Accounting Fraud and Institutional Investors

by

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To Amy and Jack

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ABSTRACT

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This dissertation examines institutional investors' trading behavior in a sample of 322 firms alleged in Accounting, Auditing, and Enforcement Releases to have manipulated their accounting earnings (hereafter fraud firms). Over the course of the fraud period, I find that institutions increase their ownership in fraud firms by approximately 14 percent, resulting in institutional losses of approximately $138 billion. Although institutional investors' losses are significant, I find that in the quarter immediately prior to the public revelation of accounting frauds, institutions with short investment horizons ("transient" institutions) slightly mitigate their losses by decreasing their ownership in fraud firms. I also provide evidence that institutions that own fraud firm shares prior to a fraud and have large stakes in fraud firms, have large portfolios, or own a relatively large block of fraud firm shares divest shares prior to the public revelation of a fraud.

CHAPTER I

Introduction

U.S. capital markets rely on financial reporting systems to help efficiently allocate capital. The recent breakdowns in the financial reporting process at many high profile companies have renewed researchers', regulators', and market participants' interest in accounting fraud. Two important empirical regularities emerge from the body of literature documenting the determinants and consequences of extreme earnings manipulations. First, stock market reactions to the revelation of accounting manipulations are significantly negative. Estimated declines in market value following the public announcement of accounting manipulations range from 20 to 40 percent (Palmrose, Richardson, and Scholz 2003; Karpoff, Lee, and Martin 2007). Second, accounting manipulations are predictable. A body of literature documents that accounting manipulations can be predicted with measures of accruals quality, accounting performance, non-financial statement variables, and stock market variables (e.g., Beneish 1999; Dechow, Ge, Larson, and Sloan 2007). Although accounting manipulations result in significant investor losses and are associated with firm characteristics and performance, little evidence exists on whether sophisticated investors are able to avoid losses associated with accounting fraud.

Institutional investors have become a significant market force over the last several decades. From the early 1980s to the late 1990s, institutional investors doubled their ownership in the equity markets to over 50 percent (Gompers and Metrick, 2001). The rising presence of institutional investors in the U.S. markets has spurred a significant body of literature investigating whether they execute profitable trades. The results of the literature are mixed. Several studies document positive associations between changes in institutional investors' holdings and future earnings and returns, suggesting that institutions are informed traders (e.g., Ke and Ramalingegowda 2005; Ke and Petroni 2004; Ali, Durtschi, Lev, and Thrombley 2004). On the other hand, some literature suggests that informed trading might be more limited, finding that superior mutual fund performance is rarely persistent (Carhart 1997; Brown and Goetzmann 1995) and trading patterns previously considered informed might simply be the result of momentum trading (Bushee and Goodman, 2007).

The predictability of accounting fraud and the large market losses associated with accounting fraud suggest that it is an ideal setting to examine the sophistication of institutional investors. If institutional investors possess superior information and are sophisticated users of accounting information with respect to accounting fraud, they should sell shares in fraud firms *prior* to public revelations of fraud. My primary research question is whether institutional investors anticipate accounting fraud revelations and divest shares in fraud firms prior to the public revelation of frauds. As a secondary research question, I examine whether institutions act as effective firm monitors in the prevention of fraud. I use Accounting, Auditing, and Enforcement Releases (AAER) involving accounting manipulations as a proxy for fraud and the first press article in Factiva mentioning an accounting irregularity as

the public revelation of fraud.[1] I examine institutional trading patterns in 322 firms that the Securities and Exchange Commission (SEC) identified in enforcement actions from 1982 through 2005 as having manipulated their accounting earnings. My analysis is conducted in two stages. The first stage is a firm-level analysis that aggregates institutions at the firm-level and examines their trading behavior in fraud firms. The second stage is an institution-level analysis that exploits the heterogeneity among institutional investors and examines their trading behavior in fraud firms.

For my firm-level analysis, I follow Bushee (2001) by grouping institutions into three categories based on their investment styles: quasi-indexer, transient, and dedicated. Quasi-indexer institutions are characterized by diversified portfolios and low portfolio turnover. Transient institutions are characterized by diversified portfolios and high portfolio turnover, and dedicated institutions are characterized by highly concentrated portfolios and low portfolio turnover. Consistent with prior literature, I expect to find that transient institutions are the most likely to initiate profitable trades in anticipation of a fraud revelation and quasi-indexer institutions are unlikely to initiate profitable trades in anticipation of a fraud revelation (e.g., Ke and Ramalingegowda 2005; Hribar, Jenkins, and Wang 2006). I make no strong predictions for dedicated institutions as research typically finds that they do not trade based on impending future events. However, fraud is a unique setting that may lead dedicated institutions to divest their positions. If dedicated institutions invest in firms based on their confidence in the vision and integrity of management, detecting a fraud might lead dedicated institutions to divest their shares. In

[1] In AAERs the Securities and Exchange Commission (SEC) typically alleges manipulation of financial statements. This does not necessarily mean that firms are guilty of fraud under the strict definition. By legal definition, fraud requires both knowledge of the falsity (scienter) and the intent to deceive and induce reliance. The vast majority of AAERs are settled between parties and the SEC without parties "admitting or denying guilt." In the following sections, I discuss the implications of this for my research design.

addition, since dedicated institutions are characterized by highly-concentrated portfolios, they are likely to have a larger percentage of their portfolios at risk if fraud is revealed. Therefore, they are likely to have the strongest incentives to anticipate fraud and divest their shares in fraud firms.

A body of literature suggests that institutional investors act as firm monitors (e.g. Chung, Firth, and Kim 2002; Chen, Harford, and Li 2007). If this is the case, then it is possible that fraud firms have low levels of institutional investment prior to committing fraud because they lack effective monitoring. Therefore, my first set of tests examines whether institutional ownership levels in fraud firms immediately prior to the release of a first fraudulent earnings report differ from a population of control firms. In univariate analysis, I find that fraud firms actually have higher levels of total institutional ownership, quasi-indexer ownership, and transient institutional ownership than non-fraud firms. Dedicated institutional ownership is not significantly different from the non-fraud sample of firms. Next, I conduct regression analysis that controls for firm characteristics. I find that immediately prior to the beginning of a fraud, fraud firms' total level of institutional ownership is higher than institutional ownership for a sample of control firms. However, I find that the higher level of institutional ownership is primarily the result of a significantly higher level of transient institutional ownership, while quasi-indexer and dedicated institutional ownership is nearly identical after controlling for firm characteristics. The univariate and regression results suggest that the level of institutional ownership does not act as a sufficient monitoring device in the prevention of fraud.

My next sets of tests provide evidence relating to my primary research question. I first examine changes in institutional ownership levels in fraud firms over the

periods firms commit fraud. From the quarter prior to the issuance of a first fraudulent earnings report until the quarter prior to the public revelation of an accounting fraud, I find that institutional ownership in fraud firms increases by almost 14 percent, representing 3.9 percent of a fraud firm's outstanding stock.[2] Because fraud firms experience stock price declines of approximately 35 percent once the fraud is revealed, the 3.9 percent increase in institutional ownership over the fraud period is not trivial. In fact, calculations suggest that total institutional losses for the 322 fraud firms in my sample are on the order of $138 billion. The 3.9 percent increase in institutional ownership over the fraud period represents approximately $20 billion of those losses.

Prior research has examined whether institutions can predict impending events over short windows (Hribar, Jenkins, and Wang, 2006). Accordingly, in my next set of tests, I observe changes in institutional ownership in the quarters immediately prior to and following the public revelation of fraud. I find that in the quarter immediately prior to a fraud revelation, institutional ownership decreases by approximately one and a half percent of a fraud firm's outstanding stock. I find significant decreases for transient institutional holdings, while changes in quasi-indexer and dedicated institutional holdings are insignificant. I also find significant decreases in the quarter immediately following the fraud revelation. These results are robust to several control variables including current and past stock returns, unexpected earnings, and changes in share turnover. Although I find some evidence that transient institutions are able to anticipate fraud one period prior to its revelation, this evidence must be interpreted in light of evidence from my previous tests. The one and a half percent decrease in institutional ownership

[2] I assume that the first quarter a firm committed fraud is the first quarter that the SEC alleged in an AAER a firm manipulated its earnings.

prior to fraud revelations, though statistically significant, only slightly mitigates substantial losses for institutional investors.

Institutions are more heterogeneous than the three categories I employ in my firm-level analysis. Therefore, I conduct a second analysis at the institution-level that further exploits the heterogeneity among institutional investors. I create proxies for institutions' information environments and institutions' incentives to avoid the negative market consequences associated with the revelation of accounting fraud. Conditional on owning fraud firm shares prior to a fraud beginning, I test whether the proxies are associated with institutions' ownership changes in fraud firms prior to the revelation of an accounting fraud. The results provide some evidence that institutions with the strongest incentives to avoid accounting fraud and with the highest quality information environments divest shares in fraud firms prior to the revelation of accounting fraud. Although the data are consistent with an increased rate of divestitures among these institutions, I am unable to establish whether these relations are a result of informed trading or natural mean reversion in ownership levels.

This study should be of interest to both institutional investors and researchers. The results suggest that institutional investors lose significant amounts of money by investing in firms that commit accounting fraud. My study contributes further evidence to the body of literature documenting the sophistication level of institutional investors. At least for this particular context, most institutions do not appear to be sophisticated users of accounting information; however, I do provide limited evidence of informed trading in the quarter immediately prior to fraud revelations among a subset of institutions.

The remainder of my dissertation proceeds as follows. Chapter 2 examines prior

literature and outlines my empirical predictions. Chapter 3 outlines my research design. Chapter 4 describes my sample selection process and provides descriptive statistics. Chapter 5 details my tests and presents results and chapter 6 concludes.

CHAPTER II

Prior Literature and Empirical Predictions

My dissertation builds on two streams of prior literature. The first stream of literature examines the determinants and consequences of accounting manipulations. The second stream of literature examines the trading behavior of institutional investors.

2.1 Accounting Manipulations

Prior research has identified characteristics of firms that manipulate their financial statements. Dechow, Ge, Larson, and Sloan (2007) investigate a comprehensive sample of all 895 firms subject to Accounting, Auditing, and Enforcement Releases (AAER) from 1982 through July 2005. They examine the use of several financial statement variables, off-balance sheet and non-financial variables, and market-related variables to predict accounting manipulations. They find that firms accused by the SEC of manipulating their financial performance tend to have had strong performance prior to manipulations. They also find that manipulations appear to be motivated by managers' desire to obfuscate deteriorating financial performance. During manipulation years, they find that cash profit margins and return on assets are declining while accruals are increasing. They also find that firms manipulating financial reporting are more likely to issue debt and equity.

Ranking firms based on the predicted likelihood of accounting manipulations from a logistic model, they classify almost 50 percent of manipulation firms in the top 20 percent of their manipulation index and 65 percent of manipulation firms in the top 40 percent of their index.

Beneish (1999) creates a fraud prediction model based on a sample of 74 firms that manipulated earnings and a sample of 2,332 matched firms. Estimating probit models of accounting manipulations as a function of eight accounting based variables (indexed day's sales in receivables, gross margin, asset quality, sales growth, depreciation, sales, general and administrative expenses, leverage, and accruals to total assets) he is able to correctly classify approximately 50 to 75 percent of fraud firms, while incorrectly classifying only 10 to 20 percent of matched firms.[1]

Several other studies document relations between earnings manipulation firms and firm characteristics. Two other notable studies include Dechow, Sloan, and Sweeney (1996) and Brazel, Jones, and Zimbelman (2006). Dechow et al. (1996) examine a sample of 92 firms with an AAER from 1982 to 1992. They document that AAERs are associated with external financing needs and poor corporate governance. They also show that AAER firms experience significant increases in their cost of capital after the revelations of accounting manipulations. Brazel et al. (2006) also find that several non-financial measures can be useful in predicting accounting manipulations.

