HEDGE FUND OWNERSHIP AND CORPORATE FINANCIAL MISCONDUCT

A Dissertation

by

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ABSTRACT

This dissertation studies whether hedge funds are proficient at avoiding investing in firms that conduct financial fraud. Using 13F quarterly holdings data from 1980 to 2012, we find that hedge funds have significantly lower ownership (34% less) in fraud firms over the course of violation period, relative to non-fraud firms and non-fraud quarters. Furthermore, less ownership by hedge funds for fraud firms also occurs one year before the fraud is revealed to the public, and hedge funds continue to divest from fraud firms until the pre-revelation quarter. In contrast, non-hedge fund institutional investors do not show any significant pattern in their holdings in fraud firms around violation period.

A panel logistic regression modeling the probability of fraud indicates that both the level and change in hedge fund ownership can predict fraudulent activities. One standard deviation increase in hedge fund ownership will decrease the odds of conducting fraud by 21.7%.

Next, we test the relationship between fraudulent severity and hedge fund holdings. Using total fine as a proxy for fraud severity, we find that, in the cross section, the more severe the fraud is, the less hedge fund ownership is in the firm.

We also develop three alternative measures for hedge fund holdings that represent better monitoring incentive. We demonstrate that hedge funds with greater incentives to monitor the firms show a larger ownership decrease in fraud firms around violation period.

Finally, we show that the implementation of Regulation Fair Disclosure does not affect hedge funds' ability to divest from fraud firms around the violation period.

Taken together, our findings suggest that hedge funds are proficient at avoiding investing in fraud firms, while non-hedge fund institutions mostly react to public news.

To my Mom, Dejun Hou, and Dad, Deling Zhao

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1. INTRODUCTION

The past three decades witnessed a dramatic shift in investment in the United States from retail investors to institutional investors as the dominant player. [1] In particular, hedge funds have become an important investment vehicle, distinct with traditional institutional investors such as banks and mutual funds. These changes have spurred numerous studies on hedge funds from different aspects. Thus far, many papers (e.g., Ackermann, McEnally and Ravenscraft (1999), Brown, Goetzmann and Ibbotson (1999), Agarwal, Jiang, Tang and Yang (2013), and Chen, Cliff and Zhao (2015)) have shown evidence of superior performance among hedge funds. Furthermore, Chen and Liang (2007) and Cao, Chen, Liang and Lo (2013) find evidence that a portion of hedge funds have the ability to enter and exit stock markets at opportune times by successfully predicting market conditions such as market return, volatility, and liquidity. In addition, several studies investigate the influence of hedge funds as shareholders on corporate operations. For example, Brav, Jiang, Partnoy and Thomas (2008) find that hedge fund activism increases firm value, while Jiang, Li and Wang (2012) show that in the Chapter 11 process, hedge funds strategically choose positions in the capital structure to increase their impact on firm value. These studies have tremendously advanced our understanding about hedge funds.

In this dissertation, we look at a new and important aspect of the relation between hedge funds and firms: the behavior of hedge funds as shareholders of companies that engage in financial misconduct. Fraudulent activities in firms are risky in the sense that once the actions are caught and revealed, the firms will incur huge losses. Karpoff, Lee and Martin (2008*b*) show that though fines imposed by authorities are at a modest amount of $23.5 million per firm on average, penalties by the market are as high as 7.5 times of

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[1]According to Barclay Hedge, the total assets under management by hedge funds exceed 2.7 trillion US dollars as of the end of 2016 Q1.

the amount charged by authorities. And such loss can transfer to investors who possess positions in fraudulent firms. Therefore, avoiding investment in a fraud firm or divesting from the firm at right times should be very important for investors' welfare.

In particular, we address the following questions: can hedge funds ferret out corporate financial misconduct? If so, do hedge funds have a better ability to anticipate firm misconduct than other types of institutional investors? Do hedge funds divest more from firms whose fraudulent activities are more severe? Finally, will Regulation Fair Disclosure have an impact on the trading behaviors of institutional investors around fraud period? Answers to these questions will complement the existing evidence and contribute to both the hedge funds and corporate misconduct literature. To our knowledge, this is the first paper to study the detection ability of hedge funds for firm misconduct.

First, using 13F quarterly holdings data from 1980 to 2012, we first find that hedge funds have significantly lower ownership in fraud firms since four quarters before fraud starts, and the low holdings in fraud firms continue over the violation period, which ranges from the fraud-beginning quarter to the end of fraud quarter. [2] However, non-hedge funds (i.e., banks, insurance companies, mutual funds, investment advisors, and other institutional investors combined) do not show any significant pattern in their holdings in fraud firms around violation period.

Second, we employ a panel logistic regression modeling the probability of fraud. We find that one standard deviation increase in hedge fund ownership will decrease the odds of conducting fraud by 21.7%. Also, one standard deviation increase in hedge fund net purchase is associated with a reduction in the odds of committing fraud by 6.4%.

Third, we test the relationship between fraudulent severity and hedge fund holdings. Using the ratio of total fine to firm equity as a proxy for fraud severity, we find that, in the cross section, hedge funds invest less in firms whose fraudulent activities are proved to be

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[2] In this paper, we use the terms "misconduct", "misrepresentation", and "fraud" interchangeably.

more severe, ex-post. This negative relationship exists in each of five testing quarters that range from two quarters before to two quarters after fraud begins.

Fourth, given the fact that hedge funds show significant variations in their ability and operation focus, we develop three alternative measures of hedge fund holdings that are more aligned with their incentives to monitor. We find that hedge funds with greater incentives to monitor firms show a larger decrease of ownership in fraud firms around violation period.

Finally, we show that Regulation Fair Disclosure does not significantly impede hedge fund managers from detecting financial misconduct. The finding suggests that hedge funds that divest from fraud firms before fraud begins probably do not rely purely on the set of information disclosed through Reg FD.

Taken together, the results are consistent with the notion that hedge funds have the ability to divest from fraud firms around violation period in anticipation of fraudulent activities. However, non-hedge funds appear to behave remarkably different, and the pattern of stock ownership by non-hedge funds in fraud firms suggests that non-hedge funds primarily react to public news instead of possessing superior information about firms.

Our study contributes to the existing literature on how institutional investors respond to corporate financial fraud. Karpoff and Lou (2010) focus on the period when misconduct is revealed to the public and show that short interest starts to increase 19 months before financial misconduct is made public, and conclude that some short sellers are proficient at detecting financial misrepresentation. Though hedge funds constitute a substantial portion of short sellers, other types of institutional investors are allowed to take short positions as well. [3] Thus, we cannot simply equalize hedge funds to short sellers. The nature of short interest data does not allow for knowing the identity of short sellers. Our paper uses

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[3]For example, Almazan, Brown, Carlson and Chapman (2004) report that by 2000, there are about 30% of mutual funds that do not have restrictions on taking short positions.

