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Financial statement fraud : capital market effects and ameliorating management actions

Albert Lawrence Nagy

To the Graduate Council:

I am submitting herewith a dissertation written by Albert Lawrence Nagy entitled "Financial statement fraud : capital market effects and ameliorating management actions." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Business Administration.

Joseph V. Carcello, Major Professor

We have read this dissertation and recommend its acceptance:

Susan Ayers, Bruce K. Behn, Ronald E. Shrieves, Jan R. Williams

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Financial Statement Fraud: Capital Market Effects and Ameliorating Management Actions

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Albert Lawrence Nagy

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DEDICATION

To my wife,

Marianne Selby Nagy

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ABSTRACT

The purpose of this research is to examine the effects that financial statement fraud announcements and certain strategic actions have on the perceived validity of financial disclosures. This study posits that: (1) Financial statement fraud announcements damage the perceived validity of future financial disclosures, and (2) certain strategic actions performed subsequent to a fraud announcement improve the perceived validity of financial disclosures. The hypotheses are based upon the prior literature that uses the earnings response coefficient (ERC) to measure earnings quality. In a similar light, this study uses the ERC to measure the perceived validity of financial disclosures. Based on prior academic literature, anecdotal evidence, and data availability, the following four strategic actions were chosen for examination and are hypothesized to improve the ERC following a financial statement fraud announcement: change the external auditor, increase the percentage of outsiders comprising the board of directors, form an audit committee, and change upper management. The OLS regression results provide evidence that a financial statement fraud announcement is associated with a decrease in the ERC, and that the strategic actions of changing external auditor and increasing the percentage of outsiders comprising the board of directors following a fraud announcement improve the ERC. These results suggest that financial statement frauds reduce the perceived validity of future financial disclosures, and that the strategic actions of changing external auditor and increasing the percentage of outside directors help mitigate this reduction.

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Chapter 1:

Introduction

During his testimony concerning H.R. 574, *The Financial Fraud Detection and Disclosure Act*, the then Chairman of the United States Securities and Exchange Commission (SEC) Richard C. Breeden stated that "financial statements provide the basis for the working of our entire market, as they form the basis for the calculation of risk that is fundamental to every extension of credit and every investment." The heavy reliance placed on financial statement information by market participants is well documented in the financial literature, and generally supports Mr. Breeden's statement. A critical component underlying the amount of reliance placed on financial statement data relates to their representational faithfulness or perceived validity. In SFAC No. 2, *Qualitative Characteristics of Accounting Information*, the Financial Accounting Standards Board (FASB) defines representational faithfulness as a "correspondence or agreement between a measure or description and the phenomenon that it purports to represent (sometimes called validity)", and considers it to be an important qualitative characteristic of accounting information [FASB 1980]. A decline in the perceived validity of financial statement disclosures jeopardizes their reliability, and in turn impairs the efficiency of the market system.

In order to ensure the validity of firm disclosures, managers often adopt different governance mechanisms to ensure quality financial disclosures. For example, mandatory external audits, an active board of directors and audit committees have all been set up to enhance, in part, the validity of company disclosures. The significant costs associated

with implementing and maintaining these mechanisms indicate the importance management and shareholders place on preserving financial disclosure validity. Although firms incur significant costs to maintain disclosure validity, there are events that damage this important financial statement characteristic.

One such event, financial statement fraud, is particularly important because it involves management intentionally deceiving financial statement users, and thus directly influences (or diminishes) investors' trust in management's representations.[1] In addition, the announcement of financial statement fraud often triggers certain management actions purported to improve the quality or validity of future financial disclosures and/or decrease the likelihood of financial statement fraud from reoccurring.[2] Despite the large volume of anecdotal evidence that suggests financial statement fraud announcements both damage the perceived validity of financial disclosures and trigger ameliorating company actions, there is a limited amount of empirical research examining these effects. This study adds to the empirical fraud research by examining the following two main questions: (1) Do financial statement fraud announcements reduce the perceived validity of financial disclosures, and (2) do certain strategic actions performed by companies

[1] For example, news of an SEC investigation for reporting violations prompted PaineWeber analyst Steve Fortuna to question the credibility of Sensormatic management (Sensor Business News 1995). After news of a financial statement fraud, Price Waterhouse told PerSeptive Biosystems that it could no longer rely on certain management representations (Wall Street Journal 1995). Additionally, an independent analyst said that the change in management following fraud allegations would help Bolar Pharmaceutical Co. restore its credibility with investors (Wall Street Journal 1990).

[2] For example, Cal Micro changed its senior management and fired several board members soon after disclosure of their alleged fraud (Richards 1996). Sunrise Medical Inc. reported that they fired the vice president of finance, changed its management bonus schemes and planned to strengthen the company's financial controls shortly after being accused of fraudulent reporting (Rundle 1996). Additionally, Comptronix Corp. fired members of its top management along with their independent auditor after a disclosure described their involvement in financial statement fraud (Wall Street Journal 1993).

subsequent to the fraud announcement improve the perceived validity of financial disclosures?

This study's hypotheses are based upon the prior literature that suggest the magnitude of market responses to information is positively related to the quality of the information [Holthausen and Verrecchia 1988]. Researchers in this area have examined whether the correlation of stock price reactions and unexpected earnings reflects the quality of the reported earnings amount [See for example, Imhoff and Lobo 1992; Teoh and Wong 1993]. A common measure of earnings quality used in these studies is the earnings response coefficient (ERC), which is a measurement of the correlation between unexpected earnings and abnormal changes in stock prices in response. In a similar light, this study uses ERCs to measure the perceived validity of financial disclosures. After controlling for other factors identified by the prior literature as affecting ERCs, this study uses this measure to examine the effects that fraud announcements and certain strategic actions have on the noise component of earnings disclosures. A decrease (increase) in the perceived validity is assumed to increase (decrease) the noise component of the earnings disclosure, thus decreasing (increasing) the ERC. A further explanation of this relationship is provided later in the paper.

The ERCs for earnings announcements surrounding the announcement of financial statement fraud were analyzed for a sample of 52 companies. The results show that after controlling for the effects of the strategic actions examined in this study, the ERC declines following a financial statement fraud announcement. Additionally, the strategic actions of replacing the external auditor and increasing the percentage of

outsiders comprising the board of directors improve the ERC subsequent to the fraud announcement. These results suggest that financial statement fraud announcements reduce the perceived validity of financial disclosures, and that certain strategic actions performed subsequently help ameliorate this reduction.

Credible financial disclosures are critical in an efficient market system, and the effects of an event that damages disclosure validity should be of interest to both managers and researchers. With an improved understanding of capital market effects resulting from financial statement fraud, managers of fraudulent companies would be better equipped to take the necessary actions in restoring their disclosure validity. Additionally, by examining the effectiveness of certain strategic actions in improving financial reporting credibility, this study may assist management in maintaining and enhancing current validity levels. Furthermore, this study is one of the first attempts to empirically examine the effects of financial statement fraud, along with accompanying strategic actions, on the perceived validity of earnings disclosures. These insights will add value to both the earnings quality and financial statement fraud literatures.

Chapter 2:

Societal Costs of Financial Statement Fraud

The American Institute of Certified Public Accountants (AICPA) defines financial statement fraud as intentionally misstating or omitting amounts or disclosures in financial statements to deceive financial statement users [AICPA 1997]. Based on this definition, financial statement fraud is a direct violation of investors' trust in the validity of financial disclosures and is costly to several members of the financial community. The significant costs of financial statement fraud were discussed by former Chairman of the Securities and Exchange Commission Richard C. Breeden who stated that "in every case where a firm 'cooks the books,' creditors and investors become the victims of these phony presentations...Even those who never buy or sell securities can become victims of fraud conducted through the use of fraudulent financial statements because they are induced to sell goods, provide services or enter into other transactions in the expectation of payment that may never occur. Thus, though the number of such cases is relatively small, they can affect many people when they occur [U.S. House of Representatives Committee on Energy and Commerce 1993]." In support of Mr. Breeden's statement, evidence exists that the financial community has incurred significant costs resulting from financial statement frauds.

A large volume of shareholder lawsuits result from financial statement frauds. In these lawsuits, in which auditors and management are often the defendants, investors seek restitution for losses suffered as a result of relying on intentionally misstated financial disclosures. Prior research suggests that slightly more than 35% of companies

with SEC enforcement actions have litigation that includes auditors as defendants [Bonner et al.1997], and a significant portion of the estimated $30 billion in damage claims faced by the accounting profession is associated with management fraud.[3]

The significant litigation costs expended by the auditing profession in defending financial statement fraud lawsuits prompted the AICPA to issue Statement on Auditing Standards No. 82, *Consideration of Fraud in a Financial Statement Audit,* which clarifies the auditors' fraud detection responsibility. Through this standard, the AICPA attempts to close the expectation gap between the public and the auditing profession regarding the auditors' responsibility in detecting financial statement fraud. In summary, significant resources have been exhausted from litigating and settling financial statement fraud lawsuits and from issuing a new auditing standard, which illustrates the significant societal costs resulting from financial statement frauds.