Although the number of Type I errors in fraud prediction models is relatively high, the relative cost of Type I to Type II errors for institutional investors is likely

[1]The accuracy of the models in Dechow, Ge, Larson, and Sloan (2007) and Beneish (1999) are not directly comparable. Beneish (1999) uses a matched sample methodology, while Dechow et al. (2007) compare AAER manipulation firms to the entire population of non-manipulation firms. The methodologies are also slightly different as Beneish (1999) includes non-AAER manipulation firms obtained from news searches, while Dechow et al. (2007) tests are joint tests of earnings manipulation and receiving an AAER.

extremely low. Several studies have estimated investment losses when accounting manipulations are revealed. The latest large sample evidence suggests that the cost of Type II errors average approximately 40 percent of an institution's investment in a fraud firm (Karpoff, Lee, and Martin, 2007). On the other hand, the cost of a Type I error is extremely low in a market with many substitute assets as investors can simply choose not to hold firms with a high probability of fraud. Investors may also be privy to private information regarding firm performance and accounting manipulations. To the extent that investors possess private information and choose to use other qualitative information, they may be able to significantly reduce the number of Type I and II errors incurred when attempting to identify accounting frauds.

The high number of Type I errors associated with using earnings manipulation prediction models might also suggest that investors would be willing to live with the negative returns associated with fraud firms if the negative returns are balanced out with sufficiently positive returns from non-fraud firms with strong signals of fraud. In a concurrent working paper, Beneish and Nichols (2007), show that this is not the case. Their results reveal that firms with a high probability of manipulated earnings have lower future earnings and returns. They also show that a trading strategy based on the probability of earnings manipulation yields an abnormal hedge return of 13.9 percent.[2] Through additional tests they conclude that the returns, which are concentrated on the short side, are not a result of asymmetric arbitrage costs, but rather a result of asymmetric errors in market expectations. Beneish and Nichols (2007) do not provide direct evidence on firms that actually manipulate earnings, rather they examine portfolios of firms with a high

[2]I conduct a similar analysis using the F-score in Dechow, Ge, Larson, and Sloan (2007), which uses the same sample I employ, and find results qualitatively similar to Beneish and Nichols (2007).

probability of manipulation. They find that institutional investors increase their holdings in firms with a high probability of manipulation. My study focuses on the actual incidence of fraud. I am able to provide more detailed and direct evidence on the trading behavior of institutions in actual fraud firms before, during, and after the period in which firms commit fraud and the frauds become public.

2.2 Institutional Investors

From 1980 to 1996, institutional investors doubled their share of the market and now control over half of the U.S. equity market (Gompers and Metrick, 2001). The increased importance and perceived sophistication of institutional investors has spawned a large body of literature.

One branch of the literature examines whether institutional investors act as monitors and influence managements' decisions. The evidence suggests that the level of institutional ownership and the composition of a firm's institutional ownership base matters when determining whether institutional owners are likely to act as effective monitors. Bushee (1998) finds that managers are less likely to cut research and development expenses when facing an earnings shortfall if institutional ownership is high. But he also finds that a large proportion of ownership by institutions that trade based on momentum and have high portfolio turnover increase the likelihood that a firm will cut research and development to meet an earnings shortfall. Chung, Firth, and Kim (2002) find that large institutional shareholdings in a firm reduce the likelihood of earnings management using accruals. Chen, Harford, and Li (2007), using acquisition decisions to reveal monitoring, find that institutions with long-term investments specialize in monitoring while other institutions do not monitor. Bushee (2001) finds that high

levels of short-term investors are associated with an over-weighting of near-term expected earnings and an under-weighting of long-term expected earnings. In light of this combined evidence, my first prediction is that fraud firms, prior to the issuance of their first fraudulent earnings report, are likely to have low levels of institutional ownership. I also expect that fraud firms will have higher levels of short-term, transient, institutional ownership and lower levels of long-term, dedicated, institutional ownership.

Much of the accounting research on institutional investors' trading behavior suggests that institutional investors are sophisticated users of accounting information. For example, previous literature has documented that the higher the level of institutional ownership, the smaller the market reaction surrounding earnings announcements (El-Gazzar, 1998). Balsam, Bartov, and Marquardt (2002) find that the valuation implications of large discretionary accruals are incorporated into stock prices more quickly for firms with large institutional investor bases. The presence of institutional investors is also positively associated with the extent that prices lead earnings (Jiambalvo, Rajgopal, and Venkatachalam, 2002). Studies have also shown that institutional investors exploit accounting based stock price anomalies such as the post-earnings announcement drift (Ke and Ramalingegowda, 2005) and the accruals anomaly (Collins, Gong, and Hribar, 2003). Lev and Nissim (2006) also show that the accruals anomaly is exploited by some institutional investors, but the magnitude of this accruals-related trading is rather small. They show that the continued persistence of the accruals anomaly is not explained by a lack of understanding among institutions, but rather an institutional distaste for extreme-accruals firms that are typically small, unprofitable, and risky. Ke and Ramalingegowda (2005) find that institutions also possess information that allows

them to avoid negative stock price shocks associated with a break in a string of consecutive earnings increases.

Although much of the literature on institutional investors suggests that they are sophisticated users of financial information, this literature stands in contrast to evidence that questions whether institutions profit from informational advantages. For example, much of the literature on mutual fund performance suggests that superior performance is not persistent (e.g., Brown and Goetzmann 1995). Additionally, O'Brien and Bhushan (1990) find that institutions are attracted to firms with more analyst following. Similarly, Bushee and Noe (2000) find that institutions are attracted to firms with high-quality disclosure regimes. Therefore, if public and private information are substitutes, institutions should have fewer opportunities to benefit from informational advantages. If institutional investors possess superior private information or information processing abilities, I expect to find support for my second prediction that institutional investors divest shares in firms that are committing accounting fraud. A lack of evidence that institutions divest shares in fraud firms prior to public revelations of fraud would suggest that either investors are unable to use private information to anticipate public announcements of fraud or the cost of anticipating the public announcements of fraud are too great relative to the benefits.

Institutional investors exhibit heterogeneity in their investment styles. Prior literature has shown that the likelihood of informed trading varies with institutional investors' characteristics (e.g., Hribar and Jenkins 2004; Ke and Ramalingegowda 2005). Much of the prior literature has relied on a methodology proposed by Bushee (1998). In this methodology, institutions are first classified into one of three investment strategies (quasi-indexer, transient, and dedicated institutional

investors) based on portfolio turnover and stake sizes. The institutions are then aggregated at the firm level. The body of evidence that uses this methodology typically finds that profitable trading in anticipation of future events is only identifiable for the transient investor category. Therefore, I expect any evidence that institutional investors predict accounting fraud will be concentrated among transient institutional investors. Because dedicated institutional owners have the largest portion of their portfolios at stake when a fraud is revealed, I also anticipate the possibility that they may divest shares in anticipation of fraud revelations.

In a recent paper, Bushee and Goodman (2007) exploit the heterogeneity among institutional investors and the positions they hold by conducting an analysis that includes not only institution-level variables such as portfolio size and trading strategy but also institution-firm-level characteristics such as the size of a position in a particular firm and the size of the position in a firm relative to an institution's portfolio size. They find that private information trading is most pronounced when large positions are taken by investment advisers in small firms. In the spirit of Bushee and Goodman (2007), I conduct an institution-level analysis that exploits the heterogeneity among institutional investors that is not captured by the three types of trading strategies employed in my firm-level analysis. Using proxies for the quality of an institution's information environment and the incentives an institution has to avoid fraud firms, I expect to find that institutions with the strongest incentives to avoid accounting fraud and higher-quality information environments are more likely to divest shares in fraud firms prior to the revelation of accounting fraud. I define and discuss in the institution-level analysis section the proxies I employ.

2.3 Accounting Fraud and Restatements

A body of literature exists examining the determinants and consequences of accounting restatements (e.g., Palmrose, Richardson, and Scholz 2003; Palmrose, Scholz, and Wahlen 2004; Hribar and Jenkins 2004). For example, Desai, Krishnamurthy, and Venkataraman (2006) find that short interest increases in the months immediately prior to an earnings restatement. Also, in a current working paper, Hribar, Jenkins, and Wang (2006) examine institutional investors and accounting restatements and find that transient institutional investors significantly reduce their holdings in the quarter prior to a restatement. Although there is some overlap with my work on accounting fraud, it is important to note that restatements and accounting fraud are not the same.

Firms in my sample are firms that are accused by the SEC of manipulating their earnings. Restatements, on the other hand, can occur for a number of reasons, including unintentional errors and legitimate disagreements over the application of generally accepted accounting principles. Additionally, not all firms accused of accounting manipulations restate their earnings. Often, firms that have manipulated their earnings are not required to restate their earnings as part of an SEC settlement. These firms may also delist or enter bankruptcy before they have a chance to restate their earnings. Palmrose, Richardson, and Scholz (2003) find that in a sample of 403 restatements fewer than 23 percent resulted in an AAER. This is consistent with restatements resulting from a number of behaviors other than intentional manipulations.

The differences between accounting fraud and accounting restatements are significant because they affect both the determinants and consequences of

accounting irregularities. For example, Palmrose, Richardson, and Scholz (2003) document a much more negative market reaction to accounting fraud than to accounting restatements. This more negative price reaction to accounting fraud increases the benefits of early detection of accounting fraud by institutional investors. In addition, substantial differences in the ability of institutional investors to detect accounting manipulations and accounting restatements likely exist. For example, accounting restatements can come in waves as a consequence of SEC and FASB clarifications on generally accepted accounting principles (such as SAB 101), whereas accounting frauds require intent and the desire to hide manipulations from investors.

CHAPTER III

Research Design

My research design involves classifying firms into two samples: a fraud sample and a non-fraud sample. I use SEC Accounting, Auditing, and Enforcement Releases (AAERs) as a proxy for accounting fraud. The SEC takes enforcement actions against firms, auditors, and managers who violate securities laws. In 1982, the SEC began issuing AAERs in cases where securities law violations involved accounting or auditing issues. Although AAERs all relate somehow to accounting and auditing issues, not all AAERs are the result of reported accounting manipulations. Some AAERs are the result of disclosure issues, bribery, and other violations of securities laws. I exclude these AAERs from my sample and focus on AAERs that allege manipulation of reported accounting earnings.

The use of AAERs as a proxy for fraud is consistent with much of the prior literature (e.g., Bonner, Palmrose, and Young 1998; Erickson, Hanlon, and Maydew 2004). This methodology has advantages and disadvantages. The use of AAERs as a proxy for fraud is a straightforward and consistent methodology that avoids potential biases induced in samples based on a researcher's classification scheme. AAERs are also likely to capture a group of economically significant frauds as the SEC has limited resources and likely pursues cases against large firms (Dechow, Ge,

Larson, and Sloan, 2007). On the other hand, using AAERs as a proxy for fraud may result in a sample that includes firms that the SEC targeted for political reasons rather than fraud.[1] This methodology also excludes an unknown number of firms the SEC did not take action against.

Any research design that attempts to classify firms into fraud and non-fraud samples will have an unknown number of Type I and Type II errors. Assuming that the number of Type I errors is relatively low in my fraud sample, then my tests, at worst, can be interpreted as joint tests of committing fraud and receiving an enforcement action. If the number of Type I errors is relatively high then, at worst, my results can be interpreted as tests of firms engaging in accounting activities that result in enforcement actions. My non-fraud sample is also likely to have an unknown number of Type I errors as the SEC clearly does not catch all frauds. Although this weakens the power of my tests, it is unlikely to be a significant problem in my research design as the number of Type I errors in my non-fraud sample is likely relatively small. In addition, the event of interest in my study is the revelation of the accounting fraud. Frauds that go undiscovered are unlikely to have as significant a negative effect on institutional investors.

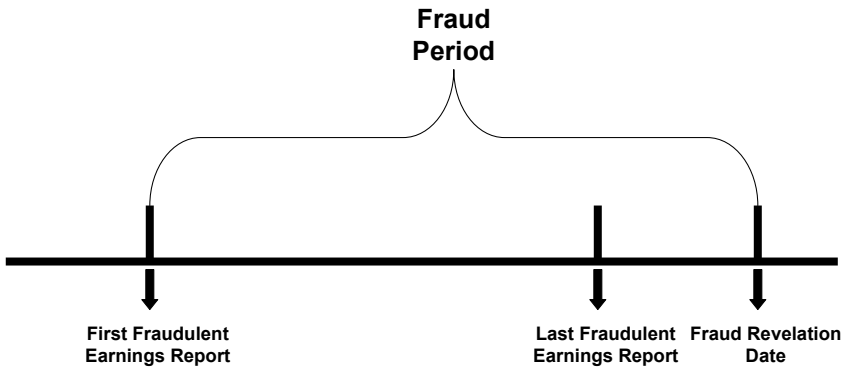
My research design and the power of my tests would benefit by including a proxy for the magnitude of the frauds. Unfortunately, the inconsistency in details across AAERs makes collection of the fraud magnitudes from the AAERs unfeasible. Magnitudes are measured inconsistently and many times are not reported at all.

