Executive Compensation and Corporate Fraud

Shane A. Johnson
Louisiana State University

Harley E. Ryan, Jr.
Louisiana State University

Yisong S. Tian
York University

July 23, 2003

Abstract

We examine the relation between executive compensation and corporate fraud. Executives at fraud firms have significantly larger equity-based compensation and greater financial incentives to commit fraud than do executives at industry- and size-matched control firms. Executives at fraud firms also earn significantly more total compensation by exercising significantly larger fractions of their vested options than the control executives during the fraud years. Operating performance measures suggest executives commit corporate fraud following declines in performance. Our results imply that optimal governance measures depend on the strength of executives' financial incentives.

JEL classification: G30; K00; M40; M52

Keywords: Corporate fraud; Incentives; Stock options; Executive compensation; Governance

Corresponding author:

Prof. Shane A. Johnson
Dept. of Finance—2160B CEBA
E.J. Ourso College of Business Administration
Louisiana State University
Baton Rouge, LA 70803-6308
Tel: (225) 578-0477
Fax: (225) 578-6366
Email: shane@lsu.edu

Acknowledgements: We thank Hao Li, Stephen Smith, and Brooke Stanley for excellent research assistance, and Andrew Christie, Bill Lane, Joseph Legoria, Adam Lei, Tim Louwers, Kelley Pace, Jeff Pontiff, Cliff Stephens, an anonymous JFE referee, and seminar participants at the University of Waterloo for helpful comments. Johnson and Tian thank the Social Sciences and Humanity Research Council of Canada for financial support.

Executive Compensation and Corporate Fraud

1. Introduction

In light of the recent and often spectacular cases of corporate fraud, we ask a basic empirical question: Do the executives who choose to commit corporate fraud face greater financial incentives to do so than those who choose not to commit fraud? The question is motivated by Becker's (1968) economic theory of crime framework, in which agents choose to commit crime because the expected utility of the payoff is high enough to outweigh the expected disutility of getting caught and prosecuted. Analyzing corporate fraud in this framework is particularly interesting because the fraction of executive compensation tied to stock performance has increased significantly in past years (Hall and Murphy, 2002). If the probability of getting caught and the consequent punishment remain constant, an increase in equity-based compensation creates greater incentives for executives to produce fraudulent financial statements or take other actions to mislead analysts and investors about the value of their firms' stocks.[1] This combination of factors could explain the increased frequency of earnings restatements over past years (see U.S. General Accounting Office, 2002).

Most corporate executives have equity-based compensation contracts and most (presumably) do not commit fraud. This observation suggests that the *presence* of equity-based compensation is not a sufficient condition for fraud. An open question, however, is whether the *size* or *strength* of the incentives provided by equity-based compensation affects the likelihood of

[1] An individual executive's ethics and morals can be such that he would not commit fraud regardless of the level of the incentives. It is more useful to think about a group of executives, each with a different proclivity to commit fraud, i.e., each with a different threshold of the size of financial payoff that would induce him to commit fraud. Increasing the size of the incentives that each faces should result in greater numbers of executives who cross that threshold and choose to commit fraud.

choosing to commit fraud. To shed light on this question, we use a sample of firms that are the subjects of Securities and Exchange Commission's (SEC) Accounting and Auditing Enforcement Releases (AAERs), hereafter, fraud firms. For the executives at each fraud firm, we compare the potential dollar payoff of equity-based compensation, standardized for dollar and percentage increases in share price, to similar metrics for executives at industry- and size-matched control firms that are not subjects of AAERs.

We find that executives at fraud firms face significantly greater stock and option payoffs from share price increases compared to executives at matched "innocent" firms. The median executive at a fraud firm has financial incentives that are 69% greater than the median executive at a control firm. In dollar terms, a one percent increase in firm value increases executive compensation at fraud firms by approximately $55,489 more than at control firms. The stronger financial incentives stem from significantly larger stock and option holdings by fraud executives, approximately $4.4 million more at the median. During fraud years, executives at fraud firms also exercise significantly larger fractions of their vested options than executives at the control firms do. Consequently, the median fraud executive earns $596,295 more per year during the fraud than the median executive at the matched control firms. The median fraud event in our sample lasts two years, which implies the median fraud executive earns approximately $1.2 million more in present value at a 5% discount rate. To put this difference in perspective, executives at the matched innocent firms earn median total compensation of approximately $1.2 million per year.

We also compare stock and operating performance measures for fraud and control firms. Stock returns over the years of the fraud do not differ significantly across fraud and control

firms. If the frauds had positive effects on fraud firms' market values during the fraud period, this result implies that but for the frauds, the fraud firms would have significantly underperformed their matched control firms. Both the fraud firms and control firms have significantly negative market-adjusted returns during the fraud periods. This result suggests that the industries in which the fraud firms compete did not perform well relative to the overall stock market during the fraud period. Growth in earnings per share in the year before the frauds begin is significantly lower than in prior years for the fraud firms and control firms. Collectively, the stock and operating performance results suggest that executives commit fraud in the face of poor current and future performance that is not necessarily firm specific. These results are consistent with Noe and Rebello's (1994) theoretical model in which ethics fall in poor economic times and vice versa.

The industry distribution of fraud firms differs significantly from the ExecuComp population from which we draw our sample. We find that 'prepackaged computer software' and 'catalog and mail-order retail' represent the two largest industry concentrations of frauds in our sample. These industries have greater than average growth opportunities, which are more difficult to monitor than assets in place. Because it is more difficult to monitor managers' actions, firms with these characteristics make greater use of incentive compensation in the form of equity-based compensation (Demsetz and Lehn, 1985; Smith and Watts, 1992; Gaver and Gaver, 1993; Mehran, 1995). This compensation choice creates an interesting tradeoff: Shareholders and boards of directors who cannot easily monitor the actions of their executives should use stronger incentives to align the executives' incentives, but the same inability to monitor coupled with the stronger incentives creates greater opportunities and incentives for the executives to commit fraud.

Our analysis cannot answer the question of whether firms' use of equity-based compensation provides efficient levels of incentive compensation. Ex post we could conclude that the incentives for our fraud firms were too strong, but because those fraud firms represent a small fraction of the population of firms from which our sample is drawn, another conclusion is that most firms have incentives that are not too strong. Without answering the efficiency question, our analysis still highlights the importance of considering the increased potential for fraud and its associated costs when choosing increased levels of incentive compensation.

A recent UBS/Gallup *Index of Investor Optimism* survey found that in May 2002 71% of investors believed accounting problems were widespread and 40% said they were less likely to invest as a result. Investor fears can impede capital flows in financial markets and increase firms' costs of capital. If executives rationally commit fraud because they face incentives that make the expected benefits of fraud exceed the expected costs, then firms, investors, auditors, regulators, and others should pay more attention to the expected costs. Even absent civil and criminal proceedings against fraud executives, an efficient labor market should punish executives who commit fraud through reductions in the value of their human capital (Fama, 1980). Extant empirical evidence, however, generally suggests that the expected costs of committing fraud are low. Beneish (1999) finds no differences in employment losses across firms that do and do not manipulate earnings. He also finds that the SEC is unlikely to impose trading sanctions on executives unless executives sell their own shares as part of a security offering. Agrawal at el. (1999) find that firms suspected of fraud or charged with fraud do not have significantly higher turnover of senior managers or directors. Agrawal and Chadha (2002) find that having several key governance mechanisms in place does not reduce the likelihood of restatements. In contrast, Dechow et al. (1996) find that fraud firms are more likely to have boards dominated by

management, CEOs as chairmen of the board, and founder CEOs, and less likely to have audit committees and outside blockholders. Dechow et al.'s results imply that fraud firms have suboptimal levels of corporate governance.

Extant research has examined other unintended outcomes associated with equity-based compensation contracts. Yermack (1997) finds evidence suggesting that firms time stock option grants around news events to benefit executives, while Aboody and Kasznik (2000) find similar evidence concerning the timing of news events around option grant dates. Bettis et al. (2001) find that some executives use zero-cost collars and equity swaps to hedge their risk exposure created by stock holdings. Hedging exposure to stock returns weakens the incentives provided by equity-based compensation. To the extent that shareholders or boards of directors do not anticipate such unintended outcomes, the resulting compensation contracts are likely inefficient. Our results suggest another unintended outcome that could create inefficiencies.