13F data on long positions in stocks. One advantage of using long positions in 13F data is that we can clearly identify institution types and calculate institutional holdings in each firm. Therefore, our study on long positions complements Karpoff and Lou (2010) by examining if institutional investors have skills at detecting fraud by avoiding investment in fraud firms or divest from the fraud firm at right times.

In addition, by studying institutional investors and accounting fraud, Larson (2008) finds that all institutional ownership does not act as a sufficient monitoring channel to prevent firm fraud. However, Larson does not distinguish between hedge funds and other institutional investors, which is one of our focuses of the paper. As shown in Cao, Chen, Goetzmann and Liang (2013), hedge funds perform very differently from other types of institutional investors in financial markets. In this aspect, our paper complements Larson (2008) by distinguishing between hedge funds and other institutions on their trading behavior around fraud-related periods.

Dechow, Ge, Larson and Sloan (2011) use the Accounting and Auditing Enforcement Releases (AAERs) data by SEC to study earnings misstatements. They find that accounting and auditing misconduct could be predicted with financial and non-financial information, stock market data, and accrual quality. They also show that during the misstatement period, firms' accrual quality is low and both financial and non-financial performances worsen. The sample we use is much richer and larger than the one employed by Dechow, Ge, Larson and Sloan (2011). We also adopt some variables presented in Dechow, Ge, Larson and Sloan (2011) as controls in our tests.

Dyck, Morse and Zingales (2010) show that detecting fraud does not rely on regular corporate governance such as monitoring but nontraditional "players" such as employees, media, and industry regulators. Our study points out hedge funds as another type of players who can anticipate corporate financial misconduct.

The rest of the dissertation proceeds as follows. Section 2 describes the data used in

the study. In Section 3, we present the main empirical results for both hedge funds and non-hedge funds. Finally, Section 4 provides some concluding remarks.

2. THE DATA

This dissertation employs several sets of data, namely, financial misconduct information at firm level (FSR), stock ownership data of all institutional investors who file 13F (13F), stock performance from the Center for Research on Security Prices (CRSP), and financial and short interest data from COMPUSTAT. Each of them is briefly described below.

2.1 Corporate Financial Misconduct Data

We obtain financial misconduct data (Federal Securities Regulation Database, hereafter FSR) from the Karpoff, Lee, and Martin (2008a, b) (hereafter KLM), and Karpoff, Koester, Lee and Martin (2014) (hereafter KKLM).[1] FSR covers 1,099 hand-collected cases identified in the four popular databases including (1) the Government Accountability Office (GAO), (2) the Audit Analytics (AA) database of restatement announcements, (3) the Securities Class Action Clearinghouse (SCAC) database of securities class action lawsuits, and (4) the Securities and Exchange Commission's (SEC's) Accounting and Auditing Enforcement Releases (AAERs). KKLM address four problems associated with the aforementioned databases, which are late initial revelation dates, scope limitations, potentially extraneous events, and complete and partial data omissions.

To be included in FSR dataset, a firm must have at least one violation of Section 13(b)(2)(a), 13(b)(2)(b) or 13(b)(5) of the Securities and Exchange Act of 1934, as amended by the Foreign Corrupt Practices Act. [2]

To fit in the scope of our study, we restrict the sample to firms with available (1)

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[2]See Karpoff, Koester, Lee and Martin (2014) for detail.

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common stocks, (2) at least have one of following identifiers: Actpermno, Actgvkey and Actcusip, and (3) at least have some data in all of the CRSP, COMPUSTAT, and 13F. We use Actpermno as the primary identifier to merge with the other datasets. If Actpermno is missing, Actgvkey will be utilized, and then Actcusip if the first two identifiers are both missing. As a result, we locate 916 fraud firms in FSR. This number further reduces to 808 after we merge them with the CRSP and 13F.

Figure 1 shows the timeline of one enforcement action. A typical misconduct will include a violation beginning date when a fraud occurs, a misconduct ending date when the fraudulent activity finishes, then followed by a revelation event when the misconduct is revealed to the public. Subsequently, a formal investigation by the SEC usually follows. At the time of a violation, a misconduct is often not known to the public. After a formal investigation starts, the SEC may drop the case upon its discretion, and this case does not show up in the sample. Since we do not have a reason to speculate that hedge fund ownership is associated with the probability the case is dropped, there should be no selection bias in the study.

Table 1 shows summary statistics of fraud firms at the pre-fraud quarter end. The mean violation period lasts 36 months, while the median is 24 months. The average duration from misconduct beginning to fraud revelation is 37 months. The average of the total monetary fines imposed on fraud firms is $110.2 million, and the median is only $2.38 million, suggesting a large skewness in the distribution of the total monetary penalty. The total penalty is defined as the sum of several variables including emp_disgorge, nonemp_disgorge, emp_fine, nonemp_fine, firm_disgorge, firm_fine, clsamt-tot, clsvaltot. The definition of the above fine items are as follows, emp_disgorge represents the total amount of disgorgement regulators ordered to be paid by employees of the firm named as respondents in the enforcement action; nonemp_disgorge represents the total amount of disgorgement regulators ordered to be paid by non-employees of the firm

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named as respondents in the enforcement action; emp_fine represents the total amount of fines regulators ordered to be paid by employees of the firm named as respondents in the enforcement action; nonemp_fine represents the total amount of fines regulators ordered to be paid by non-employees of the firm named as respondents in the enforcement action; firm_disgorge represents the total amount of disgorgement regulators ordered to be paid by agent firms named as respondents in the enforcement action; firm_fine represents the total amount of fines regulators ordered to be paid by agent firms named as respondents in the enforcement action; clsamttot represents the total cash settlement awarded in all related private civil class action lawsuit; clsvaltot represents the total value of equity shares all parties are providing as settlement to the class in a related private civil class action lawsuit. An agent firm is any firm named by regulators in the enforcement action other than a subsidiary or parent firm.

Figure 2 shows the distribution of financial misconducts across the Fama-French 48 industries at the end of the pre-fraud month. Business service is the most "fraud-prone" sector in terms of frequency (103 cases), followed by Retail (37 cases), Banks (32 cases), Wholesale (31 cases) and Electronic Equipment (31 cases). The top five "fraud-concentrated" industries account for 39% of all misconduct firms in the sample. In most analyses below, we control for the industry fixed effect by including an industry dummy.

Figure 3 shows the distribution of financial misconducts across the Fama-French 48 industries at the end of the pre-revelation month. Again, business service is the most "fraud-prone" sector regarding frequency (113 cases), followed by Wholesale (44 cases), Electronic Equipment (40 cases), Retail (36 cases) and Banks (34 cases). The top five "fraud-concentrated" industries account for 42% of all misconduct firms in the sample.

Figure 4 plots the distribution of violation start years over time. The majority of violations occurred between 1998 and 2001. As explained before, our study focuses on two dates: violation beginning date, and revelation date when misconduct is revealed to the

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public. Given the time-series variation in frauds shown in the figure, we also control for the time effect in regression analyses below by adding a time dummy.

Figure 5 plots the distribution of violation revelation years over time. The majority of violations was revealed to the public between 2000 and 2002, as well as 2005 and 2006.