In addition to the above costs, intuitively and anecdotally, financial statement frauds appear to damage the perceived validity of financial disclosures. Given that market participants rely heavily on financial disclosures in their decision making process, and that validity is an important qualitative characteristic of useful financial disclosures, any decline in the perceived validity of financial disclosures is expected to impair the efficiency of the market system. The intentional deceitfulness behind financial statement fraud makes it an event that directly violates investors' trust, and in turn potentially damages the perceived validity of future disclosures. This study empirically examines the effects that financial statement fraud, along with certain strategic actions, have on the

[3] Arthur Andersen, Coopers & Lybrand, Deloitte & Touche, Ernst & Young, KPMG Peat Marwick, and Price Waterhouse. *The Liability Crisis Facing the United States: Impact on the Accounting Profession.*

perceived validity of financial disclosures by comparing pre- and post-fraud announcement ERCs. The relationship between ERCs and perceived validity is discussed next.

Chapter 3:

Methodology, Hypotheses and the Event Window

Methodology:

This section presents analytical formulas derived by Teoh and Wong (1993) (TW) who use ERCs to measure earnings credibility. TW adapt a simplified model from Holthausen and Verrecchia (1988) that relates the stock price response to the precision of the earnings signal. The authors state that their aim is to provide a simple setting to test the relation between the market response to an information signal and the precision of the signal, and therefore they abstract from some pertinent factors that would be incorporated in a more general model, such as the firm's riskiness, the degree of earnings persistence and predictability, and other time series characteristics.

TW begin by making the following assumptions about the economy: a single period, a single risky asset, one information release, a competitive, risk-neutral market maker, and no private information. Let u be the unknown random value of the firm and assume it is normally distributed with mean m and variance υ: That is,

$$\tilde{u} \sim N(m, \upsilon)$$

Let y be the earnings signal that occurs during the period and communicates the true value of the firm with some noise:

$$\tilde{y} = \tilde{u} + \tilde{v}$$

where v is normally distributed with mean 0 and variance n. Consider the price of the firm at two points in time, when the market opens (P^0) and at the first information release (P^1). The following equations reflect the price of the firm at these two points in time:

$$P^0 = E[\tilde{u}] = m$$
$$P^1 = E[\tilde{u} \mid \tilde{y} = y] = m + \upsilon(\upsilon + n)^{-1}(y - m)$$

From these equations, the price change at the time of the information release ($P^1 - P^0$) equals:

$$P^1 - P^0 = \upsilon(\upsilon + n)^{-1}(y - m)$$

where $(y - m)$ is a measure of the earnings surprise and $\upsilon(\upsilon + n)^{-1}$ is the earnings response coefficient (ERC). The ERC is a function of the level of prior uncertainty, υ, and the amount of noise in the earnings signal n. Differentiating the ERC with respect to both υ and n produces the following:

$$\frac{\partial ERC}{\partial \upsilon} = \frac{n}{(\upsilon + n)^2} > 0,$$

$$\frac{\partial ERC}{\partial n} = -\frac{\upsilon}{(\upsilon + n)^2} < 0.$$

Thus, the stock price response increases with υ and decreases with n.[4] The positive relation between ERC and υ suggests that the earnings signal takes on greater

[4] This qualitative result, derived by Teoh and Wong (1993), is similar to Loudder and Behn (1995) who use Lev's (1989) model to develop comparative statistics.

significance when the level of prior uncertainty is high. The negative relation between ERC and n suggests that an increase in the noise component of the earnings signal (i.e., reduced precision) reduces the usefulness of the information release. In summary, a high n, for a given υ, implies a less credible (valid) or lower quality earnings signal. That is, the ERC is positively related with the quality of the earnings signal when holding constant the level of prior uncertainty. This study assumes that validity is positively related with quality, and tests for fraud effects on perceived disclosure validity by comparing pre-fraud and post-fraud ERCs, after controlling for prior uncertainty levels (υ).

Hypotheses:

As viewed within this framework, the fraud announcement is expected to damage the perceived validity of subsequent financial disclosures. This added uncertainty increases the noise component in future earnings disclosures (i.e., lessens the perceived validity), which reduces the ERC, ceteris paribus. This leads to the following hypothesis:

H1: The announcement of financial statement fraud is associated with a decrease in the company's ERC.

Anecdotal evidence suggests that companies subject to financial statement fraud announcements perform certain actions in an attempt to restore their company's credibility. Extant research provides support that certain types of these actions effectively improve earnings quality and/or deter future frauds from occurring. In either case, these actions are expected to improve the perceived validity of financial disclosures following a fraud announcement. The next section discusses the strategic actions selected for examination and their related hypotheses.

Arguably, the occurrence of financial statement fraud is indicative of a breakdown in the corporate governance structure of the company. A large amount of research has examined different types of corporate governance functions and their effect on earnings quality. Much of this research focuses on the following governance functions: external auditor, board of director composition, audit committees, and management compensation contracts. As previously discussed, anecdotal evidence suggests that companies recently subject to financial statement fraud announcements perform actions purportedly to restore their credibility. Based on the extant literature, the following actions performed by these companies are expected to improve their perceived disclosure validity, and thus were considered for examination: changing external auditor, increasing the percentage of outsiders on the board of directors, forming an audit committee, and changing to a less aggressive compensation plan. The aggressiveness of a compensation plan was not able to be measured with any reasonableness, and thus this action is not included for examination. The remaining strategic actions (changing external auditor, changing composition of the board of directors, and forming an audit committee) are discussed in greater detail, along with their related hypotheses, later in this section.

In addition to the extant academic research, and based on the numerous press disclosures read for completion of this study, I subjectively determined that the following strategic actions subsequent to a fraud announcement were disclosed with relative frequency: external auditor change, board member replacement, and upper management replacement. The changing of external auditor and changing board of director

composition are actions supported by the extant literature discussed above and are included for examination. Intuitively, replacing the upper management that were involved with the fraud is an action that should improve the credibility of the company. Thus, based on both anecdotal evidence and intuition, changing of upper management is also included as a strategic action for examination. In summary, the following four strategic actions were chosen for examination:

- change in external auditor,
- change in the composition of the board of directors,
- formation of an audit committee, and
- change in upper management.

These four strategic actions and their related hypotheses are discussed next.

The external audit is a governance function designed to provide reasonable assurance that the financial statements are presented fairly. Extant research provides evidence that the quality level of the external auditor is positively related to the informativeness of the financial disclosures (i.e., ERCs) [Ettredge et al.1988; Teoh and Wong 1993; Moreland 1995]. The effects of an auditor change on ERCs depends on whether the switch involved audit firms from within the same quality group or involved audit firms between audit quality groups. Specifically, auditor changes from lower to higher (higher to lower) quality groups increase (decrease) the ERCs of companies. With respect to the current study, the perceived quality of the external auditor associated with a fraudulent firm is expected to decline due to the auditor failing to discover the fraud, and thus any change in auditor may be perceived as an improvement in auditor quality. Therefore, the main model of this study does not consider auditor quality groups, but simply examines whether any auditor change affects the perceived validity of financial

disclosures surrounding financial statement fraud announcements. The effects of auditor quality groups (i.e., change between auditor quality groups or within the same auditor quality group) are examined in a separate sensitivity analysis. This leads to the following hypothesis:

H2: The act of changing external auditor following the announcement of financial statement fraud is positively related to ERCs.

The board of directors is a corporate governance function designed to monitor management activities. Fama and Jensen (1983) suggest that the inclusion of outside directors increases the board's ability to monitor management's behavior because they do not have the incentive to collude with top managers to expropriate stockholder wealth. Consistent with this theory, prior research provides evidence that the percentage of outsiders on the board of directors is negatively related with both the occurrence of financial statement fraud [Beasley 1996] and with the degree of manipulation of earnings prior to an SEC enforcement action [Dechow et al.1996]. Pertaining to this study, companies recently subject to a financial statement fraud announcement are expected to improve their disclosure validity by increasing the percentage of outsiders on their board of directors subsequent to the announcement. Based on the extant literature, an increase in outsiders on the board of directors for these firms is expected to reduce the likelihood of future fraud occurrences and improve the quality of earnings' disclosures. Both results are expected to improve the perceived validity of the earnings disclosures. This discussion leads to the following hypothesis:

H3: The act of increasing the percentage of outsiders on the board of directors following the announcement of financial statement fraud is positively related to ERCs.

Audit committees are installed to monitor the financial reporting process, and the occurrence of financial statement fraud may justify their formation. Prior research provides evidence that the informativeness of earnings is positively associated with the formation of an audit committee [Wild 1996; Dechow et al. 1996]. For this study, the formation of an audit committee for firms recently subject to a fraud announcement is expected to improve the perceived validity of their financial disclosures. This discussion leads to the following hypothesis:

H4: The act of forming an audit committee following the announcement of financial statement fraud is positively related to ERCs.

