior and help determine the value of a firm's stock. As a result, there is a growing body of evidence that managers are highly attentive to analyst recommendations and the resultant changes in stock price (Martin, 2011; Rao and Sivakumar, 1999). For example, one study shows that firms covered by a large number of financial analysts have less innovative activity, because financial analysts impose pressure to deliver consistently positive short-term financial results (He and Tian, 2013).

External expectations from financial analysts may come in two forms. First, sell recommendations reduce a firm's stock price and therefore impose external pressure on managers to take action so that the firm's performance bounces back (Stickel, 1995). Second, buy recommendations also introduce external pressure because managers are likely to feel the burden of high earnings expectations when analysts are recommending their stock to capital markets (Barsky, 2008; Mishina *et al.*, 2010). In contrast to buy and sell recommendations, a hold recommendation should result in shareholders devoting less attention to firms, so this represents the lowest level of external pressure from analysts, and in fact most recommendations are hold.

Agency theory envisions securities analysts collectively as an external governance mechanism, keeping managers in check by reducing information asymmetry between principals and agents (Jensen and Meckling, 1976). Seeking to gain investor following, analysts are concerned with obtaining the most comprehensive information they can get about publicly traded firms and issuing insightful recommendations to shareholders (Womack, 1996). Investors pay close heed to analyst recommendations, lending particularly close attention to those firms to whom the analysts recommend attention (Beunza and Garud, 2007; Brown, Wei and Wermers, 2013). Thus, in the

agency framework, we should expect external expectations that arise from security analyst recommendations to be negatively associated with financial fraud.

Again, cognitive evaluation theory introduces a different perspective on securities analyst ratings. Some scholars have found that high performance expectations can actually lead to fraudulent behavior owing to the increased pressure leaders feel because of those expectations (Schweitzer, Ordóñez and Douma, 2004). This may be particularly true of analyst ratings because missing analyst forecasts can precipitate drops in stock price, reduced managerial compensation (Chen *et al.*, 2015), or even dismissal (Wiersema and Zhang, 2011). In this sense, ‘sell’ recommendations can impose great pressure on managers. Similarly, when analysts recommend ‘buy’ it also introduces pressure on managers, wherein top managers are compelled to meet high expectations. Research suggests that this pressure may be accentuated by stock market overreaction to these analyst recommendations (Brown *et al.*, 2013). When external pressure from analysts is high, it could lead top managers to make decisions that violate their codes of conduct but help achieve tangible objectives (e.g., meeting analyst expectations or turning around company performance) (Hirsch and Pozner, 2005). Stated differently, external pressure from analysts could introduce high performance expectations on managers, making them less concerned with doing the right thing than they are with outward perceptions of compliance. As a result, we expect this external governance mechanism could have an adverse effect on managerial behavior, as follows:

Hypothesis 3: Pressure from security analysts’ recommendations is positively associated with the likelihood of financial fraud.

METHODS

Sample

We tested our hypotheses on a longitudinal dataset covering the years 1999-2012. The sample used in this study starts with all firms in the in the S&P 1500 index during our sampling window, as well as a few other large public firms included in the Investor Responsibility Research Center (IRRC).

The dependent variable data are from the Securities and Exchange Commission (SEC) Accounting and Auditing Enforcement Releases (AAERs). Data on institutional ownership, takeover defense provisions, and securities analysts are from Thomson Reuters Institutional (13F) Holdings, the IRRC, and Thomson Reuters IBES respectively. Financial data are from Compustat and the Center for Research in Security Prices (CRSP). We collected top manager compensation and governance data from ExecuComp and Risk Metrics.

Dependent variable

The dependent variable of our study is commitment of *financial fraud*. Since 1982, the SEC has issued AAERs during or at the conclusion of an investigation against a company, an auditor, or an individual for alleged accounting or auditing misconduct (Dechow *et al.*, 2011). The SEC takes enforcement actions against firms that it identifies as having violated the financial reporting requirements of the Securities Exchange Act of 1934. Given budget constraints, the SEC chooses firms for enforcement action when there is strong evidence of accounting manipulation. In general, firms the SEC selects have already admitted restating earnings or having unusually large write-offs (e.g., Enron and Xerox) (Dechow *et al.*, 2011).

To identify fraud commitment years accurately, we read each AAER entry to identify the years when financial fraud actually occurred and matched them to our independent and control variables based on fraud commitment years. We identified a total number of 265 cases of fraud commitment firm years for our sample firms. The primary advantage of our chosen operationalization is that firms selected for SEC enforcement are almost certainly guilty of fraudulent financial reporting (i.e., Type I error is low) (Dechow *et al.*, 2011). Fraud commitment receives a value of ‘1’ if a firm commits financial fraud in a year and is later detected by the SEC and ‘0’ otherwise.