Our focus on equity-based compensation differs from studies of earnings manipulation in the accounting literature, most of which focus on bonus contracts (see e.g., Healy, 1985; Dechow et al., 1996). This different focus is important because options have grown as a fraction of total executive compensation over past years, and because differences in executive pay sensitivity stem primarily from differences in the sizes of stock and option holdings (see Hall and Liebman, 1998; Hall and Murphy, 2002). The difference is also important because firms often cap bonus payoffs, which likely limits the potential gain to fraud compared to stock and option payoffs. In research that does consider option compensation, Kedia (2003) finds that firms with large negative stock price reactions to restatements have 50% greater *numbers* of options than matched control firms.

The next section of the paper contains background discussion on the nature of corporate fraud. Section 3 describes our data and methods. Section 4 contains analysis comparing fraud firms to control and other firms on incentives and several other dimensions. Section 5 concludes.

2. Executive compensation and corporate fraud

The notion that the separation of ownership and control creates conflicts of interest between managers and shareholders is well developed in the literature. Shareholders cannot observe and monitor an executive's effort perfectly so they write compensation contracts on observable outcomes such as accounting earnings or stock prices. Although such compensation contracts provide incentives for executives to take shareholder-wealth-increasing actions, they also create incentives to manipulate the performance measures underlying the contracts by producing fraudulent financial statement or other information. Viewing such corporate fraud as a criminal activity, Becker's (1968) economic theory of crime framework predicts that executives are more likely to commit fraud if they face greater financial incentives to do so. This is the central hypothesis we test in this paper.

Executive compensation contracts in the U.S. have shifted away from accounting earnings to stock prices as primary performance measures over the last few decades (see Bushman and Smith, 2001). The causes of this shift are unclear, but it could be in response to arguments that stock prices measure shareholder wealth more directly and thus better align managerial and shareholder incentives (Jensen, 1989; Rappaport, 1990). Critics of earnings-based contracts also argued that these contracts create incentives to manipulate earnings (see

Healy, 1985). In contrast, stock-based contracts should provide weaker incentives to manipulate earnings because stock prices reflect a superset of the information in accounting earnings.

The recent spate of corporate frauds raises the question of whether executives can use fraud to manipulate stock prices and thereby manipulate payoffs under stock-based compensation contracts. Stock prices are easily observable, but if an executive causes his firm's stock price to rise above its true value by providing fraudulent information to investors, and exercises options and sells stock while the price is artificially high, then he gains from the fraudulent behavior. For such a fraud to work, an executive must have information that investors do not have, i.e., the market for his firm's stock must not be strong-form efficient. On the other hand, if investors are sufficiently informed to know the true cash flows and future prospects of a firm despite fraudulent financial statement and other information, then executives cannot increase the value of their options and stock holdings by fraud and thus should not have incentives to engage in fraud to *attempt* to manipulate stock prices.

The central hypothesis that executives who commit fraud face greater potential payoffs from equity-based compensation clearly relies on the implicit assumption that fraud can inflate stock prices above their true values. Empirical studies of restatement announcements shed light on the reasonableness of this assumption. If investors are sufficiently informed to know that financial statement information is incorrect and value stocks based on correct but unreported information, then they should not revalue stocks when restatements are announced. Several studies, however, report significantly negative share price reactions to restatement announcements. For example, Anderson and Yohn (2002) report a mean excess return of −12.85% for the seven-day window centered on restatement announcements stemming from

fraud. Palmrose, Richardson, and Scholz (2001) report a two-day excess return of –20% for fraud-related restatements. The magnitudes of these downward revisions when investors receive corrected financial statement information imply that pre-restatement stock prices were based on false information and were artificially high. An executive who exercised options and sold shares before the restatement occurred would have gained from his fraudulent behavior.

It is very unlikely that stock prices can deviate from their true values in the long run, which implies that executives cannot maintain frauds in the long run. Investors eventually learn the truth about firm value and adjust share prices downward. Thus, an executive must exercise options and sell shares in the short run to gain from a fraud, where *short run* is defined as the period before investors learn the true firm value. An executive can exercise only options that are vested and can sell only stock that is unrestricted in the short run. Thus, the distinction between the short run and the long run is clearly important for testing the fraud hypothesis, but making that distinction empirically is difficult. As we show later for our sample, the median fraud length is two years, with some frauds extending to six or seven years. If investors do not learn the truth about firm value until after the frauds end and are publicly reported, then the short run for the median firm in our sample is at least two years. We say *at least* to acknowledge that it can take some time beyond commission of the fraud for the fraud to be reported publicly. On the other hand, we recognize that the short run could be much shorter for some firms.

A typical vesting schedule for executive stock options is 25% immediately, and 25% each in years two through four. Thus, if an executive could maintain a fraud for two years, then he could exercise half of even newly granted options as part of the fraud. Because the definitions of short and long run are difficult to define and likely vary across frauds, we calculate incentive

measures making various assumptions about which options can be exercised and which shares of stock can be sold.

3. Data and Methods

To generate a sample of fraud firms, we begin with the set of firms in Standard and Poor's (S&P) ExecuComp database. The ExecuComp database covers the period 1992 through 2001, and contains executive compensation data for firms in the S&P 1500 index, which comprises the S&P 500 index, the S&P 600 midcap index, and the S&P 400 small cap index. If S&P replaces a firm in the S&P 1500 index with a new firm, ExecuComp retains the deleted firm's historical information and adds data for the new firm. In total, the ExecuComp database contains data for 2,504 firms.

We next search the Securities and Exchange Commission's (SEC) set of Accounting and Auditing Enforcement Releases (AAERs) for the ExecuComp firms. AAERs represent cases where the SEC believes that there is sufficient evidence of accounting or auditing fraud to prosecute a case against a firm or its executives. We omit cases in which the SEC charges a firm with having inadequate controls in place to prevent embezzlement by non-executive employees. We also omit cases in which the SEC charges non-executive employees at foreign subsidiaries with bribery of foreign officials or foreign customers. We view both of these types of cases to be inappropriate for studying the relation between executive compensation and corporate fraud.

The time span between a fraud event and the filing of an AAER can range from zero to several years. Also, a particular fraud event can occur over several years. For example, a firm could produce fraudulent financial statements over a period of five years. We require that the

fraud event occur between 1992 and 2001, regardless of the filing date of the AAER. We include firms with fraud events that occur from 1992 to 2001, even if the event began in 1990 or 1991, if we can backfill executive compensation data from proxy statements. We omit several multiple-year fraud events that began before 1990 because we are unable to backfill the data. Our final sample comprises 43 unique fraud events, represented by 102 fraud-years. The Appendix contains a list of the fraud firms with brief descriptions of their frauds.

One could argue that the relatively small number of identifiable fraud cases implies that the phenomena are not worthy of study. We disagree with this argument for two reasons. First, even a small fraction of firms engaging in fraud can have harmful effects on capital markets. Firm managers use primarily financial statements and public statements to communicate with investors. Executives' ethical standards, morals, and integrity are not easily observable and verifiable ex ante, so investors rely on auditors, regulators, financial analysts, and others to certify explicitly or implicitly that the information that firms provide is accurate. If a small number of firms can fool these certifying parties, then investors who understand the incentives that other executives have to manipulate stock prices might rationally fear that fraud is more widespread than it actually is. Such fears could impede capital flows and increase the cost of capital for all firms, fraud and nonfraud alike. Consistent with this view, the UBS/Gallup *Index of Investor Optimism* survey found that in May 2002 71% of investors believed accounting problems were widespread and 40% said they were less likely to invest as a result.

