Is There a Link Between Executive Compensation and Accounting Fraud?

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Abstract:

This study investigates the association between the structure of executive compensation and accounting fraud. We study 50 firms accused of accounting fraud by the Securities and Exchange Commission (SEC) during the period 1996-2003 as compared to firms not accused of accounting fraud during the same period. We find that the probability of accounting fraud is increasing in the percent of total executive compensation that is stock-based (termed stock-based mix) after controlling for governance characteristics, financial performance, financial distress, firm size, and the likelihood of management wanting to obtain external financing. We find that while the unconditional likelihood of accounting fraud is small, a one standard deviation increase in the proportion of compensation that is stock-based increases the probability of an accounting fraud by approximately 68%.

For managers to undertake fraud they must perceive positive benefits from it. We examine the extent to which managerial wealth was overstated prior to the alleged fraud by measuring the decline in managerial wealth once the alleged fraud was made public. We find that the value of managerial stock holdings in firms accused of fraud declined by 49% at the median over the six months following the accusation of fraud.

We do not conclude from this evidence that stock-based compensation is inefficient. Rather, the evidence suggests that compensation committees face a trade-off between the positive incentive effects afford by stock-based compensation and the negative effect of increasing the probability of accounting fraud.

1. Introduction

Some of the largest alleged accounting frauds in history occurred in the last several years, leading to the well-known upheaval in the accounting industry and sweeping legislative and regulatory changes. These events have left legislators, regulators, practitioners, and academics searching for answers about the causes of these alleged frauds. Understanding the underlying forces that gave rise to the alleged frauds is a necessary precursor to effectively preventing future occurrences. Many have suggested that the explanation lies in the incentives and opportunities for personal gain faced by executives.

One of the incentives that managers might be responding to is the increase in the proportion of their wealth that is tied to stock-based compensation. It is well documented that the use of stock options as a form of executive compensation rose dramatically during the 1990s, as did other forms of pay-for-performance plans such as grants of restricted stock and bonus plans tied to performance.[1] A substantial body of theoretical work, beginning with Jensen and Meckling (1976), shows that these plans can be useful in aligning the incentives of managers with those of shareholders.[2] Following this work, many empirical researchers have predicated their analyses on the premise that granting options is consistent with firm value maximization

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[1] Ironically, Congress contributed to this trend by changing the tax code in 1993 to favor pay-for-performance over straight salary in executive compensation. Congress enacted these rules in response to some well-publicized cases of firms increasing their executive compensation while at the same time downsizing their labor forces in the early 1990s. Specifically, Congress created Section 162(m), which eliminated deductions for salaries paid in excess of $1 million for top executives. However, Congress put in an exception for compensation tied to performance, including employee stock options, allowing firms to deduct such compensation without limit.

[2] There are also several empirical papers that find results consistent with the incentive alignment view. For example, Brickley, Bhagat and Lease (1985) find that the average stock price reaction to an announcement of a long-term managerial compensation plan is positive (consistent with incentive alignment, although they cannot distinguish between a tax or signaling explanation). Another example includes Lewellen, Loderer and Rosenfield (1985) who find evidence consistent with managers being less likely to make merger bids that lower their stock prices when they hold more stock in the firm, consistent with their interests being aligned with shareholders.

(for examples see Demsetz and Lehn, 1985; Himmelberg, Hubbard and Palia, 1999; Core and Guay, 1999; and Ragjopal and Shevlin, 2002). Indeed, there is even some empirical evidence that, on average, such executive stock options are effective in generating positive future payoffs for the firm in terms of accounting earnings (Hanlon et al., 2004).[3] However, there are others that view option compensation differently. Some argue that options are an inefficient way to compensate managers (Jenter, 2001; Meulbroek, 2001; and Hall and Murphy, 2002), that managers use option grants for their own benefit (Aboody and Kasznik, 2000; Yermack, 1997), and that stock options do not exhibit empirical relations consistent with the economic motivations behind granting them (Yermack, 1995). Further, recent work by Bebchuk, Fried and Walker (2002) puts forth the possibility that executives have power to influence their own pay, they use that power to extract rents, and that the desire to camouflage rent extraction might lead to the use of inefficient pay arrangements that provide suboptimal incentives thereby hurting shareholder value.

As many observers have noted, it is possible that the timing of the increase in performance-based compensation and the perceived increase in corporate fraud is no coincidence. In testimony before the Senate Banking Committee, Alan Greenspan pointed to compensation structures as creating incentives for misleading reporting, stating that

> …the highly desirable spread of shareholding and options among business managers perversely created incentives to artificially inflate reported earnings in order to keep stock prices high and rising. This outcome suggests that the options were poorly structured, and, consequently, they failed to properly align the long-term interests of shareholders and managers, the paradigm so essential for effective corporate governance. (Greenspan, 2002).

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[3]   In addition, in a study of new economy firms, Ittner, Larcker and Lambert (2002) find that lower than expected stock option grants and/or existing option holdings are associated with lower accounting and stock price performance in subsequent years. However, they find little consistent association between future performance and greater than expected option grants and holdings.

Others are more colorful in their language. For example, Michael Jensen noted that for some firms, "Equity based compensation is like throwing gasoline on a fire."[4] Further, the Financial Economists Roundtable argued for changes in tax laws that currently encourage the use of stock options. The group noted that "The popularity of stock options may have created incentives for managers to manipulate company financial statements in order to drive up stock prices, contributing to the recent corporate scandals."[5]

There is anecdotal evidence consistent with such an association. It was reported that the CEOs from nine of the corporations targeted by recent government investigations earned a combined $2 billion from 1997-2001.[6] In 1997, the *Wall Street Journal* quoted Dennis Kozlowski as saying "Options are a free ride … a way to earn megabucks in a bull market" in response to a question about why he had never received options in Tyco. Several months later, Kozlowski reportedly received 3.3 million Tyco options. All told, Kozlowski is alleged to have obtained more than $400 million in salary, stock grants and gains from the sale of stock options during his last five years at Tyco.[7]

In its investigations, the SEC has also alleged links between compensation and fraud. For example, in its investigation of alleged accounting fraud at Vari-L, the SEC stated: "The complaint alleges that Sherman, Clark and Hume realized the fruits of Vari-L's fraudulent financial reporting by exercising stock options and selling Vari-L stock for substantial profits."[8] In the academic literature, Jensen (2001) demonstrates that non-linearity in pay-for-performance

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[4]   Source: "Boom gives execs and unnatural high." Chicago Tribune, Section 3, page 11, November 4, 2003. Jensen also asserted that "overvalued equity is like heroin in the bloodstream of corporate executives."
[5]   Source: "Economists Group Is Seeking Repeal of Executive-Pay Curb." The Wall Street Journal, November 24, 2003.
[6]   Source: *Money Magazine*, September 2002, pages 63-64.
[7]   Source: M. Maremont and L. Cohen, "How Tyco's CEO Enriched Himself" *The Wall Street Journal*, August 7, 2002.
[8]   Source: SEC AAER 1460 (September 27, 2001).

systems induces managers to lie and argues that such lying is so pervasive that firms would be better off adopting solely linear pay-for-performance systems.

Though stock-based compensation likely enhances performance on average, there appear to be a growing number of observers who perceive accounting fraud to be a negative side effect from heavy use of stock-based compensation, and employee stock options in particular. The purpose of this paper is to provide some empirical evidence on the topic. Specifically, we examine whether the incidence of alleged accounting fraud is higher for firms and executives that have compensation plans with high proportions of stock option compensation and high pay-for-performance sensitivity relative to other firms. We also provide evidence that the value of managerial equity stakes in firms accused of committing fraud were inflated as a result of the accounting fraud.

We begin by identifying all firms accused of accounting fraud by the SEC during the period January 1996 to November 2003. After some restrictions based on availability of executive compensation data, our sample consists of 50 firms accused of accounting fraud by the SEC during this period. We compare these 50 firms accused of fraud to firms from the same time period that were not accused of accounting fraud by the SEC.

Using the sample of 50 firms compared to all other firm-years on Execucomp, we find results consistent with the likelihood of accounting fraud increasing in the extent to which executives' pay is tied to performance. Specifically, the likelihood of being accused of fraud is generally decreasing in the amount of salary paid to executives, increasing in the amount of stock-based compensation, and increasing in the percent of total executive compensation that is stock-based (hereafter called stock-based mix). We also find that the sensitivity of the executives' stock-based wealth to stock price changes (i.e., the change in the value of the

executives' portfolios of stock, restricted stock, and stock options for a one percent change in stock price) is positively associated with the likelihood of accounting fraud. Of the control variables, one that is consistently significant is a variable that proxies for the likelihood that management will want to obtain external financing in the next two years, with the probability of fraud increasing in this proxy.

The positive relation between performance based compensation and accounting fraud survives a battery of robustness tests. For example, the results are robust to industry. When we add control variables to account for the effects of firm financial performance (e.g., ROE, ROA, EP, and BM) the conclusions are unchanged. If we only use a subsample of fraud firms for which we have Execucomp data, the conclusions are unchanged. In addition, the results are robust to logging the independent variables. Thus, the evidence consistently supports the conclusion that the level of stock-based compensation, the proportion of stock-based compensation relative to total compensation, and the sensitivity of executives' stock-based wealth to a change in stock price are each positively associated with the likelihood of fraud.

In additional tests, we implement a two-stage instrumental variables procedure to control for endogeneity. We use the industry average of stock-based mix of compensation as an instrument for each firm's stock-based mix of compensation. After implementing this control for endogeneity, inferences remain the same.

We interpret the weight of the evidence as consistent with the probability of fraudulent accounting increasing in stock-based compensation. We do not conclude from this evidence that stock-based compensation is inefficient. Rather, the evidence suggests that compensation committees face a trade-off between the positive incentive effects afforded by stock-based

compensation and the negative side effects, such as increasing the probability of accounting fraud, than can arise from performance-based compensation.