Intuitively, the group most responsible for the occurrence of financial statement fraud is upper management. Whether due to direct involvement in the fraud or negligence in their monitoring duties, upper management must assume some or all of the responsibility for the occurrence of financial statement fraud. Thus, changing upper management is expected to improve the perceived validity of financial disclosures following a financial statement fraud announcement. This discussion leads to the following hypothesis:

H5: The act of changing upper management following the announcement of financial statement fraud is positively related to ERCs.

To test the five stated hypotheses, this study examines ERCs surrounding the date in which news of the financial statement fraud became publicly available. The details regarding the selection and identification of this event date (financial statement fraud announcement) are discussed next.

The Event Window:

This study examines the effects of financial statement fraud on the perceived validity of financial disclosures by examining ERCs surrounding fraud announcements. Since ERCs measure market responses to unexpected earnings disclosures, the fraud announcement date (i.e., the event date) should be the first time that financial statement fraud is alleged by a credible source. This date was determined to be the date in which the public became aware that the SEC began a formal investigation for material reporting violations. The details of this date, and why it was selected as the event date, are provided later in this section. Next, a description of the process performed by the SEC in detecting and sanctioning firms involved in financial statement fraud is provided.

The SEC's Division of Enforcement was created in 1972 to protect investors and foster confidence by preserving the integrity and efficiency of the securities markets [SEC 1996]. The SEC is constantly investigating suspicious market actions that may be in violation of the federal securities laws. These investigations are commonly triggered by enforcement leads often provided from the following sources: (1) market surveillance programs, (2) public complaints, tips, referrals from other law enforcement agencies, and financial press information; and (3) reviews of 1933 and 1934 Securities Acts filings [Pincus et al. 1988]. Upon receipt of an enforcement lead, an SEC analyst scrutinizes reports for violations of routine screening criteria and for suspicious subjective factors, and then decides if an informal investigation is necessary [Feroz et al. 1991]. Informal investigations by the SEC involve persons with relevant information voluntarily providing documentation and testimony. As a matter of policy to protect firms cleared by

the inquiry, the SEC does not make informal investigations publicly known [Feroz et al. 1991].

The results from the informal investigation determine whether the SEC begins a formal investigation. The federal securities laws empower the SEC to perform formal investigations, providing subpoena power to compel testimony and the production of documents [SEC 1996]. Target firms are formally notified of the formal investigation, and the public announcement of the investigation is made soon after this notification.[5] The results of the formal investigation determine the type of enforcement action taken by the SEC.

The type of enforcement action pursued by the SEC depends on the type of alleged reporting violation under investigation. The federal court injunction, an order that prohibits future violations of the law, has always been one of the SEC's principal enforcement tools [SEC 1996]. In addition to court injunctions, the SEC often seeks civil money penalties and the disgorgement of illegal profits. Furthermore, the federal courts have the power to bar or suspend individuals from serving as corporate officers or directors, as well as mandate criminal sanctions for federal securities law violations including fines and imprisonment. A summary of the enforcement actions and other conclusions from the formal investigations are stated in the Accounting and Auditing Enforcement Releases (AAERs), which are issued by the SEC. The AAERs are used in

[5] According to Feroz et al. (1991), the SEC makes its enforcement activities public only when it files a formal complaint alleging securities law violations and seeks settlement with the enforcement target. However, the *1934 Act Release No. 5092* requires the public disclosure by companies of material information, which would include formal investigations by the enforcement division.

this study to identify companies sanctioned by the SEC for financial statement fraud. A detailed discussion on the sample selection procedures is presented later in the paper.

The SEC is believed to have more targets for formal investigations than it can practically pursue, and thus it investigates only material cases that have a high probability of success (i.e., ending with a sanction) [Feroz et al. 1991].[6] Therefore, the announcement of an SEC formal investigation signals to the public that the target company has been accused of a material reporting violation and that a future SEC sanction is likely. News of the SEC formal investigation may be the first time allegations of fraudulent reporting activity by the target firm is publicly disseminated, or it may merely confirm market participants' suspicions of fraudulent reporting by the target firm. In either event, the beginning of a formal SEC investigation announces to the public that a credible agency has accused the target company of a material reporting violation, and thus it is the event date used for this study. That is, this study will examine for fraud announcement effects by observing ERCs surrounding the date upon which the public became aware of a formal SEC investigation.

The event window to test the hypotheses measures ERCs surrounding quarterly earnings announcements immediately preceding and following the date upon which information about the formal fraud investigation is first disseminated to the public (i.e., the SEC formal investigation disclosure date). The ERCs are measured over four pre-fraud and four post-fraud quarterly earnings announcements. The reasoning that four subsequent periods are examined is twofold. First, the quarterly financial statement data

[6] Feroz et al. [1991] point out that of 43 accounting-based formal investigations completed in 1989, only two did not result in an SEC 'win'.

disclosed immediately after the fraud announcement may include significant accounting adjustments due to the fraud, which may reduce its informativeness to investors. Second, the examination of four post-fraud quarters may lend insights about the persistence of the perceived validity damage caused by fraud announcements. Additionally, an adequate time frame is necessary to allow ample time for the strategic actions to be performed and for the market to react to these actions. Four pre-fraud periods are examined in order to balance the model and to have an adequate number of observations to provide reasonable earnings response metrics prior to the fraud announcement.

Figure 1 presents a timeline showing the event window. The quarterly earnings announcements are represented by periods t-4 through t+4, which are the eight quarterly earnings announcements surrounding the SEC formal investigation disclosure date (i.e., the SEC investigation disclosure occurred between quarterly earnings announcements t-1 and t+1). This date was identified by searching the *Wall Street Journal,* industry trade journals, Form 10-Ks, and Form 8-Ks. A detailed discussion regarding the identification of the first disclosure of the formal SEC investigation is provided later in the paper. The fraud announcement effects were examined by measuring the ERCs associated with earnings announcements t-4 through t+4. The next section describes the empirical model employed to measure these market reactions.

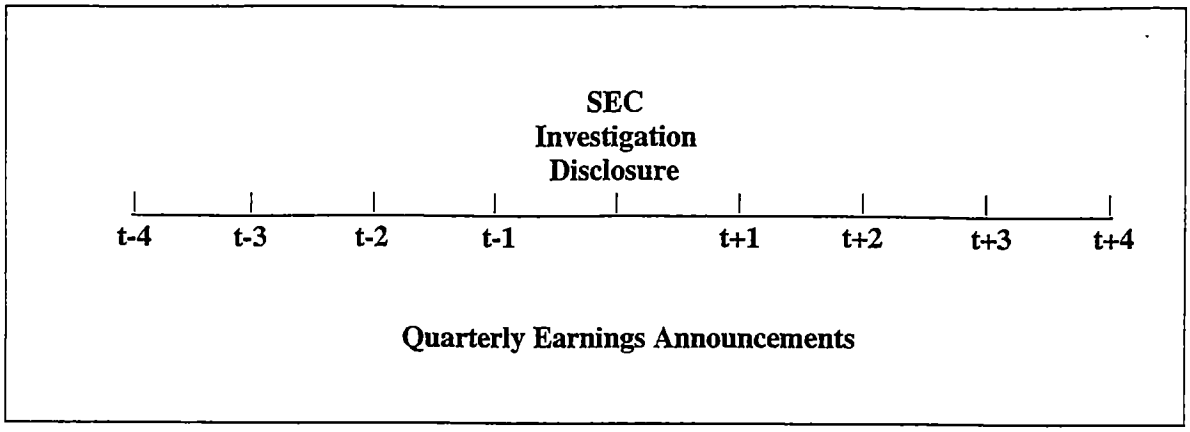

Figure 1
Event Timeline

Chapter 4:

Empirical Model

Regression Model:

Consistent with Teoh and Wong (1993) who study the effects of an auditor switch on ERCs, this study uses a cross-sectional time-series regression that is estimated using the OLS method. The data are pooled across firms so factors identified by the prior literature as affecting ERCs should be controlled for in the regression. Prior literature provides evidence that ERCs are positively related to growth prospects [Collins and Kothari 1989] and the persistence of earnings [Kormendi and Lipe 1987; Lipe 1990], and negatively associated with systematic risk [Collins and Kothari 1989; Easton and Zmijewski 1989], and the amount of predisclosure firm information [Atiase 1985]. Salamon and Stober (1994) provide evidence that fourth-quarter earnings announcements have smaller ERCs than the other three interim quarters. Each of these factors are included as control variables in the regression model.