Second, the discovery and reporting of frauds or attempted frauds likely understates the actual number of frauds that occur. The number of restatements is much larger than the number of prosecuted fraud cases. A restatement means that the original financial statements contained

incorrect information about some dimension of a firm's finances—the question is whether the misreporting was intentional or was an innocent error. All restatements represent *potential* cases of fraud, but SEC officials have indicated that they lack sufficient resources to investigate all potential frauds. The SEC works down a list ranked by the probability of success, investigating and prosecuting only the number of cases its resources allow (see Feroz, et al. 1991). This fact alone could lead a rational investor to infer that frauds are indeed more prevalent than those that are publicly identified, which exacerbates the impact of fraud on capital flows discussed above. Additionally, internal or external auditors can discover and force a firm to correct fraudulent information before it files its financial statements. In such cases, the executives did in fact falsify financial statements, but monitoring worked to prevent the false information from being passed to investors. The SEC would likely not know about or prosecute these cases.

Table 1 presents the distribution of fraud events over our sample period and data on the length of the frauds for each year of our sample period. In contrast to what might be expected from recent coverage of fraud events in the financial and popular press, there are 25 fraud events in the first half of the sample period (1992-1996) compared to 18 in the second half of the sample period (1997-2001). The lower incidence of fraud in the latter part of the sample could reflect an actual decrease in the commission of frauds over time. Alternatively, it could reflect the possibility that the SEC has not yet have discovered and charged firms that committed frauds in the later part of our sample period. The increase in (not necessarily fraudulent) earnings restatements in the latter part of the 1990s documented by the U.S. General Accounting Office (2002) gives some support for the latter possibility.

[Table 1 about here]

Table 2 presents the industry distribution of our fraud firms compared to the industry distribution of ExecuComp firms. The single largest industry represented in the fraud sample, SIC code 7372 (prepackaged computer software) represents 11.63% of the fraud sample, but only 3.96% of the ExecuComp set of firms. We also find concentrations in SIC codes 5961 (catalog & mail order retail), 4953 (refuse and disposal systems), 5172 (petroleum and other fuels), and 6021 (national commercial banks). A continuity-adjusted chi-square test, significant at the 0.01 level, indicates that the industry distributions differ across fraud and ExecuComp firms.

[Table 2 about here]

Firms that derive more value from intangible assets that produce future growth opportunities are more difficult to monitor than firms that derive more value from assets in place. Thus, such firms should optimally use more incentive compensation to counter the monitoring difficulties (Demsetz and Lehn, 1985; Smith and Watts, 1992; Gaver and Gaver, 1993; Mehran, 1995). The inability to monitor, however, also makes these firms more susceptible to fraud. To examine this premise, we compare growth opportunities for the higher-than-expected concentration fraud industries (SIC codes 7372, 5961, 4953, and 5172) to growth opportunities for all other industries. We use the market-to-book-asset ratio as a proxy for growth opportunities. Unreported results show that the two industries with the greatest concentration in the fraud sample—7372 and 5961—have significantly higher mean market-to-book ratios than other industries.

For each fraud firm in each crime year, we identify an industry- and size-matched control firm in the ExecuComp database that is not the subject of an AAER at any time during our

sample period. We match on industry and size because board of director compensation committees typically use benchmarks that depend on these two factors when setting executive compensation packages. If we do not find a four-digit-SIC code match that is within 30% of the revenues of our fraud firm, we look for a three-digit-SIC code match. For 49 of the 102 fraud years, we find a match within 30% of the fraud firm. Later we investigate potential problems with using matches that are outside the 30% bounds and find results qualitatively similar to those reported if we use only matches that are inside the 30% bounds.

It is well known that many executives manage or manipulate their firms' earnings legally within Generally Accepted Accounting Principals (GAAP). It is possible that our control firms also manage or manipulate earnings within GAAP. By using AAERs to identify fraud firms, we focus on cases in which executives cross the GAAP threshold to engage in illegal earnings manipulation. There are no criminal or civil penalties for earnings management within GAAP, and potentially significant penalties for managing or manipulating earnings in violation of GAAP, so we assume that crossing this threshold is significant. If crossing the threshold does not represent a significant executive decision, then our approach of using AAERs to define fraud firms has a bias against finding any differences in incentives across fraud firms and control firms. It is also possible that some of our control firms commit fraud, but do not get caught. Such cases would also create a bias against finding any differences in incentives across fraud firms and control firms.

We calculate two incentive measures for each executive at each fraud and control firm. First, we calculate a *dollars-on-dollars* incentive measure as the dollar change in an executive's stock and option portfolio for a $1,000 dollar change in firm value. Baker and Hall (2002) argue

that researchers should use a dollars-on-dollars measure to compare incentives across firms when executive actions affect dollar returns, as in perquisite consumption. We also use a *dollars-on-percentage* incentive measure, defined as the dollar change in an executive's equity-based portfolio (stock and options) for a one percent change in firm value. Baker and Hall argue that this dollars-on-percentage measure is more appropriate when executive actions have a similar percentage impact on the firms in the comparison. Most of the fraud events in our sample involve overstating revenues or understating expenses in apparent attempts to inflate stock prices. It is not obvious a priori whether the dollars-on-percentage measure or dollars-on-dollars measure is superior for measuring fraud incentives so we discuss results for both measures.

To calculate the two incentive measures, we need an option pricing model and several input parameters. Consistent with previous research (e.g., Marquardt, 2002), we adopt a modified version of the Black-Scholes model. Executives typically exercise their options before maturity (Hemmer et al. 1996; Huddart and Lang, 1996; Heath et al., 1999), so we reduce the contractual option maturity by 30%. We use the average yield on U.S. treasury securities that most closely match the option's (reduced) maturity to approximate the risk-free rate. We use the standard deviation of stock returns over the prior 60 months to estimate the stock return volatility. We use the average dividend yield over the past three years as a proxy for the future dividend yield. For newly granted options, strike price and maturity come directly from ExecuComp. ExecuComp does not report terms and numbers of individual grants for previously granted options. We use Core and Guay's (2002) one-year approximation method to estimate the strike price and maturity of previously granted options.

The two incentive measures are defined as:

$$\text{Dollars-on-dollars} = \frac{\text{Change in executive's equity portfolio}}{\text{Change in firm value}} \times \$1000,$$

$$\text{Dollars-on-percentage} = \frac{\text{Change in executive's equity portfolio}}{\%\text{Change in firm value}} \times 0.01.$$

These measures are linked to the equity portfolio delta, which reflects the change in portfolio value as stock price changes. We use the modified Black-Scholes model to calculate the delta of the executive's equity portfolio, which is then used to calculate the two incentive measures. The executive's equity portfolio includes options and restricted and unrestricted stock holdings.

As we discuss in Section 2, to profit from a fraud an executive must exercise options and sell shares in the short run, i.e., before investors discover the fraud. The distinction between the short run and the long run likely varies across frauds as the length of the fraud varies. Thus, we calculate incentives under two different assumptions about the short run. First, we assume that only options that are vested and only shares that are unrestricted in the year of the fraud can provide payoffs from the fraud, so the incentive measures include only these portions of compensation. Second, we recognize that unvested options and restricted stock can provide incentives to commit fraud if executives believe the unvested options will vest and the restrictions on stock will be lifted before investors learn about the fraud. Thus, under the second assumption, we use both vested and unvested options and both unrestricted and restricted stock holdings in the incentive measures. Later, we discuss the results of a robustness check that

assumes that all vested options have only a two-month maturity, which measures the level of incentives if stock prices were inflated for only two months.

Anecdotal descriptions of fraud firms suggest that some firms have a culture among top management that encourages fraud. Other descriptions imply that one influential individual exerts pressure on others to engage in fraud. These two factors that encourage fraud are not mutually exclusive. For example, a June 23, 2003 *Wall Street Journal* article (p. A1) details how an accountant at WorldCom initially balked when asked to agree to accounting irregularities, but eventually succumbed to pressure from the corporate culture and the direct influence of her boss to commit fraud. The possibility that either or both factors encourage fraud suggests that we should study both group incentives and individual incentives.