For managers to engage in accounting fraud, they must perceive positive net benefits from it. To examine whether the alleged accounting fraud led to overstated managerial wealth during the fraud, we estimate the portfolio value of the top five managers at different points surrounding the SEC's allegation of fraud. Our estimates indicate that the value of managerial holdings of sample firm equity declined by an average (median) of 39% (49%) during the six months after announcement of the fraud. The median decrease in wealth of the top five managers during the six month period is approximately $19 million. These results indicate that the value of the equity holdings of top management at the firms accused of fraud were substantially overstated prior to the revelation of the allegedly fraudulent behavior.

The paper proceeds as follows. In section 2 we discuss prior related literature. In section 3 we discuss the sample selection. Section 4 contains the results and Section 5 concludes.

2. Prior research on the determinants of fraud and related issues

While the set of papers focusing on accounting fraud is manageable, the broader context of this study relates to earnings management, compensation, and corporate governance, for which there exists a vast set of prior and current research (for reviews see Bushman and Smith, 2001; Murphy, 1999; Pavlik, Scott, and Tiessen, 1993; Sloan, 2001). Consequently, our discussion of the literature will be in general terms with the exception of some papers that are very closely related to this paper. For this purpose, we classify research into three categories: research on the determinants of violations of accounting principles and restatements, research on compensation and earnings management, and research on compensation and accounting fraud.

2.1 Research on violations of accounting principles and research on restatements

Dechow, Sloan and Sweeney (1996) examine the causes and consequences of firms

subject to SEC enforcement actions during the years 1982-1992. They posit the following

potential causes of fraud: 1) external financing needs, 2) proximity to debt covenant violations,

3) governance variables, and 4) executive wealth variables.   They find that firms subject to

enforcement actions are more likely to have boards of directors dominated by management, a

CEO who is also Chairman of the Board, a CEO who is also firm's founder, no audit committee,

and no outside blockholder.

Dechow et al. (1996) find no significant link between executive compensation and

stockholdings and the likelihood of an SEC enforcement action. The executive wealth variables

that Dechow et al. (1996) include are: 1) the total dollar of stock sales made by officers and

directors during the manipulation period, 2) total dollar of stock sales made by the CEO during

the manipulation period, and 3) whether the firm had an earnings-based bonus plan. They find

the following results with respect to executive compensation variables. First, relative to officers

and directors of control firms, officers and directors of firms subject to SEC enforcement actions

did not sell a significantly greater proportion of their firm. Second, the relative value of CEO

sales does not differ from that of the CEOs of control firms. Finally, the existence of an

earnings-based bonus plan does not differ significantly across the SEC and the control samples.

Thus, Dechow et al. (1996) do not find evidence of a link between executive compensation and

SEC enforcement actions. However, Dechow et al. (1996, p. 21) note that

> …the firms examined are predominantly from high growth industries. Smith and
> Watts (1992) suggest that firms in high growth industries are more likely to
> employ stock-based rather than earnings-based incentive plans. We find that 94.2
> percent of the SEC firms, versus only 80 percent of the control firms have stock-
> based compensation (not reported in the table). This is consistent with SEC firms
> placing a relatively greater weight on stock price-based incentives versus
> earnings-based incentives in compensating management, but provides no support

for the bonus hypothesis.

The emergence of Execucomp database and the advances in measurements of stock option based incentives allow us to extend these tests further. For example, at present there are eleven years of data in the Execucomp database from which to gather detailed disclosures of executive compensation for a broad sample of firms.

It is important to extend the tests of Dechow et al. using stock option measures of compensation for at least two reasons. First, Murphy (1999) documents that levels of pay and pay-performance sensitivities in the U.S. have increased substantially over the past decade, driven primarily by an explosion in stock-option compensation. Second, although stock options comprise the fastest growing component of top management compensation, there is no consensus on the costs and benefits of the incentives provided by executive stock options (see for example Hanlon, Rajgopal and Shevlin, 2004; Rajgopal and Shevlin, 2002; Yermack, 1995; Jenter, 2001; Meulbroek, 2001; Hall and Murphy, 2002; Ittner, Lambert and Larcker, 2003).

Other papers that are concurrent with or extend Dechow et al. (1996) include Beasley (1996), Summers and Sweeney (1998), Beneish (1999), and Bradshaw, Richardson and Sloan (2001). Beasley (1996) compares firms that were accused of fraud to a control sample of non-fraud firms, matched by size, industry and time. His sample of fraud firms comes from the period 1982-1991 and is comprised of 67 firms identified through AAERs and 8 firms identified from the *Wall Street Journal* articles. Consistent with Dechow et al. (1996), Beasley (1996) finds that outside directors decrease the probability of fraud, as does higher tenure and ownership by outside directors. He finds that the presence of an audit committee has no effect on the probability of fraud.

Like Dechow et al. (1996), Beneish (1999) examines firms subject to enforcement actions by the SEC. Beneish (1999) extends Dechow et al. (1996) by examining whether managers overstate their firms' earnings and then sell their personal holdings (i.e., stock and options) in the firm at inflated prices. Beneish (1999) finds that managers of firms subject to AAERs are more likely to sell their own stock during periods when the earnings management is taking place than are managers of control firms. In contrast to Dechow et al. (1996), Beneish (1999) does not find evidence that managers are motivated to inflate earnings in advance of an equity issuance by the firm.

Bradshaw, Richardson and Sloan (2001) investigate whether analysts and auditors utilize information about future earnings performance in accruals. They also extend Dechow et al. (1996) and find that high accruals are associated with a higher incidence of SEC enforcement actions for GAAP violations. Finally, Summers and Sweeny (1998) investigate the relation between insider trading and fraud and find that in the presence of fraud, insiders reduce their holdings of company stock through high levels of selling activity as measured by either the number of transactions, the number of shares sold, or the dollar amount of shares sold.

Several studies examine the factors associated with restatements. While in most cases the behavior underlying a restatement does not rise to the level of fraud, restatements possibly indicate some violation or disagreement about the application of Generally Accepted Accounting Principles (GAAP). Thus, there is likely common ground between the factors associated with restatements and the factors associated with fraud. At least four recent papers investigate restatements.

First, Palmrose and Scholz (2002) examine restatements. Among other things, they find that out of 492 restatements, only 52 (11%) result in an AAER issued against the restatement

firm. Further, only 186 (38%) result in litigation.   This is consistent with restatements reflecting a wide variety of behavior ranging from genuine disagreements over the application of GAAP to a specific set of transactions to behavior constituting fraud.

Second, Agrawal and Chadha (2002) investigate the probability of an earnings restatement as a function of a number of hand-collected corporate governance metrics. Among other things, they find that most restatements are initiated by the company rather than by regulators (141 initiated by the company versus 21 initiated by regulators).

Third, Richardson, Tuna, and Wu (2002) investigate 440 restatements by 225 firms from 1971-2000. Richardson et al. (2002) compare restatement-years to all other Compustat years to avoid problems with nonrandom matched samples, citing Zmijewski (1984) and Palepu (1986). Compared to non-restatement firms they find that restatement firms have higher market-to-book and price-to-earnings ratios, higher leverage, and greater use of external financing. They also find that restatement firms have longer strings of positive quarterly earnings growth and longer strings of positive quarterly earnings surprises than non-restatement firms.

Finally, Kedia (2003) examines the option grants and exercises of the top executives of 224 firms that announce restatements of earnings due to accounting irregularities. Keida finds that firms that both 1) announce a restatement and 2) have a negative market response to the announcement had granted approximately 50% more options to their top executives in the years prior to the restatements. Moreover, the executives of these firms also exercised more options than did the executives of a control sample of firms matched by size and industry. Kedia (2003) concludes that private gains in option portfolios of the top executives might have given them incentives for aggressive interpretation of GAAP.

2.2. Research on executive compensation and earnings management

The study of compensation and earnings management dates back to Healy (1985) and Watts and Zimmerman (1986).[9] Our paper relates to those studies and recent working papers that investigate whether there is a link between earnings management and executive compensation or weak corporate governance. For example, Cheng and Warfield (2002) find that the magnitude of abnormal accruals is positively related to the magnitude of stock-based compensation. Further, they find a lower earnings/returns association in firms that use higher stock based compensation than other firms. Ke (2002) examines the possible link between CEO compensation and two empirical regularities: 1) the tendency of firms to report small earnings increases more often than they report small earnings decreases and 2) the tendency of firms to report long strings of increasing earnings. Ke (2002) finds that firms whose CEOs have high amounts of equity incentives related to unrestricted stock and whose CEOs have options immediately exercisable both exhibit this behavior more than firms whose CEOs have low amounts of these incentives. Gao and Shrieves (2002) find that the absolute value of discretionary accruals is affected by executive compensation structure. Earnings management intensity is increasing in the amount of options and bonuses and decreasing in salaries.

These studies have the advantage that they can examine large samples and they are certainly useful for better understanding earnings management across a broad set of firms. The disadvantage of these studies is that they for the most part rely on models of discretionary accruals, which have well known limitations. While these studies are useful, none of them focus

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[9] There are also studies of compensation and other types of managerial action. For example, Bizjak, Brickley, and Coles (1993) investigate how concern over current stock price may motivate managers to use observable investments to manipulate the market's inferences about the firm resulting in either over- or under-investment. They find evidence consistent with firms having high information asymmetries favoring contracts that focus on long-run stock returns (current and future) over contracts that focus on near term stock returns alone.

on accounting fraud – the most extreme form of earnings management and the behavior that lead to the downfall of Arthur Andersen and regulatory changes by Congress, e.g., the Sarbanes-Oxley Act and the formation of the Public Company Accounting Oversight Board (PCAOB). Using AAERs allows us to investigate a sample of firms that the SEC alleges to have engaged in accounting fraud. As a result, we are not forced to identify firms engaged in accounting related malfeasance using models that *estimate* earnings management.