Independent variables

Our first independent variable is *dedicated institutional ownership*. We followed Bushee (2001) to identify dedicated institutional investors among all the institutional investors reported in Thomson Reuter Institutional (13F) Holdings. This approach relies on a factor and cluster analysis to classify institutional investors into different types. The classification is based on portfolio turnover, momentum trading strategies, and portfolio diversification strategies (Bushee, 2001). We identified dedicated institutional investors, which are low on all three factors, for each sample firm and calculated their average holdings across four quarters for each year. Dedicated institutional ownership is the ratio of total shares held by dedicated institutional investors to total shares outstanding (Connelly *et al.*, 2010b).

Our second independent variable is takeover defenses. We measured the number of *takeover defense provisions* as the sum of the following six indicator variables: staggered board, limitation on amending bylaws, limitation on amending the charter, supermajority to approve a merger, golden parachute, and poison pill. Findings by Bebchuk *et al.* (2009) suggest these six takeover defense provisions play the most important role in shielding managers from the market for corporate control and are of greatest relevance to managerial entrenchment. Because the IRRC published takeover defense provision data every other year until 2004, we followed existing work by Bebchuk *et al.* (2009) and replaced the four years in our sampling window that did not have IRRC coverage with data from immediately subsequent years.

The third independent variable is *analyst recommendation pressure*. We measured this as the sum of the average percent of sell recommendations and the average percent of buy recommendations issued by securities analysts across different quarters for each year. We focus on sell and buy recommendations because these two types of recommendations have important implications on the trading behavior of individual investors and fund managers (Stickel, 1995). Sell recommendations suggest that rated stocks are likely to underperform relative to the market or its previous

performance whereas buy recommendations suggest that rated stocks are likely to outperform the market within the next six to twelve months. As we argued, sell and buy recommendations introduce powerful external earnings expectations on managers, while hold recommendations present the least pressure.

Control variables for fraud commitment

Our chosen method of analysis, bivariate probit models, mandates that we develop separate models with fraud commitment as one dependent variable and fraud detection as a different dependent variable (Wang, 2013; Wang, Winton and Yu, 2010). We follow Wang's (2013) guidelines for control variables that could increase the likelihood of fraud commitment.

First, we control for a range of firm-level characteristics. We control for *firm performance* using return on assets (ROA). We also control for *firm size* using the natural logarithm of total assets. The fraud literature suggests that managers of firms with high levels of *external financing need* are more likely to commit fraud than managers of firms with lower need (Teoh, Welch and Wong, 1998). We follow Demirguc-Kunt and Maksimovic (1998) to measure this as a firm's asset growth rate in excess of the maximum internally financeable growth rate: $\text{asset growth rate} - \text{ROA}/(1-\text{ROA})$. We control for *firm leverage* using the ratio of total short- and long-term debt to total assets.

We also control for three variables related to firm risk-taking activities that are associated with fraud commitment (Wang, 2013). These are *capital expenditure intensity* measured as capital expenditure divided by total sales revenues, *R&D intensity* measured as R&D expenditure divided by total sales revenues, and *acquisition intensity* measured as total annual acquisition expenditure divided by total sales revenues.

We control for a number of executive characteristics as well. We control for *top management team (TMT) equity ownership*, measured as the total percent of equity ownership held by all the top executives reported in ExecuComp. We control for *TMT option pay*, measured as the ratio of total

TMT option pay value to total TMT pay. We control for *board independence* measured as the total number of independent outside directors divided by board size and for the percent of *directors appointed by CEOs*, measured as the ratio of directors appointed by CEOs to board size. We control for *outside directors' ownership*, measured as the ratio of shares held by outside directors to total shares outstanding and for *CEO duality*, which receives a value of '1' if a CEO is also Board Chair. We control for *analyst coverage*, measured as the number of analysts covering a firm. Lastly, we control for the *post-SOX period* which is '1' for years after (and including) 2002 and '0' otherwise because governance reforms triggered by the Sarbanes-Oxley Act (SOX) may deter managers from committing financial fraud.

Control variables for fraud detection

Fraud detection describes when firms commit fraud and the SEC catches them for doing so. To model the likelihood of fraud detection we include some control variables that overlap with the control variables used to model the likelihood of fraud commitment. Control variables used in both the fraud commitment (P(F)) and fraud detection (P(D | F)) are possible indicators not only that a firm will commit fraud but also that they will be caught. When we include a control in both fraud commitment and fraud detection models, we operationalize the variable the same in both models.