To measure group incentives, it is important first to understand how ExecuComp reports executive compensation data. ExecuComp reports data for more than five executives for a particular firm for a particular year for any one of three reasons. First, a firm can report more than five executives in the summary compensation table of its proxy statement if two or more executives are tied on compensation rank for the top five places. Second, if a new CEO takes over during the fiscal year ExecuComp usually reports data on both the new and former CEOs. Third, the summary compensation tables in proxies report compensation data for the current and two prior years. ExecuComp uses data reported in a particular proxy year to backfill other years. This procedure can result in significantly more than five executives per firm-year in ExecuComp. For example, suppose that executives A through E are the top five executives at a given firm in 1997, and that mid-level executives F through H are employed by the firm in 1997, but are not in the top five. Now suppose that executives F through H are promoted to replace executives C

through E in 1999. The 1999 summary compensation table in the firm's proxy statement reports 1997 compensation packages for executives F through H even though they were not top-five executives in 1997. Because ExecuComp backfills data the 1997 compensation data from the 1999 proxy, it then has 1997 compensation data for executives F through H. This procedure produces eight observations for 1997 on ExecuComp—the correct top-five for 1997 (executives A through E) and three other "executives" (F through H) who were not really in the top five for 1997.

To avoid erroneously including non-top-five executives in our analysis, we hand-collect the identities of the true top-five executives for each year from the sample and control firms' proxy statements. We then use this data to exclude those executives who show up in a particular year solely because ExecuComp backfilled their data. We could measure group incentives by summing the incentive measures across executives at each firm to measure how large of a "prize" the top managers would split if they could cause share price to increase. A large potential prize could promote a culture that encouraged fraud as a means of increasing share price. Comparing summed incentives across the fraud and control firms would be invalid, however, for observations where one or more executives in either a fraud or control firm have a missing data item because the sums would be over different numbers of executives. Thus, we compute the mean incentive for executives at each firm to measure group incentives. We can compare these means across fraud and control firms even if they have differing numbers of executives. We also study the individual CEO's incentives. The CEO is typically the most powerful executive at a firm, and can potentially exert pressure on others to engage in fraud.

4. Results

4.1. Executive compensation and incentives for fraud versus control firms

In Table 3, we present statistics to compare group (i.e., mean) incentive measures for the top executives at fraud and control firms. Even though there are 102 fraud-years, extreme values skew the means significantly. Thus, we present and discuss results for medians. We use signed-rank tests to test if the median of the paired differences is significantly different from zero. We measure incentives at different points in time, so we use the consumer price index to express all values in constant 2002 dollars.

Panel A contains the results for vested options and unrestricted stock holdings. We use the average across all executives for each firm as our proxy for group incentives. The dollars-on-percentage measure is $135,762 for fraud firms and $80,273 for control firms. A median paired-difference test has a *p*-value less than 0.01. Thus, the fraud firms provide significantly stronger financial incentives than the control firms provide. The magnitudes indicate that for a one-percent increase in share price, the fraud executive's stock and option portfolio increases by $55,489, or 69%, more than the increase in the portfolio of the control firm's executive. The dollars-on-dollars measure (i.e., the dollar increase in the executive's stock and option portfolio for a $1,000 increase in firm value) is also significantly larger for fraud firms than for control firms: $4.14 for fraud firms compared to $2.33 for control firms. The median measure for fraud firms is 78% larger than the median measure for the control firms. The paired-difference test for this measure also has a *p*-value less than 0.01. These results support the hypothesis that executives of fraud firms face larger financial incentives to commit fraud. The results imply that

the financial incentives could be large enough to outweigh the expected disutility of getting caught.

[Table 3 about here]

The greater incentives shown by our comparison of the two incentive measures reflect the larger stock and option portfolios held by the executives at fraud firms. As shown in Panel A of Table 3, the median fraud executive holds unrestricted stocks and vested options worth $10,961,500. This value compares to the median for control executives of $6,521,830. The median paired difference is significantly greater than zero at the 0.01 level, which indicates that fraud executives hold significantly larger portfolios of equity-based compensation. We also find that the median executive at fraud firms receives a greater proportion of his compensation from newly granted options (31.78%) than does the median executive at innocent firms (21.79%), significantly different with a *p*-value of 0.03.

The results described above raise an interesting question: Do fraud firms' executives hold larger option and stock portfolios because their firms substitute options and stock for cash salary and bonus in their compensation packages? If fraud firms are relatively more cash constrained, such a substitution could lead to a greater fraction of equity-based compensation for fraud firms. To address this question, we also present in Table 3 measures of compensation and compensation structure that reflect the fractions of compensation represented by salary and bonus. Median salary is slightly lower for fraud firms ($438,426) than for control firms ($454,494) with a *p*-value of 0.10. Similarly, the ratio of salary to total compensation is lower for fraud firms (42.18%) than for control firms (45.58%), with a *p*-value of 0.08. The median bonus and the ratio of salary and bonus to total compensation do not differ significantly for fraud

firms and control firms. The results for bonus are somewhat surprising because many bonuses are linked to accounting figures. The results for salary are only marginally statistically significant and are probably economically insignificant. In general, these results suggest that fraud firms do not substitute stock options for salary and bonus to create the larger incentives discussed earlier.

The results in Panel A, based on vested stock options and unrestricted stock, indicate that executives at the fraud firms have significant financial incentives to commit fraud to manipulate stock prices for a short period of time. Panel B of Table 3 presents incentive measures based on all options (vested and unvested) and all stock holdings (restricted and unrestricted). Assuming that executives can manipulate prices for a longer period of time, these measures provide an upper bound measure of the incentives to commit fraud.[2] The dollars-on-percentage incentive measure for the median executive at fraud firms is $229,131 compared to $137,360 for the median executive at innocent firms, significantly different with a *p*-value of 0.01. Based on these data, the median fraud executive faces incentives that are $91,771, or 67% greater than his control counterpart faces. The dollars-on-dollars incentive measure is $9.31 and $4.62 for the executives at the fraud and innocent firms, respectively, significantly different with a *p*-value of 0.01. The median value of options and stock is $15,043,200 for fraud executives compared to $10,428,720 for non-fraud executives, also significant with a *p*-value of 0.01. The Panel B results confirm those in Panel A for a longer, alternative definition of short term. If an executive can maintain a fraud long enough for all of his options to vest and all restrictions on stock to be lifted, then the level of the incentives to commit fraud is much larger.

[2] *Upper bound* here means the maximum payoff for the standardized changes in value (one percent or $1,000) underlying our two incentive measures, not the maximum payoff from committing fraud.

Table 4 presents results comparable to those in Table 3, except that we use the individual CEO incentive measure rather than the mean (group) measure. Panel A presents results based on vested options and restricted stock. The results for the dollars-on-percentage measure and the dollars-on-dollars measure are similar to those in Table 3—both incentive measures indicate that fraud executives faced greater financial incentives to commit fraud. Fraud firms have a median dollars-on-percentage measure of $287,313, which is approximately 58% greater than the median of $181,733 for control firms. These greater incentives reflect significantly larger stock and option holdings: $23,755,000 for fraud firms versus $14,613,140 for the control firms. The results based on all options and stock holdings presented in Panel B are even more striking. The dollars-on-percentage measure is $554,381 for the fraud firms, which is approximately twice the median $277,597 for the control firms (p-value = 0.01). The dollars-on-dollars measure for fraud executives is also approximately twice that of the measure for the median control executive. The total value of the option and stock portfolio held by the median fraud executive is $38,650,070 compared to $20,475,480 for the median control executive.

[Table 4 about here]

We next examine whether fraud executives cashed in on their frauds during the fraud period by exercising options at greater rates than control executives. In Table 5 we compare measures of the exercise behavior by fraud and control firm executives. Executives can only exercise vested options, so we first compare the ratio of vested options to total options across fraud and control firms. The median fraud firm executive has 43.39% of total options vested, which compares to 46.47% for control firm executives. The proportions are relatively close in magnitude and the median paired difference p-value is 0.08. The moneyness of vested options

should also affect an executive's likelihood of exercise. Thus, we compare the moneyness, which we define as stock price divided by average strike price, across fraud and control executives. The median moneyness for fraud executives' options is 1.70, which is not significantly greater than the median moneyness for control executives' options of 1.30 (p-value < 0.01). Thus, a slightly greater fraction of fraud executives' options are vested, and there is a large and significant difference in option moneyness across fraud and control executives. It is impossible to tell what part of the increased moneyness stems from the frauds themselves, but the higher moneyness of fraud executives' options is consistent with executives committing fraud to increase their option payoffs.