[1] Using a stricter legal definition of fraud, Feroz, Park, and Pastena (1991) point out that not all AAERs are the result of fraud. Therefore, in some studies, such as Erickson, Hanlon, and Maydew (2004), where managerial intent is central to the hypotheses being tested, all AAERs are read and only those firms that the SEC specifically alleged committed fraud are included. I elect not to take this approach, because managerial intent is not as critical in my setting. Therefore, my approach increases my sample size at a relatively low cost. In addition, after a detailed reading of many AAERs it becomes clear that the wording and level of detail in the AAERs varies greatly. Although this variation is likely associated with the severity and types of violations, the variation is also likely to be associated with the SEC regime at the time of the enforcement action, the individuals investigating the violations, who is assigned to write the AAER, and negotiations between the SEC and those receiving the enforcement action. Therefore any methodology that seeks to separate AAER firms into fraud and non-fraud firms based on direct allegations of fraud in an AAER is likely reducing Type I errors while increasing Type II errors.

An AAER may report magnitudes on a before or after tax basis, a gross or net income basis, or a raw dollar or per share basis.[2] As a result, I focus on the incidence of fraud rather than the magnitude.

Investigating the trading behavior of institutional investors during accounting frauds requires an understanding of the timing of the events surrounding the manipulations. Figure 3.1 shows a timeline of the events and time period associated with an earnings manipulation.

Figure 3.1: Fraud period timeline



[2]For those firms that do eventually restate earnings, it may be possible to obtain restatement amounts, but this methodology will exclude many firms that never restate earnings either because they were not required to restate as part of a SEC settlement, or the firms went bankrupt, merged, or were acquired prior to a restatement opportunity. Another approach would be to consider changes in stock prices around the fraud announcements. Although this method may appear reasonable, it poses significant problems in my research design. If institutional investors divest some fraud firms prior to fraud announcements as a result of fraud suspicions, then this information is likely to be impounded into stock prices. This would bias the fraud magnitude proxy - announcement returns - downward for these firms. In addition, the initial announcement of fraud often does not include many details. This means that the market may react efficiently to the fraud revelation by impounding the expected result of the fraud investigation into price, but the expected magnitude is by no means the actual magnitude of the fraud once all of the details are revealed.

The timeline includes three events. The first event is the issuance of a first fraudulent earnings report, which is then followed by the second event, the issuance of a final fraudulent earnings report. The number of quarters between these two events varies considerably across firms some only manipulate 1 quarter while a handful of firms manipulate over 20 quarters. The last event in the timeline is the public announcement of the earnings manipulations. I define the time period between the issuance of a first fraudulent earnings report and the fraud revelation date as the *fraud period*. The fraud period in my sample varies in length from 1 quarter to 39 quarters. Figure 4.1 displays the distribution of fraud period lengths for the 322 firms in my fraud sample. My non-fraud sample consists of all firms never included in my fraud sample.

I conduct both firm-level and institution-level analyses. For the firm-level analysis, I conduct three sets of tests. Each set of tests is conducted on total, quasi-indexer, transient, and dedicated institutional ownership. I use the classification scheme in Bushee (2001) to characterize institutional investors.[3] Following Ke and Ramalingegowda (2005) and Hribar, Jenkins, and Wang (2006), I assign each institution to the type that is most frequent over my sample period.[4] First, I test whether levels of institutional ownership in fraud firms the quarter prior to the fraud period differ from non-fraud firms. Second, I test for unusual changes in institutional ownership levels and numbers of institutional investors owning shares in fraud firms from the quarter prior to the fraud period until the last quarter of

[3]Bushee (2001) uses several variables from prior studies that describe institutional trading behaviors including portfolio concentration, average percentage holding, percent held in large blocks, Herfindahl measure of concentration, stability of holdings, and portfolio turnover. He then uses principal factor analysis to generate factors that explain the variation across institutions. The institutions are then classified into groups using K-means cluster analysis. I would like to thank Brian Bushee for providing me with the institution classifications through 2005.

[4]Thomson Financial has reused approximately 500 manager identification numbers out of approximately 2500 manager identification numbers in the Institutional Ownersip Database. I have not made any attempts to fix this issue. This reuse of manager numbers will add an unknown amount of noise to my classification scheme. This should have no effect on the total institutional ownership inferences.

the fraud period. Third, I examine changes in institutional ownership in the quarters immediately prior to and following the public revelation of the fraud. In my second analysis, I test whether institution-level proxies for 1) incentives to avoid accounting fraud and 2) private information and superior information processing ability are negatively associated with changes in ownership of fraud firms prior to fraud revelations. The next chapter describes my sample selection and provides descriptive statistics for the fraud and non-fraud samples.

CHAPTER IV

Sample Selection and Descriptive Statistics

I obtain data for my tests from four data sources: the Dechow, Ge, Larson, and Sloan (2007) AAER database, the CDA/Spectrum S34 database, the Center for Research in Stock Prices (CRSP), and COMPUSTAT. Dechow et al. (2007) read and code AAER one through 2,261. After reading the AAERs, they identify 895 separate firms identified by the SEC as having committed wrongdoing. Of the 895 firms, 677 were alleged to have manipulated at least one specific quarterly earnings report. The Dechow et al. (2007) quarterly database includes observations for each quarter that AAERs alleged firms manipulated earnings.[1] I use this quarterly database of 677 firms as the starting point for the construction of my fraud sample. Table 4.1 details my sample selection process.

Table 4.1: Sample selection

	Firms
Firms alleged in AAERs to have manipulated their earnings	677
Missing a Cusip	(139)
Fraud begins before 1981	(20)
Do not have a Compustat match with data during the fraud quarters	(77)
Do not have a CRSP Match	(55)
Do not have institutional ownership data in CDA/Spectrum	(15)
Do not have an identifiable fraud revelation date in Factiva	(46)
No institutional report date during the fraud period	(3)
Fraud Sample	322

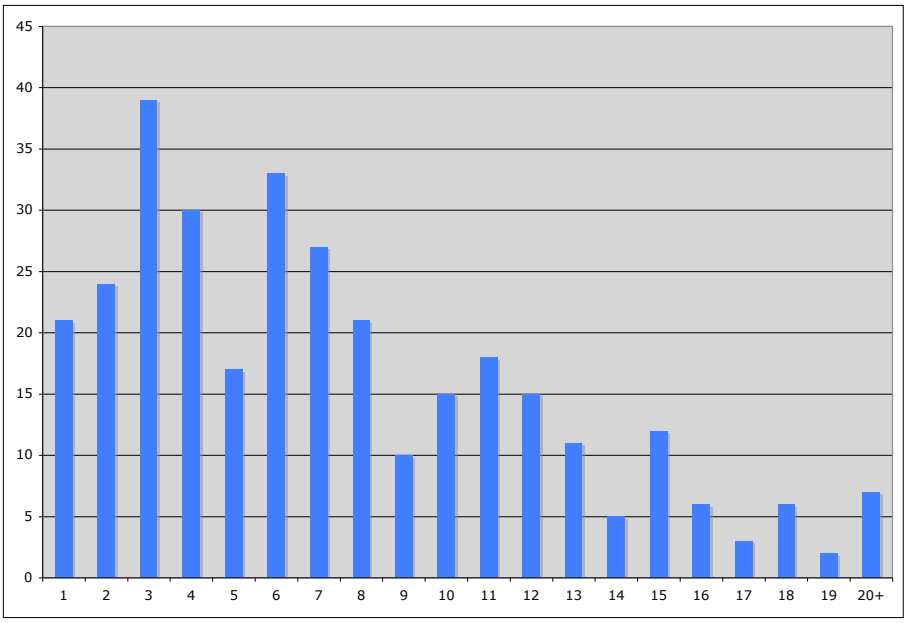
[1]Dechow et al. (2007) include a detailed description of the data collection process and the AAER database they create. They also include numerous descriptive statistics on the firms in the databases including the number of AAERs per firm, firm industries, and who the AAERs were against, just to mention a few.

Of the 677 firms that manipulated a quarterly earnings report, Dechow et al. (2007) are unable to identify Cusips for 139 of those firms and thus I exclude them from my sample. I also exclude 20 firms with fraud periods beginning before 1981. I exclude 77, 55, and 15 firms because they are not covered on Compustat, CRSP, and the CDA/Spectrum databases, respectively. I then searched Factiva between the issuance of the last fraudulent earnings report and the date of the first AAER for a fraud revelation date for each of the remaining fraud firms. I consider the fraud revelation date to be the first announcement in the press that a firm had an accounting issue. The sources of these announcements included firm press releases announcing accounting "irregularities" or restatements, announcements of SEC investigations, articles by journalists who uncovered evidence of fraud, and press releases from auditors resigning over accounting issues. I lose another 46 fraud firms for which I cannot establish a fraud revelation date.[2] Lastly, I exclude an additional 3 firms because the fraud period was so short that there was no institutional report date during the fraud period. My final fraud sample consists of 322 fraud firms with frauds beginning and ending between 1981 and the first quarter of 2004. Figure 4.1 displays the number of quarters in each fraud period for the 322 firms in my fraud sample. The average fraud period is approximately 7.5 quarters with the shortest fraud period being only one quarter and a handful of fraud periods extending over five years.

In figure 4.2, I detail the frequency and types of accounting manipulations alleged in AAERs for my 322 sample firms. Consistent with prior literature, just over 60 percent of the frauds in my sample involve revenue manipulations. Common types

[2] A small number of firms experienced multiple AAERs relating to different earnings manipulations over different time periods. I only include the last earnings manipulation incident for these firms. For example, Enron Broadband, a subsidiary of Enron, received an AAER in the 1980's for an earnings manipulation. I excluded this event and only included the later Enron earnings manipulations relating to AAERs in the most recent scandal, so that no firm is included in the sample more than once.

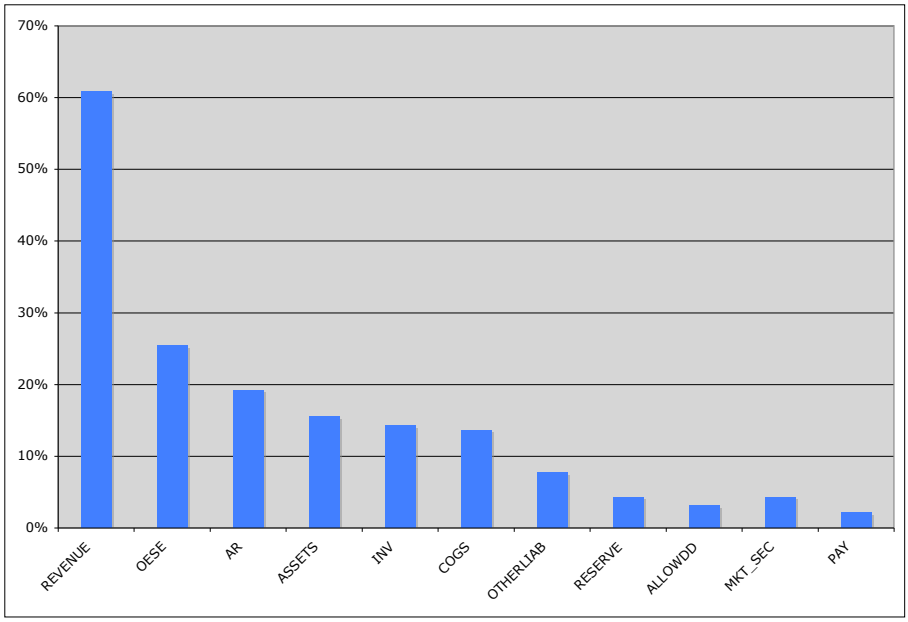
Figure 4.1: Number of quarters during the fraud period (n=322)



of revenue manipulations in the AAER sample include the creation of fictitious sales, recognition of revenue with side letters granting return provisions, and holding the quarter open to recognize revenue from the subsequent quarter. Other common manipulations include the understatement of expenses or overstatement of shareholder equity accounts (24%), the overstatement of accounts receivable (19%), the overstatement of other asset accounts (15%), and the overstatement of inventory accounts (14%).[3] In additional analyses, I test whether institutional investors are more or less likely to detect certain types of accounting manipulations. I discuss those results in the empirical tests and results chapter.

[3]The percentages sum to over 100 percent as many firms manipulate multiple accounts.