However, our models for the likelihood of fraud detection contain some unique control variables that we do not use in our models of fraud commitment. For instance, the SEC could be more likely to select for investigation firms that operate in industries where securities lawsuits are common, so we control for *abnormal industry litigation*. To measure this, we calculate industry litigation intensity, measured as the natural logarithm of the total market value of all litigated firms in an industry year (using 2-digit SIC codes). Abnormal industry litigation is the annual deviation from the average litigation intensity in an industry. We also control for *abnormal ROA*, which can flag a firm as a potential problem, using the residual from the regression: $ROA_1 = \alpha_0 + \alpha_1 ROA_0 + \alpha_2 ROA_{-1} + \epsilon$.

Similarly, we control for *annual stock returns* because the SEC may target for enforcement firms with sharp changes in stock returns. For the same reason, we control for *abnormal return volatility*, measured as the demeaned standard deviation of monthly stock returns in a year, and *abnormal stock turnover*, measured as the natural logarithm of the demeaned monthly turnover in a year. Lastly, we include a measure of total *institutional ownership* in our fraud detection models because research shows that institutional investors could play a role in discovering fraud (Dyck, Morse and Zingales, 2010).

METHODS AND RESULTS

Table 1 summarizes the descriptive statistics, including means, standard deviations, and correlations of variables used in this study. Table 2 presents the results of bivariate probit models. P(F) models the likelihood of fraud commitment and P(D|F) models the likelihood of fraud detection given fraud commitment.

[Insert Table 1 here]

Analysis

Corporate fraud is a rare event. Given the low rate of occurrence within our population of firms, examining the data using hazard models or conditional logistic regressions with matched pairs could be appropriate (Carberry and King, 2012). Yet, there are two latent processes associated with corporate fraud: firms that engage in fraud (i.e., fraud commitment) and those that the SEC actually catches in the act of fraud (i.e., fraud detection). We are interested in the former but can only observe the latter. Traditional methods are limited to examining the observable firms that have been caught in the act of fraud, ignoring firms that have committed fraud but not (or not yet) been caught. The underlying assumption is that firms that are cheating and getting away with it are comparatively much fewer than those that cheat and are caught, but this may not be an accurate assumption.

We attempt to address this problem methodologically by using bivariate probit regressions with partial observability, following the works of Wang *et al.* (2010) and Wang (2013). Bivariate probit regressions model fraud detection and fraud commitment simultaneously, thus mitigating biases caused by the presence within our sample of firms that have engaged in fraud but not yet been detected. This is an important distinction because our theory describes why firms might actually engage in financial fraud, not whether the SEC catches them in the act. Of course, neither the traditional methods nor our bivariate probit models account for the possibility that firms may have had an SEC enforcement action against them when in fact they did nothing wrong. However, given the extensive nature SEC investigations and the burden of proof they must overcome, we expect it is a safe assumption that there are few, if any, firms that are innocent victims of the SEC enforcement.

To explain how bivariate probit models work, let F_i^* represent firm i 's propensity to commit fraud, and D_i^* represent the firm's likelihood of being detected conditional on fraud being committed. The reduced form model is then:

$$F_i^* = \mathbf{x}_{F,i} \boldsymbol{\beta}_F + u_i \quad (1),$$

$$D_i^* = \mathbf{x}_{D,i} \boldsymbol{\beta}_D + v_i \quad (2)$$

where $\mathbf{x}_{F,i}$ is a row vector with variables that explain the propensity for firm i to commit fraud, and $\mathbf{x}_{D,i}$ is a second row vector with variables that explain the firm's likelihood of getting caught conditional on fraud commitment. The variables u_i and v_i are zero-mean disturbances with a bivariate normal distribution and variances normalized to unity because we cannot estimate the variances. The correlation between u_i and v_i is ρ (Wang, 2013).

To model fraud commitment, we transform F_i^* into a binary variable F_i , where $F_i = 1$ if $F_i^* > 0$, and $F_i = 0$ otherwise. To model fraud detection conditional on fraud commitment, we

transform D_i^* into a binary variable in the same way. We cannot observe all the realizations of F_i^* and D_i^* , but note that

$$Z_i = F_i \times D_i \quad (3)$$

where $Z_i = 1$ if firm i has committed fraud and been detected, and $Z_i = 0$ otherwise. With Φ as the bivariate standard normal cumulative distribution function, the empirical model for estimating Z_i is

$$P(Z_i = 1) = P(F_i D_i = 1) = P(F_i = 1, D_i = 1) = F(x_{F,i} \beta_F, x_{D,i} \beta_D, \rho) \quad (4)$$

$$P(Z_i = 0) = P(F_i D_i = 0) = P(F_i = 0, D_i = 0) + P(F_i = 1, D_i = 0) = 1 - F(x_{F,i} \beta_F, x_{D,i} \beta_D, \rho) \quad (5)$$