We next calculate four ratios to characterize exercise behavior: (1) (number of options exercised) / (an executive's total options outstanding); (2) (number of options exercised) / (an executive's total number of vested options); (3) (dollar payoffs from option exercises) / (total cash compensation); and (4) (dollar payoffs from option exercises) / (total cash and non-cash compensation). The median fraud-firm executive exercises 4.94% of his total options outstanding and 12.45% of his vested options during the fraud years. In contrast, the median control-firm executive exercises 1.53% and 3.11%, respectively. These medians differ significantly across fraud firms and control firms for both measures. Thus, fraud executives exercise approximately four times their vested options than control executives do during the fraud years.

[Table 5 about here]

The more aggressive exercise behavior provides payoffs that represent larger fractions of cash compensation and total compensation. The median fraud-firm executive has gains from

option exercise equal to 33.82% of his cash compensation and 13.35% of his total (cash and non-cash) compensation. In contrast, control-firm executives receive payoffs equal to 10.63% of cash compensation and 6.34% of total compensation. Both measures differ significantly across fraud and control firms. Fraud-firm executives exercise stock options more aggressively during fraud periods and obtain larger fractions of their compensation from these exercises.

The results show that fraud executives' options have higher moneyness and that they exercise proportionately more of them. An interesting question is whether fraud executives exercise options at higher rates holding option moneyness constant. To investigate this question, we estimate the following Tobit regression:

(No. of options exercised / vested options) =

$$B_0 + B_1 \times \text{moneyness} + B_2 \times \text{fraud dummy} + B_3 \times (\text{moneyness}) \times (\text{fraud dummy}) + \varepsilon.$$

The estimate of B_1 is 0.08 (p-value <0.01), of B_2 is 0.13 (p-value = 0.02), and of B_3 is –0.05 (p-value < 0.01). Thus, the rates of option exercise are significantly higher for fraud executives after controlling for differences in moneyness. In fact, the significant negative interaction effect between moneyness and the fraud dummy suggests that moneyness is less important (i.e., the coefficient is smaller) for the fraud executives than for the control executives in determining exercise behavior. Qualitatively similar regression results hold for the ratio of exercised options to total options.

The results in Tables 3 and 4 indicate economically small and statistically weak differences in salary and bonus across fraud and control executives. The results in Table 5 indicate greater dollar payoffs from option exercises for fraud executives. Combined, these results imply that fraud executives receive larger total compensation during their fraud years. To

shed additional light on this issue, we present in Table 5 the medians for total compensation. We use the ExecuComp variable TDC2 to measure total compensation. TDC2 includes salary, bonus, other annual compensation, total value of restricted stock granted, net value of stock options exercised, long-term incentive payouts, and total all other compensation. The median fraud executive receives total compensation from all sources of $1.753 million, which compares to $1.157 million for control executives.

Although not related to the incentive question per se, it is interesting to ask what these option exercises cost shareholders of the fraud firms. To shed light on this question, we compute the gains from option exercises as a percentage of firm market capitalization. This measure ignores any other costs of the frauds, e.g., economic losses associated with a loss of firm reputation or wealth losses to investors who bought shares at inflated prices. Exercise payoffs at fraud firms represent 0.005% of firm market capitalization compared to 0.002% for payoffs at control firms. The median paired-difference is not statistically significant at conventional significance levels (p-value = 0.11).

4.2. Stock and operating performance measures for fraud versus control firms

We next compare stock returns across fraud and control firms during the fraud periods. Because the AAERs typically use fiscal years instead of calendar days to define the fraud period, we compute returns from the beginning of the first fiscal year of the fraud period through the end of the last fiscal year of the fraud period. We also measure stock returns beginning our computations one year before the fraud started. This alternative approach accounts for the possibility that executives made fraudulent statements to analysts or investors about expected revenues, expenses, and earnings in the months preceding the first fiscal year in which they

produced fraudulent financial statements. Following our method outlined in the previous section we present medians and corresponding *p*-values from paired-difference tests.

[Table 6 about here]

Panel A of Table 6 contains median annualized raw returns during the fraud period. We present data for both fraud firms and control firms. The median fraud firm generates an annual return of 2.04% during their fraud years, which compares to 4.91% for control firms. The *p*-value from the paired-difference test is 0.42, which indicates that the medians do not differ significantly. We find similar results when we begin our test period one year before the fraud begins. In Panel B of Table 6, we subtract the return on the value-weighted CRSP index to adjust the raw returns for market performance. Fraud firms have a median annual market-adjusted return of –9.55% during the fraud period, which is significantly different from zero at the 0.01 level. Control firms have a median annual market-adjusted return of –9.46%, which is also significantly different from zero at the 0.01 level. Like the unadjusted returns, the market-adjusted returns do not differ significantly across fraud firms and control firms. Thus, although fraud firms provide fraudulent information to financial markets during the fraud periods, they significantly underperform the overall stock market and do not outperform their control firms.

Anecdotal evidence suggests that analysts, investors, and financial market commentators frequently focus on firms' abilities to consistently increase earnings per share (EPS). Firms that fail to maintain EPS growth suffer via lower stock prices. Such stock price penalties reduce the value of executives' holdings of stock and stock options, so executives have incentives to avoid negative EPS growth and possibly even reductions in EPS growth. These incentives could

motivate an executive to commit fraud. Thus, we compare EPS growth across fraud firms and control firms in the years preceding the frauds.

We compute an arithmetic average of EPS growth from years –5 to –2, where year 0 is the first fraud year. We use an arithmetic average to allow calculation of average annual growth rates from a positive to a negative value for EPS. We cannot calculate a growth rate from a negative to a positive EPS, so we substitute the EPS for year –4 if the earnings figure in year –5 is negative and the –2 EPS is positive. If the year –4 EPS is also negative, we omit the observation. We also omit observations with less than a four-year history, and observations for which we cannot collect data on Research Insight or by hand to calculate any of these growth rates. Because we conduct matched-pair tests, we have the same data requirements across fraud and control firms. Collectively, these restrictions limit this analysis to 33 pairs of fraud and control firms. For fraud firms and control firms, we compare the average annual growth rate in EPS from years –5 to –2 to the annual growth rate from years –2 to –1.

To reduce the loss of observations created by undefined growth rates from a negative to a positive EPS, we construct an additional measure defined as the dollar change in EPS scaled by price. Specifically, we compute the dollar change in EPS from year –5 to –2, scaled by price in year –5 multiplied by 3 to adjust for the fact that EPS changes over three years. We also compute the dollar change in EPS from year –2 to –1, scaled by price in year –1. This measure allows us to pick up an additional four paired observations. The remaining six fraud-control firm pairs have missing data for four or more years before the fraud so we cannot include them in this analysis.

[Table 7 about here]

As shown in Panel A of Table 7, fraud firms have a median annual growth in EPS from years –5 to –2 of 21.84%. The median annual growth rate is only 10.14% for the year immediately preceding the frauds (i.e., from years –2 to –1). The reduction in EPS growth rates is statistically significant at the 0.01 level. Control firms have median annual growth in EPS of 15.53% from years –5 to –2, which is significantly greater than the growth rate of 12.73% from years –2 to –1 (p-value = 0.01). The EPS growth rates do not differ significantly across the fraud and control firms in either time period. Thus, both the fraud and control firms display significant slowdowns in EPS growth in the years preceding the fraud. The results in Panel B for changes in EPS scaled by price produce qualitatively similar results to those in Panel A.