2.2 Stock Ownership by Hedge Funds and Other Institutional Investors

The institutional ownership information is from Thomson Reuters Ownership Database (Form 13F). The SEC requires that all investment managers with discretion over $100 million or more report their equity positions to the SEC on Form 13F. All equity positions greater than 10,000 shares or $200,000 must be disclosed. Institutional ownership (hereafter IOR) for each stock in each quarter is defined as the total number of shares held by institutional investors at the quarter end divided by the total number of shares outstanding. To correct the problem that there are some late filings after 45-day deadline set by the SEC and potential stock splits that have occurred between the end of the reported quarter and the filing date, we undo this split adjustment using share adjustment factors from CRSP. Another potential problem is missing holdings in 13F. We follow Nagel (2005) to impute zero holdings for the missing observations in 13F. Specifically, if there are market data for a firm at a quarter end in CRSP, but no holding information for the corresponding quarter in 13F, then we will assign a zero holding for the quarter. As a robustness check, we do not impute the missing holdings in 13F; the inferences do not change. We remove all observations that holding levels exceed 100%. These observations account for less than 2% in the sample. The sample period ranges from the first quarter of 1980 to the last quarter of 2012.

The 13F ownership data classify institutional investors into five groups: Banks, Insurance Companies, Investment Companies, Independent Investment Advisers, and Others.

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However, there are several potential problems. First, the classification code is not accurate after 1998. To correct this issue, we adopt Bushee's (1998, 2001) classification code.[3] Bushee (1998, 2001) extends the classification code of institutional investors into newer dates. We also follow Gompers and Metrick (2001) and Bushee (2001) to treat institutions whose institution type code is 3 or 4 as mutual funds, unless they are identified as hedge funds below. Second, hedge funds are not classified separately. In the paper, we identify hedge funds by manually matching 13F institutional investors' names with a comprehensive list of hedge fund names obtained from Cao, Chen, Goetzmann and Liang (2013).[4]

Figure 6 shows the gradual increase of institutional ownership from 1980 to 2012. An average stock had about 14% institutional ownership in 1980, and this number increased to almost 60% at the end of 2012. Over the sample period, hedge funds experienced dramatic growth in stock markets. The average ownership by hedge funds increased from almost zero to about 9% in 2012.

2.3 Stock Performance and Firm Characteristics

We follow Gompers and Metrick (2001) and calculate firm characteristics as follows.

SP500: S&P inclusion dummy, a dummy variable equals one if the firm is an S&P 500 component at the quarter end and zero otherwise;

Book-to-market: book value for the fiscal year ended before the most recent June 30, divided by size as of December 31 during that fiscal year;

Dividend Yield: dividends for the fiscal year ended before the most recent June 30, divided by size as of December 31 during that fiscal year;

Price: share price at the quarter end;

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[3]I would like to thank Brian Bushee for generously providing me with the extended institution type's data.

[4]See Cao, Chen, Goetzmann and Liang (2013) for the detailed identification of hedge funds.

Size: price * number of shares outstanding at the quarter end;

Age: number of months since first return observation appears in CRSP data;

Volatility: volatility of monthly returns over the past two years;

MOM3: past three-month gross returns;

MOM9: nine-month gross return preceding the quarter of filing (i.e., June 30-March 31 return for a June 30 13F filing in the following year;

Turnover: trading volume divided by shares outstanding, measured for the month prior to the beginning of the quarter.

We follow Shumway (1997) and make adjustment on the missing delisting returns on CRSP to correct returns for delisting bias.

To ease explanation, we follow Gompers and Metrick (2001) to take the natural log of firm characteristics except for S&P inclusion dummy and two past return variables (MOM3 and MOM9). For dividend yield and turnover, we follow Cao, Chen, Goetzmann and Liang (2013) to add one to the values before taking logs.

2.4 Short Interest

COMPUSTAT provides supplementary data on short interest. For each month, there are two short interests reported at the mid and at the end of the month (for old dates there is only one data point per month). We calculate short ratio as the short interest reported divided by the shares outstanding on the same date. Monthly short ratio is the average of the two (one for early dates) in each month. Then quarterly short ratio will be the last monthly short ratio in that quarter. We also calculate the average of monthly short ratios within the quarter as an alternative quarterly short interest ratio measure.

2.5 Discretionary Accrual

We follow Jones (1991) to calculate the discretionary accrual by regressing the following model.

$$TA_{it} = \alpha_1 + \alpha_2(\Delta REV_{it}) + \alpha_3(PPE_{it}) + \epsilon_{it} \tag{2.1}$$

where

TA = total accruals in year t,

ΔREV = revenues in year t - revenues in year t-1,

PPE = Gross property, plant and equipment in year t.

All three variables are scaled by lagged total assets. The discretionary accruals are the residuals from the regression of the model.

We also use a performance adjusted Jones model (Kothari, Leone and Wasley (2005)) to calculate an alternative discretionary accrual.

Following the routine, we winsorize book-to-market, dividend yield, and discretionary accrual at both the 1st and the 99th percentiles, and short ratio at the upper 1% level. Table 2 reports summary statistics of firm characteristics for 600 fraud firms that exist in their pre-fraud quarters. On average, a fraud firm has a hedge fund ownership of 2.62%, while the mean holding by a non-hedge fund is much larger at 31.91%. In addition, only 15% of the fraud firms are the S&P 500 member stocks, suggesting that the majority of fraud firms are small ones.

Table 3 reports summary statistics of firm characteristics for 627 fraud firms that exist in their pre-revelation quarters. On average, fraud firms have a mean hedge fund ownership of 3.66%, a 40% increase from the pre-fraud quarter, and a mean holding of non-hedge funds at 32.61%. The median of hedge fund holdings increases by 28% from the pre-fraud

period.

From pre-fraud to pre-revelation quarters, fraud firms have several notable changes. The mean fraud firms' price decreases from \$21.70 to \$16.31, representing a 20% drop. The mean market capitalization shrinks 23% to \$3.88 billion. Both average short-term momentum (MOM3) and long-term momentum (MOM9) reduce sharply from fraud beginning to misconduct revelation. The mean short ratio increases from 2% to 3% at pre-revelation quarters, a 50% increase. The mean of discretionary accruals at the pre-fraud quarters is 0, and this value jumps to 0.04 at the end of pre-revelation quarters. Furthermore, the means of volatility, turnover, book-to-market, and dividend yield of fraud firms do not show dramatic changes from pre-violation quarters to pre-revelation quarters.

3. EMPIRICAL RESULTS

In this section, we conduct several empirical tests. First, we do a univariate analysis on institutional ownerships (IOR) at the pre-fraud quarter ends. Second, we study the relation between IOR and fraud by performing panel regressions of IOR on a few fraud-related dummy variables. Third, we perform similar regressions using quarterly change in institutional ownership. Fourth, we conduct a logit analysis to model the probability of fraud. Fifth, we study the relationship between fraud severity and hedge fund holdings. Sixth, we develop three alternative hedge fund holdings that are more aligned with incentives to monitor and make comparisons among different measures. Finally, we analyze the impact of Regulation Fair Disclosure on hedge funds' ability to detect fraud.