Figure 4.2: Frequency of manipulation types mentioned in Accounting Auditing and Enforcement Releases (n=322)



Firms may have multiple manipulations therefore the percentages sum to over 100 percent.

REVENUE	=	Manipulated revenue
OESE	=	Manipulation of other expense/shareholder equity account
AR	=	Manipulated accounts receivable
ASSETS	=	Manipulated assets
INV	=	Manipulated inventory
COGS	=	Manipulated cost of goods sold
OTHRLIAB	=	Manipulated liabilities
RESERVE	=	Manipulated a reserve account
ALLOWDD	=	Manipulated allowance for bad debt
MKTSEC	=	Manipulated marketable securities
PAYABLE	=	Manipulated payables

I construct my non-fraud sample by running the firms never receiving an AAER through a similar sample selection criteria. I require that non-fraud firms have data on Compustat, CRSP, and at some point during the sample period, institutional ownership on the CDA/Spectrum S34 database. As in previous research, I find that the distributions of my variables are characterized by a small number of extreme outliers. Therefore, with the exception of returns, indicator variables, and institutional ownership levels and changes, for my firm-level analysis I winsorize variables at the 1st and 99th percentiles. I also winsorize institutional holdings levels at 100% and changes at +/- 100%.[4]

I obtain institutional investor data from the CDA/Spectrum S34 database of 13f filings. According to SEC rule 13f, managers of institutions with more than $100 million in equity must report on a quarterly basis all equity holdings that are greater than $200,000 or 10,000 shares. I have two sets of dependent variables in my tests. Institutional ownership levels defined as the sum of end-of-calendar-quarter institutional holdings scaled by a firm's total shares outstanding ($TOTALHELD_t$, QIX_t, TRA_t, and DED_t for total, quasi-indexer, transient, and dedicated institutional investors, respectively) and quarterly changes in institutional holdings as a percentage of a firm's total shares outstanding ($\Delta TOTALHELD_t$, ΔQIX_t, ΔTRA_t, and ΔDED_t for total, quasi-indexer, transient, and dedicated institutional investors, respectively).

The quality of the institutional data limits my analysis and the inferences I can draw in two ways. First, quarterly measurements of institutional ownership

[4]These observations are clearly data errors, likely a result of rounding in shares outstanding. Where possible I obtain shares outstanding from CRSP as CRSP only rounds to the thousands. Unfortunately, CDA/Spectrum rounds to the nearest million. Therefore, firms with institutional holdings close to 100% and shares outstanding unavailable on CRSP might appear to have holdings slightly above 100% although this is clearly impossible. As total holdings for these firms are likely near 100% it makes sense to winsorize these observations at 100% rather than eliminate them.

weakens the power of my event study tests because changes in institutional ownership, which are measured over an entire quarter, do not match the event date, which is measured on a specific day. Second, 13f institutional data is measured at the institution level rather than the fund level. For example, Fidelity, which manages hundreds of funds, reports as one entity for 13f purposes. The result is that methodologies that consider institution-level characteristics, such as splitting institutions into investment styles, are measured with noise.

Table 4.2 Panel A presents descriptive statistics for the 322 fraud firms in the quarter immediately prior to the first fraudulent earnings report. Panel B presents descriptive statistics for 662,565 firm-quarter observations in the non-fraud control sample. Total institutional ownership is higher for fraud firms (27.5 percent) than non-fraud firms (21.7 percent). The table shows that fraud firms in my sample tend to be larger. They also tend to be younger and to have extremely positive earnings momentum and low book-to-market ratios, consistent with prior evidence that managers may commit fraud to maintain high stock prices.

Table 4.2: Descriptive statistics

	N	Mean	1st Quartile	Median	3rd Quartile
Panel A: Fraud firm sample descriptive statistics the quarter prior to the first fraud quarter					
TOTALHELD	322	0.275	0.003	0.211	0.479
QIX	322	0.133	0.001	0.075	0.245
TRA	322	0.087	0.000	0.047	0.149
DED	322	0.053	0.000	0.027	0.082
SIZE (millions)	272	1446.08	40.36	155.70	610.72
PRICE	272	20.77	7.59	15.13	26.19
AGE	274	111.64	18.00	51.50	141.00
$TURNOVER_{t-1}$	256	0.164	0.047	0.099	0.228
YIELD	264	0.017	0.000	0.000	0.004
$RET_{0,-3}$	270	0.090	−0.126	0.014	0.206
$RET_{-4,-12}$	255	0.379	−0.119	0.261	0.664
SP	322	0.109	0.000	0.000	0.000
BTM	250	0.604	0.131	0.305	0.586
Panel B: Non-fraud firm sample descriptive statistics					
TOTALHELD	662565	0.217	0.014	0.128	0.359
QIX	662565	0.114	0.005	0.055	0.186
TRA	662565	0.051	0.000	0.012	0.071
DED	662565	0.050	0.000	0.018	0.073
SIZE (millions)	605796	658.04	23.12	83.05	343.51
PRICE	605796	16.31	4.75	11.88	22.75
AGE	615647	141.60	38.00	93.00	189.00
$TURNOVER_{t-1}$	583201	0.085	0.022	0.047	0.098
YIELD	539930	0.041	0.000	0.000	0.025
$RET_{0,-3}$	604454	0.038	−0.117	0.014	0.145
$RET_{-4,-12}$	597360	0.116	−0.200	0.039	0.288
SP	662565	0.067	0.000	0.000	0.000
BTM	520796	1.409	0.310	0.590	1.018

TOTALHELD, *QIX*, *TRA*, and *DED* are measured as the percentage of the firm owned by all institutional investors, quasi-indexer institutional investors, transient institutional investors, and dedicated institutional investors, respectively. *SIZE* is measured as market value of equity, and *PRICE* is the current share price. *AGE* is the number of months since first appearing on CRSP. *TURNOVER* is the average monthly turnover for the quarter. *YIELD* is the annual dividend from the previous year scaled by total market value of equity. $RET_{0,-3}$ is the market return for the quarter. $RET_{-4,-12}$ is the market return for the 9 months prior to the start of the quarter. *SP* is an indicator variable if the firm is a member of the S&P 500. *BTM* is measured as the previous year's book value of equity scaled by current market value of equity. *SIZE*, *PRICE*, *AGE*, *TURNOVER*, *YIELD*, and *BTM* are winsorized at the 1st and 99th percentiles. Institutional investor variables are winsorized at 100 percent.

CHAPTER V

Empirical Tests and Results

In this chapter, I present my empirical tests and results. The first section conducts my firm-level analysis. The second section reports my institution-level analysis. The third section provides some additional tests.

5.1 Firm-level Analysis

In this section, I conduct tests on levels and changes in institutional holdings aggregated at the firm level. All of my tests are conducted on total, quasi-indexer, transient, and dedicated institutional ownership.

5.1.1 Pre-fraud institutional ownership levels

To test whether levels of institutional ownership in fraud firms differ from non-fraud firms in the quarter prior to the fraud period, I first conduct univariate tests and then regression analysis. Univariate tests in Table 5.1 show that total institutional ownership for fraud firms immediately prior to committing fraud is 0.058 higher than for non-fraud firms and significant at the one percent level. Quasi-indexer ownership and transient institutional ownership for fraud firms are also higher and significantly different from non-fraud firms at the one percent level. Dedicated institutional ownership for fraud firms is slightly higher but not

significantly different from non-fraud firms. Next, I employ regression analysis to test whether institutional ownership of fraud firms differs significantly from institutional ownership for non-fraud firms after controlling for firm characteristics.

Table 5.1: Univariate tests of institutional ownership levels

	N	*Total Held*	*QIX*	*TRA*	*DED*
Pre-fraud Institutional Ownership Levels	322	0.275	0.133	0.087	0.053
Non-fraud Institutional Ownerhsip Levels	662565	0.217	0.114	0.051	0.050
Difference		0.058	0.019	0.036	0.002
		(3.89)	(2.32)	(6.12)	(0.56)

TOTALHELD, *QIX*, *TRA*, and *DED* are measured as the percentage of the firm owned by all institutional, quasi-indexer, transient, and dedicated institutional investors, respectively. Institutional investor variables are winsorized at 100 percent.

In my regression analysis, I employ a model based on Gompers and Metrick (2001). Gompers and Metrick (2001) model institutional ownership as a function of several firm characteristics for which institutional investors have varying preferences.[1] To test whether total institutional ownership differs for fraud firms prior to the issuance of a first fraudulent earnings report, I estimate the following regression for fraud-firm quarters immediately prior to the fraud beginning and all non-fraud firm observations:

$$TOTALHELD_t = \beta_1 PREFRAUD_t + \beta_2 SIZE_t + \beta_3 BTM_t + \beta_4 YIELD_t + \beta_5 PRICE_t +$$
$$\beta_6 SP_t + \beta_7 AGE_t + \beta_8 RET_{0,-3} + \beta_9 RET_{-4,-12} +$$
$$\beta_{10} TURNOVER_t + \sum_{i=11}^{104} \beta_i QTR_t + \epsilon_t$$

Where

[1] I modify Gompers and Metrick (2001) model slightly by excluding volatility as it requires two years of data in their model and would decrease my sample size significantly. I also calculate book-to-market quarterly rather than calculating it once at the beginning of the year and average turnover over the whole previous quarter rather than over one month.

$TOTALHELD$	=	shares held by all institutions scaled by total shares outstanding
$PREFRAUD$	=	indicator variable equal to one for a quarter immediately prior to a fraud and zero otherwise
$SIZE$	=	market value of equity
BTM	=	book value divided by market value of equity
$YIELD$	=	cash dividends for the fiscal year divided by market value of equity
$PRICE$	=	price per share
SP	=	indicator variable equal to one if the firm is a member of the S&P 500 and zero otherwise
AGE	=	number of months since first return appears in the CRSP file
$RET_{0,-3}$	=	past three-month return, the return earned in the current quarter
$RET_{-4,-12}$	=	nine-month return preceding the quarter
$TURNOVER$	=	average monthly share turnover from the previous quarter
QTR	=	indicator variables for quarterly fixed effects

To test for differences in quasi-indexer, transient, and dedicated institutional ownership levels, I estimate the same model replacing the dependent variable $TOTALHELD$ with QIX, TRA, and DED respectively. For consistency with Gompers and Metrick (2001) and to ease interpretation of the coefficients because the dependent variable is measured as a percentage, I take natural logs of all independent variables with the exception of returns and indicator variables. I also include quarterly fixed effects to control for time-series trends in institutional holdings. A significantly positive (negative) coefficient on $PREFRAUD$ would imply higher (lower) institutional holdings for a fraud firm prior to the fraud period

after controlling for fraud firms' characteristics.[2] Typically, firm-level auto-correlation of the error terms is a concern in an estimation procedure where firms appear multiple times. To adjust for this possibility, I estimate Rogers (1993) standard errors clustered at the firm level. These standard errors are robust to heteroskedasticity and within cluster correlation.

The results of the tests are presented in Table 5.2. I include 233 fraud firm quarter observations (only the fraud firm quarters immediately prior to the fraud beginning) and 498,065 non-fraud firm-quarter observations with available data. The estimates of the coefficients on the control variables are consistent with those in Gompers and Metrick (2001). I find that institutional ownership levels are positively associated with *SIZE*, *PRICE*, *AGE*, *TURNOVER*, *SP*, and *BTM* and negatively associated with *YIELD*, $RET_{0,-3}$, and $RET_{-4,-12}$. I also find that the *PREFRAUD* indicator variable is positive and significant in the total and transient institutional ownership regressions and insignificant in the quasi-indexer and dedicated ownership regressions. After controlling for other firm characteristics, the regression results suggest that on average fraud firms have 2.5 percent more institutional ownership and 1.7 percent more transient institutional ownership than non-fraud firms immediately before the fraud period. I find no evidence that fraud firms have higher or lower levels of total, quasi-indexer, or dedicated institutional ownership than control firms.[3]

The univariate results and the results in Table 5.2 are inconsistent with my first

[2] Another alternative research design to test for differences in institutional ownership levels would be a matched sample methodology. I choose not to use this methodology for two reasons. First, ex-ante there is no reason to suspect that there are any correlated omitted variables or non-linearities that could be controlled for by matching fraud firms to non-fraud firms on any pre-fraud characteristics. Second, by including all non-fraud firm observations, the coefficients on the control variables are being estimated as efficiently as possible.