The ERC is a measurement of the correlation between unexpected earnings and abnormal changes in stock prices in response. Thus, the dependent variable of the regression model is abnormal stock returns and the independent variable is unexpected earnings. The effects that financial statement fraud announcements and the strategic actions have on ERCs are examined by including interaction terms (the test variable * unexpected earnings) in the regression model. These interaction terms measure the effects that the test variables have on the abnormal return-unexpected earnings relation (i.e., the ERC). After the addition of control variables proxying for the effects mentioned

above, the following multiple regression model was employed:

$$UR_{ia} = \beta_0 + \beta_1 FRD_{ia} + \beta_2 UE_{ia} + \beta_3 (UE_{ia} * FRD_{ia}) + \beta_4 AUD_{ia} + \beta_5 (UE_{ia} * AUD_{ia}) + \beta_6 OUT_{ia} + \beta_7 (UE_{ia} * OUT_{ia}) + \beta_8 MGMT_{ia} + \beta_9 (UE_{ia} * MGMT_{ia}) + \beta_{10} AC_{ia} + \beta_{11} (UE_{ia} * AC_{ia}) + \beta_{12} MBRAT_{ia} + \beta_{13} RISK_{ia} + \beta_{14} SIZE_{ia} + \beta_{15} QTR_{ia} + \varepsilon_{ia},$$

where,

UR_{ia}. The cumulative unexpected return for firm i surrounding quarterly earnings announcement a. The details regarding the measurement of this variable are explained in the following section.

UE_{ia}. The unexpected quarterly earnings for firm i at announcement a. The details regarding the measurement of this variable are explained in the following section.

FRD_{ia}. A dummy variable equaling 1 if the quarterly earnings announcement is subsequent to the fraud announcement, and 0 otherwise. A negative coefficient on this variable's interaction term ($UE*FRD$) would suggest that the announcement of financial statement fraud decreases the ERC, and would support H1.

AUD_{ia}. For subsequent fraud announcement periods, this variable equals 1 if company i changed its external auditor, and 0 otherwise.[7] For prior fraud announcement periods, this variable equals zero. A positive coefficient on this variable's interaction

[7] As previously discussed, the effect of auditor change depends on whether the market perceives the auditor change as an improvement in audit quality. The main model presented assumes that the perceived quality of the incumbent auditor is severely damaged from the fraud occurrence and that any change of auditor is perceived as an improvement in quality. A sensitivity analysis is performed to test whether the effectiveness of the auditor change depends on the type of change (i.e., from higher to lower, lower to higher or between the quality groups).

term (*UE*AUD*) would suggest that a change in external auditor increases the earnings response coefficient subsequent to the fraud announcement, and would support H2.

OUT_{ia}. For subsequent fraud announcement periods, this variable equals the increase in the percentage of outside directors serving as board members from the beginning of the measurement period. For prior fraud announcement periods, this variable equals zero. A significant and positive coefficient on this variable's interaction term (*UE*OUT*) would suggest that an increase in the percentage of outside board members improves the earnings response coefficient subsequent to the fraud announcement, and would support H3.

AC_{ia}. For subsequent fraud announcement periods, this variable equals 1 if an audit committee was formed, and 0 otherwise. For prior fraud announcement periods, this variable equals zero. A positive coefficient on this variable's interaction term (*UE*AC*) would suggest that the formation of an audit committee increased the earnings response coefficient subsequent to the fraud announcement, and would support H4.

$MGMT_{ia}$. For subsequent fraud announcement periods, this variable equals 1 if the company changed an upper management position subsequent to the fraud announcement, and 0 otherwise. For prior fraud announcement periods, this variable equals zero. Upper management positions considered are chief executive officer (CEO), chief operating officer (COO), chief financial officer (CFO), and the chief accounting officer (CAO). A positive coefficient on this variable's interaction term (*UE*MGMT*) would suggest that changing upper management increased the earnings response coefficient subsequent to the fraud announcement, and would support H5.

$MBRAT_{ia}$. The market-to-book value of equity ratio for firm i at quarter a. This variable proxies for both growth and earnings persistence and is expected to have a positive coefficient.[8]

$RISK_{ia}$. The systematic risk of firm i measured per the market model beta. The coefficient of this variable is expected to be negative.

$SIZE_{ia}$. The natural log of the market value of equity at the beginning of quarter *a*. Atiase (1985) suggests that firm size is a reasonable proxy for the amount of predisclosure firm information. Thus, this variable proxies for the noise in the predisclosure environment and is expected to have a negative coefficient.

QTR_{ia}. A dummy variable equaling one if the quarterly announcement is a fourth period (i.e., fiscal year-end) announcement and 0 otherwise.

ε. The disturbance term.

A summary of all of the variable definitions is presented in Table 1.

The average intercept of the pre-event period is measured by β_0; and β_1 measures the shift in the intercept for the post-event period. The pre-event period residual ERC left unexplained by the control and the strategic action variables is estimated by β_2, and the

[8] A separate persistence of earnings measure is not included due to the sampled firms lacking an earnings history that is necessary to calculate a persistence variable. Kormendi and Lipe (1987) used 35 consecutive earnings observations per firm, and Easton and Zmijewski (1989) used 20 earnings observations per firm to measure persistence. This study would require a similar number of earnings from each period (pre-announcement and post-announcement) to measure a persistence variable, and such an amount is not available for many of the sampled companies. Therefore, the market-to-book value of equity ratio is used to proxy for both growth potential and earnings persistence. Collins and Kothari (1989) suggest that this ratio is likely to be affected by earnings persistence, and prior empirical studies have used the market-to-book ratio to proxy for both growth and earnings persistence (Teoh and Wong 1993; Wild 1996).

Table 1
Variable Definitions

Variable	Variable Type	Description
UR	Dependent	The two-day cumulative unexpected return surrounding the quarterly earnings announcement.
FRD	Independent	A dummy variable equaling 1 if the quarterly earnings announcement is subsequent to the fraud announcement date, and 0 otherwise.
UE	Independent	The unexpected quarterly earnings computed from a seasonal random walk model of earnings scaled by price.
AUD	Independent	For post-event periods, this variable equals 1 if the company changed its external auditor, and 0 otherwise. For pre-event periods this variable equals 0.
OUT	Independent	For post-event periods, this variable equals the increase in the percentage of outside directors serving as board members from the beginning of the event window. For pre-event periods this variable equals 0.
MGMT	Independent	For post-event periods, this variable equals 1 if the company changed an upper management position (CEO, COO, CFO, or CAO), and 0 otherwise. For pre-event periods this variable equals 0.
AC	Independent	For post-event periods, this variable equals 1 if an audit committee was formed, and 0 otherwise. For pre-event periods this variable equals 0.
MBRAT	Independent	Market-to-book value of equity. This variable proxies for both growth and earnings persistence.
RISK	Independent	Systematic risk of the firm is measured per the market model beta.
SIZE	Independent	Size is the natural log of the market value of equity at the beginning of the quarter and proxies for the noise in the predisclosure environment
QTR	Independent	A dummy variable equaling 1 if the quarterly announcement is a fourth period announcement (fiscal year-end), and 0 otherwise.

shift in this coefficient is estimated by β_3. That is, the difference in the residual ERC between the pre-event period versus the post-event period is measured by β_3. Thus, a negative and significant β_3 would support H1. The effects of the four strategic actions on the earnings response coefficient are measured by estimating the coefficients of interaction terms consisting of unexpected earnings (*UE*) and the strategic action. Significant and positive coefficients on these interaction terms would support the ameliorating action hypotheses (H2-H5).

Measurement of Variables:

Unexpected returns are estimated through the following market model:

$$UR_{ja} = \sum_{t=-1}^{0} (R_{jt} - \hat{\gamma}_{j0} - \hat{\gamma}_{j1} R_{Mt}),$$

where $t = 0$ is the day of the firm's quarterly earnings announcement, j denotes firm and a denotes quarter. R_{jt} is the rate of return of firm j at day t, R_{Mt} is the Center for Research in Security Prices (CRSP) value-weighted index, and γ_{j0} and γ_{j1} are parameter estimates from a firm specific market return model. These parameters are estimated over a 200 trading day period.[9] The firm specific *RISK* variable is obtained from the market model. Specifically, γ_{j1} is firm j's market model beta and proxies for firm risk. These variables were obtained from the daily CRSP tapes.

[9]For quarterly earnings announcements prior to the fraud announcement, the 200 day estimation period ended the day before the quarterly announcement. For quarterly earnings announcements after the fraud announcement, however, the 200 day estimation period had to cover a period surrounding the earnings announcement due to the event date (i.e., fraud announcement) being within 200 days of the subsequent

UE_{ia} is computed from a seasonal random walk model of earnings, scaled by price:

$$UE_{ia} = (EPS_{ia} - EPS_{ia-4}) / P_{ia},$$

where EPS_{ia} is the earnings per share for firm i for quarter a, and EPS_{ia-4} is prior period's earnings per share (i.e., prior year's EPS for the same quarter). P_{ia} is the price per share of firm i's stock at the beginning of the quarter. These variables were obtained from the Compustat quarterly tapes.