3.1 Institutional Ownership Around the Fraud-Beginning Quarter

To test whether IOR levels for fraud firms differ from non-fraud firms at the pre-fraud quarter ends, we first conduct a univariate analysis on the IOR. Table 4 Panel A reports the univariate test results at the pre-fraud quarter. The ownership by all types of institutional investors for fraud firms at the quarter immediately prior to committing frauds is 34.53%, compared to 28.93% for non-fraud firms and fraud firms in other periods. The difference of 5.6% is positive and statistically significant at 1% level. However, the average IOR level by hedge funds in the fraud firms is 2.62% at the pre-fraud quarter, which is 0.58% lower than the IOR for the non-fraud firms and fraud firms in other quarters. The difference is statistically significant at the 1% level.

Next, we limit the sample to only fraud firms and calculate the mean of the IOR during the violation period, which is defined as quarters from fraud beginning to misconduct end and the average of the IOR for the rest of quarters. The results are shown in Table 4

Panel B. There are totally 44,365 fraud firm-quarter observations, among which 8,013 are fraud quarters and 36,352 are non-fraud quarters. Models (1) - (3) test for IOR by all institutional investors, non-hedge fund investors, and hedge funds, respectively. The mean IOR by all institutional investors during the violation period is 2.37% higher than IOR at other quarters and is statistically significant at 1% level. The IOR level by hedge funds during the violation period is 3.35%, which is 0.49% lower than IOR for other quarters. And this difference is also statistically significant at 1% level.

In the last univariate test, we study a net purchase by institutional investors in each quarter, which is denoted as the first difference in quarterly holdings. We calculate the average of the net purchases by institutional investors right before the fraud-beginning quarter, and the mean of the net purchases in other quarters. The results are shown in Table 4 Panel C. The average of net investment by hedge funds at the pre-fraud quarters (0.14%) is not statistically significantly different from the mean of the net purchases in other quarters (0.08%) at 10% level.

The results in Table 4 could suggest that (1) hedge funds have relatively smaller ownership in fraud firms at the quarter immediately before a misconduct begins, compared to their holdings in other quarters, whereas non-hedge funds and all institutional investors may have an opposite behavior. (2) hedge funds have lower ownership in fraud firms during violation period than other periods. (3) the mean net purchases by hedge funds at the pre-fraud quarter end is not significantly different from the mean in other quarters.

A potential problem with univariate tests, however, is that they do not control for the time trend that institutional investors increase their holdings steadily from less than 15% in 1980 to over 50% at the end of 2012, as well as firm-specific characteristics that can affect institutional ownership. The univariate analyses are difficult to distinguish whether the low IOR of hedge funds for fraud firms in pre-fraud periods is due to hedge funds' ability to detect financial misconduct or due to a time trend, industry effect, or other firm fixed effect.

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To control for other factors, we perform a panel regression analysis. Gompers and Metrick (2001) find that institutional ownership is associated with several stock characteristics such as SP500 dummy, firm age, firm equity size, book-to-market ratio, dividend yield, stock momentum, stock price, stock volatility, and turnover. Karpoff and Lou (2010) show that short interests are related to corporate financial fraud. Furthermore, a large body of academic literature studies the motivation for earnings management, and how to define earnings management (Healy (1985), Jones (1991), Patricia M. Dechow (1995), Kothari, Leone and Wasley (2005)). Dechow, Ge, Larson and Sloan (2011) show that accruals, which measure earnings management, could predict accounting misstatement. We include these variables in the analyses. Specifically, we run the following panel regressions.

$$
\begin{aligned}
IOR\_HF_{it} =& \alpha + \beta_1 Begin(4)_{it} + \beta_2 Begin(3)_{it} + \beta_3 Begin(2)_{it} \\
& + \beta_4 Begin(1)_{it} + \beta_5 ViolationPeriodDummy_{it} \\
& + \gamma_1 SP500_{it} + \gamma_2 MOM3_{it} + \gamma_3 MOM9_{it} + \gamma_4 logsize_{it} \\
& + \gamma_5 logBM_{it} + \gamma_6 logyld_{it} + \gamma_7 logprc_{it} + \gamma_8 logvol_{it} + \gamma_9 logage_{it} \\
& + \gamma_{10} logturnover_{it} + \gamma_{11} shortratio_{it} + \gamma_{12} |DAccrual|_{it} + \epsilon_{it},
\end{aligned}
\tag{3.1}
$$

where IOR_HF is the quarterly institutional ownership level by hedge fund investors; Begin(i) is a quarter dummy equals one when the firm is a fraud firm and the quarter is in the ith quarter before fraud-beginning quarter, and zero otherwise. For example, Begin(3) = 1 if the firm is a fraud firm and the quarter is the third quarter before fraud starts and zero otherwise; Violation Period Dummy is a dummy variable that equals one if and the firm is a fraud firm and the quarter is in the violation period, and zero otherwise. Violation period is a period of quarters in fraud.

The control variables are described in Section 2. Positive accruals are income-increasing

accruals, while negative accruals are income-decreasing accruals. Both discretionary accruals regardless of the sign are forms of earnings management and would attract the SEC's attention. Therefore we follow Reichelt and Wang (2010) to calculate absolute values of discretionary accruals in the model.

If an investor can somehow gather information about firms and use sophisticated skills to predict a fraud based on information collected, he will reduce his positions in the fraud firm and reallocate investment accordingly. Therefore, we expect to find a relatively lower level of hedge fund ownership over the course of violation period as well as quarters before misrepresentation for fraud firms if such skills exist.

Table 5 reports the panel regression results of hedge fund ownership. Models (1) – (3) are the panel regressions of total institutional ownership, non-hedge fund ownership, and hedge fund ownership on pre-fraud quarter dummies, violation period dummy and firm controls, respectively.

Models (1) - (4) are panel regression models that adopt different control variables. Hedge fund managers have on average a 0.6% - 1.1% lower ownership in fraud firms during the violation period than non-fraud firms and other quarters, depend on different models. Also, hedge funds hold fewer shares in fraud firms since as early as four quarters before fraud begins in all the four models. Take model (4) for example - the coefficient of one-quarter-before-fraud dummy (begin(1)) is -0.009 (t-statistic=-3.47). At the quarter right before fraud begins, hedge funds on average have 0.9% lower holdings in fraud firms than in non-fraud firms. Given the fact that hedge funds have a mean quarterly holding of 3.2% over the sample period, hedge fund investors decrease their holdings in fraud firms by 28% at the quarter before fraud starts, and the decrease is statistically significant at 1% level.

With the same idea, hedge funds reduce their ownership in fraud firms by 34% over the course of violation period, and the reduction is statistically significant at 1% level as well.