2.3. Research on compensation and accounting fraud

Despite the importance of understanding the factors associated with accounting fraud, we are aware of no published research on the possible link between compensation and accounting fraud, other than what is in the studies mentioned above. However, there are related contemporaneous working papers. For example, Johnson, Ryan, and Tian (2003) present univariate comparisons between executives of firms accused of fraud and executives of firms not accused of fraud. They find that executives of firms accused of fraud had higher financial incentives to increase stock price than did executives of firms not accused of fraud. In addition, Goldman and Slezak (2003) develop an agency model in which stock-based compensation is a double-edged sword, inducing managers to exert productive effort but also inducing managers to divert valuable resources to misrepresent performance. Finally, Peng and Roell (2003) examine the role of executive compensation in inducing management behavior that triggers private securities litigation and find that incentive pay in the form of options (but not restricted stock or base pay) increase the probability of lawsuit incidence. They also find evidence consistent with accounting earnings management (measured as discretionary accruals) being a mediating factor in this relation.

3. Sample selection and description

To identify firms accused of accounting fraud, we searched SEC Accounting and Auditing Enforcement Releases (AAERs) for the word "fraud" during the years 1996-2003. AAERs are summaries of the SEC's accounting-based enforcement actions and describe the SEC's investigations of alleged violations of accounting provisions of the securities laws. AAERs include several types of alleged violations by firms and/or their employees including fraud, non-fraudulent but reckless or grossly negligent disclosure, and instances where the company failed to comply with reporting provisions of the Securities Acts but was neither fraudulent nor grossly negligent (Feroz et al. 1991).[10]

Table 1 summarizes our sample selection procedure. From the set of AAERs during the period January 1, 1996 to November 19, 2003, we identify 287 instances (excluding repeat accusations) in which the SEC uses the word "fraud." We exclude AAERS that are not relevant for the subject of this inquiry, such as alleged fraud by brokers and dealers, government personnel, or charitable organizations. We also require sufficient disclosure about executive compensation to compute our estimates of compensation mix and executive wealth sensitivity to stock price changes. We first look to the S & P Execucomp database (Execucomp). For the firms without Execucomp data, whenever possible we hand-collect the necessary data from proxy statements filed with the SEC.[11] This results in a sample of 50 firms that are both accused of fraud by the SEC and for which we have compensation data. Panel B of table 1 presents the name of each of the 50 sample firms accused of fraud by the SEC. As the list indicates, the

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[10] For more detail on AAER and the SEC's process in investigating firms, see Pincus, Holder, and Mock (1988), Feroz, Park and Pastena (1991) and Dechow, Sloan and Sweeney (1996).

[11] Note that data are hand-collected for 22 firms. Because the sample of firm-years not accused of fraud are all from the Execucomp database, as a sensitivity test we estimate the regression results excluding the hand-collected observations to eliminate any potential bias. We find results that are qualitatively similar—see section 4.4. and table 5C for further discussion and tabulation of the results.

sample captures the well-publicized alleged accounting frauds of recent years as well as some of those that were less publicized.

In table 2 we break down the number of fraud and non-fraud firms by industry (panel A) and by year (panel B). To make panel A of manageable size, we break out only those two-digit SIC codes for which we have one or more firms accused of fraud. Most two digit SIC codes have no firms accused of fraud by the SEC during the time period in this study and we lump those together into an "all other" category.

The first observation one can make regarding panel A is that the incidence of fraud does not seem to be highly concentrated in a few industries. The 50 firms accused of fraud are spread over 20 different two-digit SIC codes. A reasonable expectation would have been that entire industries become prone to fraud at the same time due to common external influences and common governance and compensation structures across firms in a given industry. But we do not observe much industry clustering of alleged fraud.

The industry with the largest absolute number of alleged frauds is business services (SIC 73), which has 10 firms accused of fraud. Business services firms are over twice as likely as the average firm to be accused of fraud, accounting for 8.44 percent of the non-fraud firms and 20 percent of the alleged frauds. Miscellaneous retail (SIC 59) is also over-represented in the alleged fraud sample; firms in this industry are about five times more likely than the average firm to be accused of fraud, accounting for 1.9 percent of the non-fraud sample and 10 percent of the fraud sample. Other over-represented industries in the fraud sample include communications (SIC 48) and fabricated metal (SIC 34). Overall, however the data in this table suggest that fraud is not specific to any particular industry.

We excluded banks and savings and loans from our sample because an important control variable – the proxy for the desire for external financing - was not available on Compustat for these firms.   However, this restriction only excluded three firms, suggesting that unlike the alleged accounting frauds of the late 1980s (see Erickson, Mayhew, and Felix, 2000), the alleged frauds of the 1990s and early 2000s do not appear to be concentrated in banks and savings and loans.

Panel B of table 2 presents the breakdown of SEC fraud allegations by year, where year represents the first year the alleged fraud took place (not the year in which the SEC made the allegation). The alleged frauds begin as early as 1992 and as late as 2001. The number of frauds beginning in a given year range from a low of one in 1993 to a high of ten in 1997.   Overall, there is no discernable trend over time and the alleged frauds are not overly clustered in any given year.

For each of the fraud firms, we collected the disclosure of the method of earnings overstatement as documented by the SEC (while in theory the SEC could issue and AAER for understating earnings, all of the AAERs that we observed were for overstating earnings). In table 3, we summarize the types of accounting manipulations used by sample firms to overstate earnings by frequency. As this table indicates, 60.9 percent of the firms were accused of overstating their revenue. Specific SEC accusations include: reporting "false revenues," "improperly recognizing" revenue, "channel stuffing," "prematurely recognizing revenue," "inflating" revenue, "recording revenue from the sale … prior to shipment," and recognizing revenue on "invalid or nonexistent sales." The second most common accusation consisted of various types of cost or expense understatement, applying to 37 percent of the firms. Examples of such expense understatement accusations contained in SEC AAERs include: "created

fictitious assets," "overstating inventory," "improperly capitalizing expenses," "improper capitalization of millions of dollars of company expenses," and "including fake items in inventory." Other more specific sources of overstatement include purchase accounting or merger related accounting entries (e.g., "cookie jar reserves"), barter transactions, lease accounting manipulation, and overstatement of inventory.

We also examine the level of management accused in the AAER. In untabulated results, we find that the highest levels of management are most often accused of involvement in the accounting fraud. In more than 50% of the cases, the CEO or the CFO was accused of perpetrating the accounting fraud that led to the AAER.

4. Tests of the relation between executive compensation and alleged accounting fraud and estimates of managerial benefits from accounting fraud

4.1.   Variable measurement – relation between executive compensation and accounting fraud

For the firms accused of fraud, all variables are measured in the year immediately preceding the first alleged fraud year. For some firms, the fraud years started prior to 1992 however and thus, data on Execucomp is not available for these firm-years. In those cases and where the fraud started no more than two years earlier, we substitute the year 1992 for the year prior to fraud in order to keep the firm in the sample. All compensation variables are aggregated over the entire management team listed in the proxy statement for the fiscal year. Generally, this is the five most highly compensated executives. The variables are defined as follows:

FRAUD   = indicator variable set equal to one if the firm is accused of fraud and zero otherwise.

SALARY   = dollar value of base salary earned by the top five executives during the fiscal year (Execucomp variable *Salary*).

BONUS	=	the dollar value of a bonus earned by the top five executives during the fiscal year (Execucomp variable *Bonus*).
STOCK-BASED COMP	=	the sum of the value of the current year stock option grants (valued using the Black-Scholes method[12]) and the market value of restricted stock granted during the fiscal year (Execucomp variables *Blk_value* and *Rstkgrnt*).
STOCK-BASED MIX	=	the ratio of *STOCK-BASED COMP* to the total of current year compensation (*SALARY, BONUS, STOCK-BASED COMP*). In other words the proportion of total current compensation that comes from stock based compensation.
SENSITIVITY	=	the sensitivity of the top five managers' stock, restricted stock, and stock option portfolio values to a one percent change in the stock price. (We discuss this measure further below.)
CEO=CHAIR	=	indicator variable that is set to one if the Chairman of the Board is also the chief executive officer (CEO).
NUMMTGS	=	the number of board meetings held during the fiscal year (Execucomp variable *Nummtgs*).
FINANCING	=	An ex ante measure of a firm's desire for external financing. It is an indicator variable coded 1 if the firm's variable *FREECASH* is less than -0.5 and 0 otherwise. (We discuss this measure further below.)
LEVERAGE	=	total debt (Compustat data item #34+#9) scaled by total assets (data item #6).
MVE	=	the market value of equity of the firm (Compustat data item #199 times #25).
ALTMAN Z SCORE	=	proxy for risk of financial distress calculated based on Altman (1968) as updated by Begley, Ming and Watts (1996)[13]

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[12] For more information on how Execucomp calculates the Black-Scholes value of stock option grants see http://umi.compustat.com/docs-mi/help/execdefs_alpha.htm under Black-Scholes Methodology. The firms for which we had to hand-collect the data have a value calculated using this methodology as closely as possible.

[13] We also estimated the regressions using the proxy for distress as developed by Shumway (2001) and our inferences are unchanged. In addition, in sensitivity analyses we include other variables that control for firm performance and likely capture a significant portion of distress risk—return on assets, return on equity, book-to-market, and earnings-to-price. Again, after including these controls our results are essentially unchanged. See

4.1.1. Sensitivity

We define *SENSITIVITY* as the expected change in the top five executives' wealth from a one percent change in stock price. This change in wealth consists of the sum of the change in the value of the executives' employee stock option portfolios, restricted stock holdings, and stock holdings. We aggregate across the three to derive a total dollar measure of the sensitivity (slope) for each executive. We aggregate across the firm's top five executives to get a total dollar measure for the top management team of the firm. The wealth changes from stock and restricted stock are estimated by multiplying the market value of the stock holdings at year-end (the year prior to the alleged accounting fraud for the alleged fraud firms) by one percent.