The data regarding the strategic action variables were obtained by examining Form 10-Ks and proxy statements. The following procedures were performed to capture the date at which information regarding the strategic actions was disseminated to the public. First, auditor and upper management data were obtained from Form 10-Ks issued immediately before the beginning of the event window, and audit committee and board of director data were obtained from proxy statements issued immediately before the event window.[10] Then, the same information was obtained from Form 10-Ks, 8-Ks and proxy statements issued during and immediately after the event window to determine the status of the strategic action variables throughout the event window. Next, in order to identify the first disclosure date concerning these actions, the Dow Jones *News/Retrieval* search engine was used to perform a full text search of the Wall Street Journal, news wire, and industry trade journals for each of the sampled companies to identify disclosures concerning the strategic actions during the event window. The strategic action variables

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quarterly announcement. In order to exclude the effects of the fraud announcement, a 10 day period surrounding the fraud announcement was excluded from the market model estimation period.

[10] Recall the event window for this study consists of four quarters prior and four quarters subsequent to the announcement of financial statement fraud.

were calculated based upon when the information became publicly known. Descriptive statistics about these variables are presented and discussed later in the paper.

Chapter 5:

Sample

The sample is limited to publicly held companies because this study uses information in financial statements and proxy statements filed with the SEC. Fraud firms were identified from two sources: (1) AAERs issued by the SEC, and (2) the Wall Street Journal. AAERs issued between 1/1/90 and 1/31/98 were examined for firms sanctioned by the SEC for violating Rule 10(b)-5 of the Securities Act of 1934.[11] Violation of Rule 10(b)-5 of the 1934 Securities Act requires the intent to deceive, manipulate, or defraud. In addition to the AAER examination, a full-text Wall Street Journal search was performed for 1995 and 1996 to identify companies currently under investigation by the SEC, but not yet sanctioned.[12] The SEC is believed to pursue cases where their probability of success is high and where the allegations involve material violations [Feroz et al. 1991]. Therefore, it is reasonable to assume that the sample obtained for this study consists of publicly traded firms accused of material reporting violations by the SEC.

Panel A of Table 2 summarizes the sample selection procedure used to obtain firms for empirical analyses. The AAER examination produced a total of 234 companies that were sanctioned by the SEC for violating Rule 10(b)-5. After considering the availability of Compustat and CRSP data, 41 firms remained. An additional 11 firms were identified per the *WSJ* search and met the data requirements. The final sample

[11] This period is chosen for examination in order to ensure that the data obtained are current and that the sample is large enough for meaningful analysis.

[12] Dow Jones *News/Retrieval* was used for the full-text search. The search involved examining articles in which the words investigation, inquiry or probe were within 25 words of the words Exchange Commission or SEC. This period (1995-1996) was searched in order to ensure that a long enough period exists after the fraud announcement to examine the effects of subsequent strategic actions.

Table 2
Sample Information

Panel A: Sample Selection Summary

Firms selected from AAERs (#251-#1011) issued between 1/1/90 and 1/31/98		234
less firms with incomplete CRSP data	(188)	
less firms not listed on COMPUSTAT	(5)	
plus firms selected from the WSJ search	11	
Final Sample		52

Panel B: SEC Investigation Dates

SEC Investigation Disclosure	Companies
1987	2
1988	2
1989	1
1990	4
1991	3
1992	11
1993	7
1994	5
1995	11
1996	6
Total	52

Panel C: Summary of Final Data Set

Potential Observation Points (52 firms * 8 quarters)		416
less missing data items	8	
less extreme UE values (greater than 1 or less than -1)	5	
less extreme RISK values (greater than 3.5 or less than -.1)	10	
less extreme MBRAT values (greater than 65)	3	
less influential outliers	14	
Final Sample of Observations		376

consists of 52 companies.

As previously discussed, the event date for this study is the time in which the public became aware that an SEC investigation for reporting violations had commenced. The following procedures were performed for each of the sampled companies to determine this event date: (1) a full text search was performed via Dow Jones *News/Retrieval* of the Wall Street Journal and numerous industry trade journals beginning with the reporting violation date and ending with the AAER issuance date for each of the sampled companies,[13] (2) forms 10-Ks, 10-Qs and 8-Ks were searched using Lexis-Nexis for an SEC investigation disclosure over the same period.[14] Panel B of Table 2 indicates the distribution of the sample according to the year in which the SEC investigation was announced. The disclosure dates range from 1987 to 1996, with the highest number of disclosures occurring in 1992 and 1995 (11 firms).

Panel C of Table 2 summarizes the final set of observations used to perform the empirical analyses. This study attempts to examine eight data points (four quarters before and four quarters after the event date) for each of the sampled companies. With 52 firms in the sample, the possibility of 416 observations exist (8 data points * 52 firms). A total of 40 observations were excluded from analyses for the following reasons: missing data item (8), extreme unexpected earnings amount (5), extreme RISK (market

[13] For companies identified via the *WSJ* search, the Dow Jones *News/Retrieval* search period extended back a period of two years using the company name as a key-word.
[14] For companies not included in the Lexis-Nexis database, form 10-Ks were examined via Q-Data SEC files.

model Beta) variable amount (10), extreme market-to-book ratio (3), influential outlier (14).[15] After these considerations, a total of 376 observations remained for analyses.

[15] Extreme amounts were determined as follows: *UE* amounts greater than 1 or less than –1; *RISK* amounts greater than 3.5 or less than -.10; and *MBRAT* amounts greater than 65. Influential outliers were determined by examining the studentized residuals and the Cook's D Influence variables for the sampled observations.

Chapter 6:

Descriptive Statistics

Table 3 presents the overall mean and median amounts, along with pre-event and post-event mean amounts for unexpected returns (*UR*), unexpected earnings (*UE*) and the control variables *MBRAT, RISK,* and *SIZE.* Additionally, the geometric mean of the *SIZE* variable stated in millions of dollars (i.e., *GMSIZE*) is presented. T-statistics were calculated (although not reported) to test the significance of the difference between the mean levels of the variables. All three of the presented mean amounts (overall, pre-event, and post-event) for both unexpected returns (*UR*) and unexpected earnings (*UE*) are not significantly different from zero at any conventional level. Additionally, the pre-event mean amount is not significantly different from the post-event mean amount for either *UE* or *UR*. The mean and median amounts for the other variables (*MBRAT, RISK,* and *SIZE)* appear reasonable. Similarly, the pre-event and post-event means are not significantly different for any of these three variables.

Table 4 presents some descriptive statistics on the four ameliorating action variables examined in this study. Panel A of Table 4 indicates that 16 of the sampled companies (31%) changed external auditors sometime during the measurement period. Most of these auditor changes (75%) occurred within two periods after the announcement of the SEC investigation (periods t+1 and t+2). The remaining auditor changes occurred in the fourth period (19%) after the event date, and in the period immediately preceding (6%) the event date. Of the 16 companies changing auditors, 10 companies (63%)

Table 3
Descriptive Statistics of Dependent and Control Variables

Variable	Overall Mean	Overall Median	Pre-Event Mean	Post-Event Mean
UR	.0015	.0017	-.0040	.0074
UE	-.0147	-.0026	-.0173	-.0120
MBRAT	4.148	2.293	3.745	4.577
RISK	1.101	.9986	1.101	1.101
SIZE	5.131	5.139	5.121	5.142
GMSIZE	169.25	170.55	167.57	171.06

UR = Cumulative unexpected return surrounding quarterly earnings announcement computed via the market model.

UE = Unexpected quarterly earnings computed from a seasonal random walk model $(EPS_t - EPS_{t-4})/P_t$.

MBRAT = Market-to-book value of equity ratio.

RISK = Systematic risk measured per the market model beta.

SIZE = The natural log of the market value of equity at the beginning of the quarter.

GMSIZE = The geometric mean of *SIZE* stated in millions of dollars.

Table 4
Descriptive Statistics of Ameliorating Action Variables

Panel A: Auditor Changes

Period	Higher Quality Change	Same Quality Change	Lower Quality Change	Total
Pre-Event	0	1	0	1
t+1	1	4	0	5
t+2	3	4	0	7
t+3	0	0	0	0
t+4	0	1	2	3
Total	4	10	2	16

Period t+n represents the n quarter following event date t (SEC investigation announcement).

Higher quality change reflects changing from a non-Big 6 audit firm to a Big 6 audit firm, same quality change reflects changing within these groups, and lower quality change reflects changing from a Big 6 auditor to a non-Big 6 auditor.

Panel B: BOD Compositions and Audit Committees

Period	% of Outsiders on BOD	Companies without an Audit Committee
t-4	43%	7
t+4	50%	3

Period t+n represents the n quarter following event date t (SEC investigation announcement).

Panel C: Upper Management Changes

Period	Replaced CEO	Replaced CFO	Replaced COO	Replaced CAO	At least one position replaced
t+1	29%	47%	29%	50%	50%
t+2	31%	54%	38%	54%	58%
t+3	33%	65%	45%	62%	65%
t+4	43%	70%	65%	62%	75%

Period t+n represents the n quarter following event date t (SEC investigation announcement).

changed to an auditor of the same quality[16], 4 companies (25%) changed to an auditor of higher quality, and 2 companies (12%) changed to an auditor of lower quality. Of the 52 sampled companies, 43 companies (83%) began the event period with a Big 6 auditor and 9 companies (17%) began the period with a non-Big 6 auditor.