The coefficients on the dummies for the other quarters in the model generate a similar impression. The common observation is that relative to other firm-quarters, hedge funds have significantly lower ownership of fraud firms as early as four quarters before fraud starts, and the pattern continues to the whole violation period. The pattern seems to imply that hedge funds can avoid owning much of a firm when it starts to engage in financial misconduct.

Also, the ownership of hedge funds is related to several stock characteristics. For example, hedge funds tend to hold stocks that do not belong to the S&P 500 membership. Also, the hedge fund ownership is negatively related to dividend yield, but positively associated with firm age, firm size, book-to-market ratio, share price, stock turnover, and short interest ratio. Finally, hedge fund ownership is not related to stock momentum as well as volatility.

All firm, industry, and time effect are included and standard errors are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter. (Petersen (2009))

To make a comparison among different institutional investors, we re-run the model 3.1 and replace the dependent variable (IOR_HF) with the total institutional holding (IOR_Total) and the non-hedge fund holding (IOR_NonHF). The results are summarized in Table 6.

On the contrary, Table 6 shows that non-hedge fund and total institutional holdings do not have any significant patterns around the fraud periods. None of the coefficients on the four pre-fraud quarter dummies and the violation period dummy is significant at 10% level. Moreover, non-hedge funds exhibit some different preferences for firm characteristics compared to hedge funds. For instance, non-hedge funds tend to hold stocks with less momentum and less volatility. And non-hedge funds holdings are not sensitive to stock turnover or discretionary accruals.

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3.2 Institution Ownership Around the Violation Revelation

The previous results in Section 3.1 show that hedge funds reduce their ownership in fraud firms as early as four quarters before fraud starts and the trend continues to the violation periods. In contrast, non-hedge funds and total institutional holdings do not show any significant patterns around fraud quarters. At the early stage of fraud, investors have little information on the fraudulent activity. When the time is close to the revelation of misconduct, investors will have more information and start to detect the potential fraud. Now we switch gear and study the trading behavior of institutional investors around fraud revelation period.

We apply the same setup in Section 3.1 to the fraud revelation period. Specifically, we estimate the following regressions.

$$
\begin{aligned}
IOR\_HF_{it} =& \alpha + \beta_1 Reveal(-4)_{it} + \beta_2 Reveal(-3)_{it} + \beta_3 Reveal(-2)_{it} \\
&+ \beta_4 Reveal(-1)_{it} + \beta_5 Reveal(0)_{it} + \beta_6 Reveal(+1)_{it} \\
&+ \beta_7 Reveal(+2)_{it} + \beta_8 Reveal(+3)_{it} + \beta_9 Reveal(+4)_{it} \\
&+ \gamma_1 SP500_{it} + \gamma_2 MOM3_{it} + \gamma_3 MOM9_{it} + \gamma_4 logsize_{it} \\
&+ \gamma_5 logBM_{it} + \gamma_6 logyld_{it} + \gamma_7 logprc_{it} + \gamma_8 logvol_{it} + \gamma_9 logage_{it} \\
&+ \gamma_{10} logturnover_{it} + \gamma_{11} shortratio_{it} + \gamma_{12} |DAccrual|_{it} + \epsilon_{it},
\end{aligned}
\tag{3.2}
$$

where IOR_HF is hedge fund ownership, Reveal(i) is the ith quarter after fraud revelation. For example, Reveal(+4) =1 if the firm is a fraud firm and the quarter is the fourth quarter after fraud-revelation.

The regression results are shown in Table 7. Hedge funds tend to hold relatively fewer shares in fraud firms during each of the four quarters before the fraud is revealed to the

public, but do not show any notable change in holdings since then. For example, the coefficient of one-quarter-before-revelation dummy for the model (4) in Table 7 is -0.007, and t-statistic is -2.42, which is significant 5% level. The mean hedge fund holdings in fraud firms in the quarter right before fraud revelation is 0.7% lower than holdings in non-fraud firms.

To test whether institutional investors other than hedge funds will change their holdings in response to ex-post fraud revelation, we re-run the Model 3.2 but replace hedge fund holdings with total institutional and non-hedge fund holdings. Table 8 shows the panel regression results.

Non-hedge funds start to reduce their holdings in fraud firms right before misconduct revelation and continue to keep lower ownership until one year after fraud revelation. For example, the coefficient of fraud revelation dummy is -0.021, and t-statistic is -2.33. During the fraud revelation quarter, non-hedge funds' ownership in fraud firms is 2.1% lower than that in non-fraud firms. Given that the mean of non-hedge fund ownership levels is 25.7%, non-hedge funds reduce their holdings by 8.2% in the quarter immediately prior to the revelation. And this reduction is statistically significant at 5% level.

So far, the results show that hedge funds tend to reduce their ownership in fraud firms since four quarters before misconduct starts and the trend continues to the quarter right before the fraud is revealed to the public. After the fraud revelation, hedge funds' holdings do not show a further reduction. On the contrary, non-hedge funds do not have any notable changes in the holdings in fraud firms around the period when fraud starts, but significantly decrease their holdings since fraud is revealed to the public.

3.3 Changes in Institution Ownership Around the Violation Period

Gompers and Metrick (2001) show that institutional holdings are positively related to

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future stock returns, and argue that both institutional ownership level and change in the level may drive future returns. In anticipation of a financial fraud an investor may not only reduce his position in the potentially fraudulent firm but reduces his net purchase, which is the change in quarterly ownership level in that firm. In this section, we test whether institutional investors will have different trading patterns in terms of changes in quarterly holdings (net purchases). Specifically, we run the panel regressions as below.

$$
\begin{aligned}
\Delta IOR\_it =& \alpha + \beta_1 Begin(4)_{it} + \beta_2 Begin(3)_{it} + \beta_3 Begin(2)_{it} \\
&+ \beta_4 Begin(1)_{it} + \beta_5 ViolationPeriodDummy_{it} \\
&+ \gamma_1 SP500_{it} + \gamma_2 MOM3_{it} + \gamma_3 MOM9_{it} + \gamma_4 logsize_{it} \\
&+ \gamma_5 logBM_{it} + \gamma_6 logyld_{it} + \gamma_7 logprc_{it} + \gamma_8 logvol_{it} + \gamma_9 logage_{it} \\
&+ \gamma_{10} logturnover_{it} + \gamma_{11} shortratio_{it} + \gamma_{12} |DAccrual|_{it} + \epsilon_{it},
\end{aligned}
\tag{3.3}
$$

where $\Delta IOR_{it} = IOR_{it} - IOR_{it-1}$; Begin(i) is a quarter dummy equals one when the firm is a fraud firm and the quarter is in the ith quarter before fraud-beginning quarter, and zero otherwise.

Table 9 shows the panel regression results of the change in hedge fund ownership. Hedge funds' net purchase is negatively related to some quarter dummies. Take model (4) in Table 9 for example - The coefficient of 1-quarter-before-fraud dummy is -0.002, and t-statistic is -2.34. Holding other control variables constant, the net purchase by hedge funds in fraud firms in the quarter before fraud begins is 0.2% lower than non-fraud firms. Considering that the average quarterly Δ IO_HF is 0.075% across all firms and all quarters in the data, 0.2% decrease in the pre-fraud quarter accounts for 2.67 times lower than the average. This decrease in Δ IO_HF is statistically significant at 5% level.