In summary, the stock return and operating performance results suggest that the frauds in our sample are motivated by declines in performance and possibly expectations by management of poor future returns. Our results are consistent with the predictions of Noe and Rebello (1994), who show theoretically that business ethics are positively correlated with economic cycles. We note here that although our incentive measures indicate the changes in portfolio value for *increases* in firm value, the magnitudes of the measures are nearly symmetric but opposite in sign for comparable *decreases* in firm value. Thus, we can view the equity-based compensation for fraud executives as providing stronger incentives to increase firm value or stronger incentives to avoid decreases in firm value, both of which create greater incentives to commit fraud.

4.3. Sensitivity and robustness checks

This section contains various sensitivity and robustness checks of our results. Rising stock prices increase the moneyness of stock options. Ceteris paribus, the increase in moneyness increases option deltas and the strength of the associated incentives. Thus, the greater incentives

we find for fraud firms, in particular in years beyond the first year of the fraud, could be created by the fraud itself if it inflated stock prices. If executives commit frauds that increase stock price and the moneyness of their options, then stronger measured incentives could be induced by the rising stock prices. If so, our measured incentives would not reflect the differences in the compensation that was initially awarded to the executives.

To check whether such a phenomena drives our results, we repeat the comparison of fraud versus control firms using only the first year of data for each firm. In unreported results, we find that the two incentive measures, dollars-on-percentage and dollars-on-dollars, are still significantly larger for fraud firms than for control firms at the 0.01 level. We conduct a similar analysis over the 34 pairs of firms for which we have incentive data for the year *preceding* the first fraud year. The two incentive measures are still significantly larger for fraud firms than for control firms, albeit at a lower significance level (p-value = 0.09) for the dollars-on-dollars measure. Thus, our findings of stronger financial incentives for fraud firms do not appear to be driven by any increases in stock price and option moneyness that result from the frauds themselves.

In the data discussion we noted that the control firm's revenue differs from the fraud firm's revenue by more than 30% for a significant number of fraud-control pairs. Compensation is related to size, so our results could be sensitive to inclusion of mismatched fraud-control pairs, where mismatched means their revenues are not within 30% of each other. Thus, we repeat our analysis excluding the mismatched paired observations. Unreported results show that our two incentive measures remain significantly greater for fraud firms than for control firms at the 0.01 level. Thus, our main results are not sensitive to inclusion of mismatched fraud-control pairs.

The results in Table 4 reveal larger differences between fraud firms and control firms for the CEO incentive measures per firm than the mean incentive measures per firm. Extremely high CEO values could skew the means for some firms upward, which could lead to incorrect inferences about the importance of group versus individual incentives. To avoid the effects of possibly extreme values for the CEO at each firm, we repeat our analysis with median incentives per firm instead of mean incentives per firm. Unreported results show that the two incentive measures remain significantly greater for fraud firms than for control firms at the 0.05 level.

Some fraud events extend to more than one year, so our analysis of fraud-years means that there is no strict independence among all of the observations. The dependence among fraud years for the same fraud event could lead to overstated test statistics and significance levels. Although this is likely to be a trivial problem because the maximum fraud length for any single firm is seven years, we also conducted an analysis designed to avoid such problems. Specifically, we average the incentive measures across years for each fraud event to produce one observation for each unique fraud event. This approach results in a sample that is independent across fraud events. Unreported results show that the two incentive measures, the dollars-on-percentage measure and the dollars-on-dollars measure, are still both significantly larger for fraud firms than for control firms at the 0.01 level.

Finally, the discussion in Section 2 emphasizes the importance of defining the *short-run* period before investors learn of the frauds because that is the period when executives can potentially profit from their frauds. The incentive measures in the previous analyses distinguish between vested and unvested options, but ignore the fact that option time value is lost if executives believe they can manipulate stock price only for a very short time and exercise vested

options accordingly. Thus, we recomputed the two incentive measures assuming that vested options had only a two-month maturity. This pushes the delta for in-the-money options towards one and the delta for out-of-the-money options towards zero, which is more reflective of true incentives if executives will exercise options in the very short term. Unreported results show that the two incentive measures are still both significantly larger for fraud firms than for control firms at the 0.01 level. Thus, our main results are not sensitive to the assumption that executives exercise options in the very short term.

5. Conclusions

We find that executives who commit corporate fraud face greater financial incentives to do so. These incentives stem from significantly larger stock and option holdings. Executives who commit fraud also exercise significantly larger fractions of their stock options, and as a result earn significantly greater total compensation than control executives. Our results suggest that executives commit frauds following significant slowdowns in their earnings growth. Frauds appear disproportionately in certain industries. We also find that the fraud firms and their industry-matched controls have relatively low stock returns during the fraud periods, which suggests that executives are more likely to commit frauds during industry downturns.

Our results have several implications for optimal incentive structures and for optimal expenditures on anti-fraud measures by firms, investors, analysts, and regulators. First, the strength of costly corporate governance measures need not be constant across firms. Instead, the optimal level of anti-fraud measures should depend in part on the strength of the incentives to commit fraud. For firms that should optimally provide very strong incentives to executives via equity-based compensation (e.g., firms with high growth opportunities), the optimal level of anti-

fraud measures should be higher. This is a potentially difficult prescription because it is more difficult to monitor executives of firms with higher growth opportunities. Second, the concentration of fraud in certain industries where it intuitively seems easier to commit fraud suggests that the optimal level of anti-fraud mechanisms varies across industry and firm characteristics. Third, the level of equity-based compensation trended upward in recent years. Managers receive a greater proportion of their compensation from equity-based incentives than they did in the past. Anti-fraud measures—both at the firm level and at the auditor, investor, and regulator level—should increase commensurately. It is not obvious that such measures did increase commensurately with the levels of equity-based compensation, which could explain the apparent increased incidence of corporate fraud in recent years.

Research on equity-based compensation suggests that it has substantial benefits. However, the timing issues in Yermack (1997) and Aboody and Kasznik (2000) and the hedging issue in Bettis et al. (2001), together with our findings on fraud incentives, suggest that at least some compensation contracts can produce unexpected outcomes that likely do not maximize shareholder wealth. Future theoretical and empirical work on executive compensation should incorporate potential indirect or unintended costs of various compensation structures and levels.

We note that corporate fraud imposes costs on society in a number of ways. First, corporate fraud potentially leads to a misallocation of resources, inducing greater capital flows to firms that do not actually provide the highest risk-adjusted expected returns. Second, corporate fraud can reduce investor confidence in all or many public corporations, leading to increases in the costs of capital for non-fraud firms (see U.S. General Accounting Office, 2002). Third, an increased likelihood of corporate fraud increases monitoring and enforcement costs of investors,

boards of directors, auditors, bankers, and regulators. Our results cannot speak to the question of whether the current monitoring and enforcement expenditures of these parties or the level of equity-based compensation are optimal in a social welfare sense. Our results do imply, however, that researchers who consider that question must also consider the nature and size of executive incentives provided by equity-based compensation.

References

Aboody, D., Kasznik, R., 2000, CEO stock option awards and the timing of voluntary corporate disclosures, Journal of Accounting and Economics 29, 73-100.

Anderson, K. L., Yohn, T. L., 2002, The effect of 10-K restatements on firm value, information asymmetries, and investors' reliance on earnings, Georgetown University working paper.

Agrawal, A., Jaffe, J.F., Karpoff, J.M., 1999, Management turnover and corporate governance changes following the revelation of fraud, Journal of Law and Economics 42, 309-342.

Agrawal, A., Chadha, S., 2002, Corporate governance and accounting scandals, University of Alabama working paper.

Baker, G.P., Hall, B.J., 2002, CEO incentives and firm size, Journal of Labor Economics, forthcoming.

Becker, G.S., 1968, Crime and punishment: an economic approach, Journal of Political Economy 76,169-217.

Beneish, M.D., 1999, Incentives and penalties related to earnings overstatements that violate GAAP, Accounting Review 74, 425-457.

Bettis, J.C., Bizjak, J.M., Lemmon, M.L., 2001, Managerial ownership, incentive contracting, and the use of zero-cost collars and equity swaps by corporate insiders, Journal of Financial and Quantitative Analysis 36, 345-370.