[3] As a robustness test, because institutional preferences for firm shares may have changed over time, I estimate the same model for each quarter without *PREFRAUD* and the fixed effects. I then aggregate the fraud firm residuals and test whether the mean residuals are significantly positive or negative. The magnitudes and significance are similar to those presented in Table 5.2.

Table 5.2: Pooled OLS regressions of institutional ownership levels on firm characteristics (n=498,298)

	TOTALHELD	*QIX*	*TRA*	*DED*
PREFRAUD	0.025	0.007	0.017	0.001
	(2.21)	(1.12)	(2.86)	(0.20)
SIZE	0.052	0.031	0.013	0.008
	(39.13)	(38.68)	(33.80)	(14.54)
PRICE	0.033	0.019	0.006	0.008
	(22.51)	(21.86)	(14.17)	(12.32)
AGE	0.023	0.017	−0.002	0.008
	(20.22)	(25.30)	(−4.94)	(16.16)
$TURNOVER_{t-1}$	0.049	0.019	0.023	0.008
	(43.13)	(29.09)	(60.47)	(12.52)
YIELD	−0.375	−0.179	−0.079	−0.116
	(−33.61)	(−29.44)	(−23.07)	(−32.90)
$RET_{0,-3}$	−0.030	−0.027	0.002	−0.006
	(−27.86)	(−36.07)	(5.53)	(−13.55)
$RET_{-4,-12}$	−0.021	−0.018	0.004	−0.007
	(−13.17)	(−11.93)	(5.99)	(−11.43)
SP	0.022	0.043	−0.018	−0.004
	(3.49)	(10.91)	(−9.24)	(−1.55)
BTM	0.014	0.008	−0.001	0.007
	(9.99)	(10.32)	(−3.11)	(13.49)
R^2	0.778	0.743	0.560	0.480

Each regression is estimated with quarterly fixed effects. The sample includes 233 fraud-firm quarters immediately prior to a first fraudulent earnings report and 498,065 non-fraud firm quarters. Standard errors are estimated as Rogers adjusted standard errors clustered at the firm level. *TOTALHELD*, *QIX*, *TRA*, and *DED* are measured as the percentage of the firm owned by all institutional, quasi-indexer, transient, and dedicated institutional investors, respectively. *PREFRAUD* is an indicator variable equal to 1 for quarters immediately prior to the first fraud quarter. *SIZE* is measured as the market value of equity, and *PRICE* is the current share price. *AGE* is the number of months since a firm first appears on CRSP. *TURNOVER* is the average monthly turnover for the quarter. *YIELD* is the annual dividend from the previous year scaled by total market value of equity. $RET_{0,-3}$ is the market return for the quarter. $RET_{-4,-12}$ is the market return for the 9 months prior to the start of the quarter. *SP* is an indicator variable if the firm is a member of the S&P 500. *BTM* is measured as the previous year's book value of equity scaled by current market value of equity. *SIZE*, *PRICE*, *AGE*, *TURNOVER*, *YIELD*, and *BTM* are winsorized at the 1st and 99th percentiles. Institutional investor variables are winsorized at 100 percent. All variables with the exception of the dependent variables, returns variables, and indicator variables are entered into the regression as natural logs.

prediction. I find no evidence that institutional ownership levels are lower than would be expected given firm characteristics. This evidence suggests that the level of institutional ownership does not act as a sufficient monitoring device in the prevention of fraud. I do find some evidence consistent with my predictions regarding institutional ownership levels for transient institutions. I find that transient ownership levels are higher in fraud firms than expected given firm characteristics. Although the magnitude is small and I cannot determine the causality of this result (transient institutions have an increased demand for firms with "aggressive" accounting practices or transient institutions place pressure on firms to use "aggressive" accounting), it is interesting in light of evidence that transient institutions overweight short-term expected earnings and underweight expected long-term earnings (Bushee, 2001) and that firms with high transient ownership make myopic decisions (Bushee, 1998).

5.1.2 Changes in institutional ownership over the fraud period

In my second set of tests, I investigate whether institutional investors increase or decrease their positions in fraud firms over the course of the fraud period. I first provide univariate tests of mean changes in institutional ownership levels and in the number of institutional investors owning shares in fraud firms from the quarter prior to the first fraudulent earnings report to the quarter immediately prior to the revelation of the fraud.

Table 5.3 Panel A presents the univariate results. I find that the level of total institutional ownership significantly increases by 3.92 percent of shares outstanding over the entire fraud period – a 14 percent increase in institutional ownership. The total number of institutions owning shares also significantly increases from almost 66 institutions to 79 institutions, an 18 percent increase. Both quasi-indexer and

dedicated institutional ownership levels and the number of owners significantly increase over the fraud period. Transient institutional ownership slightly but insignificantly decreases, while the number of transient institutions owning shares significantly increases.

It is possible that the changes in institutional ownership observed in Table 5.3 Panel A are simply the result of general trends in institutional ownership. Therefore, I estimate regressions controlling for time-series trends in institutional ownership and institutional ownership levels in Panel C. If ownership levels over the entire fraud period were decreasing, it would be necessary to establish that the decline was abnormal and a result of sophisticated trading and not poor performance. But because institutional ownership levels are increasing over the fraud period, I am only interested in testing whether the increase is not the result of general time-series trends in institutional ownership levels. I am uninterested in controlling for performance as fraud firms' performance is a direct result of the perpetrated fraud.[4]

To control for general time-series trends in total institutional ownership changes, I estimate the following regression:

$$\Delta TOTALHELD_t = \beta_1 FRAUDPERIOD_t + \beta_2 TOTALHELD_{t-1} + \beta_3 PWEIGHT_{t-1} + \sum_{i=4}^{97} \beta_i QTR_t + \epsilon_t$$

Where

[4]It is possible that although institutions increase their institutional ownership in fraud firms, they are doing so cautiously and increasing their ownership levels less than for non-fraud firms reporting similar financial performance. Therefore, in untabulated results I estimate regressions that control for firm performance. I find no evidence that institutions are approaching fraud firms cautiously.

$\Delta TOTALHELD$	=	quarterly change in shares held by all institutions scaled by total shares outstanding
$FRAUDPERIOD$	=	indicator variable equal to one for a quarter during a fraud and zero otherwise
$TOTALHELD$	=	shares held by all institutions scaled by total shares outstanding
$PWEIGHT$	=	market value of firm i held by a group of institutions in period t scaled by the market value of all firms held by the same group of institutions in the same period t
QTR	=	indicator variables for quarterly fixed effects

I estimate this regression for the entire non-fraud sample and for the quarters during the fraud period for the fraud sample. In addition to to this first regression, I estimate additional regressions for QIX, TRA, and DED, replacing $\Delta TOTALHELD$, $PWEIGHT$, and $TOTALHELD$ with each groups change in ownership, portfolio weight, and ownership level. Portfolio weights and lagged levels of institutional ownership are included to control for the influence of level and concentration of holdings on future changes in institutional ownership. Quarterly fixed effects control for general time-series trends in institutional ownership changes. If positive changes in institutional ownership are not increasing as a result of general time-series trends in institutional ownership, I expect to find a positive coefficient on $FRAUDPERIOD$. If the coefficient on $FRAUDPERIOD$ is insignificant or negative, this would suggest that the increase in institutional ownership over the fraud period is simply the result of an increasing trend in institutional ownership. To adjust for firm-level auto-correlation of the error terms, I estimate Rogers standard errors clustered at the firm level. Panel C presents the

regression results.

I find that all *FRAUDPERIOD* indicator variables are positive and significant, suggesting that institutional ownership in fraud firms is significantly increasing over the fraud period over and above the general trend in institutional ownership for all three institutional ownership types. The coefficient on *FRAUDPERIOD* for the total ownership regression equals 0.008. This means that for the average fraud period, which is approximately 7.5 quarters in length, institutional ownership is increasing by approximately 6.0 percent after controlling for institutional ownership levels, portfolio weights, and quarterly fixed effects. The coefficients on the levels are negative, consistent with mean reversion in institutional ownership. The increase in institutional ownership is similar across all three groups of institutional owners.

These results show that over the course of the fraud period institutional investors increase their ownership in fraud firms. Because fraud firms experience significant stock price declines once frauds are revealed, the 3.9 percentage point increase in institutional ownership over the fraud period is not trivial. To access the magnitude of the losses that institutional investors suffer, I present raw returns over the fraud period and estimates of the dollar returns institutional investors experience over the entire period firms commit fraud.

I calculate returns over two periods. The first period is from the first institutional report date prior to the issuance of a first fraudulent quarterly report until the institutional report date immediately prior to the quarter in which the fraud is made public. The second period covers the quarter in which the fraud is revealed to the public. I find that over the fraud quarters prior to the fraud revelation quarter, fraud firms experience total positive mean returns of 21.6 percent over an average

Table 5.3: Changes in institutional ownership over the fraud period

Panel A: Mean levels and changes in institutional ownership over fraud periods (n=322)

	TOTALHELD	*QIX*	*TRA*	*DED*
Pre-Fraud Level	0.2748	0.1332	0.0871	0.0526
Before-Fraud Revelation Level	0.3141	0.1552	0.0859	0.0714
Change	0.0392	0.0221	-0.0012	0.0188
	(3.40)	(4.02)	(-0.19)	(5.15)

Panel B: Mean levels and changes in number of institutions over fraud periods (n=322)

# Institutional Investors Pre-Fraud	66.12	44.61	16.51	4.13
# Institutional Investors Before-Fraud Revelation	79.08	53.40	19.90	4.75
Change	12.97	8.78	3.39	0.62
	(4.17)	(4.21)	(3.45)	(3.91)

Panel C: Regression of quarterly changes in percentage holdings for fraud and non-fraud sample

	$\Delta TOTALHELD$	ΔQIX	ΔTRA	ΔDED
$FRAUDPERIOD$	0.008	0.004	0.003	0.003
	(4.27)	(4.81)	(3.34)	(4.90)
$TOTALHELD_{t-1}$	-0.044			
	(-56.84)			
QIX_{t-1}		-0.048		
		(-40.93)		
TRA_{t-1}			-0.104	
			(-41.59)	
DED_{t-1}				-0.071
				(-33.33)
$PWEIGHT_{t-1}$	1.708			
	(10.33)			
$PWEIGHTQIX_{t-1}$		2.034		
		(14.86)		
$PWEIGHTTRA_{t-1}$			0.528	
			(6.63)	
$PWEIGHTDED_{t-1}$				0.258
				(4.41)
R^2	0.032	0.031	0.050	0.053

TOTALHELD, *QIX*, *TRA*, and *DED* are measured as the percentage of the firm owned by all institutional, quasi-indexer, transient, and dedicated institutional investors, respectively. *PWEIGHT*, *PWEIGHTQIX*, *PWEIGHTTRA*, and *PWEIGHTDED* are measured as the market value of the instititutional ownership for firm i scaled by the sum of the portfolio values of the institutions invested in firm i. *FRAUDPERIOD* is an indicator variable equal to 1 if the quarter is during a fraud period and 0 otherwise. Panel C regressions are estimated as pooled regression that include quarters during the fraud period and the non-fraud sample. Standard errors are estimated as Rogers adjusted standard errors clustered at the firm level. The regressions in Panel C are estimated with quarterly fixed effects.

of 7.5 quarters. While in the fraud revelation quarter, fraud firms experience significant negative mean returns of 32.5 percent.[5] Next, I calculate the dollar returns institutional investors are likely to have experienced. Because institutions only report holdings on a quarterly basis, I must assume when institutional investors buy and sell their shares. For simplicity, I assume that all of an institutions buying and selling occurs on one date, the end of quarter report date. I find that from the first institutional quarterly report prior to the fraud beginning through the quarter that the accounting frauds are revealed institutional investors lose a total of $137.8 billion from their investments in 322 fraud firms.[6]