For options, we use the method of calculating the stock option sensitivity to stock price (i.e., slope) as described by Core and Guay (2002). Although detail such as the number of options, exercise price and time to maturity is available from Execucomp or the current year proxy statement for current year grants, much of these data are unavailable in the current year proxy statement for prior grants. The one-year approximation method described in Core and Guay (1999, 2002) requires information only from the most recent proxy statement to estimate the sensitivity of the option portfolio to a change in stock price. The sensitivity to stock price (slope) for each option held is estimated as

$$[\partial(optionvalue)/\partial(price)]*[price*0.01] = e^{-dT}N(Z)*[price*0.01]$$

where *d* is the natural logarithm of expected dividend yield over the life of the option, *T* is the time to maturity of the option in years, *N* is the cumulative normal probability function and *Z* is

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section 4.4 and table 5B for discussion and tabulation of these results.

$\left[\ln(S/X) + T(r - d + \boldsymbol{s}^2/2)\right]/\boldsymbol{s}T^{\frac{1}{2}}$ (where S is the price of the underlying stock, X is the

exercise price of the option, r is the natural logarithm of the risk-free interest rate, and $\boldsymbol{s}$ is the

expected stock-return volatility over the life of the option).

4.1.2. Management's desire for external financing

We follow Dechow et al. (1996) in measuring management's desire for external

financing. The desire for external financing not only depends on how much cash is generated

from operating and investment activities but also on the stock of funds already available within

the firm (e.g., short term investments or cash). We assume that current assets are readily

convertible into cash and represent the stock of funds available to the firm. We use the average

capital expenditures during the prior three years as the desired investment level during the

current year.[14] Therefore, a measure of a firm's ex ante desire for external financing is

FREECASH$_t$ =

$$\frac{\text{Cash from operations}_t \text{ (data \# 308)} - \text{Average Capital Expenditures}_{t-3\,to\,t-1} \text{ (data \#128)}}{\text{Current Assets}_{t-1} \text{ (data \#4)}}$$

When *FREECASH* is negative, the absolute value of the ratio (1/*FREECASH*) provides

an indication of the number of years that the firm can continue to internally fund its current level

of operating and investing activities. For example, when *FREECASH* is equal to -0.5, absent

external financing, a firm will consume all of its available current assets within two years.

Dechow et al. (1996) hypothesize that as *FREECASH* becomes more negative (i.e., the firm is

closer to exhausting its internal funds), the firm is more likely to manipulate earnings. Because

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[14]   If the firm has less than three years of data available, we average over the shorter period.

the relation is not likely linear, we follow Dechow et al. (1996) and create an indicator variable set equal to one if the firm will likely want external financing within the next two years and zero otherwise. This cutoff assumes that if a firm requires external financing within the next two years, then it will start taking action now to raise the desired funds.

4.2. Univariate tests

In table 4 we present descriptive statistics for the alleged fraud firms and non-fraud firms. For each variable we present the mean, standard deviation, median, and lower and upper quartiles. Variables that represent dollars are shown in millions and all variables are winsorized (reset) at the 1% and 99% levels. For the firms accused of fraud, all variables are measured as of the year prior to the beginning of the fraud.

As table 4 indicates, when comparing means, the alleged fraud firms are not statistically different from the non-fraud firms in terms of assets and market value of equity. At the median, non-fraud firms are larger than fraud firms in terms of total assets. The alleged fraud firms have lower return on assets and lower return on equity. The lower accounting returns for the alleged fraud firms is consistent with the idea that these firms are somewhat troubled possibly providing at least a part of the motivation for the alleged accounting fraud.

In terms of the non-compensation related regression variables, the statistics in table 4 indicate that the only item that is statistically different between the two groups is *FINANCING* (p=0.035) with the firms accused of fraud more likely to desire external financing within the next two years as compared to the non-fraud firms.[15] This is again consistent with the alleged fraud firms facing more financial constraints and poor returns.

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[15] Median capital expenditures are larger for non-fraud firms than for fraud firms.

With regard to the compensation variables, the data in table 4 indicate that executives at the alleged fraud firms receive salaries and bonuses that are not significantly different than executives at non-fraud firms.[16]

The executives at the alleged fraud firms receive greater compensation in terms of stock based compensation (measured as the sum of the Black-Scholes value of stock option grants and the market value of restricted stock grants) (p=0.013). We also find that executives at the alleged fraud firms receive a higher percentage of current year compensation on average from stock based pay (57%) as compared to the non-fraud firm executives (40.7%) (p=0.0001). However, when we compare the sensitivity of the executives' wealth from their stock option, restricted stock and stock portfolios to a 1% change in stock price the data reveal that there is not a significant difference (p>.10) between the average sensitivities of the two groups.

Finally, when we compare the market values of the holdings of stock and restricted stock by the executives at the two sets of firms we find there is no statistical difference between stock holdings and restricted stock holdings. However, the alleged fraud firm executives have a marginally higher average intrinsic value (market price less exercise price as of the end of the fiscal year) of stock option holdings as compared to executives at non-fraud firms (p=0.026).[17] However, the difference in this variable is not significant at the median.

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[16] As a sensitivity test, we also estimate scaled compensation measures and use these variables in the regression tests in table 5. When scaled, the denominator is the executives' firm specific wealth (the sum of the market value of stock and restricted stock held, the intrinsic value of all the in the money stock options held, and three times the amount of salary and bonus received in the current year). The scaled measure normalizes the variable relative to an estimate of the executive's wealth. The scaling is intended to make the numbers comparable between executives of large firms that are likely more wealthy (e.g., Bill Gates, Jack Welch) to executives at small firms to whom an identical amount of compensation may represent a much larger proportion of wealth and thus provide very different incentives. The regression results analogous to those in table 5 are qualitatively the same with the scaled as compared to the unscaled measures.

[17] One potential criticism of the metrics in table 4 and tests in table 5 is that they do not take into account industry differences in compensation practices. For example, software and biotech firms typically make heavy use of performance-based compensation relative to firms in other industries. It is possible that the likelihood of an executive committing accounting fraud is not so much a function of his compensation package relative to that of the average package of the entire market, but the degree to which his compensation package differs from

4.3. Multivariate tests

In this section we examine whether executive compensation is associated with alleged accounting fraud after controlling for corporate governance factors, the desire for external financing, and firm size. The conceptual model for the logit analysis is as follows:

$$Pr(Fraud) = f(compensation, governance, external financing, size) \qquad (1)$$

Table 5A presents the results of the main logistic regressions. The dependent variable equals one if the firm was accused of accounting fraud by the SEC and zero otherwise. The first model, presented in column A of the table, includes three compensation variables: *SALARY*, *BONUS*, and *STOCK-BASED COMP*. Recall that each of these variables represents the dollar value of current compensation the top five executives in the firm receive, for the particular form of compensation. The coefficient on *SALARY* is negative and significant (p=0.025), consistent with increases in executive salaries reducing the likelihood of accounting fraud. The coefficient on *BONUS* is not statistically significant. The coefficient on *STOCK-BASED COMP* is positive and significant (p=0.0001) consistent with increases in stock-based compensation increasing the likelihood of accounting fraud. Among the control variables, *FINANCING* is positive and significant (p=0.0004), suggesting that an increased desire for external financing is associated with an increased probability of accounting fraud. The coefficients on *CEO=CHAIR*, *NUMMTGS*, *LEVERAGE, MVE, and ALTMAN'S Z SCORE* are insignificant.

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industry norms. If deviation from industry is what is relevant, then our tests need to account for industry norms. To account for this possibility, we perform additional analysis (untabulated) in which each potential explanatory variable is measured as the difference from the industry mean. All inferences are unaffected when the tests are estimated in this manner.

In the second model presented in column B of table 5A, we substitute *STOCK-BASED MIX* for *SALARY*, *BONUS*, and *STOCK-BASED COMP*. Recall that *STOCK-BASED MIX* is defined as the proportion of total current compensation that comes from stock-based compensation. The coefficient on *STOCK-BASED MIX* is positive and significant (p=0.0001) consistent with the likelihood of fraud increasing in the fraction of total compensation that is based on stock price performance. The control variables follow the same pattern as in the first model. For example, *FINANCING* is positive and significant (p=0.0003) while the other variables are insignificant.

The third model in table 5A (column C) examines the association between *SENSITIVITY* and accounting fraud. We find the coefficient on *SENSITIVITY* is positive and significant (p=0.015). This result supports the conclusion that the sensitivity of managerial equity portfolios to a 1% change in stock price is positively associated with the likelihood of accounting fraud. Among the control variables, as with the first two models, *FINANCING* is positive and significant while the other control variables are insignificant.

4.4. Additional tests

4.4.1. Alternative specifications and control variables

In this section, we test the sensitivity of the results to alternative specifications and the inclusion of additional control variables. In Table 5B, we add book-to-market ratio, earnings-to-price ratio, *ROA*, and *ROE* to the logistic regression. After doing so, *STOCK BASED COMP*, *STOCK BASED MIX*, and *SENSITIVITY* are all positively associated with the likelihood of accounting fraud consistent with the results in table 5A. Inclusion of these additional control variables does however dampen the statistical significance of *FINANCING*.

In table 5C, we include only those 28 fraud firms for which we obtained compensation data from Execucomp. In other words, we exclude firms accused of fraud for which we hand-collected compensation. We perform this test to obtain some assurance that the aforementioned results are not due to differences in firms that are and are not included on Execucomp. As table 5C indicates, the tenor of the results is unchanged when we exclude firms for which we hand-collected compensation data, although the statistical significance of the compensation variables weakens slightly.