Poirier (1980) and Feinstein (1990) suggest that the conditions for full identification of the model parameters have two requirements. First, $x_{F,i}$ and $x_{D,i}$ must not include the same variables. As noted in the variable section, we mainly follow Wang (2013) to identify key variables that influence the propensity of fraud commitment and the likelihood of fraud detection. The second requirement is that predictor variables need to exhibit substantial variation in the sample. As a result, the model can be identified more easily if $x_{F,i}$ and $x_{D,i}$ include continuous instead of indicator variables (Wang, 2013). This explains why we did not include industry dummy variables and year dummy variables in our bivariate probit models, because inclusion of too many dummies without sufficient variation can lead to estimation failure. Given that we cannot include industry fixed-effects in regressions, we cluster standard errors by two-digit SIC codes to address potential correlations among residuals of firms in the same industry (Khanna, Kim and Lu, 2015). We then estimate bivariate probit models using the maximum-likelihood method, as follows:

$$\begin{aligned} L(\beta_F, \beta_D, \rho) &= \sum_{z_i=1} \log(P(Z_i = 1)) + \sum_{z_i=0} \log(P(Z_i = 0)) \\ &= \sum_{i=1}^N \{z_i \log[\Phi(x_{F,i} \beta_F, x_{D,i} \beta_D, \rho)] + (1 - z_i) \log[1 - \Phi(x_{F,i} \beta_F, x_{D,i} \beta_D, \rho)]\} \quad (6) \end{aligned}$$

Results

P(F) in Model 1 of Table 2 introduces the first independent variable, dedicated institutional

ownership. The coefficient estimate of dedicated investors is positive ($\beta=1.913$, $p=0.026$), lending support to Hypothesis 1, which suggests a positive relationship between the level of dedicated institutional ownership and the likelihood of committing financial fraud. In terms of economic significance, when dedicated institutional ownership increases from mean (0.045) to mean plus one standard deviation (0.112), holding all other variables at their means, the likelihood of firms' committing financial fraud will increase by 36%. In $P(D|F)$ in Model 1, the coefficient estimate of institutional ownership is positive but statistically not significant, suggesting that institutional ownership may not influence fraud detection.

[Insert Table 2 here]

Hypothesis 2 states that takeover defenses are negatively associated with the likelihood of committing financial fraud. The estimated coefficient for takeover defense provisions in $P(F)$ of Model 2 is negative and is associated with a p-value of 0.008 ($\beta=-0.202$, $p = 0.008$), consistent with Hypothesis 2. In terms of economic impact, when the number of takeover defense provisions increases from zero to one, holding all other variables at their means, the likelihood of firms' committing financial fraud is expected to decrease by 37%. In $P(D|F)$ in Model 2, the coefficient estimate of takeover defense is statistically not significant, indicating that takeover defense provisions may not bear a relationship with the likelihood of fraud detection.

Hypothesis 3 states that earnings pressure from analyst recommendations is positively associated with the likelihood of committing financial fraud. The estimated coefficient for this independent variable in $P(F)$ of Model 3 is positive and is associated with a p-value of 0.005 ($\beta=1.056$, $p=0.005$), supporting Hypothesis 3. In terms of economic magnitude, when analyst pressure increases from mean (0.560) to mean plus one standard deviation (0.785), holding all other variables at their means, the likelihood of firms' committing financial fraud is expected to increase by 82%. In $P(D|F)$ in Model 2, the coefficient estimate of analyst pressure is statistically not

significant, indicating that analyst pressure may not bear a relationship with the likelihood of fraud detection.

Additional analyses

In our main study and analysis, we theorize that and test whether external monitoring and pressure from dedicated investors, the market for corporate control, and financial analysts result in higher levels of financial fraud. One could make additional related arguments, though, that a moderate amount of external pressure may be necessary and discourage top managers from committing financial fraud, even if too much external pressure exacerbates fraud. Therefore, in supplementary analyses, we tested whether there were curvilinear relationships between our independent variables and dependent variable. However, we failed to find statistical support for such relationships. Results for this analysis and other unreported results are available from the authors on request.

Also, as described in our theory and methods, we examined external pressure from analyst recommendations in terms of both buy and sell recommendations. To investigate this further in a post-hoc manner, we subsequently considered the individual relationships between buy/sell recommendations and fraud commitment. We found that the coefficient estimate of the percent of buy recommendations is positive and is statistically significant, whereas the coefficient estimate of the percent of sell recommendations is positive but statistically not significant. This suggests that high earnings expectations from positive analyst recommendations appear to exert a stronger influence on top managers' motivation to commit financial fraud compared to the pressure managers feel from having to turn around performance in the face of negative recommendations.