Interestingly, of the 9 companies that had an opportunity to improve the quality of their external auditor (i.e., those beginning the event period with a non-Big 6 auditor), 4 companies (44%) changed to a Big 6 auditor after the disclosure of an SEC investigation. Of the 43 companies beginning the period with a Big 6 auditor, 10 companies (23%) changed to another Big 6 auditor, while 2 companies (5%) changed to a lower quality auditor. The higher auditor change percentage for companies starting the measurement period with a non-Big 6 auditor versus those starting the period with a Big 6 auditor (44% vs. 28%) suggests that having the ability to improve the perceived quality of the external auditor adds incentive for companies to change auditors subsequent to a financial statement fraud announcement. However, as previously discussed, this study assumes that any change in auditor subsequent to a fraud announcement is perceived as an improvement in auditor quality, and thus no auditor change firms are compared to auditor change firms in the initial analyses. Possible effects of auditor quality are considered as an additional analysis.

Panel B of Table 4 presents some descriptive statistics on the board of directors and audit committees for the sampled companies. The first column shows that at the beginning of the measurement period (t-4) the sampled companies' board of directors, on

[16] Consistent with DeAngelo's (1981) argument that auditor size is a reasonable proxy for quality, this study considers Big 6 audit firms to be of higher quality than non-Big 6 audit firms.

average, consisted of 43% outside directors.[17] By the end of the measurement period (t+4) this average increased to 50%. Of the 52 sampled companies, 29 companies (56%) increased the percentage of outsiders on their board of directors, 13 companies (25%) had no change in their board composition, and 10 companies (19%) decreased the percentage of outsiders during the event period. Overall, the sampled companies increased the percentage of outsiders comprising their board of directors by an average of 7.5%.

The second column of Panel B presents information about audit committees for the sampled companies. A total of seven companies began the event period without an audit committee. Of these seven companies, four (57%) formed an audit committee soon after the financial statement fraud announcement.

The number of executive officers disclosed in the annual Form 10-Ks varied among the sampled companies. Of the sampled companies, I was able to track all four positions for 14 companies, three positions for 23 companies, two positions for 13 companies, and only the Chief Executive Officer (CEO) position for two of the companies. Specifically, the CEO was identified by 51 companies, the Chief Financial Officer (CFO) by 46 companies, the Chief Operating Officer (COO) by 31 companies, and the Chief Accounting Officer (CAO) by 26 companies. Arguably, if the position is not listed in the Form 10-K, either the position does not exist for that particular company or it is not considered to be an upper level managerial position. This study is concerned with the ameliorating effects of upper management changes, and thus it appears reasonable to track only the executive positions disclosed in the company's Form 10-K.

[17] This amount is somewhat consistent with Dechow et al. (1996), whose sample had an average of 53% insiders on the board of directors.

Panel C of Table 4 presents descriptive statistics regarding managerial changes made by the sampled companies. The rows represent the periods subsequent to the event date and the columns represent the management positions tracked for this study. The percentage amounts reflect the percentage of sampled companies that had changed the applicable column's managerial position as of the stated period. For example, the percentage amount found under the column Replaced CFO and at row t+3 reflects that 65% of the sampled companies had changed their CFO as of the third quarter following the event date. By the end of the measurement period (t+4), 43% of the companies had replaced their CEO, 70% had replaced their CFO, 65% had replaced their COO, and 62% had replaced their CAO sometime during the measurement period. Overall, approximately 75% of the sampled companies had replaced at least one of the four positions during the measurement period. In summary, the descriptive statistics presented in Table 4 provide evidence that a reasonable number of sampled companies performed the ameliorating actions examined in this study. The empirical analyses attempt to determine whether these actions were effective in improving the perceived disclosure validity subsequent to a financial statement fraud announcement.

Table 5 presents the correlation among several variables of interest. The correlation results suggest that several interesting relationships exist among the variables. First, a significant and positive correlation exists between *UR* and *UE* (.11), but not between *UR* and *UE*FRD* (.06; positive but not significant). Recall that *FRD* is an indicator variable equaling 1 if the quarter is subsequent to the fraud announcement, and

Table 5
Correlation Matrix

Variable	*UR*	*UE*	*UE*FRD*	*FRD*	*AUD*	*UE*AUD*	*OUT*	*UE*OUT*	*AC*	*UE*AC*	*MGMT*	*UE*MGMT*
UR	1.00	.11*	.06	.06	-.05	.20*	.04	.15*	.01	.07	.04	.04
UE		1.00	.75*	.03	.03	.30*	-.03	.33*	.02	.04	.04	.65*
*UE*FRD*			1.00	-.09	-.01	.40*	-.09	.45*	.01	.06	-.04	.86*
FRD				1.00	.35*	-.03	.39*	-.14*	.20*	-.04	.66*	-.05
AUD					1.00	-.09	.22*	-.06	-.06	.01	.43*	-.03
*UE*AUD*						1.00	-.05	.48*	.01	-.01	-.05	.44*
OUT							1.00	-.32*	.18*	.08	.39*	-.12*
*UE*OUT*								1.00	.05	.01	-.23*	.51*
AC									1.00	-.19*	.11*	-.01
*UE*AC*										1.00	-.09	.07
MGMT											1.00	-.07
*UE*MGMT*												1.00

* statistically significant at less than the .05 level

0 otherwise. The interaction term *UE*FRD* measures the effects that the fraud announcement has on the *UR-UE* relation. Because the correlation between *UE*FRD* and *UR* is less than the correlation between *UR* and *UE*, it appears that the effects of the fraud announcement (i.e., *FRD* = 1) weakens the *UR-UE* relation, or decreases the ERC, which is consistent with H1. Second, *UR* is positively and significantly correlated with *UE*AUD* (.20) and with *UE*OUT* (.15), which suggests that these two strategic actions improve the *UR-UE* relation, or positively affect the ERC, after the fraud announcement. These results are consistent with H2 and H3, respectively. Third, neither the correlation between *UR* and *UE*AC* (.07) nor between *UR* and *UE*MGMT* (.04) is significant at any conventional level. These weak correlation amounts suggest that these strategic actions (changing upper management and forming an audit committee) actually weaken the *UR-UE* relation, or decrease the ERC, which is opposite the relationships predicted in H4 and H5.

The results of the *AC* variable should be interpreted with caution because of the small number of companies that formed an audit committee during the measurement period (four companies). The lack of variation for the variable (*AC*) makes the validity of these results questionable. The highly significant and positive correlation amounts between *MGMT* and *FRD* (.66) and between *UE*MGMT* and *UE*FRD* (.86), suggest that the *MGMT* variable has similar effects on the *UR-UE* relation, or ERC, as the *FRD* variable. Perhaps the act of changing upper management subsequent to the fraud announcement is an action that market participants expect companies accused by the SEC of a material reporting violation to perform. That is, if the market perceives the changing

of upper management as an expected and necessary action following the announcement of financial statement fraud, the market effects of the fraud announcement and the changing of upper management would be similar. The high percentage of sampled companies that changed upper management (75%) supports this notion. This issue is considered further in the empirical results section of the paper.

Chapter 7:

Empirical Results

Table 6 presents the results of the OLS regression analyses. Column (a) of Table 6 shows the results from the full regression model presented in the empirical model section of the paper. The overall model is statistically significant (F-Ratio = 2.44; p-value = .002), and has an R^2 of .09. Two of the strategic actions, changing external auditor and increasing the percentage of outsiders on the board, have significant interaction terms in the predicted direction. Specifically, the significant and positive coefficient on the interaction term *UE*AUD* (p-value = .003) suggests that the act of changing external auditor following the fraud announcement improves the *UR-UE* relation, and supports H2. The significant and positive coefficient on the interaction term *UE*OUT* (p-value = .012) suggests that the act of increasing the percentage of outsiders comprising the board of directors following the fraud announcement improves the *UR-UE* relation, and supports H3.