Table 5D presents the logit regression results when we log the compensation variables and market value of equity. Logging these independent variables mitigates the skewness in the empirical distributions and provides additional evidence about the relation, if any, between the form of executive compensation and accounting fraud. As table 5D indicates, *STOCK BASED COMP*, *STOCK BASED MIX* and *SENSITIVITY* all remain positively associated with the probability of accounting fraud.[18]

4.4.2. Controlling for endogeneity of compensation structure

Compensation structure is a choice variable, so using it as an explanatory variable runs the risk of endogeneity problems. For example, in cases where monitoring is more difficult firms may use a higher level of incentive (stock-based) compensation (Demsetz and Lehn, 1985; Smith and Watts, 1992; Gaver and Gaver, 1993; and Core, Holthausen and Larcker, 1999). It is exactly in those cases where monitoring is difficult that we might also expect to see a higher likelihood of fraud. This is especially true of our variable *STOCK-BASED MIX* because this variable represents risk the executive bears in his compensation structure as it varies with the

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[18]   We also estimated a rank regression version of the logit model, and the results from that specification are qualitatively the same as those reported in tables 5A through 5D.

stock price of the firm. If firms provide more incentives through pay risk when monitoring is more difficult and if fraud is more likely when monitoring is more difficult then we may see the association between *STOCK-BASED MIX* and *FRAUD* simply because monitoring is difficult in these firms not because the stock-based pay provided incentives for managers to engage in fraud.

In this section we explicitly recognize the endogenous nature of compensation structure and implement a two-stage instrumental variables procedure.[19,20] In the first stage, we regress *STOCK-BASED MIX* on an instrumental variable, the average stock-based mix value of other firms in the same four-digit SIC code, as well as all other (assumed) exogenous variables from the second stage regression.[21] The industry wide average of *STOCK-BASED MIX* is an appealing instrument as it is likely to be associated with an individual firm's *STOCK-BASED MIX* because compensation practices in one firm are influenced by industry-wide compensation practices. In addition, the industry-wide *STOCK-BASED MIX* is unlikely to be correlated with *FRAUD* because we do not find that fraud is highly concentrated in a few industries.

We estimate the first stage and compute a fitted value of the variable *STOCK-BASED MIX* and substitute that fitted value in place of the actual *STOCK-BASED MIX* in the primary

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[19]   While the two stage least squares instrumental variables method is the standard textbook fix for endogeneity, we recognize that appropriate instrumental variables are difficult to determine. Larcker (2004) points out that "Researchers face an extremely difficult task when instrumental variables are used in an attempt to mitigate endogeneity problems…In fact, it is quite possible to obtain results from multi-stage estimation that are worse than those obtained by the use of standard multiple regression estimation without instrumentation" (p. 93). For further discussion of problems with instrumental variables see Bound et al. (1995). We present both types of analyses –the multiple regression approach as the primary analysis and the two stage least squares approach as additional analyses.

[20]   We also recognize that other variables in our regression are also likely endogenous. However, we cannot control for endogeneity of all the variables and must assume that some variables are exogenous. We control for endogeneity in the mix variable explicitly because this variable provides the main test variable of the paper and it is one for which we can find an appropriate instrument (i.e., an instrument that is relatively highly correlated with the test variable, is not likely correlated with the error term, and significantly increases the R^2 in the first stage regression).

[21]   We require a minimum of four observations to compute the industry average. If there are less than four observations in the four-digit (three-digit) SIC code, we use the three-digit (two-digit) SIC code. Again, while we treat all variables other than *STOCK-BASED MIX* as exogenous, we recognize that clearly some of these variables are likely endogenous as well. The results with respect to each of these variables should be interpreted with care.

regression. We present the results from the first stage regression in panel A of table 6. The first

stage regression shows that the relation between the industry-wide *STOCK-BASED MIX* and

STOCK-BASED MIX is positive and significant and that the incremental R-squared from

including the instrument in the regression is 0.1119, which represents more than a doubling of

the R-squared. In addition, in unreported results, we find that the correlation between the

instrument and *STOCK-BASED MIX* is 0.38.[22]

We then estimate the second stage regression by substituting the predicted mix value

from the first stage in for *STOCK-BASED MIX* in the second stage regression. These results are

presented in panel B of table 6. The coefficient on the predicted *STOCK-BASED MIX* is 6.55 (p

= 0.0001) after controlling for other factors that may be associated with *FRAUD*. Thus, after

controlling for endogeneity, we find that the probability of fraud is positively associated with

STOCK-BASED MIX.

4.4.3. *Estimates of economic significance*

In this section we give a sense of the economic importance of compensation structure in

the probability of accounting fraud. At the outset it is important to note that the unconditional

probability of accounting fraud by any given firm in any given year is quite low, at least as

measured by SEC enforcement actions. Our sample contains 50 firms accused of fraud by the

SEC and over 13,000 firm-years not accused, giving an unconditional probability of being

accused of fraud by the SEC of around 0.38% per year.[23] Despite its rare occurrence, accounting

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[22] There is a loss of twelve observations from requiring four observations per industry to calculate an industry
average. To ensure that these twelve observations do not affect the results reported in table 5, we re -estimate
those tests excluding these twelve observations and find nearly identical results.

[23] More precisely this is the unconditional probability of being both accused of fraud by the SEC and having
sufficient proxy statements and/or Execucomp data available to compute our metrics.

fraud is important to understand because being accused of fraud by the SEC has severe adverse effects on the market value of the firm involved (Dechow, Sloan and Sweeny, 1996). Further, it only took a handful of very large alleged frauds to bring down Arthur Andersen and lead to the Sarbanes-Oxley Act. Thus, even what might appear to be a small increase in the probability of fraud can be economically significant.

To assess the marginal effects of an increase in the portion of *STOCK-BASED MIX*, we first set all of the explanatory variables, including the *STOCK-BASED MIX*, to their sample means (or modal value for indicator variables) (using the regression B in Table 5A). Then we increase the *STOCK-BASED MIX* by one standard deviation. We find that a one standard deviation increase in the portion of *STOCK-BASED MIX* increases the probability of being accused of fraud by the SEC by approximately 0.26%, which is a 68% increase in the likelihood of fraud.[24]

In terms of the control variables, one variable stands out from the rest – *FINANCING* – the indicator variable reflecting the likelihood of management seeking external financing. Moving from a zero value for *FINANCING* to a one (indicating a greater likelihood of management seeking external financing) increases the probability of fraud by 1.1%, a more than three-fold increase in the probability of fraud. This is consistent with Dechow, Sloan and Sweeney (1996) and others who have found that desire to access the capital markets can induce managers to manipulate earnings.

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[24]   By way of comparison, in the table 6 specification that uses the instrumental variables approach to control for endogeneity, we find that a one standard deviation in the predicted value of *STOCK-BASED MIX* increases the probability of being accused by fraud by the SEC by approximately 0.47%, more than doubling the likelihood of fraud.

We assess the marginal effects of an increase in *SENSITIVITY* in regression (C) of Table 5A in a similar manner. We find that a one standard deviation increase in *SENSITVITY* increases the probability of being accused of fraud by the SEC by approximately 0.09%, which is a 25% increase in the likelihood of fraud. While this is economically smaller than the marginal effect of *STOCK-BASED MIX*, we consider a 25% increase in the probability of being accused of fraud by the SEC economically meaningful.

4.5   Managerial Benefits Derived from the Accounting Fraud

The fundamental link between executive compensation and accounting fraud is the premise that firm management engages in accounting fraud with the expectation that the fraudulent activities will increase the firm's stock price or prevent a decline that would otherwise occur.   In order to more directly examine this link and ascertain whether fraud actually leads to positive net benefits for managers we investigate changes in the firm's stock prices and changes in managerial wealth surrounding the alleged frauds. Figure 1 presents cumulative average abnormal returns for the 50 sample firms for the 120 trading days prior and subsequent to public announcement of the accounting fraud.[25] As Figure 1 indicates, news of the accounting fraud led to a precipitous decline in the stock prices of sample firms. In sum, Figure 1 indicates that news of the accounting fraud led to an economically significant decline in fraud firms' market values.

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[25]   Figure 1 includes the abnormal returns of Microstrategy, which is a potential outlier in the analysis of wealth loss. If we exclude Microstrategy from this figure the decline in the sample firms' market values for the days surrounding the revelation of the accounting fraud is approximately 20% rather than the slightly more than 30% decline shown in the figure.

Next, we estimate the value of the top five managers' equity holdings in the firm prior to the announcement of the accounting fraud and at various dates subsequent to the announcement of the accounting fraud. The relative and absolute changes in the value of managers' equity holdings provides a measure of the degree to which they benefited from any inflation in stock price resulting from the accounting fraud. If there were no inflation in stock price and no inflation in managerial wealth as a result of the accounting fraud, there would be no incentive for managers to inflate accounting earnings and expose themselves to the risks associated with the fraud.[26]

For each of the 50 sample firms, we identify the date that news of the alleged accounting fraud first reached the market through a search of Lexis-Nexis. We then compute the value of managerial equity holdings of the top five executives on the day prior to the announcement of the accounting fraud. The total value of managerial equity holdings is comprised of stock options, stock, and restricted stock. We then compute the value of these same managerial holdings one week after the announcement of the fraud, six months after the announcement of the fraud, and one year after the announcement of the fraud.

In Table 7, we present the change in the value of equity holdings of the management team at our sample firms around announcement of the accounting fraud. We use the decline in value of managerial equity holdings after the announcement of the alleged fraud as an estimate of the amount of inflation in managerial equity holdings resulting from the accounting fraud. Table 7 reports the percentage change in value of equity holdings over the various time periods.