Moreover, the net purchase by hedge funds is associated with several firm characteris-

tics. For instance, the net purchase by hedge funds is positively related to stock momentum, stock price, firm size, book-to-market ratio, volatility, and short interest ratio, and negatively related to stock volatility.

To make a comparison among different institutional investors, we re-run model 3.3 using net purchases by total institutional investors and non-hedge funds, and summarize the results in Table 10.

Table 10 shows that on average, non-hedge funds and total institutional investors as a whole do not exhibit any reductions in net purchases in the quarters before fraud is revealed to the public at 5% level. But once the fraud is known, both total institutional investors and non-hedge funds tend to decrease quarterly net purchases in the quarter of fraud revelation and the following quarter.

3.4 Predicting Fraud with Institutional Ownership

In this Section, we adopt a logistic regression model to predict fraud. Specifically, we run the following logistic model.

$$
\begin{aligned}
Fraud_{it} =& \alpha + \beta_1 IOR_{it-1} + \gamma_1 SP500_{it-1} + \gamma_2 MOM3_{it-1} + \gamma_3 MOM9_{it-1} \\
&+ \gamma_4 logsize_{it-1} + \gamma_5 logBM_{it-1} + \gamma_6 logyld_{it-1} + \gamma_7 logprc_{it-1} \\
&+ \gamma_8 logvol_{it-1} + \gamma_9 logage_{it-1} + \gamma_{10} logturnover_{it-1} + \gamma_{11} shortratio_{it-1} \\
&+ \gamma_{12}|DAccrual|_{it-1} + \epsilon_{it-1},
\end{aligned}
$$

(3.4)

where the dependent variable (Fraud) is a binary variable that equals one if a firm is a fraud firm and the quarter is the fraud-beginning quarter; IOR is institutional holdings by either total institutions, non-hedge funds or hedge funds; Other parameter estimates

consist of firm's market variables as well as financial accounting data, which are listed in the previous sections.

Industry and year dummies are included in the regressions. T-Statistics are robust to heteroskedasticity and within cluster correlation by firm and year. The regression results are shown in Table 11.

First, we test whether total institutional holdings can predict corporate fraud. Model (1) in Table 11 shows the results. The coefficient of total institutional holdings is -0.094, but is not statistically significant at 10% confidence level. Next, we split total institutional holdings by investors' type and calculate institutional holdings by hedge funds and non-hedge funds for each firm. Model (2) and (3) show panel logit regression that models the probability of fraud using non-hedge fund and hedge fund holdings, respectively. Model (4) uses the quarterly net change of hedge fund holdings to predict corporate fraud, and model (5) uses both hedge fund level and hedge fund holdings change to predict fraud.

Take model (3) for example - The coefficient of hedge fund holding level is -3.352, and the t-statistic is -2.58. A higher hedge fund ownership will predict a lower probability of conducting fraud, holding other parameters constant. To ease the interpretation of the coefficient, we calculate an odds ratio for the hedge fund ownership coefficient. The odds ratio for IOR_HF = exp(-3.352) = 0.035. 100% increase in hedge fund holdings will decrease the odds of conducting fraud by 96.5%. To put it another way, one standard deviation increase in hedge fund ownership will decrease the odds of conducting fraud by 21.7%. The coefficient is statistically significant at 1% level.

Model (4) in Table 11 show that a decrease in hedge fund net purchase will indicate a higher probability to commit fraud. One standard deviation decrease in hedge funds' net purchase will increase the odds of conducting fraud by 6.4%.

The results in this Section shows that hedge fund investors on average can predict fraud, while institutional investors as a whole and non-hedge fund investors do not have

the same kind of talent.

3.5 Alternative Hedge Fund Ownership Measures

Hedge funds show a great variation in both ability and operation focus. Hedge funds that hold a relatively small fraction of firm shares may not have incentives to monitor the firm closely. Similarly, hedge funds whose holdings in a firm only account for a small portion of their assets under management may have little incentives to monitor the firm. Therefore, we construct three alternative hedge fund holdings based on the above concerns. Specifically, for each firm in each quarter, we sort institutional holdings into quartiles, and then we calculate hedge funds' holdings only for those that rank in the top quartile. We denote this hedge fund holding as a Firm Concentrated IOR_HF. Next, for each hedge fund in each quarter, we sort firms into quartiles based on hedge funds' dollar investment in each firm. We only account hedge fund holdings for those firms that rank in the top quartile. We denote this hedge fund holding as a Fund Concentrated IOR_HF. Finally, the third measure needs to meet the requirements of both firm concentrated and fund concentrated hedge fund holdings. We denote this measure as Firm Fund IOR_HF.

Overall, these measures should be better aligned with hedge funds' incentives to monitor the firms they invest with closely. Table 12 shows summary statistics of hedge fund ownership across the three measures at both pre-fraud quarter end (Panel A) and pre-revelation quarter end (Panel B). Panel A in Table 12 shows that all three alternative measures are more right-skewed (or positive skewed) than total hedge fund holdings.

In this Section, we repeat the regressions in Section 3.2, with the three alternative hedge fund ownership measures as the dependent variables. Model (1) in Table 13 is the regression of original hedge fund holdings on firm characteristics. Models (2) - (4) regress the three alternative hedge fund holdings on firm controls, respectively. As expected all

coefficients on fraud related dummy variables are negative and statistically significant at 1% or 5% levels. Using Model (4) as an example, the dependent variable is firm and fund concentrated hedge fund ownership. The coefficient of the violation period dummy is -0.009 (t-statistic=-4.8). Since the mean of the firm and fund concentrated hedge fund ownership is 1.35% over the sample, 0.9% decrease in fraud firms over the course of fraud accounts for a notable 66.7% decrease, which is almost twice size of decrease by using total hedge funds' ownership (34%).

The results in this Section show that hedge funds with greater incentives to monitor firms will unload even more holdings in fraud firms around violation periods than all hedge funds do.

3.6 Cross-sectional Test of Fraud Severity on Hedge Fund Ownership Level Around Fraud Beginning Period

Previous tests show that hedge funds have certain skills to avoid investing with fraud firms. It could be possible that hedge fund investors do not possess any specific knowledge of the fraud, and merely unload shares in anticipation of large stock price decline. To distinguish between hedge funds' ability to detect misconduct and the above competing interpretation, we find a direct measure misconduct severity and test whether hedge funds' ownership is associated with fraud severity. To answer this question, we follow Karpoff and Lou (2010) and conduct a similar cross-sectional regression as below.

$$
\begin{aligned}
IOR\_HF_i = {} & \alpha + \gamma_1 \text{Total Fine}_i + \gamma_2 MOM3_i + \gamma_3 MOM9_i + \gamma_4 logsize_i + \gamma_5 logBM_i \\
& + \gamma_6 Shortratio_i + \gamma_6 |DAccrual|_i + \epsilon_{it},
\end{aligned}
$$

$$(3.5)$$

where Total Fine is the total monetary penalty imposed by authorities scaled by the market capitalization at the testing periods; Mom3, Mom9, logsize, logBM, short ratio, and discretionary accrual are firm characteristics measured at the same measurement period.