The audit committee interaction term (UE*AC) coefficient is marginally significant (p-value = .09), which provides support for H4. However, this result should be interpreted with caution because of a lack of variation of the *AC* variable (i.e., only four of the sampled companies formed an audit committee during the measurement period). The coefficient of the management change interaction variable (*UE*MGMT*) is negative, which is opposite the direction predicted in H5. Additionally, the *UE*FRD* variable is not significant at any conventional level, and thus H1 is not supported. However, as discussed in the previous section, the management change variable (*MGMT*)

Table 6
OLS Regression Results
(dependent variable = UR)

Variable	Predicted Direction	Column (a) Coefficient (Std Error)	Column (b) Coefficient (Std Error)
Intercept	none	.008692 (.0181)	.007609 (.0181)
FRD	none	.010100 (.0132)	.015233 (.0111)
UE	positive	.145266** (.0836)	.146315** (.0837)
*UE*FRD*	negative	-.04577 (.1676)	-.208937** (.1181)
AUD	none	-.033261* (.0184)	-.026182 (.0177)
*UE*AUD*	positive	.59639*** (.2140)	.567347*** (.2127)
OUT	none	.050374 (.0765)	.064742 (.0759)
*UE*OUT*	positive	3.38704*** (1.498)	2.67639** (1.451)
AC	none	-.018404 (.0282)	-.016912 (.0282)
*UE*AC*	positive	1.57211* (1.183)	1.33107 (1.176)
MGMT	none	.015274 (.0151)	
*UE*MGMT*	positive	-.253224 (.1740)	
MBRAT	positive	.000738 (.0007)	.000723 (.0007)
RISK	negative	-.012126** (.0074)	-.013062** (.0074)
SIZE	negative	-.000527 (.0030)	-.000114 (.0030)
QTR	negative	.011955 (.0110)	.012227 (.0110)
Sample Size		376	376
R-Square		.09	.08
F-Ratio		2.44	2.54

***,**,* Statistically significant at less than the .02, .05, and .10 levels, respectively. Based on one-tailed (two-tailed) tests for variables whose relation to the dependent variable is (is not) predicted.

appears to be capturing similar effects as the *FRD* variable. The variance inflation factors (VIFs) of the terms *UE*FRD* and *UE*MGMT* are 5.57 and 4.49, respectively. VIFs represent the inflation that each regression coefficient experiences above ideal. Large VIFs suggest that collinearity may be problematic. The VIFs on the two aforementioned terms are nearly twice as large as the next highest VIF (2.38) associated with the remaining variables. Based on the correlation analysis presented in Table 5, and the variance inflation factors, the variables measuring fraud effects and management change effects appear to be highly collinear. This result is consistent with market participants viewing managerial changes of the sampled companies as a necessary and expected reaction by a company recently the target of an SEC investigation.

Column (b) of Table 6 presents the results of the regression model excluding the managerial change variables (*MGMT* and *UE*MGMT*). These variables are excluded from the model because of the apparent collinearity problem between them and the fraud indicator variables. The overall model is significant (F-Ratio = 2.54; p-value = .002) and has an R^2 of .08. The coefficient of the interaction term *UE*FRD* is now significant in the predicted direction, thus supporting H1. The coefficient of the interaction term *UE*OUT* reduces slightly in significance, and the coefficient of the *UE*AC* interaction term is no longer significant at any conventional level. The direction and significance of the coefficients for the remaining variables are consistent with model (a).

Regarding the control variables, the coefficients of *RISK* are significant in the expected directions for both models (a) and (b). The coefficients of *MBRAT* and *SIZE* are in the predicted directions, but not significant at any conventional level. The *QTR*

variable is also not significant at any conventional level. In summary, after excluding the management change variables, the results suggest that the announcement of financial statement fraud is associated with a decrease in the earnings response coefficient. Furthermore, the strategic actions of changing external auditor and increasing the percentage of outsiders comprising the board of directors following the announcement of financial statement fraud improves the earnings response coefficient. These results support H1, H2 and H3, but do not support H4 or H5. The next section tests for the robustness of these results, along with several additional analyses.

Chapter 8:

Sensitivity Tests and Additional Analyses

Sensitivity Tests:

Several sensitivity tests were performed to test the robustness of the results. First, the immediate quarters surrounding the event date (t-1 and t+1) were excluded from the sample. A high degree of uncertainty may exist during these periods and thus may be adding noise to the analyses. A total of 278 observations were used to run the Table 6 column (b) model, and although not reported, the results are similar to those presented. Consistent with the results presented at column (b) of Table 6, the coefficients of the interaction terms *UE*FRD* (p-value = .05), *UE*AUD* (p-value = .007), and *UE*OUT* (p-value = .02) are significant in the predicted directions. Additionally, the coefficient of the interaction term *UE*AC* (p-value = .03) is positive and significant, and suggests that forming an audit committee subsequent to a fraud announcement improves the ERC, which supports H4. The coefficient of the control variable *RISK* (p-value = .40) is no longer significant, and the coefficients of the control variables *MBRAT* and *SIZE* remain insignificant in the same directions. In summary, consistent with the results presented in Table 6, these results suggest that fraud announcements reduce the ERC, and that the actions of changing external auditor and increasing the percentage of outside board members subsequent to a fraud announcement improve the ERC. Additionally, these results provide evidence that forming an audit committee subsequent to a fraud announcement improves the ERCs, which supports H4.

As a second sensitivity test, alternative measurements of the *MGMT* variable were considered. The first alternative measurement had *MGMT* equaling the percentage change of upper management from the beginning of the measurement period. Although not reported, the results of the regression model using this measurement of *MGMT* are very similar to those reported in column (a) of Table 6. The coefficient of the interaction term *UE*MGMT* remains negative, and the coefficient of the interaction term *UE*FRD* remains insignificant. The directions and significance of the coefficients for the remaining variables are also the same as those reported. The second alternative measurement had *MGMT* equaling 1 if the company changed CFO, and 0 otherwise. Again, the results are very similar to those reported. Based on these findings, the results reported seem robust in light of alternative measurements of the *MGMT* variable.

As a final sensitivity analysis, tests were performed to examine whether the effectiveness of the auditor change depends on the type of change (i.e., from higher to lower, lower to higher or within auditor quality groups). DeAngelo (1981) suggests that auditor size is a reasonable measure of quality, and a common proxy for size is Big 6 audit firms versus non-Big 6 audit firms. Two sensitivity tests were performed to consider the possibility of auditor quality effects. First, the models were run using the variable *AUD* as equaling 1 if the firm changed to an auditor of greater or equal quality, and 0 otherwise. Although not reported, the results of this model are very similar to those reported in Table 6. The significance and directions of the coefficients for all the variables remain consistent. Second, a control variable was included measuring the effects of changing only to a higher quality auditor. Specifically, I included a dummy

variable (B6) equaling 1 if the company changed to a higher quality auditor (i.e., from a non-Big 6 firm to a Big 6 firm), and 0 otherwise. The model was run including the three way interaction term *UE*AUD*B6*.[18] Because only 4 sampled companies changed to a higher quality auditor the B6 variable has minimal variation, thus these results should be interpreted with caution. The coefficient on the three-way interaction term is not significant at any conventional level (p-value = .92), and the coefficient of the interaction term *UE*AUD* remains positive and significant (p-value = .01). Based on these findings and the results reported in Table 6, any change in external auditor (regardless of quality) following a financial statement fraud announcement appears to be perceived by the market as an improvement in disclosure validity.

Additional Analyses:

Consistent with Wild (1996) who examined the effects of an audit committee on earnings quality, this study considers an alternative measurement of earnings informativeness. As discussed by Wild (1996), the higher the quality of the financial disclosures the greater the predicted revisions in users' expectations of future company performance, ceteris paribus. Pertaining to this study, a decline in users' revisions surrounding earnings announcements after a financial statement fraud announcement suggests that such announcements are associated with declines in the perceived validity of financial disclosures.

A standardized variance returns metric that considers firm specific abnormal returns standardized by the firm specific variance of the market model residuals was

[18] For model specification purposes, the variables B6 and B6*UE were also included in the model.

calculated over the pre-fraud and post-fraud earnings announcement periods. Specifically, the standardized variance returns metric was calculated as follows:

$$VR_{i,t} = [(u_{i,t})^2(T_i - 4)]/[s_i^2(T_i - 2)]$$

where u is the abnormal return for firm i at earnings announcement period t. The abnormal return measurement required the estimation of a firm specific market model. The market models were estimated over a 200 day pre-earnings announcement estimation period. T is the number of stock returns in company i's estimation period, and s^2 is the variance of the market model's residuals from the estimation period. Significant declines in *VR*s from before to after the event date would support H1 and suggest that financial statement fraud announcements are associated with declines in the perceived validity of financial disclosures.

Consistent with the window used in the main model, two daily *VRs* were calculated for each earnings announcement period: one for the day prior to the earnings announcement, and the other for the day of the earnings announcement. The average of these two *VRs* was used for analysis. Thus, a total of eight standardized variance returns metrics (*VRs*) were calculated for each of the sampled companies. Table 7 presents the cross-sectional averages of the standardized variance returns metrics (*VRs*) estimated for each of the eight quarters surrounding the event date. Panel A of Table 7 shows that the post-event average *VR* is less than the pre-event average *VR* (1.998 vs. 2.398). Panel B provides a further breakdown by presenting the *VR* averages of the coupled periods (i.e., periods t-4 and t-3; t-2 and t-1; t+1 and t+2; t+3 and t+4). The average *VRs* decline from pre- to post-event date, particularly in periods t+3 and t+4.

Table 7
Variance Returns Results (*VRs*)

Panel A: Post-event *VR* versus Pre-event *VR*

Period	Average *VR*	Z-Stat	p-value
Pre-event	2.398	-1.43	.08
Post-event	1.998		

Panel B: *VR* averages by coupled periods

Period	Average *VR*	Z-Stat	p-value
t-4 and t-3	2.57		
t-2 and t-1	2.19		
t+1 and t+2	2.16	-.0817[1]	.47
t+3 and t+4	1.82	-2.604[2]	.01

Period t+n represents the n quarter following event date t (SEC investigation announcement).