5.1.3 Changes in institutional ownership around fraud revelations

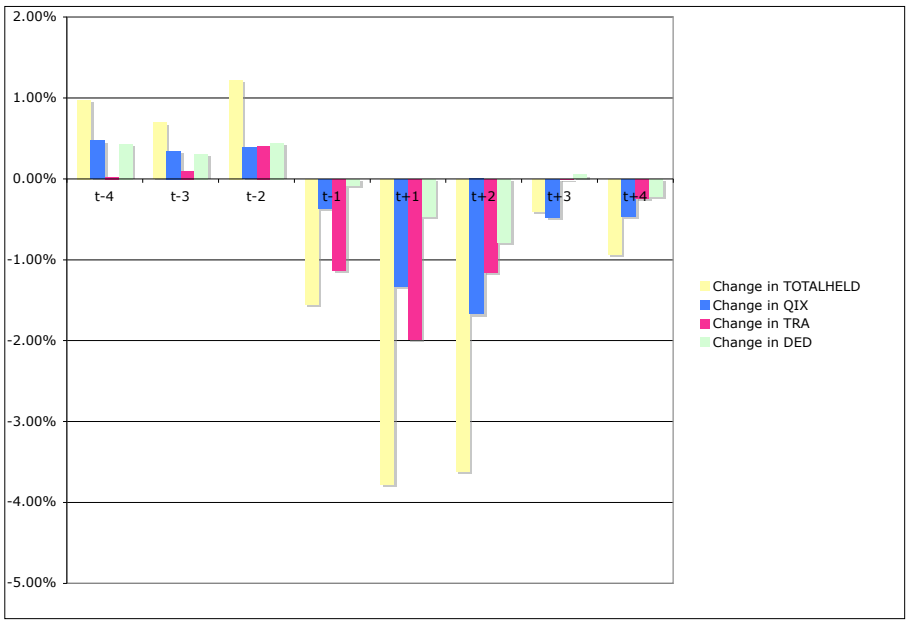
In my third set of tests, I examine quarterly changes in institutional ownership in the two quarters immediately prior to and the quarter following the public revelation of the fraud. I first present descriptive evidence of changes in institutional ownership around fraud revelations in Figure 5.1. I find that institutional ownership is increasing up to one quarter prior to the fraud revelation at which point institutional ownership decreases by approximately one and one half percent of shares outstanding. The decrease in t-1 is particularly strong for transient institutional owners, representing almost 75 percent of the total decrease. Following the fraud revelation, institutional ownership drops by approximately 4 percent of shares outstanding in each of the next two quarters.

Although the drop in institutional ownership prior to the fraud revelation is significant, it is far from complete and may have nothing to do with the detection

[5]Returns are calculated from the CRSP monthly stock file. Returns are inclusive of delisting returns from the CRSP monthly event file. Missing quarterly returns are set equal to 0.

[6]I also conduct the same analysis making two different assumptions about the timing of institutions' trades. I first assume that firms make all of their trades on the first day of the quarter rather than the last. Second, I assume that firms hold the average of the beginning of quarter and end of quarter holdings for each quarter. Using these assumptions, the losses over the fraud period are $ 34.4 billion and $86.1 billion respectively.

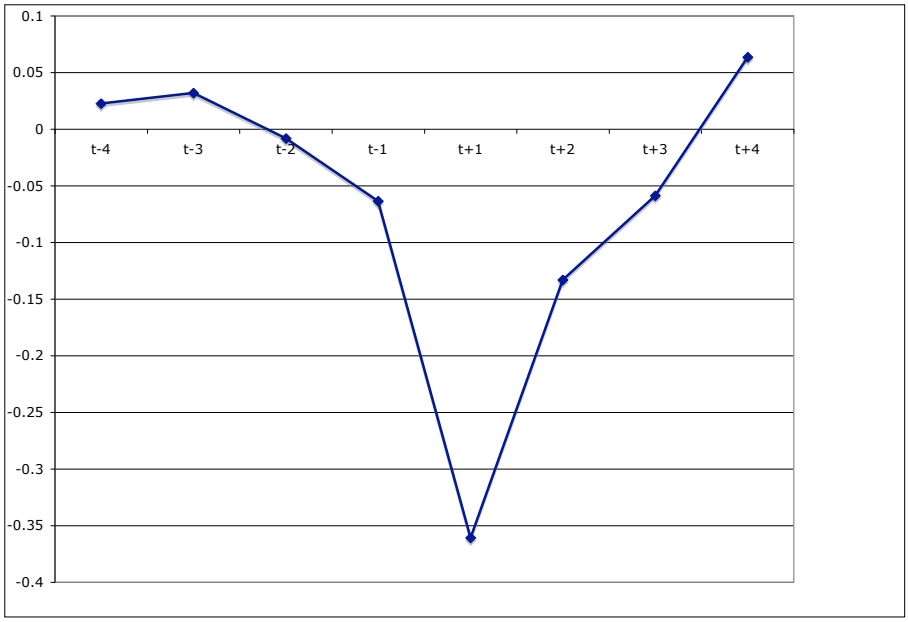
Figure 5.1: Quarterly mean changes in institutional holdings around fraud revelations (n=322)



Changes in *TOTALHELD*, *QIX*, *TRA*, and *DED* are measured as quarterly changes in the percentage of the firm owned by all institutional investors, quasi-indexer institutional investors, transient institutional investors, and dedicated institutional investors, respectively. Quarter t-1 represents the quarter immediately prior to the fraud revelation, and quarter t+1 represents the quarter of the fraud revelation.

of fraud; it may simply be due to poor firm performance. Figure 5.2 presents returns over the same period, and shows that in quarter t-1 institutional ownership begins to drop consistent with the idea that the decrease in institutional ownership might be due to poor performance. Therefore, I test whether institutional ownership changes around fraud announcements are significant after controlling for firm performance.

Figure 5.2: Quarterly mean raw returns around fraud revelations



Returns are calculated from the CRSP monthly stock file. Returns are inclusive of delisting returns from the CRSP monthly event file. Quarter t-1 represents the quarter immediately prior to the fraud revelation, and quarter t+1 represents the quarter of the fraud revelation. N=295 for period t-4, N=298 for period t-3, N=306 for period t-2, N=310 for period t-1, N=291 for period t+1, N=245 for period t+2, N=216 for period t+3, and N=208 for period t+4.

Using the Gompers and Metrick (2001) model of institutional ownership levels and other previous literature, I develop a model of changes in institutional ownership. Beginning with the levels regression, I convert *TURNOVER*, and *SP* (SP^{+} and

SP^-, indicator variables equal to one for additions and deletions from the S&P 500 index and zero otherwise) into changes. I retain $RET_{0,-3}$ and $RET_{-4,-12}$ because prior literature has documented that institutional investors tend to be momentum traders (Cai and Zheng, 2004). I also include market value of equity (*SIZE*) and unexpected earnings, measured as earnings before extraordinary items less earnings before extraordinary items in the previous same quarter scaled by average total assets (*UE*), which prior research shows is positively associated with changes in institutional holdings (Hribar, Jenkins, and Wang, 2006). Consistent with my previous set of tests, I also include lagged levels of institutional ownership, lagged portfolio weights, and quarterly fixed effects to control for time-series trends in institutional ownership. I test changes in institutional ownership around the fraud revelation by including three indicator variables, $FRAUD_{t-2}$, $FRAUD_{t-1}$, and $FRAUD_{t+1}$, where t-2 and t-1 indicate two quarters and one quarter before the fraud revelation respectively and t+1 indicates the quarter immediately following the fraud revelation. I estimate the following model for the fraud quarters surrounding the fraud revelation and the non-fraud sample:

$$\begin{aligned}\Delta TOTALHELD =& \beta_1 FRAUD_{t+1} + \beta_2 FRAUD_{t-1} + \beta_3 FRAUD_{t-2} + \\ & \beta_4 TOTALHELD + \beta_5 PWEIGHT + \beta_6 SIZE + \beta_7 RET_{0,-3} + \\ & \beta_8 RET_{-4,-12} + \beta_9 \Delta TURNOVER_t + \beta_{10} SP^+ + \beta_{11} SP^- + \\ & \beta_{12} UE + \sum_{i=13}^{106} \beta_i QTR + \epsilon_t\end{aligned}$$

If institutional investors are anticipating the fraud immediately prior to the revelation, I expect negative coefficients on $FRAUD_{t-2}$ or $FRAUD_{t-1}$. Consistent with my previous tests, I also estimate regressions for QIX, TRA, and DED by

replacing total change in ownership, total level of ownership, and total portfolio weight with the respective change, level, and weight. To adjust for firm-level auto-correlation of the error terms, I estimate Rogers standard errors clustered at the firm level.

Table 5.4: Pooled OLS regressions of changes in institutional ownership surrounding accounting fraud revelations (n=476,662)

	$\Delta TOTALHELD$	ΔQIX	ΔTRA	ΔDED
$FRAUD_{t+1}$	-0.030	-0.009	-0.016	-0.003
	(-4.16)	(-2.74)	(-3.64)	(-1.11)
$FRAUD_{t-1}$	-0.010	-0.002	-0.007	0.000
	(-1.63)	(-0.72)	(-1.98)	(0.12)
$FRAUD_{t-2}$	0.017	0.005	0.008	0.005
	(3.00)	(1.82)	(2.53)	(2.60)
$TOTALHELD$	-0.053			
	(-51.17)			
QIX		-0.061		
		(-38.25)		
TRA			-0.103	
			(-43.36)	
DED				-0.068
				(-28.24)
$PWEIGHT$	-3.874			
	(-21.07)			
$PWEIGHTQIX$		-1.603		
		(-12.11)		
$PWEIGHTTRA$			-0.784	
			(-10.90)	
$PWEIGHTDED$				-0.138
				(-1.97)
$SIZE$	0.005	0.004	0.002	0.001
	(47.04)	(43.02)	(34.78)	(30.58)
$RET_{0,-3}$	0.004	0.001	0.004	0.000
	(14.03)	(11.20)	(15.13)	(-7.65)
$RET_{-4,-12}$	0.017	0.002	0.015	0.000
	(34.40)	(12.25)	(39.07)	(-0.51)
$\Delta TURNOVER$	0.015	-0.001	0.022	-0.005
	(5.63)	(-0.74)	(14.30)	(-5.35)
SP^{+}	0.011	0.020	-0.007	-0.001
	(2.90)	(9.00)	(-3.97)	(-0.82)
SP^{-}	-0.250	-0.143	-0.056	-0.050
	(-19.04)	(-20.54)	(-14.22)	(-12.13)
UE	0.021	0.012	0.008	0.003
	(10.56)	(11.11)	(6.53)	(3.80)
R^2	0.068	0.059	0.085	0.068

Regressions are estimated as pooled regressions including the fraud sample observations in the two quarters immediately prior to and the one quarter immediately following fraud revelations, the non-fraud sample and quarterly fixed effects. Standard errors are estimated as Rogers adjusted standard errors clustered at the firm level. *TOTALHELD*, *QIX*, *TRA*, and *DED* are measured as the percentage of the firm owned by all institutional, quasi-indexer, transient, and dedicated institutional investors at the beginning of the quarter, respectively. Changes are measured as quarterly changes in institutional ownership as a percentage of shares outstanding. *FRAUD* variables are indicator variables equal to 1 for the two quarters immediately prior to and the first quarter immediately following the fraud revelation and 0 otherwise. *PWEIGHT*, *PWEIGHTQIX*, *PWEIGHTTRA*, and *PWEIGHTDED* are measured as the market value of the instititutional ownership for firm i scaled by the sum of the portfolio values of the institutions invested in firm i. *SIZE* is measured as the natural log of market value of

equity. $RET_{0,-3}$ is the market return for the quarter. $RET_{-4,-12}$ is the market return for the 9 months prior to the start of the quarter. $\Delta TURNOVER$ is measured as the change in average monthly turnover from the current quarter to the previous quarter. *SP+* and *SP-* are indicator variables for additions and deletions from the S&P500 index respectively. *UE* is measured as earnings before extraordinary items in period t minus earnings before extraordinary items in period t-4 scaled by average total assets. *SIZE*, *PWEIGHT*, *PWEIGHTQIX*, *PWEIGHTTRA*, *PWEIGHTDED*, and *UE* are winsorized at the 1st and 99th percentiles. Institutional investor variables are winsorized at +/- 100%.