We run the cross-sectional regression in five different quarters separately, which range from two quarters before fraud begins to two quarters after misconduct starts. The results are shown in Table 14.

The results show that the coefficients in all the five regressions are negative and significant. For example, in the quarter when fraud starts, the coefficient of total fine is -0.005 (t-statistics=-3.13.). A 1% increase in the final fine will be associated with a 0.5% decrease in institutional ownership. The result is both economically and statistically significant.

The results in Table 14 lead to the conclusion that hedge funds' ownership is negatively associated with the severity of fraud. More severe fraudulent activities in terms of the penalty imposed by authorities will attract less investment by hedge funds. The conclusion supports that hedge fund has particular ability to detect financial fraud.

3.7 Regulation Fair Disclosure as A Quasi-Natural Experiment

The SEC promulgated the Regulation Fair Disclosure in October 2000. The regulation mandates that all publicly traded companies must disclose material information to all investors at the same time. If hedge fund investors are skilled at collecting private information about firms, the pass of Regulation FD will weaken hedge fund's comparative advantage over other institutional investors on obtaining private information.

From the previous results, we show that hedge funds are proficient at detecting financial fraud. In this Section, we study whether Regulation FD will have an effect on institutional investors' ability to detect financial fraud. Specifically, we run the regression models as below.

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$$
\begin{aligned}
IOR_{it} =& \alpha + \beta_1 Begin(-1)_{it} + \beta_2 (RegFD)_{it} + \beta_3 Begin(-1)_{it} * RegFD_{it} \\
& + \gamma_1 SP500_{it} + \gamma_2 MOM3_{it} + \gamma_3 MOM9_{it} + \gamma_4 logsize_{it} \\
& + \gamma_5 logBM_{it} + \gamma_6 logyld_{it} + \gamma_7 logprc_{it} + \gamma_8 logvol_{it} + \gamma_9 logage_{it} \\
& + \gamma_{10} logturnover_{it} + \gamma_{11} shortratio_{it} + \gamma_{12} |DAccrual|_{it} + \epsilon_{it},
\end{aligned}
\tag{3.6}
$$

and

$$
\begin{aligned}
IOR_{it} =& \alpha + \beta_1 ViolationPeriodDummy_{it} + \beta_2 (RegFD)_{it} \\
& + \beta_3 ViolationPeriodDummy_{it} * RegFD_{it} \\
& + \gamma_1 SP500_{it} + \gamma_2 MOM3_{it} + \gamma_3 MOM9_{it} + \gamma_4 logsize_{it} \\
& + \gamma_5 logBM_{it} + \gamma_6 logyld_{it} + \gamma_7 logprc_{it} + \gamma_8 logvol_{it} + \gamma_9 logage_{it} \\
& + \gamma_{10} logturnover_{it} + \gamma_{11} shortratio_{it} + \gamma_{12} |DAccrual|_{it} + \epsilon_{it},
\end{aligned}
\tag{3.7}
$$

where Reg FD is the Regulation FD dummy equals one for the quarters after the year 2000, and zero otherwise. Begin(-1) is one quarter before fraud dummy that equals one if the quarter is the pre-fraud quarter and the firm is a fraud firm. Violation Period dummy is a dummy that equals one for all quarters during the violation and the firm is a fraud firm. Begin(-1)*reg FD is the interaction of Reg FD dummy and pre-fraud quarter dummy. Violation Period*reg FD is the interaction of Reg FD dummy and violation period dummy. IOR is institutional ownership by total institutions, non-hedge funds, and hedge funds.

Models (1) – (3) in Table 15 are based on the regression model 3.6. The coefficient of 1-quarter-before-fraud dummy by hedge fund is -0.006, and is statistically significant at 5% level. The coefficient on the interaction term of Reg FD and 1-qtr-before-fraud is -0.002, but not significant. In contrast, the coefficient of 1-qtr-before-fraud dummy for either total institutional investors or non-hedge fund investors is significant. But the coefficient of the interaction term is significant for both total and non-hedge institutional

investors. For example, the coefficient of 1-qtr-before-fraudxReg FD is -0.043 for non-hedge fund investors. Though non-hedge fund investors do not have any significant change in their holdings in fraud firms before Regulation FD, they reduce their ownership in fraud firms by 4.3% in the quarter immediately before fraud begins after the Regulation FD.

Models (4) – (6) in Table 15 are based on the model 3.7. Hedge funds show a similar pattern in the regression that they have 1% less ownership during violation period, and this reduction pattern is not affected by the pass of Regulation FD.

The results in this Section indicate that hedge funds' skills in predicting fraud are not affected by the implementation of Regulation Fair Disclosure. But the passage of Reg FD reduces the barrier for non-hedge funds in gathering information, and as a result, non-hedge funds start to show tendency to reduce ownership in fraud firms in the quarter immediately prior to the beginning of fraud.

4. CONCLUSION

In this paper, we investigate whether hedge funds, presumably most sophisticated investors, have the ability to avoid investing in the firms that conduct financial misconduct. The prior research has shown that many hedge funds can deliver superior performance, that a portion of hedge funds have the skill to predict market conditions, and that hedge fund activists can significantly influence corporate operations. Given the evidence, one would expect that if a group of institutional investors can predict corporate fraud, they are most likely hedge funds. In our study, therefore, we not only test the fraud-detection ability of hedge funds but make a comparison between hedge funds and other types of institutional investors. Using 13F quarterly holdings data from 1980 to 2012, we first find that hedge funds have significantly lower ownership in fraud firms since four quarters before fraud starts, and the lower holdings in fraud firms continue over the violation period, which ranges from the fraud-beginning quarter to the end of fraud quarter. However, non-hedge funds (i.e., banks, insurance companies, mutual funds, investment advisors, and other institutional investors combined) do not show any significant pattern in their holdings in fraud firms around violation period.

Second, we employ a panel logit regression on modeling the probability of fraud. We find that both hedge fund level and change are associated with the likelihood of conducting fraud. One standard deviation increase in hedge fund ownership will decrease the odds of committing fraud by 21.7%. Also, one standard deviation increase in net hedge fund purchase indicates a decrease in the odds of conducting fraud by 6.4%.

Third, we test the relationship between fraudulent severity and hedge fund holdings. With a proxy for fraud severity, we find that, in cross-section, hedge funds invest less in firms whose fraudulent activities are proved to be more severe, ex-post. Fourth, given the

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fact that hedge funds show significant variations in their ability, and operation focus, we develop three alternative hedge fund holdings' measures that are more aligned with their incentives to monitor. We find that hedge funds with greater incentives to monitor firms show larger ownership decrease in fraud firms around violation period.