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[26] In this case it is management's expectation of an increase in wealth that influences their decision about whether or not to commit the accounting fraud. However, because actual expectations cannot be measured we use ex post realizations as a proxy for average expectations.

We find that the value of the equity holdings of managers at sample firms declines by an average (median) of 18.4% (17.2%) during the week after announcement of the accounting fraud, both of which are significant at less than the 1% level. Moreover, 81% of sample firm managers experience a decline in the value of their holdings of firm equities (p<.01). The median value of managerial holdings declined by about $2 million during the week following announcement of the fraud. During the six months after the announcement of the accounting fraud, the value of managerial holdings declined by about 49% at the median ($p < 0.01$), which is equivalent to about $19 million. Results are similar for the year subsequent to the announcement of the accounting fraud. In sum, the results in table 7 indicate that the value of managerial holdings of firms accused of accounting fraud declined significantly in response to public disclosure of the accounting fraud. Thus, it appears that the value of managerial stock holdings was inflated substantially as a result of the accounting fraud and managers obtained net benefits in terms of an increase in personal wealth.

We note a caveat to our interpretation of these data. The decrease in market value upon revelation of the fraud is likely the upper bound of how much the firm was overvalued as a result of the fraud. Suppose the market would have valued the firm's stock at $P_{nofraud}$ if no fraud had taken place, i.e., all information had been truthfully revealed. But instead the manager commits fraud, inflating the stock price to P_{fraud}, where $P_{fraud} = P_{nofraud}$. When the fraud is discovered, the market loses confidence in the firm and the stock drops to $P_{knownfraud}$, where it is probable that $P_{knownfraud} = P_{nofraud}$. It is unlikely that $P_{knownfraud} = P_{nofraud}$ because the very act of fraud likely destroys value, for example, by leading to litigation, a loss of confidence in the accuracy of the financial statements and the firm's governance, increased input costs, and increased costs of capital.

Thus there are three stock prices that we are interested in when trying to determine manager's private benefits: $P_{fraud} = P_{nofraud} = P_{knownfraud}$. However, because we can only observe P_{fraud} and $P_{knownfraud}$ and cannot observe what $P_{nofraud}$ would have been in the absence of fraud, there is an unavoidable limitation in our analysis of wealth changes. The manager's private benefits had his fraud not been discovered is really a function of $P_{fraud} - P_{nofraud}$, but we can only measure $P_{fraud} - P_{knownfraud}$, the decrease in stock price following the revelation of fraud. As a result, the decrease in stock price following the revelation of the fraud is likely an upper bound of the extent to which the fraud inflated stock price.

5.   Conclusion

This paper examines whether the incidence of alleged accounting fraud is associated with executive stock-based compensation and executive pay-for performance sensitivity. The results are consistent with the likelihood of accounting fraud increasing in the percent of total executive compensation that is stock-based. This result is robust to controls for the likelihood of the firm obtaining external financing, governance characteristics, financial performance, industry controls, and alternative specifications. Of the control variables, one that is consistently significant is a variable that proxies for the likelihood of management wanting to obtain external financing in the next two years, with the probability of fraud increasing in this proxy, consistent with Dechow et al. (1996).

One difficulty faced by most studies of compensation, including this study, is that compensation is endogenously determined. Accordingly, we implement a two-stage least squares procedure using the industry wide average of stock-based mix of compensation as the instrumental variable. We find results consistent with the main logistic regression analysis. Thus, although both methodologies (multiple regression and two-stage least squares) have

limitations, the results using either method yield similar results. We consistently find that a higher stock-based mix of pay is positively associated with the likelihood of fraud.

We do not conclude from this evidence that stock based compensation is inefficient on the whole. Rather the evidence suggests that compensation committees face a trade-off between the positive incentive effects afforded by performance-based compensation and the negative side effects, such as increasing the probability of accounting fraud.

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Table 1

Panel A: Description of sample selection procedure

Sample of firms accused of fraud

Total Accounting and Auditing Enforcement Releases (AAERs) issued from January 1, 1996 through November 19, 2003 attributable to alleged or actual accounting fraud (non-duplicates)	287
Less:	
Fraud allegations not against a firm or its executives (e.g., allegations involving broker dealers, investment advisors, auditors, city government personell, charitable organizations)	(57)
AAER unrelated to fraudulent financial statements	(1)
AAER that does not specifiy the year of the alleged fraud	(1)
AAER firms for which data are not available (Not on Compustat, Execucomp, no proxy statements are available, missing variables, or fraud pre-dates 1992 when Execucomp coverage begins)	(178)
Sample of firms accused of fraud by the SEC	50

Sample of firm-years not accused of fraud

Total firm-years available on Execucomp through 2001 [1]	17,477
Less: Firm-years of firms accused of fraud	(191)
Firm-years with missing required Execucomp compensation or stock holding variables	(685)
Firm-years with missing required Compustat financial statement data [2]	(3,167)
Sample of firm-years not accused of fraud by the SEC	13,434

Notes:

[1] We require non-missing option data to be included.

[2] This category includes firm-years in the financial services industry for which our measure of ex ante financing cannot be obtained--similar to alleged fraud firm sample.

Table 1
Panel B: List of firms accused of accounting fraud by the SEC

Number	Company Name	Time period of alleged fraud
1	Adelphia Communications Corporation	1999-2001
2	Advanced Technical Products Inc.	1998-1999
3	Anicom Inc.	1998-2000
4	Aremissoft Inc.	2000-2001
5	Ashford.com Inc.	2000-2001
6	Atchison Casting Corporation	1997-2000
7	Bausch & Lomb Inc.	1993-1994
8	Critical Path Inc.	2000-2001
9	Cyberguard Corporation	1997-1998
10	Cylink Corporation	1998
11	Diagnostek Inc.	1992-1993
12	Dynegy Inc.	2001-2002
13	Enron Corporation	1997-2001
14	Jo Ann Stores Inc.	1992
15	Fine Host Corporation	1996-1997
16	Gateway Inc.	2000
17	Guilford Mills Inc.	1997-1998
18	HBO & Co.	1997-1999
19	Healthsouth Corporation	1999-2002
20	IGI Inc.	1995-1997
21	Indus International Inc.	1999
22	International Thoroughbred Breeders	1997
23	K Mart Corporation	2001
24	Safety Kleen Corporation	1998-2000
25	Legato Systems Inc.	1999-2000
26	Material Sciences Corporation	1996-1998
27	Max Internet Communications Inc.	2000
28	Micro Warehouse Inc.	1994-1996
29	Microstrategy, Inc.	1998-2000
30	Oak Industries Inc.	1995-1996
31	Physician Computer Network Inc.	1996-1997
32	Premier Laser Systems Inc.	1998
33	Qwest Communications International Inc.	2000-2001
34	Rite Aid Corporation	1998-2000
35	Saf T Lok Inc.	1997-1998
36	Signal Technology Corporation	1996-1998
37	Structural Dynamics Research Corporation	1992-1994
38	Sunbeam Corporation	1997-1998
39	Sunrise Medical Inc.	1994-1995
40	Swisher International Inc.	1996
41	Symbol Technologies Inc.	1998-2002
42	System Software Assoc Inc.	1994-1996
43	Texlon Corporation	1999
44	Thomas & Betts Corporation	1998-1999
45	Thor Industries Inc.	1996-1998
46	Tyco International LTD	1997-2002
47	W R Grace & Co.	1992-1995
48	Waste Management Inc.	1992-1997
49	Worldcom Inc.	1999-2002
50	Xerox Corporation	1997-2000

Table 2
Sample of firms accused of accounting fraud by the SEC and firms not accused
by industry and by year

Panel A: By Industry

Two Digit SIC	Industry Name	No Allegation of Fraud Firms Percent of Total (1)	Alleged Fraud Firms Percent of Total (2)
22	TEXTILE MILL PRODUCTS	1.01%	2.00%
23	APPAREL & OTHER FINISHED PDS	0.99%	2.00%
28	CHEMICALS & ALLIED PRODS	8.43%	6.00%
33	PRIMARY METAL INDUSTRIES	2.84%	2.00%
34	FABR METAL,EX MACHY,TRANS EQ	1.76%	6.00%
35	INDL,COMML MACHY,COMPUTER EQ	6.97%	12.00%
36	ELECTR, OTH ELEC EQ, EX CMP	8.12%	4.00%
37	TRANSPORTATION EQUIPMENT	2.94%	2.00%
38	MEAS INSTR;PHOTO GDS;WATCHES	4.99%	6.00%
48	COMMUNICATIONS	2.12%	6.00%
49	ELECTRIC, GAS, SANITARY SERV	8.25%	4.00%
50	DURABLE GOODS-WHOLESALE	2.51%	2.00%
51	NONDURABLE GOODS-WHOLESALE	1.38%	4.00%
53	GENERAL MERCHANDISE STORES	1.53%	2.00%
58	EATING AND DRINKING PLACES	2.14%	2.00%
59	MISCELLANEOUS RETAIL	1.90%	10.00%
67	HOLDING,OTHER INVEST OFFICES	0.50%	2.00%
73	BUSINESS SERVICES	8.44%	20.00%
79	AMUSEMENT & RECREATION SVCS	0.93%	2.00%
80	HEALTH SERVICES	1.95%	2.00%
99	NONCLASSIFIABLE ESTABLISHMNT	0.24%	2.00%
	OTHER INDUSTRIES	30.06%	0.00%
		100.00%	100.00%

Panel B: By Year

Year	No Allegation of Fraud Firms Percent of Total	Alleged Fraud Firms Percent of Total
1992	7.3%	10.0%
1993	9.4%	2.0%
1994	9.7%	6.0%
1995	9.9%	4.0%
1996	10.7%	12.0%
1997	11.4%	20.0%
1998	11.4%	18.0%
1999	10.8%	12.0%
2000	10.2%	12.0%
2001	9.1%	4.0%
	100.0%	100.0%

Notes:

Firms are categorized as those accused of accounting fraud and those not accused.