Table 5 presents estimation results. Consistent with prior results, I find that changes in institutional ownership are positively associated with *SIZE*, *SP+*, and *UE*. I also find that changes in ownership are positively associated with $RET_{0,-3}$ and $RET_{-3,-12}$, consistent with momentum trading. In Table 5.2, returns are negatively associated with levels, while in Table 5, returns are positively associated with changes. This suggests that institutions flock to growth firms as they increase in market value and then remain once the firms have matured and returns slow. Changes in institutional ownership are negatively related to *SP-*, portfolio weights, and lagged institutional ownership levels. I find a negative coefficient on $FRAUD_{t-1}$ for total institutional ownership. This result suggests that in the quarter prior to the fraud becoming public, total institutional ownership significantly decreases. More specifically, I find that transient institutional ownership significantly decreases while quasi-indexer institutional ownership and dedicated institutional ownership does not significantly decrease. Following the fraud revelation, institutional ownership significantly decreases for total, quasi-indexer, and transient institutional ownership. This evidence suggests that some institutional owners, particularly transient owners, may be avoiding some of the negative effects of fraud revelations by reducing their ownership in fraud firms immediately prior to fraud revelations. Though this evidence suggests some informed trading, it must be interpreted in light of the evidence from the previous tests, which suggests that all institutions increase their ownership in fraud firms over the course of the entire fraud. The decrease in institutional holdings prior to the fraud revelations is incomplete for

total institutional ownership representing only a 4.7 percent decrease in total institutional holdings. The decrease in transient institutional ownership in the quarter immediately prior to the fraud revelations represents only a 15.1 percent decrease in their institutional holdings. Thus, although institutions mitigate losses by divesting fraud firms prior to fraud revelations, overall they still lose a considerable amount of their investments.

5.2 Institution-level Analysis

Institutions exhibit significant heterogeneity beyond the three investment styles I employ in my first analysis; therefore, I conduct a second analysis at the institution level. In this analysis, I test whether institution-level proxies for incentives to avoid accounting fraud and for private information are negatively associated with changes in institutions' ownership of fraud firms. In this section, private information refers to both an institution's ability to gather private information and an institution's ability to process both private and public information. I employee two sets of variables in my tests. The first set is measured at the institution level and the second set is measured at the institution-firm level.

My first variables are measured at the institution level and include an institution's investment strategy, fiduciary type, and size. To measure investment strategy, I create indicator variables for the three trading strategies that I employee in my firm-level analysis: *INDEXERS*, *TRANSIENT*, and *DEDICATED*. Next, I classify institutions into four categories based on fiduciary type: bank trusts (*BANK*), insurance companies (*INSURANCE*), investment advisors (*IA*), and pensions and endowments (*PENSION*). Bank trusts and pensions face strict prudent investment standards under the *Employee Retirement Income Securities Act* and common law.

These investment standards may lead these institutions to tilt their portfolios toward characteristics that are more likely to justify the prudence of their investments. For example, Guercio (1996) finds that banks tilt their portfolios toward firms with high S&P stock ratings. Following Bushee and Goodman (2007), my last institution-level measure is *ISIZE*, which is an indicator variable equal to one if the market value of an institution's equity portfolio is in the top quintile for all institutions in a particular quarter and zero otherwise. Because larger institutions have more resources, I expect that *ISIZE* is a proxy for an institution's ability to acquire and process information. Therefore, I expect that large institutions will be more likely to divest shares in firms committing fraud.

At the institution-firm level, I employ two additional measures that proxy for an institution's private information and incentives to avoid accounting fraud. The first, *BET*, is a variable that measures the relative size of the stake an institution has at risk in a particular firm. *BET* is measured as the market-value of equity owned by institution j in firm i in quarter t scaled by the total market value of institution j's portfolio in quarter t. I expect *BET* to be negatively associated with institutional changes in ownership in fraud firms. Institutions with higher levels of *BET* have relatively more value at risk than firms with lower levels of *BET*; therefore, these institutions have greater incentives to gather private information and avoid investments in firms committing fraud. My last institution-firm level variable is *BLOCK*, which is an indicator variable equal to one if the percent of total shares outstanding held by an institution in a firm is in the top quintile of institutional ownership for that firm and zero otherwise. I expect that *BLOCK* is associated with private information advantages because these institutions are more likely to have access to private information and are more willing to incur the costs

of private information acquisition and processing. Therefore, I expect that *BLOCK* will be negatively associated with changes in institutional holdings of fraud firms. Bushee and Goodman (2007) were the first to employ these two measures and point out that while *BET* and *BLOCK* are probably positively correlated, *BET* is likely a better measure of incentives to gather private information about a firm. *BLOCK*, on the other hand, is a better measure of an institution's access to management. I also include the pre-fraud level of institutional ownership, $HELD_{t-1}$, as a control variable.

For my institution-level analysis, my sample consists of those institutions holding fraud firms immediately prior to a fraud firm's first issuance of a fraudulent earnings report. Because institutions that purchase fraud firms during the fraud period and hold shares until the fraud is revealed do not appear to anticipate fraud, I focus on those institutions that hold fraud firms prior to frauds beginning. To test the relation between changes in institutional ownership and my proxies for private information and incentives, I first examine correlations between changes in institutional ownership and my explanatory variables. I then conduct regression analysis using my fraud sample and a matched sample. Consistent with my tests in the firm-level analysis, I measure changes in institutional ownership, $\Delta HELD$, as changes in percentage ownership of the firm from the period immediately prior to the first fraudulent earnings report until the period immediately prior to the fraud revelation. All incentive and information environment proxies are measured in the quarter immediately prior to the fraud beginning.

The samples for my institution-level tests include a fraud sample of 21,290 institution-fraud firm observations and a matched sample of 21,290 institution-non-fraud firm observations. For the regression analysis, I construct my

matched sample by matching each institution-firm observation in my fraud sample with a different institution-non-fraud firm observation. Matches between institution-fraud firm observations and non-institution-fraud firm observations are made in the quarter immediately prior to the first fraudulently-issued earnings report. Institution-firm observations are first matched to all other institution-non-fraud observations with the same trading strategy in the same quarter. I then require that all institution-non-fraud matches be within 30 percent of the market value of an institution's portfolio and 30 percent of $HELD_{t-1}$.[7] Lastly, I match the institution-fraud firm observation with the institution non-fraud observation with the closest value of BET_{t-1}. The dependent variable in my analysis, $\Delta HELD_t$, for the matched institution-non-fraud firm observations is then measured over the same time-period as the dependent variable for the matched institution-fraud-firm observations.

Table 5.5 presents descriptive statistics for both the fraud sample and the matched sample. All of the variables for the institution-fraud firm observations and the institution-non-fraud firm observations are similar in magnitude and variance. The pre-fraud level of institutional ownership is 0.38 percent and the average firm has 0.57 percent of their portfolio at risk in a fraud firm. The average $\Delta HELD$ is -0.15 percent, which is a decrease of 39.5 percent from the pre-fraud level of institutional ownership. It is important to note once again that these tests are all conditional on pre-fraud ownership of fraud firm shares. The evidence in 5.5 suggests that on average institutions owning fraud firm shares prior to the fraud decrease their ownership over the fraud period. This result in conjunction with the firm-level results suggests that the increase in institutional ownership over the fraud period is

[7] An insignificant number of institution-firm observations did not match using the 30 percent criteria. For the observations that did not match, I expanded the percentage by 10 percent until all 21,290 observations matched.

a result of increased ownership by institutions not owning fraud firm shares prior to frauds beginning.

Table 5.5: Institution-level descriptive statistics

		Fraud Sample		Matched Sample	
	N	Mean	Std. Dev.	Mean	Std. Dev.
$\Delta HELD_t$	21290	-0.0015	0.0066	-0.0015	0.0061
INDEXERS	21290	0.6701	0.4702	0.6701	0.4702
TRANSIENT	21290	0.2516	0.4339	0.2516	0.4339
DEDICATED	21290	0.0657	0.2477	0.0657	0.2477
$HELD_{t-1}$	21290	0.0038	0.0092	0.0036	0.0088
BET_{t-1}	21290	0.0057	0.0100	0.0057	0.0099
$BLOCK_{t-1}$	21290	0.1974	0.3980	0.2050	0.4037
$ISIZE_{t-1}$	21290	0.1717	0.3771	0.1643	0.3706
BANK	21290	0.2362	0.4248	0.2473	0.4315
INSURANCE	21290	0.0482	0.2143	0.0526	0.2232
IA	21290	0.2979	0.4573	0.2857	0.4517
Pension	21290	0.4177	0.4932	0.4145	0.4926

The fraud sample is composed of all institution-firm observations holding fraud firm shares in the quarter immediately prior to the first fraudulently issued earnings report. The matched sample is composed of non-fraud institution-firm observations matched to institution-fraud firm observations. $\Delta HELD_t$ is the change in shares held by the institution scaled by total shares outstanding in the firm. *INDEXERS*, *TRANSIENT*, and *DEDICATED* are indicator variables equal to one if an institution belongs to that particular investment strategy and zero otherwise. *HELD* is the total shares held by an institution scaled by total shares outstanding. *BET* is the market value of equity that institution i owns in firm j scaled by the total portfolio value of institution i. *BLOCK* is an indicator variable equal to one if an institution is in the top quintile of institutional ownership for a particular firm. *ISIZE* is an indicator variable equal to 1 if an institution is in the top quintile of portfolio size for period t and zero otherwise. *BANK*, *INSURANCE*, *IA*, and *PENSION* are indicator variables equal to one if an institution belongs to a particular fiduciary group and zero otherwise. Continuous variables are winsorized at the 1st and 99th percentiles.

In table 5.6, I present the first evidence on associations between my proxies for private information and incentives and changes in ownership. Consistent with my predictions, I find negative and significant correlations between $\Delta HELD_t$ and *TRANSIENT*, *DEDICATED*, BET_{t-1}, $BLOCK_{t-1}$ and $ISIZE_{t-1}$. I also find a negative and significant relation between $\Delta HELD_t$ and *IA*, suggesting that investment advisors decrease their ownership in fraud firms before fraud revelations, while banks and pensions and endowments increase their ownership in fraud firms.

Table 5.6: Institution-level fraud correlation matrix (pearson/spearman)

	$\Delta HELD_t$	$INDEXERS$	$TRANSIENT$	$DEDICATED$	$HELD_{t-1}$	BET_{t-1}	$BLOCK_{t-1}$	$ISIZE_{t-1}$	$BANK$	$INSURANCE$	IA	$PENSION$
$\Delta HELD_t$		0.120	-0.112	-0.031	-0.625	-0.034	-0.329	-0.055	0.055	0.004	-0.076	0.021
		(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.591)*	*(0.000)*	*(0.002)*
$INDEXERS$	0.137		-0.826	-0.378	-0.155	0.044	-0.087	0.053	0.236	-0.011	-0.145	-0.064
	(0.000)		*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.099)*	*(0.000)*	*(0.000)*
$TRANSIENT$	-0.128	-0.826		-0.154	0.061	-0.023	0.043	-0.127	-0.291	-0.021	0.135	0.135
	(0.000)	*(0.000)*		*(0.000)*	*(0.000)*	*(0.001)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.002)*	*(0.000)*	*(0.000)*
$DEDICATED$	-0.021	-0.378	-0.154		0.194	-0.068	0.099	0.143	0.072	0.064	0.021	-0.110
	(0.002)	*(0.000)*	*(0.000)*		*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.002)*	*(0.000)*
$HELD_{t-1}$	-0.468	-0.138	0.083	0.134		0.013	0.527	0.269	-0.071	-0.008	0.117	-0.043
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*		*(0.063)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.252)*	*(0.000)*	*(0.000)*
BET_{t-1}	-0.058	0.011	0.026	-0.095	-0.014		0.171	-0.194	-0.096	-0.042	0.023	0.080
	(0.000)	*(0.121)*	*(0.000)*	*(0.000)*	*(0.046)*		*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.001)*	*(0.000)*
$BLOCK_{t-1}$	-0.234	-0.081	0.040	0.095	0.553	0.239		0.272	-0.048	0.000	0.077	-0.030
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.000)*	*(0.981)*	*(0.000)*	*(0.000)*
$ISIZE_{t-1}$	-0.057	0.051	-0.129	0.151	0.386	-0.348	0.271		0.128	0.021	-0.034	-0.088
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.002)*	*(0.000)*	*(0.000)*
$BANK$	0.027	0.240	-0.299	0.084	-0.005	-0.173	-0.044	0.171		-0.125	-0.362	-0.471
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.445)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.000)*	*(0.000)*
$INSURANCE$	-0.017	-0.024	-0.029	0.101	0.063	-0.026	0.039	0.034	-0.135		-0.147	-0.191
	(0.011)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*	*(0.000)*
IA	-0.101	-0.160	0.154	0.013	0.085	0.052	0.050	-0.070	-0.362	-0.149		-0.552
	(0.000)	*(0.000)*	*(0.000)*	*(0.061)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*		*(0.000)*
$PENSION$	0.077	-0.053	0.134	-0.131	-0.102	0.116	-0.025	-0.101	-0.482	-0.198	-0.532	
	(0.000)	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	*(0.000)*	

The fraud sample is composed of all institution-firm observations holding fraud firm shares in the quarter immediately prior to the first fraudulently issued earnings report. The matched sample is composed of non-fraud institution-firm observations matched to institution-fraud firm observations. $\Delta HELD_t$ is the change in shares held by the institution scaled by total shares outstanding in the firm. *INDEXERS*, *TRANSIENT*, and *DEDICATED* are indicator variables equal to one if an institution belongs to that particular investment strategy and zero otherwise. *HELD* is the total shares held by an institution scaled by total shares outstanding. *BET* is the market value of equity that institution i owns in firm j scaled by the total portfolio value of institution i. *BLOCK* is an indicator variable equal to one if an institution is in the top quintile of institutional ownership for a particular firm. *ISIZE* is an indicator variable equal to 1 if an institution is in the top quintile of portfolio size for period t and zero otherwise. *BANK*, *INSURANCE*, *IA*, and *PENSION* are indicator variables equal to one if an institution belongs to a particular fiduciary group and zero otherwise. Continuous variables are winsorized at the 1st and 99th percentiles for the fraud sample and matched sample.