Bushman, R. M., Smith, A. J., 2001, Financial accounting information and corporate governance, Journal of Accounting and Economics 32 237-333.

Core, J., Guay, W., 2002, Estimating the value of employee stock option portfolios and their sensitivities to price and volatility, Journal of Accounting Research 40, 613-630.

Dechow, P.M., Sloan, R.G., Sweeney, A.P., 1996, Causes and consequences of earnings manipulation: an analysis of firm subject to enforcement actions by the SEC, Contemporary Accounting Research 13, 1-36.

Demsetz, H., Lehn, K., 1985, The structure of corporate ownership: causes and consequences, Journal of Political Economy 93, 1155-1177.

Fama, E., 1980, Agency problems and the theory of the firm, Journal of Political Economy 88, 288-307.

Feroz, E., Park, K., Pastena, V.S., 1991, The financial and market effects of the SEC's Accounting and Auditing Enforcement Releases, Journal of Accounting Research 29, 107-142.

Gaver, J., Gaver, K., 1993, Additional evidence on the association between the investment opportunity set and corporate financing, dividend, and compensation policies, Journal of Accounting and Economics 16, 125-160.

Hall, B.J., Liebman, J., 1998, Are CEOs really paid like bureaucrats? Quarterly Journal of Economics 103, 653-691.

Hall, B.J., Murphy, K.J., 2002, Stock options for undiversified executives, Journal of Accounting and Economics 33, 3-42.

Healy, P., 1985, The effect of bonus schemes on accounting decisions, Journal of Accounting and Economics 7 85-107.

Heath, C., Huddart, S., Lang, M., 1999, Psychological factors and stock option exercise, Quarterly Journal of Economics 114, 601-627.

Hemmer, T., Matsunaga, S., Shevlin, S., 1996, The influence of risk diversification on the early exercise of employee stock options by executive officers, Journal of Accounting and Economics 21, 45-68.

Huddart, S., Lang, M., 1996, Employee stock option exercises: an empirical analysis, Journal of Accounting and Economics 21, 5-43.

Jensen, M. C., 1989, Eclipse of the public corporation, Harvard Business Review 67 61-74.

Kedia, S., 2003, Do executive stock options generate incentives for earnings management? Evidence from accounting restatements, Harvard University working paper.

Marquardt, C., 2002, The cost of employee stock option grants: an empirical analysis, Journal of Accounting Research 40, 1191-1217.

Mehran, H., 1995, Executive compensation structure, ownership, and firm performance, Journal of Financial Economics 38, 163-184.

Noe, T. H., Rebello, M. J., 1994, The dynamics of business ethics and economic activity, The American Economic Review 84 531-547.

Palmrose, Z., Richardson, V. J., Scholz, S., 2001, Determinants of market reactions to restatement announcements, University of Southern California working paper.

Rappaport, A., 1990, The staying power of the public corporation, Harvard Business Review 68 96-104.

Smith, C.W., Jr. and R.L. Watts, 1992, The investment opportunity set and corporate financing, dividends, and compensation policies, Journal of Financial Economics 32, 263-292.

U.S. General Accounting Office, 2002, Financial statement restatements: trends, market impacts, regulatory responses, and remaining challenges, report to Chairman, Committee on Banking, Housing, and Urban Affairs, October.

Yermack, D., 1997, Good timing: CEO stock option awards and company news announcements, Journal of Finance 52, 449-476.

Appendix: Sample firms with years and natures of frauds

Details are from the SEC AAERs and news articles about the frauds. The years marking the beginning and end of frauds are fiscal years.

Fraud Begins	Fraud Ends	Firm	Nature of Offense
1992	1993	Advanced Micro Devices	Inaccurate/misleading public statements about new product development.
1993	1995	Alexander & Alexander	Materially overstated quarterly income by 14% to 104% related to derivative securities trading.
1997	2000	Amazon.Com Inc	Aided customer in misstating its earnings to beat expectations; overvalued customer's stock would count as revenue for Amazon.
1996	1997	American Banknote Corp	Accrued revenue following the close of books for 1996; overstated annual income by 16% to 167%.
1995	1996	AOL Time Warner Inc	Amortized certain costs instead expensing them, thereby overstating earnings.
1999	1999	Avon Products	Improperly valued capitalized costs, thereby overstating pre-tax earnings by 5%.
1997	1997	BankAmerica Corp	Incorrectly treated equity investment as loan; resulted in $372m writedown.
1994	1996	Bankers Trust Corp	Used unclaimed customer funds to falsely increase revenue by $700,000.
1997	1998	Boston Scientific Corp	Recorded false sales to overstate net income by $75m (or by 10% - 46% quarterly)
1992	1992	Diagnostek Inc	Inflated accounts receivable to overstate net income by $2.5m (14%).
2001	2001	Dynegy Inc	Used special-purpose entities to overstate cash flow by $300m.
1997	2000	Enron Corp	Used off-balance sheet entities to improve results and hide debt; overstated net income by $744m.
1992	1992	Frontier Insurance Group Inc	Overstated statutory capital and surplus by 133% by failing to properly account for related-party transactions.
1993	1993	Gibson Greetings Inc	Deferred gains/losses from speculative derivatives trading, overstating pre-tax income by $16.7m
1992	1995	Grace (W R) & Co	Improperly used excess reserves and deferred income to smooth earnings; false filings and public statements.
1997	1998	Guilford Mills Inc	False journal entries overstated pretax earnings by $4.4m-$6.5m (7%-10%).
1993	1993	Jo-Ann Stores Inc	Misstated inventory levels, gross profit, and pre-tax earnings
1995	1999	Kimberly-Clark Corp	Improperly accounted for restructuring charges, resulting in earnings being overstated by $23m (0.4%)
1999	1999	Legato Systems Inc	Overstated revenue to overstate net income by $12.3m (80%).
1996	1997	Material Sciences Corp	False entries in inventory and accounts payable records to overstate net income 29%; quarterly overstatements up to 300%.

1997	1999	McKesson Corp	Fraudulent journal entries to understate expenses, overstate revenue as much as 500%, and earnings by as much as 5%; overstated sales of one product by over $20m to produce sales growth of 21% compared to 1% to meet analysts' expectations.
1995	1996	Micro Warehouse Inc	Falsified expense and accounts payable accounts to inflate profits by $45m (100%)
1995	1998	Microsoft Corp	Maintained undisclosed reserves, accruals, etc. to smooth earnings.
1997	2000	Microstrategy Inc	Premature/improper revenue recognition; restatement reduced revenues by $66m and net income by 195%.
1997	1997	Oxford Health Plans Inc	Erroneously recorded revenue to overstate net income by 26%.
1995	1996	Per-Se Technologies Inc	Improperly recognized revenues, improperly reduced expenses, and understated development costs to overstate pre-tax income by $27m.
1993	1994	Perseptive Biosystems Inc	Prematurely and improper revenue recognition overstated income by as much as 320%.
1996	1997	Picturetel Corp	Improper revenue recognition overstated net income by $4m (8%).
1993	1996	Pier 1 Imports Inc	Concealed $20m derivatives trading losses, overstating pretax income by as much as 150%.
2001	2001	PNC Financial Services Group Inc	Created special entities to remove loans and investments from balance sheet, overstating net income by 52%.
1998	2000	Rite Aid Corp	Used a fraudulent vendor-return scheme to overstate cumulative pretax income by $2.3b.
1998	2000	Safety-Kleen Corp	Overstated revenue, causing earnings to be overstated by $534m.
1993	1993	Service Corp International	Failed to disclose auditor disagreement over accounting treatment of certain revenue.
1992	1994	Structural Dynamics Research	Premature and fictitious revenue recognition, overstating pretax earnings $30m.
1994	1995	Sunrise Medical Inc	Understated expenses by recording fictitious assets and liabilities, overstating pretax earnings by $19.6m.
1994	1996	System Software Assoc Inc	Improper revenue reporting.
1998	1998	Telxon Corp	Improper revenue recognition overstated net income by $11.4m (270%).
1997	2001	Tyco International Ltd	Executives received low and zero-interest loans from company. Company failed to disclose related-party transactions and compensation. Executives engaged in fraudulent stock trading.
1996	1996	USA Detergents Inc	Concealed invoices to reduce expenses and overstate net income by $4.5m.
1999	1999	Waste Management Inc	False public projections of future earnings; shares fell 35% on disclosure of accurate projections.
1992	1997	Waste Management Inc	Falsified and misrepresented financial results resulting in a $1.7b restatement of earnings.
2000	2000	Worldcom Inc-Worldcom Group	Falsified earnings by almost $10b.
1997	2000	Xerox Corp	Premature revenue recognition overstated pretax earnings by $1.5b.