As described in the analysis section above, our chosen methodology is a unique approach to investigating the likelihood of fraud. Therefore, we confirm our results using an alternative method based on a matched-pair sample (Arthaud-Day *et al.*, 2006; Cumming, Leung and Rui, 2015; Gomulya and Boeker, 2014; O'Connor *et al.*, 2006). For each fraud firm, we found a control firm

that is most similar to fraud firm in terms of firm size (log assets) and Tobin's q and belongs to the same Fama and French 12 industry classification (Fama and French, 1997). We require that control firms have never been charged with fraud. To analyze the matched-pair sample, we used conditional logistic regressions, which recognize the conditional nature of the probabilities that matched-pair samples create (Manski and Lerman, 1977). Conditional logistic regressions control for time-invariant paired fixed-effects, but cannot address potential biases caused by fraud that has been committed but not detected. In unreported results, we find support for our three hypotheses.

Supplementary study

The analyses above suffer from some limitations common to studies of archival data. For example, our control variables cannot account for all possible alternative explanations and the control variables we include could overlap with the explained variance of our predictors, thus changing what it is our predictors are actually measuring (Audia, Locke and Smith, 2000). Another problem with archival studies of market data is that we cannot actually measure people's thoughts, but rather are limited to viewing outcomes. This may be important because our theory deals with intrinsic motivation, and with archival analyses we make inferences about how managers are motivated based on how we see them behaving.

Therefore, we develop a supplementary study, the details of which we provide in an online appendix, to observe managerial decision-making directly in a more controlled environment (Priem, Walters and Li, 2011). We used a policy capturing approach in a survey-based study with strengths, and limitations, that are complementary to our prior analyses. In short, we ask executives to imagine they are the CEO of a small but publicly traded company. The company received a sale a few days into Q1 of the current fiscal year, but it would help the CEO if he/she could book it in Q4 of the prior year, which is when most of the work for the sale actually occurred anyway. Results are presented in Table 3.

[Insert Table 3 here]

We analyze the data using hierarchical linear modelling to account for both within-person and between-person variance (Spence and Keeping, 2010). The dependent variable is *managers' reaction*, which is how they would actually report the sale. For each scenario, participants select their response on a seven-point Likert scale to the statement “Based solely on the information provided here, I might consider reporting the sale in Q4 of the prior year.” Answers range from “strongly disagree” to “strongly agree.” We inform respondents that they should report the sale in Q1, but reporting it in Q4 would engender both personal benefits and risk to the firm. In other words, indicating they would report the sale in Q4 is equivalent to intent to commit fraud.

Model 1 in Table 3 shows the effects of the control variables. Model 2 in Table 3 shows our supplementary study’s measurement of the main effects advanced in Hypotheses 1 through 3, with the dependent variable being intent to commit fraud. Consistent with the results from our main study, the coefficient estimate of pressure from shareholders is positive ($\beta=0.086$, $p=0.064$), consistent with Hypothesis 1. Also in Model 2, the coefficient estimate of takeover defenses is negative ($\beta=-0.077$, $p=0.097$), consistent with Hypothesis 2. The drop in significance level may be due to the small number of observations used in this study. The coefficient estimate of analyst pressure is positive ($\beta=0.121$, $p=0.009$), supporting Hypothesis 3.

DISCUSSION

In this study, we extend agency theory by examining external mechanisms of corporate governance in view of managerial cognitions. We find empirical support for the notion that external governance can dampen managers’ intrinsic motivation to act in the interest of shareholders, increasing their likelihood of financial fraud. Each of the three external governance mechanisms under investigation – activist shareholders, the market for corporate control, and rating agencies – provides unique explanatory value in the context of financial fraud, and each runs counter to traditional agency

predictions.

Key contributions

Our results hold the potential for contributing to the literature in several ways. Foremost, behavioral agency theory incorporates cognitive biases into agency theory assumptions about internal governance (Martin *et al.*, 2013; Wiseman and Gomez-Mejia, 1998), but this stream of research devotes less attention to external governance. Our study adds to the academic community's understanding of agency theory by introducing a key behavioral consideration into agency theory's predictions about external governance. In so doing, our study questions the utility of external governance mechanisms for reigning in the potential for moral hazard, in our case in the form of managerial financial fraud. Whereas the governance literature has prescribed (over the long years of research in corporate governance) several alignment mechanisms that policymakers expect to work most of the time, our study shows that some of these mechanisms may not work as expected.