Although I find negative and significant relationships between changes in institutional ownership in fraud firms and my proxies for private information and incentives, the correlations must be interpreted cautiously as they may be the result of mean reversion. For example, by definition transient institutional investors buy and sell shares over short periods of time; therefore, it should not be surprising to find a negative relationship between $\Delta HELD$ and $TRANSIENT$ for any random sample of firms. Therefore, I estimate the following regression of $\Delta HELD$ on my proxies for institutional private information and incentives for both my institution-fraud observations and my matched observations:

$$\begin{aligned}\Delta TOTALHELD_t =& \beta_1 + \beta_2 TRANSIENT + \beta_3 DEDICATED + \beta_4 HELD_{t-1} + \\ & \beta_5 BET_{t-1} + \beta_6 BLOCK_{t-1} + \beta_7 ISIZE_{t-1} + \beta_8 INSURANCE + \beta_9 IA + \\ & \beta_{10} PENSION + \beta_{11} FRAUD + \beta_{12} FRAUD * TRANSIENT + \\ & \beta_{13} FRAUD * DEDICATED + \beta_{14} FRAUD * HELD_{t-1} + \\ & \beta_{15} FRAUD * BET_{t-1} + \beta_{16} FRAUD * BLOCK_{t-1} + \\ & \beta_{17} FRAUD * ISIZE_{t-1} + \beta_{18} FRAUD * INSURANCE + \\ & \beta_{19} FRAUD * IA + \beta_{20} FRAUD * PENSION + \epsilon_t\end{aligned}$$

INDEXERS and *BANK* are the excluded groups from the regression. $FRAUD$ is an indicator variable equal to one if an observation is an institution-fraud firm observation and zero otherwise. Although I match based on $HELD_{t-1}$ and BET_{t-1}, I include these variables in the regression to control for residual variation. If my proxies explain changes in institutional ownership in fraud firms beyond mean reversion, I expect to find significantly negative coefficients for my interaction variables.

Although significantly negative coefficients on my interaction variables can provide strong evidence that specific types of institutions are more likely to make informed trades in fraud firms, a lack of significance is difficult to interpret. For example, if BET_{t-1} is significantly negative and $FRAUD*BET_{t-1}$ is not significantly negative, the explanation might simply be that on average large bets taken by institutions are a result of informed trading and are thus likely to reverse in the near future after the private information is made public and returns are realized. In fact, this is consistent with Baks, Busse, and Green (2006), which shows that mutual funds with more concentrated portfolios are more likely to out perform mutual funds with more diversified portfolios. To adjust for auto-correlation of the error terms at the firm-level, I estimate Rogers standard errors clustered at the firm level.

Table 5.7 presents the regression results. The variables of interest, the interactions between *FRAUD* and my proxies for incentives and information environments, are largely insignificant. The two exceptions are the coefficient on *FRAUD*TRANSIENT*, which is negative and significant in the direction I predicted, and the coefficient on $FRAUD*ISIZE_{t-1}$, which is positive and significant in the opposite direction. Because many of the variables in the regression are highly collinear, in other regressions (untabulated) I remove HELD_{t-1}, BET_{t-1}, BLOCK_{t-1}, ISIZE_{t-1}, and their interaction terms and estimate new coefficients including each variable and its interaction one at a time. Although the coefficients on HELD_{t-1}, BLOCK_{t-1}, and ISIZE_{t-1} are all significant and negative, none of the coefficients on the interaction terms are significantly negative. Neither the coefficient on BET_{t-1} or its interaction was significant. The results of the regression make it difficult to draw any strong conclusions.

The results of the institution-level analysis suggest that conditional on owning

Table 5.7: Institution-level OLS regression of change in percentage ownership for fraud and matched samples (n=42,580)

	$\Delta HELD_t$
INTERCEPT	-0.0045
	(-0.75)
TRANSIENT	-0.0544
	(-6.29)
DEDICATED	0.1022
	(4.47)
$HELD_{t-1}$	-45.7945
	(-29.84)
BET_{t-1}	-0.0194
	(-0.06)
$BLOCK_{t-1}$	-0.0094
	(-0.73)
$ISIZE_{t-1}$	0.1381
	(9.59)
INSURANCE	0.0099
	(0.57)
IA	0.0032
	(0.34)
PENSION	0.0248
	(3.25)
FRAUD	-0.0196
	(-2.13)
*FRAUD*TRANSIENT*	-0.0264
	(-1.79)
*FRAUD*DEDICATED*	0.1027
	(2.91)
$FRAUD*HELD_{t-1}$	-1.4830
	(-0.56)
$FRAUD*BET_{t-1}$	0.0377
	(0.06)
$FRAUD*BLOCK_{t-1}$	-0.0235
	(-1.13)
$FRAUD*ISIZE_{t-1}$	0.0605
	(2.53)
*FRAUD*INSURANCE*	-0.0057
	(-0.24)
*FRAUD*IA*	0.0421
	(2.94)
*FRAUD*PENSION*	0.0222
	(1.90)

Coefficient estimates are multiplied by 100 to aid presentation. Standard errors are estimated as Rogers adjusted standard errors clustered at the firm level. The omitted group from the regression is the *BANK* and *INDEXERS* group. $\Delta HELD$ is measured as the change in shares held by an institution scaled by total firm shares outstanding. *INDEXERS*, *TRANSIENT*, and *DEDICATED* are indicator variables equal to one if an institution belongs to that particular investment strategy and zero otherwise. *HELD* is the total shares held by an institution scaled by total shares outstanding. *BET* is the market value of equity that institution i owns in firm j scaled by the total portfolio value of institution i. *BLOCK* is an indicator variable equal to one if an institution is in the top quintile of ownership for a particular firm and zero otherwise. *ISIZE* is an indicator variable equal to 1 if an institution is in the top quintile of portfolio size for period t and zero otherwise. *BANK*, *INSURANCE*, *IA*, and *PENSION* are indicator variables equal to one if an institution belongs to a particular fiduciary group and zero otherwise. Period t-1 represents the quarter immediately prior to the issuance of the first fraudulent quarterly report. Period t is the entire period over which a firm commits fraud. *FRAUD* is an indicator variable equal to 1 if an institution-firm observation is a fraud-firm observation and zero if the institution-firm observation is a matched observation. Continuous variables are winsorized at the 1st and 99th percentiles.

fraud firm shares prior to the beginning of a fraud, certain types of institutions are more likely to divest shares in fraud firms prior to the public revelation of a fraud. These institutions include those that are transient, dedicated, investment advisors, make large bets, hold large blocks of shares, or have large portfolios. The lack of evidence in the regression analysis makes it difficult to conclude whether the associations are the result of greater incentives to avoid fraud firms and information advantages or natural mean reversion.

5.3 Additional Tests

I conduct two further sets of tests. The first test examines whether institutional investors are more likely to divest fraud firms with stronger publicly-available signals of fraud. The second test examines whether institutional investors are more likely to anticipate and divest fraud firms engaging in specific types of fraud.
For the first analysis, I use the F-score from the model in Dechow, Ge, Larson, and Sloan (2007) as a proxy for publicly-available signals of fraud. Using firms accused of manipulating earnings in AAERs, Dechow et al. (2007) create a prediction model based on publicly available information. The basic model has six variables: total accruals, change in receivables, change in inventory, change in cash sales, change in return on assets, and an indicator variable equal to one if a firm issues debt or equity. The prediction model produces an annual F-score, which is calculated as the predicted probability of an earnings manipulation scaled by the unconditional probability. Because the number of fraud periods varies across firms and fraud signals vary across time, I select the largest F-score (*MAXFSCORE*) for each fraud firm over its fraud period. This seems reasonable, as the largest F-score represents institutions' best opportunity to detect the fraud.

Using only the sample of fraud firms, I estimate a model (untabulated) of changes in institutional ownership over the entire fraud period as a function of *MAXFSCORE* and four control variables. The control variables include *SIZE*, beginning of period institutional ownership levels ($TOTALHELD_{t-1}$, QIX_{t-1}, TRA_{t-1}, and DED_{t-1}), and portfolio weights ($PWEIGHT_{t-1}$, $PWEIGHTQIX_{t-1}$, $PWEIGHTTRA_{t-1}$, and $PWEIGHTDED_{t-1}$). I expect that if institutional investors are more likely to divest fraud firms with stronger fundamental signals of fraud, I will observe a negative coefficient on *MAXFSCORE*.

I find that changes in institutional ownership are not significantly negatively associated with *MAXFSCORE* for any of the institutional ownership groups. If there is a relation at all, it appears that changes in institutional ownership over the fraud periods may be positively associated with *MAXFSCORE*. The results suggest that institutions are not more likely to divest shares in fraud firms with stronger publicly-available signals of fraud. The failure to find a result suggests a potential learning opportunity for institutional investors.

It is possible that specific types of manipulations are more likely to be detected by institutions as they may pay closer attention to specific accounts or line items or that certain manipulations are more easily observed. For example, for many firms revenue is an extremely important income statement line item, and therefore, investors may approach the line item with more scrutiny. On the other hand, detection of manipulations that involve allowance accounts might be more easily detected as fundamental analysis and private information might lead investors to conclude that estimates are not reasonable. Therefore, I estimate similar regressions as those used in the F-score analysis, but instead of the F-score I include indicator variables for the types of manipulations alleged in AAERs. The

frequency of the types of manipulations are reported in Figure 4.2. The results (untabulated) do not present any evidence that institutions are more likely to sell shares in fraud firms manipulating specific accounts.

CHAPTER VI

Conclusion

The purpose of my dissertation is to document the trading patterns of institutional investors in fraud firms. I examine institutional trading patterns in 322 firms that the Securities and Exchange Commission identified in enforcement actions from 1982 through 2005 as having manipulated their accounting earnings. I find that institutional ownership for fraud firms increases by 14 percent, over the fraud period, representing an increase of 3.9 percent of the firm's outstanding shares. The 3.9 percent increase consists of significant increases for both quasi-indexer and dedicated institutional investors. Transient institutional ownership, however, remains nearly constant. I also find that the number of institutional owners significantly increases for all three groups over the fraud period. Although institutional investors lose approximately $138 billion by investing in fraud firms, I do find that some investors are able to mitigate their losses by anticipating fraud revelations in the quarter immediately prior to the revelation. I also conduct an institution-level analysis of trading behavior in fraud firms and find that of the firms holding shares prior to a fraud, those with greater incentives and private information divest shares in fraud firms prior to fraud revelations.

This study increases our understanding of the sophistication of institutional

investors. My results suggest that transient institutional investors have the ability to predict impending revelations of accounting fraud one quarter prior to fraud revelations and thus mitigate losses. I also provide evidence that institutional investors increase their holdings over the course of the fraud period and lose substantial amounts of money. This piece of evidence, in conjunction with a lack of evidence that institutional investors use publicly available signals of earnings manipulations, suggests that institutional investors may be less sophisticated than previously thought with respect to fraud. It also suggests a potential learning opportunity for institutional investors.

Future research could explore more fully the questions regarding publicly-available signals of earnings manipulation and institutional investors. For example, what are the cost and benefit trade-offs of using publicly-available signals of fraud? Future research could also consider the different components of the fraud signal I analyze and how much money institutions could save by using publicly-available signals of fraud.

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