[1] Z_{VR} value comparing the inner groupings (t-2 and t-1 versus t+1 and t+2).
[2] Z_{VR} value comparing the outer groupings (t-4 and t-3 versus t+3 and t+4).

A similar test statistic used by Wild (1996) and McNichols and Manegold (1983) is employed to provide evidence on the significance of the average *VR* decreases throughout the measurement period. The statistic uses within-firm differences between the variance of returns behavior from pre- to post-fraud announcement and is defined as follows:

$$Z_{VR} = [\sum_{i=1}^{N}(VR_{iaft} - VR_{ibef})]/[\sum_{i=1}^{N}2\{(T_{iaft}-3)/(T_{iaft}-6)+(T_{ibef}-3)/(T_{ibef}-6)\}]^{1/2}$$

where N is the number of sample firms, $i_{bef(or\ aft)}$ refers to company *i* in the pre-investigation period (*ibef*) or post-investigation period (*iaft*). The other variables were defined previously. The values of Z_{VR} and associated p-values are shown in the applicable columns of Table 7. The overall decline of *VRs* from pre to post-event date presented in Panel A is mildly significant (p-value = .08 (one-tailed)). The Z_{VR} value comparing the averages of the outside groupings (t-4 and t-3 versus t+3 and t+4) presented in Panel B is significant (p-value = .01 (one-tailed)). The Z_{VR} comparing the inner groupings (t-2 and t-1 versus t+1 and t+2) is not statistically significant (p-value = .47). Overall, these results provide some support for H1 and suggest that the informativeness of earnings disclosures decline as a result of a financial statement fraud announcement.

As a final additional analysis, trading volume trends were examined throughout the measurement period for the sampled companies. Kim and Verrecchia (1991) theoretically investigate how price and volume reactions to public announcements are related to each other. They allow traders to be diversely informed and have different

levels of precision regarding their private information. The authors provide a generalization of Holthausen and Verrecchia (1988) and propose that the expected volume and the variance of price change are increasing functions of the precision of the announced information and decreasing functions of the amount of preannouncement public and private information. That is, as the quality of the announcement increases, traders react to the announcement with greater conviction, and as the quality of preannouncement information increases, the relative importance of the announcement to traders decreases, so they respond less to the announcement. As viewed within this framework, a reduction in the perceived validity of financial disclosures reduces the perceived precision of earnings announcements, which results in less trading volume surrounding these announcements, ceteris paribus.

The average percentage of daily shares traded over the earnings announcement periods were calculated for the sampled observations as follows:

$$VOL\%_{ia} = \sum_{t=-1}^{0} DVOL_{it} / OSHRS_{ia}$$

where t=0 is the day of the firm's quarterly earnings announcement, *VOL%* is the average percentage of daily shares traded for firm i associated with the quarter a earnings announcement. *DVOL* equals the daily volume of shares traded for firm i at day t, and *OSHRS* equals the outstanding shares of common stock for firm i at quarter a.

Table 8 presents the *VOL%* means for the individual quarters covering the measurement period. The average *VOL%* peaks at the quarters immediately surrounding the fraud announcement (t-1 and t+1), and generally declines for the quarters following the fraud announcement (quarters t+1 through t+4). The overall pre-event *VOL%* mean (.0172) is greater than the post-event mean (.0152), however this difference is not statistically significant at any conventional level (p-value = .34). In summary, although not statistically significant, the apparent decline of *VOL%* throughout the measurement period is consistent with traders reacting to earnings announcement with lesser conviction subsequent to a financial statement fraud announcement.

Table 8
Trading Volume Descriptive Statistics

Period	Average VOL%	Standard Error
t-4	.0179	.00295
t-3	.0163	.00292
t-2	.0165	.00292
t-1	.0185	.00292
t+1	.0199	.00295
t+2	.0180	.00295
t+3	.0098	.00295
t+4	.0127	.00304

Period t+n represents the n quarter following event date t (the SEC investigation announcement).

Chapter 9:

Summary and Conclusions

This study examines the effects that financial statement fraud announcements and certain strategic actions have on the perceived validity of financial disclosures. The hypotheses are based upon the prior literature that uses the earnings response coefficient to measure earnings quality. In a similar light, this study uses the ERC to measure the perceived validity of financial disclosures. The first hypothesis proposes that the announcement of a financial statement fraud is associated with a decrease in the company's ERC. The remaining hypotheses propose that certain strategic actions performed by companies following a fraud announcement improve the ERC. After considering the prior literature, anecdotal evidence, and data availability, the following strategic actions were chosen for examination: change in external auditor, increase in the percentage of outsiders comprising the board of directors, formation of an audit committee, and change in upper management. Hypotheses 2 through 5 consider each of these strategic actions individually and predict that the considered action has a positive effect on the ERC. The hypotheses were tested by examining the ERCs associated with the quarterly earnings announcements surrounding a financial statement fraud announcement.

Fraudulent firms were identified by examining the AAERs issued between 1/1/90 and 1/31/98 and searching the Wall Street Journal for the years 1995 and 1996. A total of 52 companies met the data requirements and were selected for analyses. The ERCs associated with eight quarterly earnings announcements surrounding the financial

statement fraud announcement (four pre and four post the announcement) were examined to test the hypotheses. After considering extreme variable amounts and influential outliers, 376 observations were available to estimate the empirical models.

Based on an examination of the variables' correlation amounts and the regression results, it was determined that the management change variable (*MGMT*) was highly collinear with the fraud indicator variable (*FRD*) (which indicates whether the observation is before or after the fraud announcement). A possible explanation for this high collinearity is that the act of changing upper management is expected, or even dictated, by market participants from companies subject to a formal SEC investigation. Because of this apparent collinearity problem, the management change variables were excluded from analyses.

An OLS regression was estimated to measure the effects that fraud announcements and the strategic actions have on the ERC. The regression results show that a financial statement fraud announcement is associated with a decrease in the ERC, and supports H1. Additionally, the results suggest that the strategic actions of changing external auditor and increasing the percentage of outsiders comprising the board of directors following a fraud announcement improve the ERC, and supports H2 and H3. The hypotheses regarding the two strategic actions of forming an audit committee (H4) and changing upper management (H5) were not supported by the results. Based on this evidence, financial statement frauds appear to damage the perceived validity of financial disclosures, and the strategic actions of changing external auditor and increasing the percentage of outsiders on the board of directors appear to ameliorate this damaged

validity. The robustness of these results were tested by performing several sensitivity tests.

The following sensitivity tests were performed: (1) the model was employed excluding the periods immediately surrounding the fraud announcement (i.e., the event date), (2) alternative measurements of the management change variable were considered, and (3) possible auditor quality effects regarding the auditor change variable were considered. Based on these tests, the reported results appear robust. As an additional analysis, an alternative measure of earnings informativeness (a standardized variance returns metric) was examined. The results of this analysis are consistent with those reported and suggest that fraud announcements damage the perceived validity of financial disclosures. Finally, trading volume trends for the sampled companies over the measurement period are presented.

This study is subject to several limitations. First, only 52 companies were available for analyses, and thus the power of the statistics and the ability to generalize the results are questionable. Second, a pooled cross-sectional regression is used to analyze the earnings response coefficients of the selected companies. Although control variables are included to attempt to control for any firm-specific effects, the model specifications may be questioned. Third, only four strategic action variables were considered for examination. Arguably, companies accused of a material reporting violation perform other ameliorating actions than those examined. If another type of strategic action is correlated with one of the actions examined, the presented results may lead to erroneous conclusions. Fourth, although careful attention was given toward the identification of the

event date (SEC investigation announcement), leakage of information may have occurred prior to the date identified. This would add noise to the data and possibly lead to incorrect conclusions.

Overall, this study is one of the first attempts to empirically examine financial statement fraud effects on the validity of earnings disclosures. The results suggest that fraud announcements damage the perceived validity of financial disclosures, and that certain strategic actions effectively ameliorate this negative effect. I encourage future research to examine additional capital market effects and to identify other strategic actions resulting from financial statement frauds. For example, future research can examine the persistence of the decline in the perceived disclosure validity resulting from financial statement fraud announcements. That is, can fraudulent companies ever fully restore the perceived validity of their financial disclosures, and if so, how long does it take and what are the necessary actions? Future research may also examine whether fraud announcements of a company trigger reactions from similar companies within the fraudulent firm's industry. Perhaps the announcement of fraud raises investor skepticism of companies facing a similar type of environment as that of the fraud firm, thus reducing the perceived validity of these companies as well. Additionally, future research may consider how financial statement fraud affects the perceptions of disclosure validity for other users of financial disclosures. For example, researchers may examine how financial statement frauds and the strategic actions affect disclosure validity perceived by creditors. This paper provides some initial empirical results on the effects of financial statement

fraud and certain strategic actions on the perceived validity of financial disclosures. I hope these results will encourage further research in this area.

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