Our study also potentially provides new insights into the consequences of investor activism. Agency theory suggests that dedicated institutional investors, who are well known for their activist approach to ownership (Goranova and Ryan, 2014), can mitigate agency problems because they have incentive to monitor managers and the ability to bring about change due to the size of their holdings (Shleifer and Vishny, 1997). Existing studies lend empirical support to the notion that dedicated investors can be conducive to mitigating managerial risk aversion and encouraging managers to make decisions that create long-term value for the firm (Bushee, 1998; Connelly *et al.*, 2010b; Hoskisson *et al.*, 2002). However, researchers have devoted little attention to possible tradeoffs of the powerful expectations imposed on managers via the external pressure of dedicated investors. Our results show that an ownership structure laden with dedicated investors can have unanticipated consequences in the form of diminished intrinsic motivation, resulting in higher instances of managerial financial fraud. There is an ongoing policy debate about the effects of

activist shareholders (Benoit and Hoffman, 2015; Gandel, 2015). Our study informs this debate by showing that powerful shareholders could perhaps be hurting more than helping as they magnify the Wall Street ‘expectations game,’ and consequently managers could abandon their own beliefs in order to satisfy the expectations of shareholders (Martin, 2011).

Our findings may also contribute to research on takeover defenses. Existing studies generally suggest that the market perceives takeover defense provisions negatively because they result in reduced firm value (Gompers *et al.*, 2003; Mahoney and Mahoney, 1993; Sundaramurthy *et al.*, 1997). Research shows that managerial entrenchment brought on by takeover defenses can cushion managers’ exposure to the market for corporate control. Our study, however, adds that such protection can provide a positive effect wherein managers maintain higher levels of intrinsic motivation, akin to stewardship theory, as opposed to being motivated mainly by extrinsic factors, which are central to agency theory (Sundaramurthy and Lewis, 2003). Future research might tease out even further this juxtaposition of the principles and assumptions underlying cognitive evaluation theory and, relatedly, stewardship theory versus those that underlie agency theory.

We also contribute to a nascent stream of literature that explores the benefits of takeover defense provisions. For instance, Danielson and Karpoff (2006) find that firms that have adopted poison pills witness modest operating performance improvement over time. Similarly, findings by Kacperczyk (2009) and Wang *et al.* (forthcoming) suggest that an exogenous increase in takeover protection leads managers to focus on strategic decisions that can increase shareholders’ long-term interests. Our results suggest that the benefits of takeover defense provisions extend beyond issues of performance as they discourage managers from engaging in financial fraud, which is detrimental to the interests of shareholders and other stakeholders. Relatedly, researchers might also consider how different kinds of corporate governance provisions operate in different ways, such as those that prevent actions that could lead to a takeover versus those that take effect only if a takeover occurs.

Lastly, our study illustrates the power that securities analysts wield. Although analysts play an important role as information intermediaries that can help reduce information asymmetry between investors and companies, their recommendations introduce powerful expectations on managers to perform, which could influence their financial reporting decisions. While much of the research on rating agencies focuses on how investors react to analyst recommendations, our study builds on the more limited amount of research (Gentry and Shen, 2013; Zhu and Westphal, 2011) that explores how managers react, and behave differently in response, to analyst recommendations. Our study has focused on one type of external rating agencies (i.e., financial analysts), but future research might explore how other external rating agencies (e.g., journalists) shape managers' performance expectations and thereby influence managerial motivations to engage in financial fraud (Shani and Westphal, 2016; Westphal and Deephouse, 2011).

The focus of our study is on how performance expectations from external governance mechanisms crowd out top managers' intrinsic motivation, leading to higher instances of financial fraud. Future research might consider whether and how this generalizes to managerial misconduct. Further, scholars could extend this research by considering how cognitive evaluation theory applies to internal governance devices, such as boards of directors and top manager compensation designs. Similarly, scholars might also examine whether internal and external governance devices are complements or substitutes. It could be, for example, that dedicated institutional investors substitute for vigilant boards because both introduce strong expectations on managers. If this is the case, then the monitoring role of vigilant boards could become less important when dedicated investors are present. Conversely, one could make an argument that dedicated investors complement vigilant boards. In this case, the two work together to inflict such weighty expectations that managers reach a tipping point where they feel they have to resort to fraud so that they do not let everybody down.

Conclusion

In sum, our findings suggest that policymakers may face a paradox in regulating corporate governance. Imposing strict external monitoring and control can decrease top managers' intrinsic motivation and reduce their focus on internal values, potentially leading them to commit financial fraud. However, granting top managers too much freedom from external performance pressure could result in some managers extracting personal gains at the expense of shareholders. Perhaps managers can 'earn the right' to autonomy over time as they demonstrate that they consistently act in the best interest of shareholders, despite who may or may not be looking over their shoulders.