Table 1
Distribution of frauds and lengths of frauds through time. We define fraud events as SEC Accounting and Auditing Enforcement Releases filed between 1992 and 2001 against firms in the ExecuComp database. We classify the frauds by the first year of the fraud event.

Year	Number of fraud events	Median fraud length in years	Minimum fraud length in years	Maximum fraud length in years
1992	6	2.5	1	6
1993	6	1.5	1	4
1994	3	3	2	3
1995	5	2	2	5
1996	5	2	1	7
1997	8	2.5	1	4
1998	4	3	1	4
1999	3	1	1	1
2000	1	3	3	3
2001	2	1	1	1

Table 2
Industry distribution of fraud firms versus ExecuComp firms. This table compares the industry distribution of fraud firms with the industry distribution of ExecuComp firms. A continuity-corrected chi-square test indicates that the distributions differ from each other at the 0.01 level.

Industry (SIC code)	Percentage of Fraud Firms Industry Represents	Percentage of ExecuComp Firms Industry Represents
7372: Prepackaged computer software	11.63%[a]	3.96%
5961: Catalog & mail order retail	6.98[a]	0.64
4953: Refuse and disposal systems	4.65[a]	0.52
5172: Petroleum and other fuels	4.65[a]	0.12
6021: National commercial banks	4.65	3.00
All others	67.44[a]	91.77

[a]Indicates the fraud and ExecuComp proportions are significantly different from each other at the 0.05 level.

Table 3

Median group incentive and compensation measures for fraud firms versus matched control firms for 102 fraud-years. We present the median of each group measure. The group measure for each firm-fraud year is the average across its top-five executives. The dollars-on-percentage incentive measure is the dollar change in stock and option holdings for a one percent increase in firm value. The dollars-on-dollars incentive measure is the dollar change in executive stock and option holdings for a $1,000 increase in firm value. We use Black-Scholes values in all measures that contain option values.

Panel A: Includes only vested options and unrestricted stock holdings

Measure	Fraud Firms	Matched Firms	p-value of H_0: Median paired difference = 0
Dollars-on-percentage incentive measure ($)	135,762	80,273	<0.01
Dollars-on-dollars incentive measure ($)	4.14	2.33	<0.01
Value of options & stock ($)	10,961,500	6,521,830	<0.01
Salary ($)	438,426	454,494	0.10
Bonus ($)	242,691	207,263	0.26
Salary / Total compensation	42.18%	45.58%	0.08
(Salary + Bonus) / Total Compensation	68.32%	71.10%	0.16
New Options Granted / Total Compensation	31.78%	21.79%	0.03

Panel B: Includes all options and all stock holdings

Dollars-on-percentage incentive measure ($)	229,131	137,360	<0.01
Dollars-on-dollars incentive measure ($)	9.31	4.62	<0.01
Value of options & stock ($)	15,043,200	10,428,720	<0.01

Table 4
Median CEO incentive and compensation measures for fraud firms versus matched control firms for 102 fraud-years. The dollars-on-percentage incentive measure is the dollar change in stock and option holdings for a one percent increase in firm value. The dollars-on-dollars incentive measure is the dollar change in executive stock and option holdings for a $1,000 increase in firm value. We use Black-Scholes values in all measures that contain option values.

Measure	Fraud Firms	Matched Firms	*p*-value of H_0: Median paired difference = 0
Panel A: Includes only vested options and unrestricted stock holdings			
Dollars-on-percentage incentive measure ($)	287,313	181,733	<0.01
Dollars-on-dollars incentive measure ($)	10.72	5.07	<0.01
Value of options & stock ($)	23,755,000	14,613,140	<0.01
Salary ($)	602,186	777,376	0.51
Bonus ($)	282,086	307,777	0.23
Salary / Total compensation	32.90%	43.08%	0.12
(Salary + Bonus) / Total Compensation	58.47%	70.78%	0.07
New Options Granted / Total Compensation	19.78%	13.40%	0.02
Panel B: Includes all options and all stock holdings			
Dollars-on-percentage incentive measure ($)	554,381	277,597	<0.01
Dollars-on-dollars incentive measure ($)	22.04	10.09	<0.01
Value of options & stock ($)	38,650,070	24,475,480	<0.01

Table 5
Median vested options, moneyness, exercise behavior, and compensation for fraud versus control executives. Total compensation is the ExecuComp variable TDC2 and includes salary, bonus, other annual compensation, total value of restricted stock granted, net value of stock options exercised, long-term incentive payouts, and total all other compensation. Total compensation is in constant 2002 dollars.

Measure	Fraud Firms	Matched Firms	*p*-value of H_0: Median paired difference = 0
Vested options / total options	43.39%	46.47%	0.08
Stock price / average strike price of vested options	1.70	1.30	<0.01
No. of exercised options / total options outstanding	4.94%	1.53%	0.04
No. of exercised options / total vested options	12.45%	3.11%	<0.01
Value of option exercises / total cash compensation	33.82%	10.63%	<0.01
Value of option exercises / total cash and non-cash compensation	13.35%	6.34%	0.04
Value of option exercises / firm market capitalization	0.005%	0.002%	0.11
Total compensation	$1,753,467	$1,157,172	<0.01

Table 6
Median fraud and control firm stock returns during fraud periods for 43 pairs of fraud firms and control firms. This table presents annualized raw and market-adjusted returns. Market-adjusted returns are firm returns less value-weighted CRSP index returns.

Measure	Fraud Firms	Matched Firms	*p*-value of H_0: Median paired difference = 0
Panel A: Raw Returns			
Annualized stock return over fraud period	2.04%	4.91%	0.42
Annualized stock return from one year before fraud to end of fraud	4.20%	6.95%	0.84
Panel B: Market-Adjusted Returns			
Annualized stock return over fraud period	-9.55%[a]	-9.46%[a]	0.42
Annualized stock return from one year before fraud to end of fraud	-13.03%[a]	-9.13%[a]	0.79

[a]Indicates the median market-adjusted return is significantly different from zero at the 0.05 level or better.

Table 7
Median fraud and control firm earnings per share growth. Panel A compares growth rates in earnings per share (EPS) from –5 to –2 years before the fraud to –2 to –1 years before the fraud for 33 matched fraud firm-control firm pairs. Panel B compares the change in EPS from –5 to –2 years scaled by the year 5 share price (times 3) to in the change in EPS from –2 to –1 years scaled by the year –2 share price for 37 matched fraud firm-control firm pairs. The differences in sample sizes across panels A and B stem from the inability to calculate growth rates from a negative to a positive EPS.

Measure	Fraud Firms	Matched Firms	*p*-value of H_0: Median paired difference = 0
Panel A: Changes EPS growth rates			
Annual EPS growth rate (-5 to -2)	21.84%	15.53%	0.80
Annual EPS growth rate (-2 to -1)	10.14%	12.73%	0.09
p-value of H_0: Median paired change from growth rate (-5 to -2) to growth rate (-2 to -1) = 0	<0.01	0.01	
Panel B: Changes in EPS yields			
(ΔEPS from -5 to -2) / 3*$\text{Price}_{t=-5}$	0.76%	0.84%	0.84
(Δ EPS from –2 to -1) / $\text{Price}_{t=-2}$	0.58%	0.74%	0.68
p-value of H_0: Median paired change from (*t* = -5 to -2) to (*t* = -2 to -1) = 0	<0.01	0.06	