(1) In this column we report the firms not accused of fraud by industry as a percentage of all firms not accused of fraud.

(2) In this column we report the percentage of all firms accused of fraud in the sample, drawn from the respective industry.

Table 3
Type of alleged accounting fraud discussed in the subject
Accounting and Auditing Enforcement Releases (AAERs)
50 firms subject to enforcement actions by the SEC

Source of Income Overstatement	Number of Firms	Percentage of Total
Overstatement of Revenues	28	60.9%
Understatement of Expense or Costs	17	37.0%
Improper Capitalization of Expenses	5	10.9%
Merger Accounting Related Manipulation	4	8.7%
Overstatement of Assets	3	6.5%
Overstatement of Inventory	7	15.2%
Overstatement of Accounts Receivable	1	2.2%
Improper Revenue Recognition	13	28.3%
Improper Lease Accounting	3	6.5%
Improper Environmental Accounting	1	2.2%
Understated Debt/Liabilities	4	8.7%
Overstated Cash Flow	2	4.3%
Overstated Earnings	5	10.9%
Manipulating Accounting Reserves	3	6.5%
Inappropriate Related Party Transactions	3	6.5%
Total	99 *	

Notes:

* Does not sum to number of firms in sample. Several firms are accused of engaging in multiple types of fraudulent behavior.

Table 4
Descriptive statistics on financial statement variables and market based measures
for firms subject to enforcement actions by the SEC and for all remaining firm-years on the Execucomp database

Variable	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile	Tests of Differences in Mean (p-value)	Wilcoxon Differences in Median (p-value)
TOTAL ASSETS (MILLIONS)							
Accused of fraud	$3,855.0	$7,881.6	$100.3	$281.0	$2,038.7		
Not accused of fraud	$2,957.1	$5,841.0	$299.5	$793.7	$2,487.3	0.4248	0.0052
EARNINGS TO PRICE							
Accused of fraud	(0.012)	0.107	(0.030)	0.020	0.050		
Not accused of fraud	0.019	0.013	0.018	0.044	0.067	0.0934	0.0003
BOOK TO MARKET							
Accused of fraud	0.405	0.343	0.183	0.340	0.481		
Not accused of fraud	0.486	0.365	0.242	0.409	0.632	0.1164	0.0280
RETURN ON ASSETS							
Accused of fraud	(0.023)	0.189	(0.051)	0.040	0.097		
Not accused of fraud	0.047	0.107	0.020	0.054	0.096	0.0001	0.0482
RETURN ON EQUITY							
Accused of fraud	(0.048)	0.046	(0.165)	0.109	0.200		
Not accused of fraud	0.090	0.265	0.048	0.124	0.193	0.0122	0.1429
AVERAGE CAPITAL EXPENDITURES							
Accused of fraud	$182.2	$439.4	$1.2	$8.1	$99.1		
Not accused of fraud	$169.0	$372.4	$11.9	$39.1	$136.7	0.8017	0.0002
FINANCING							
Accused of fraud	0.140	0.351	0.000	0.000	0.000		
Not accused of fraud	0.033	0.178	0.000	0.000	0.000	0.0354	0.0001
ALTMAN Z SCORE							
Accused of fraud	0.995	1.116	0.177	0.813	1.329		
Not accused of fraud	1.033	1.053	0.353	0.780	1.339	0.7984	0.7243
LEVERAGE							
Accused of fraud	0.202	0.174	0.037	0.184	0.325		
Not accused of fraud	0.229	0.176	0.694	0.223	0.351	0.2765	0.2602
MARKET VALUE OF EQUITY							
Accused of fraud	$4,991.5	$11,570.7	$168.7	$412.1	$4,257.0		
Not accused of fraud	$3,691.0	$9,221.8	$348.0	$871.6	$2,744.9	0.4311	0.1241

Notes: All monetary amounts are in $ millions. Variables are as defined as follows:

Total assets are the firms total assets, for firms accused of fraud, total assets are measured as of the year preceding the alleged fraud. Earnings to Price is the earnings to price ratio, for firms accused of fraud, the ratio is measured as of the year preceding the alleged fraud. Book to Market is the book value of shareholders equity divided by the market value of shareholder's equity, for the firms accused of fraud, the ratio is measured as of the year preceding the alleged fraud. Return on Assets is the net income divided by assets, for the firms accused of fraud, the ratio is measured as of the year prior to the alleged fraud. Return on Equity is the net income divided by assets, for the firms accused of fraud, the ratio is measured as of the year preceding the alleged fraud. Average Capital Expenditures is the average of the three prior years capital expenditures, for the firms accused of fraud, the variable is measured as of the three years preceding the year before the alleged accounting fraud. Financing is an indicator variable set equal to one when the firm's free cash flow divided by lagged current assets is less than -0.5 and zero otherwise. Altman Z Score is a proxy for risk of financial distress calculated based on Altman (1968) as updated by Begley, Ming and Watts (1996). Leverage is measured as the firm's debt divided by total assets, for firms accused of fraud, this ratio is measured as prior to the fraud. Market Value of Equity is the market value of shareholder's equity, for firms accused of fraud, it is measured the year prior to the alleged fraud. All variables are winsorized at the 1% and 99% levels.

Table 4 (cont'd)
Descriptive statistics on financial statement variables and market based measures
for firms subject to enforcement actions by the SEC and for all remaining firm-years on the Execucomp database

Variable	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile	Tests of Differences in Mean (p-value)	Wilcoxon Differences in Median (p-value)
CEO=CHAIR							
Accused of fraud	0.78	0.42	1.00	1.00	1.00		
Not accused of fraud	0.71	0.46	0.00	1.00	1.00	0.2644	0.2644
NUMBER OF MEETINGS							
Accused of fraud	7.26	3.62	4.00	6.00	8.00		
Not accused of fraud	7.07	2.80	5.00	6.00	9.00	0.7184	0.6687
SALARY							
Accused of fraud	$1.547	$1.011	$0.885	$1.060	$2.295		
Not accused of fraud	$1.631	$0.808	$1.057	$1.469	$2.046	0.5602	0.2987
BONUS							
Accused of fraud	$1.375	$2.184	$0.145	$0.419	$1.558		
Not accused of fraud	$1.100	$1.339	$0.239	$0.677	$1.453	0.1489	0.0872
STOCK-BASED COMPENSATION							
Accused of fraud	$10.429	$16.530	$0.878	$2.253	$12.719		
Not accused of fraud	$4.415	$8.450	$0.418	$1.527	$4.314	0.0132	0.0078
STOCK-BASED MIX							
Accused of fraud	0.570	0.290	0.366	0.688	0.747		
Not accused of fraud	0.407	0.271	0.185	0.402	0.623	0.0001	0.0001
SENSITIVITY							
Accused of fraud	1.985	3.880	0.154	0.456	1.644		
Not accused of fraud	1.075	2.389	0.129	0.336	0.913	0.1038	0.0785
STOCK HOLDINGS							
Accused of fraud	$128.519	$300.144	$5.438	$18.276	$71.314		
Not accused of fraud	$67.503	$195.274	$3.230	$11.259	$39.814	0.1572	0.019
STOCK OPTION HOLDINGS							
Accused of fraud	$47.954	$90.433	$0.851	$4.780	$43.850		
Not accused of fraud	$17.891	$42.522	$0.682	$3.876	$14.415	0.0258	0.1077
RESTRICTED STOCK HOLDINGS							
Accused of fraud	$2.48	$6.081	$0.000	$0.000	$0.761		
Not accused of fraud	$1.54	$4.680	$0.000	$0.000	$0.594	0.2830	0.7883

Notes:

All monetary amounts are in $ millions. Variables are as defined as follows:

CEO=CHAIR is a dummy variable taking the value one if the CEO is also the chairman of the board. Number of meetings is the number of times the firm's board meets, annually. assets is less than -0.5 and zero otherwise Leverage is measured as the firm's debt divided by total assets, for firms accused of

Compensation Variables:

Salary is the total base salary for the top five executives, for the firms accused of fraud this is measured in the year prior to the alleged fraud. Bonus is the dollar value of bonuses earned by the top five executives during the fiscal year, the year for the firms accused of fraud is the year prior to the alleged fraud Stock Based Compensation is the sum of the Black-Scholes value of current year stock option grants and the market value of restricted stock grants for the top five executives, for the firms accused of fraud this is measured in the year prior to the alleged fraud. Stock-Based Mix is the proportion of the top five executives' total compensation that is stock based. Specifically it is the ratio of Stock Based Compensation to (Stock Based Compensation + Salary + Bonus). Sensitivity is a measure of how much the top five executives' portfolio of stock options, restricted stock and stock changes in response to a one percent change in stock price. This variable is measured using the methodology described in Core and Guay (2002). For the firms accused of fraud this variable is measured in the year prior to the alleged fraud. Stock Holdings is the top five executives' total holdings of the firm's stock measured as of the end of the fiscal year, for firms accused of fraud this is measured as of the year prior to the alleged fraud. Stock Option Holdings are the intrinsic value of all the in the money stock options held by the top five executives, measured as of the end of the fiscal year, for firms accused of fraud this variable is measured in the year prior to the fraud. Restricted Stock Holdings are the executives restricted stock holdings, in market value, measured as of the end of the fiscal year, for firms accused of fraud this is measured in the year prior to the alleged fraud.