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Table 1. Descriptive statistics

Variable	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10
1 Financial fraud	0.017	0.128	0.000	1.000	1.000									
2 Dedicated ownership	0.045	0.067	0.000	0.350	0.076	1.000								
3 Takeover defense	2.569	1.344	0.000	6.000	-0.054	-0.093	1.000							
4 Analyst pressure	0.560	0.225	0.000	1.000	0.061	0.078	-0.084	1.000						
5 ROA	0.090	0.085	-0.230	0.352	-0.018	0.018	-0.054	0.156	1.000					
6 Firm size (Log)	7.807	1.663	4.584	12.441	0.056	-0.017	0.001	-0.056	-0.092	1.000				
7 External financing need	0.159	1.265	-5.768	6.971	0.018	-0.001	0.005	0.034	0.020	-0.032	1.000			
8 Firm leverage	0.218	0.174	0.000	0.768	0.027	0.067	0.049	-0.023	-0.127	0.255	-0.028	1.000		
9 Capital expenditure ratio	0.067	0.110	0.000	0.801	-0.011	0.035	0.008	0.091	-0.063	0.030	0.039	0.133	1.000	
10 R&D intensity	0.037	0.076	0.000	0.441	0.023	0.029	-0.059	0.111	-0.221	-0.223	0.043	-0.203	0.037	1.000
11 Acquisition intensity	0.032	0.086	0.000	0.553	0.014	-0.012	0.008	0.092	-0.016	-0.034	-0.009	0.081	0.017	0.135
12 Analyst coverage	10.652	7.845	0.000	55.000	0.008	0.046	-0.066	0.061	0.159	0.516	0.001	-0.028	0.113	0.085
13 Institutional ownership	0.689	0.247	0.000	1.000	-0.051	0.144	0.129	0.086	0.166	-0.090	-0.008	-0.054	-0.018	0.029
14 TMT ownership	0.012	0.034	0.000	0.228	-0.040	-0.133	0.041	-0.044	0.003	-0.121	0.007	-0.072	-0.030	-0.017
15 TMT option pay	0.275	0.245	0.000	0.898	0.106	0.233	-0.097	0.190	0.029	-0.023	0.036	-0.093	0.040	0.318
16 Board independence	0.716	0.156	0.000	1.000	-0.079	-0.140	0.246	-0.098	-0.033	0.193	-0.012	0.050	-0.003	0.003
17 CEO appointed director	0.678	0.299	0.000	1.000	0.034	0.024	-0.079	0.046	0.007	-0.053	0.018	-0.009	0.030	-0.005
18 Outside director ownership	0.045	0.087	0.000	0.544	-0.010	0.050	-0.157	-0.007	0.029	-0.148	-0.001	-0.025	-0.032	-0.061
19 CEO duality	0.596	0.491	0.000	1.000	0.028	0.073	0.011	0.015	0.004	0.136	-0.004	0.078	0.028	-0.069
20 Abnormal industry litigation	0.655	0.824	0.000	4.729	0.039	0.013	-0.055	0.046	-0.068	0.022	0.041	-0.009	0.157	0.221
21 Abnormal ROA	0.013	0.073	-0.252	0.233	-0.020	0.011	-0.055	0.162	0.992	-0.085	0.022	-0.123	-0.060	-0.217
22 Annual stock returns	0.074	0.443	-0.796	1.788	-0.030	0.012	0.024	-0.006	0.034	-0.026	-0.049	-0.020	-0.016	-0.017
23 Abnormal return volatility	0.114	0.069	0.017	1.074	0.036	0.060	0.006	0.086	-0.254	-0.287	0.036	-0.027	0.057	0.260
24 Abnormal stock turnover (Log)	11.744	1.502	4.663	18.584	0.056	-0.063	-0.009	0.073	0.052	0.647	0.022	0.047	0.090	0.167

Variable	11	12	13	14	15	16	17	18	19	20	21	22	23	24
11 Acquisition intensity	1.000													
12 Analyst coverage	0.012	1.000												
13 Institutional ownership	0.056	0.308	1.000											
14 TMT ownership	0.004	-0.055	0.071	1.000										
15 TMT option pay	0.051	0.153	-0.060	-0.122	1.000									
16 Board independence	-0.003	0.121	0.187	-0.020	-0.124	1.000								
17 CEO appointed director	0.006	-0.014	-0.027	0.138	0.031	-0.113	1.000							
18 Outside director ownership	-0.019	-0.127	-0.166	0.120	-0.015	-0.365	-0.059	1.000						
19 CEO duality	-0.005	0.041	-0.053	-0.005	0.056	0.067	0.376	-0.174	1.000					
20 Abnormal industry litigation	0.029	0.122	-0.019	0.013	0.124	-0.042	0.042	-0.034	-0.024	1.000				
21 Abnormal ROA	-0.030	0.158	0.163	0.001	0.020	-0.028	0.004	0.025	0.002	-0.063	1.000			
22 Annual stock returns	-0.040	0.010	0.049	-0.028	-0.078	0.017	-0.012	0.027	-0.016	-0.002	0.047	1.000		
23 Abnormal return volatility	-0.010	-0.130	-0.090	0.008	0.211	-0.120	0.040	0.047	-0.035	0.100	-0.254	-0.008	1.000	
24 Abnormal stock turnover (Log)	0.004	0.671	0.113	-0.047	0.178	0.203	-0.048	-0.185	0.039	0.123	0.054	-0.045	0.051	1.000

Note: N = 14,729. The absolute value of correlation greater than 0.02 significant at $p < .05$ for two-tailed tests.