Table 5A
Results of a logit regression comparing 50 firms subject to enforcement actions by the SEC to the remaining
firms on the Execucomp database

Variable	Predicted Sign	(A) Coefficient	(A) Chi-Square p-value	(B) Coefficient	(B) Chi-Square p-value	(C) Coefficient	(C) Chi-Square p-value
INTERCEPT		-5.153	<0.0001	-6.580	<0.0001	-5.834	<0.0001
SALARY	-	-0.548	0.0250				
BONUS	+	0.139	0.2028				
STOCK-BASED COMPENSATION	+	0.050	<0.0001				
STOCK-BASED MIX	+			2.281	0.0001		
SENSITIVITY	+					0.100	0.0152
CEO=CHAIR	+	0.511	0.1418	0.453	0.1923	0.474	0.1717
NUMBER OF MEETINGS	-	-0.003	0.9580	-0.011	0.8241	0.019	0.6991
FINANCING	+	1.566	0.0004	1.538	0.0003	1.724	<0.0001
LEVERAGE	+	-1.427	0.1275	-1.512	0.1100	-1.690	0.0831
MARKET VALUE OF EQUITY	+/-	0.000	0.7954	0.000	0.8589	0.000	0.9203
ALTMAN Z SCORE	-	-0.224	0.1567	-0.184	0.2350	-0.150	0.3343
MODEL LIKELIHOOD RATIO		36.4885	<0.0001	32.1967	<0.0001	20.6652	0.0043
N =		13,484		13,484		13,484	

Notes:

(1) Variables are defined in Table 4. In the logit regression, the dependent variable is coded one for firms accused of accounting fraud by the SEC, zero otherwise.

Table 5B
Results of a logit regression comparing 50 firms subject to enforcement actions by the SEC to the remaining firms on the Execucomp database: Including financial performance measures and market ratios

Variable	Predicted Sign	(A) Coefficient	(A) Chi-Square p-value	(B) Coefficient	(B) Chi-Square p-value	(C) Coefficient	(C) Chi-Square p-value
INTERCEPT		-4.926	<0.0001	-6.198	<0.0001	-5.430	<0.0001
SALARY	-	-0.459	0.0583				
BONUS	+	0.156	0.1572				
STOCK-BASED COMPENSATION	+	0.045	<0.0001				
STOCK-BASED MIX	+			2.069	0.0006		
SENSITIVITY	+					0.105	0.0123
CEO=CHAIR	+	0.516	0.1405	0.459	0.1863	0.473	0.1728
NUMBER OF MEETINGS	-	-0.015	0.7695	-0.020	0.6974	0.006	0.8999
FINANCING	+	1.001	0.0495	0.893	0.0850	0.901	0.0844
LEVERAGE	+	-1.407	0.1186	-1.388	0.1281	-1.508	0.0988
MARKET VALUE OF EQUITY	+/-	0.000	0.7653	0.000	0.6770	0.000	0.9692
ALTMAN Z SCORE	-	-0.198	0.2044	-0.172	0.2554	-0.146	0.3224
BOOK-TO-MARKET		-0.427	0.3801	-0.356	0.4677	-0.508	0.3029
EARNINGS-TO-PRICE		1.733	0.2336	1.874	0.2116	1.596	0.2581
ROA		-2.855	0.0796	-2.963	0.0784	-3.385	0.0418
ROE		-0.347	0.5797	-0.352	0.5932	-0.357	0.5840
MODEL LIKELIHOOD RATIO		45.1878	<0.0001	40.5387	<0.0001	32.764	0.0006
N =		13,484		13,484		13,484	

Notes:

(1) Variables are defined in Table 4. In the logit regression, the dependent variable is coded one for firms accused of accounting

Table 5C

Results of a logit regression comparing 50 firms subject to enforcement actions by the SEC to the remaining firms on the Execucomp database: Excluding observations with hand collected compensation data (fraud firms, n = 28)

Variable	Predicted Sign	(A) Coefficient	(A) Chi-Square p-value	(B) Coefficient	(B) Chi-Square p-value	(C) Coefficient	(C) Chi-Square p-value
INTERCEPT		-7.204	<0.0001	-7.867	<0.0001	-7.257	<0.0001
SALARY	-	-0.158	0.5834				
BONUS	+	0.274	0.0172				
STOCK-BASED COMPENSATION	+	0.037	0.0083				
STOCK-BASED MIX	+			2.083	0.0088		
SENSITIVITY	+					0.107	0.0277
CEO=CHAIR	+	0.871	0.1116	0.884	0.1062	0.923	0.0917
NUMBER OF MEETINGS	-	0.026	0.6897	0.024	0.7157	0.056	0.3911
FINANCING	+						
LEVERAGE	+	-0.842	0.5364	-0.844	0.5289	-0.964	0.4825
MARKET VALUE OF EQUITY	+/-	0.000	0.6309	0.000	0.1739	0.000	0.4455
ALTMAN Z SCORE	-	-0.048	0.8280	-0.094	0.6584	-0.074	0.7257
MODEL LIKELIHOOD RATIO		22.704	0.0038	15.6668	0.0157	12.0888	0.0600
N =		13,462		13,462		13,462	

Notes:

(1) Variables are defined in Table 4. In the logit regression, the dependent variable is coded one for firms accused of accounting fraud by the SEC, zero otherwise.

Table 5D
Results of a logit regression comparing 50 firms subject to enforcement actions by the SEC to the remaining
firms on the Execucomp database: Baseline regressions with logged data

Variable (2)	Predicted Sign	(A) Coefficient	(A) Chi-Square p-value	(B) Coefficient	(B) Chi-Square p-value	(C) Coefficient	(C) Chi-Square p-value
INTERCEPT		-3.654	<0.0001	-5.646	<0.0001	-4.398	<0.0001
SALARY	-	-1.237	0.0787				
BONUS	+	0.262	0.4797				
STOCK-BASED COMPENSATION	+	0.849	<0.0001				
STOCK-BASED MIX	+			3.653	<0.0001		
SENSITIVITY	+					0.156	0.0002
CEO=CHAIR	+	0.542	0.1196	0.532	0.1259	0.574	0.0983
NUMBER OF MEETINGS	-	-0.003	0.9519	0.003	0.9483	0.037	0.4401
FINANCING	+	1.252	0.0056	1.267	0.0043	1.459	0.0008
LEVERAGE	+	-1.091	0.224	-1.221	0.1837	-1.385	0.1381
MARKET VALUE OF EQUITY	+/-	-0.322	0.0296	-0.211	0.0419	-0.265	0.0212
ALTMAN Z SCORE	-	-0.179	0.2722	-0.146	0.3459	-0.125	0.4171
MODEL LIKELIHOOD RATIO		42.2447	<0.0001	34.7968	<0.0001	26.2007	0.0005
N =		13,484		13,484		13,484	

Notes:

(1) Variables are defined in Table 4. In the logit regression, the dependent variable is coded one for firms accused of accounting fraud by the SEC, zero otherwise.

Table 6

Estimation of two stage least squares regressions with industry wide average of stock-based mix as an instrumental variable

Panel A: First stage regression-dependent variable is STOCK-BASED MIX

Variable	Predicted Sign	Coefficient	p-value
INTERCEPT		0.022	0.0365
INDUSTRY-WIDE AVERAGE OF STOCK-BASED MIX OF COMPENSATION	+	0.619	<0.0001
CEO=CHAIR	+	0.010	0.0307
NUMBER OF MEETINGS	+/-	0.010	<0.0001
FINANCING	+	0.036	0.0028
LEVERAGE	-	0.037	0.0111
MARKET VALUE OF EQUITY	+/-	0.000	<0.0001
ALMAN'S Z SCORE	+/-	0.023	<0.0001
ADJUSTED R-SQUARED		0.1892	
INCREMENTAL R-SQUARED ALLOCATED TO INSTRUMENT		0.1119	
N =		13,472	
Hausman test p-value		0.0223	

Panel B: Second Stage Regression-Dependent Variable is FRAUD

Variable	Predicted Sign	Coefficient	p-value
INTERCEPT		-7.749	<0.0001
PREDICTED STOCK-BASED MIX OF COMPENSATION	+	6.550	<0.0001
CEO=CHAIR	+	0.451	0.1932
NUMBER OF MEETINGS	-	-0.063	0.2349
FINANCING	+	1.262	0.0042
LEVERAGE	+	-1.348	0.1423
MARKET VALUE OF EQUITY	+/-	-0.000	0.1043
ALTMAN'S Z SCORE	-	-0.311	0.0514
MODEL LIKELIHOOD RATIO		32.9665	<0.0001
N =		13,472	

Notes:

Industry wide stock based mix of compensation is the industry average of the stock-based mix of compensation. We require four firms in the four-digit (three-digit) SIC code to calculate the industry average; if there are not four firms, we use the three-digit (two-digit) SIC code. Predicted stock-based mix of compensation is the predicted value from the first stage regression (Panel A). All other variables are as defined in table 4.

Table 7
Change in managerial wealth in response to the announcement
 of the accounting fraud

	Percentage Change in Managerial Wealth From Day Before Fraud Announced Until		
	One Week After the Announcement (1)	Six Months After the Announcement (1)	One Year After the Announcement (1)
Average	-18.4%	-38.8%	-23.6%
t-stat	-5.22	-4.69	-2.16
p-value	0.001	0.001	0.015
Median	-17.2%	-49.2%	-46.3%
p-value	0.001	0.001	0.015
Minimum	-61.6%	-97.0%	-98.3%
Maximum	13.8%	57.5%	96.2%
Standard Deviation	20.2%	43.8%	52.3%
% Negative	81.3%	82.1%	73.9%
p-value	0.001	0.001	0.011

Notes:

(1) Computed as the difference between the value of managerial equity holdings the day prior to the fraud and the value of those holdings at the subsequenty date denoted in each column. Total value of equity holdings includes options, stock, and restricted stock.

Figure 1
Cumulative Abnormal Returns Around Announcement of Accounting Fraud