Table 2. Bivariate probit models with fraud commitment and detection as dependent variables

Variables	Model 1		Model 2		Model 3	
	P(F)	P(D F)	P(F)	P(D F)	P(F)	P(D F)
Constant	-2.949 (0.000)	-5.231 (0.000)	-2.664 (0.000)	-4.979 (0.000)	-3.119 (0.000)	-4.994 (0.000)
ROA	0.664 (0.415)		-0.967 (0.383)		-0.719 (0.587)	
External financing need	0.032 (0.041)		0.027 (0.263)		0.044 (0.009)	
Firm leverage	0.201 (0.478)		0.302 (0.373)		0.157 (0.532)	
TMT ownership	-1.415 (0.003)		-1.525 (0.002)		-1.420 (0.000)	
TMT option pay	0.510 (0.165)		0.525 (0.048)		0.450 (0.127)	
Board independence	-0.883 (0.106)		-1.415 (0.068)		-0.566 (0.302)	
CEO appointed directors	0.991 (0.000)		1.023 (0.000)		1.007 (0.000)	
Outside director ownership	-6.024 (0.020)		-6.778 (0.087)		-5.767 (0.027)	
CEO duality	0.010 (0.916)		0.061 (0.688)		0.096 (0.307)	
Post-SOX	-0.479 (0.003)		-0.612 (0.000)		-0.541 (0.018)	
Firm size	0.000 (0.999)	0.464 (0.020)	-0.014 (0.814)	0.380 (0.001)	-0.036 (0.697)	0.455 (0.095)
Capital expenditure ratio	-1.910 (0.004)	2.033 (0.533)	-1.999 (0.013)	-0.117 (0.941)	-2.748 (0.003)	3.900 (0.371)
R&D intensity	0.236 (0.801)	0.412 (0.831)	-1.327 (0.161)	3.780 (0.151)	-0.694 (0.603)	1.272 (0.805)
Acquisition intensity	-1.098 (0.181)	13.311 (0.202)	-0.469 (0.575)	6.337 (0.217)	-1.238 (0.394)	13.464 (0.571)
Analyst coverage	-0.189 (0.015)	-0.443 (0.110)	-0.122 (0.097)	-0.700 (0.007)	-0.046 (0.876)	-0.407 (0.616)
Institutional ownership		0.806 (0.376)		2.267 (0.013)		2.121 (0.255)
Abnormal industry litigation		0.293 (0.052)		0.425 (0.010)		0.334 (0.059)
Abnormal ROA		-1.008 (0.608)		2.926 (0.379)		0.938 (0.816)
Annual stock returns		0.440 (0.210)		0.296 (0.060)		0.500 (0.354)
Abnormal return volatility		0.233 (0.912)		0.817 (0.668)		0.911 (0.801)
Abnormal stock turnover		0.315 (0.030)		0.496 (0.001)		0.302 (0.279)
Dedicated ownership	1.913 (0.026)					
Takeover defense			-0.202 (0.008)	0.397 (0.107)		
Analyst pressure					1.056 (0.005)	-1.587 (0.247)
Observations		15,845		15,032		14,729
Chi-squared		2180		285.6		2433
Log-likelihood		-986.3		-854		-793.1

Note: p-values in parentheses. Standard errors clustered by two-digit SIC codes. We do not control for dedicated ownership P(D|F) in Model 1 because dedicated ownership is included in total institutional ownership.

Table 3. Hierarchical regression of intent to commit fraud

Variables	Model 1 Controls	Model 2 Main effects
Experience	-0.071 [0.031]	-0.071 [0.031]
Gender	-0.658 [0.326]	-0.658 [0.326]
Locus of causality	0.131 [0.839]	0.131 [0.839]
CEO power	-0.050 [0.281]	-0.050 [0.275]
Shareholder pressure		0.086 [0.064]
Takeover defense		-0.077 [0.097]
Analyst pressure		0.121 [0.009]
Race (dummy variables)	Included	Included
Education (dummy variables)	Included	Included
Raised place (dummy variables)	Included	Included
Constant	4.802 [3.231]	4.802 [3.231]
Chi-squared	17.63	30.65
Log-likelihood	-722.8	-722.9

Note: N=456. p-values based on Huber-White robust errors reported in brackets.