Fourth, we show that Regulation Fair Disclosure will not significantly impede hedge fund managers' ability to detect financial misconduct. The finding suggests that hedge funds' ability to divest from fraud firms before misconduct begins may not come purely from information-driven strategy.

Taken together, the results suggest that hedge funds have the ability to divest from fraud firms around violation period in anticipation of fraudulent activities. However, non-hedge funds do not have such ability, and the pattern of stock ownership by non-hedge funds in fraud firms suggests that non-hedge funds primarily react to the public news instead of possessing superior information about firms.

Finally, there are several directions to conduct further research. For instance, one can examine if the physical proximity of a hedge fund to the fraud firm's headquarter is related to the fund's ability to detect corporate misconduct. Another interesting test is to examine the actual stock return pattern of those fraud firms after hedge funds reduce their ownership. In conclusion, investigating the link between institutional investors and corporate fraudulent behavior could be a fertile area for future research.

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Figure 1: This figure illustrates a timeline of an enforcement action. A typical misconduct will include a violation beginning date, on which a misconduct begins, a violation ending date, on which misconduct finishes, then come with a revelation event that misconduct is revealed to public, followed by SEC investigation on a later period.
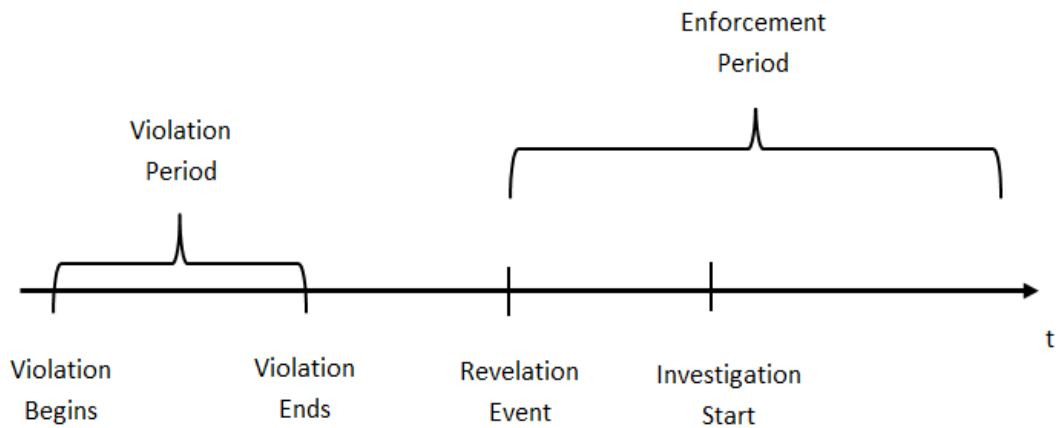
Figure 2: This figure plots the distribution of misconduct across Fama-French 48 Industries at the pre-fraud month. The sample period is from 1980Q1 through 2012Q4.

Frequency Distribution of Misconducts Across Industries
Pre-Fraud Month

The definition of Fama-French 48 Industries can be found at Kenneth French's website

Brief definitions are shown below: 1 Agric Agriculture, 2 Food Food Products, 3 Soda Candy & Soda, 4 Beer Beer & Liquor, 5 Smoke Tobacco Products, 6 Toys Recreation, 7 Fun Entertainment, 8 Books Printing and Publishing, 9 Hshld Consumer Goods, 10 Clths Apparel, 11 Hlth Healthcare, 12 MedEq Medical Equipment, 13 Drugs Pharmaceutical Products, 14 Chems Chemicals, 15 Rubbr Rubber and Plastic Products, 16 Txtls Textiles, 17 BldMt Construction Materials, 18 Cnstr Construction, 19 Steel Steel Works Etc, 20 FabPr Fabricated Products, 21 Mach Machinery, 22 ElcEq Electrical Equipment, 23 Autos Automobiles and Trucks, 24 Aero Aircraft, 25 Ships Shipbuilding, Railroad Equipment, 26 Guns Defense, 27 Gold Precious Metals, 28 Mines Non-Metallic and Industrial Metal Mining, 29 Coal Coal, 30 Oil Petroleum and Natural Gas, 31 Util Utilities, 32 Telcm Communication, 33 PerSv Personal Services, 34 BusSv Business Services, 35 Comps Computers, 36 Chips Electronic Equipment, 37 LabEq Measuring and Control Equipment, 38 Paper Business Supplies, 39 Boxes Shipping Containers, 40 Trans Transportation, 41 Whlsl Wholesale, 42 Rtail Retail, 43 Meals Restaurants, Hotels, Motels, 44 Banks Banking, 45 Insur Insurance, 46 RlEst Real Estate, 47 Fin Trading, 48 Other Almost Nothing.

Figure 3: This figure plots the distribution of misconduct across Fama-French 48 Industries at the pre-revelation month. The sample period is from 1980Q1 through 2012Q4.

Frequency Distribution of Misconducts Across Industries
Pre-Revelation Month

The definition of Fama-French 48 Industries can be found at Kenneth French's website

Brief definitions are shown below: 1 Agric Agriculture, 2 Food Food Products, 3 Soda Candy & Soda, 4 Beer Beer & Liquor, 5 Smoke Tobacco Products, 6 Toys Recreation, 7 Fun Entertainment, 8 Books Printing and Publishing, 9 Hshld Consumer Goods, 10 Clths Apparel, 11 Hlth Healthcare, 12 MedEq Medical Equipment, 13 Drugs Pharmaceutical Products, 14 Chems Chemicals, 15 Rubbr Rubber and Plastic Products, 16 Txtls Textiles, 17 BldMt Construction Materials, 18 Cnstr Construction, 19 Steel Steel Works Etc, 20 FabPr Fabricated Products, 21 Mach Machinery, 22 ElcEq Electrical Equipment, 23 Autos Automobiles and Trucks, 24 Aero Aircraft, 25 Ships Shipbuilding, Railroad Equipment, 26 Guns Defense, 27 Gold Precious Metals, 28 Mines Non-Metallic and Industrial Metal Mining, 29 Coal Coal, 30 Oil Petroleum and Natural Gas, 31 Util Utilities, 32 Telcm Communication, 33 PerSv Personal Services, 34 BusSv Business Services, 35 Comps Computers, 36 Chips Electronic Equipment, 37 LabEq Measuring and Control Equipment, 38 Paper Business Supplies, 39 Boxes Shipping Containers, 40 Trans Transportation, 41 Whlsl Wholesale, 42 Rtail Retail, 43 Meals Restaurants, Hotels, Motels, 44 Banks Banking, 45 Insur Insurance, 46 RlEst Real Estate, 47 Fin Trading, 48 Other Almost Nothing.

Figure 4: This figure illustrates the frequency of misconduct cases by fraud beginning year.The sample period is from 1980 through 2012. The majority of violations occurred between 1998 and 2001.

Frequency Distribution of Misconduct Beginning Year
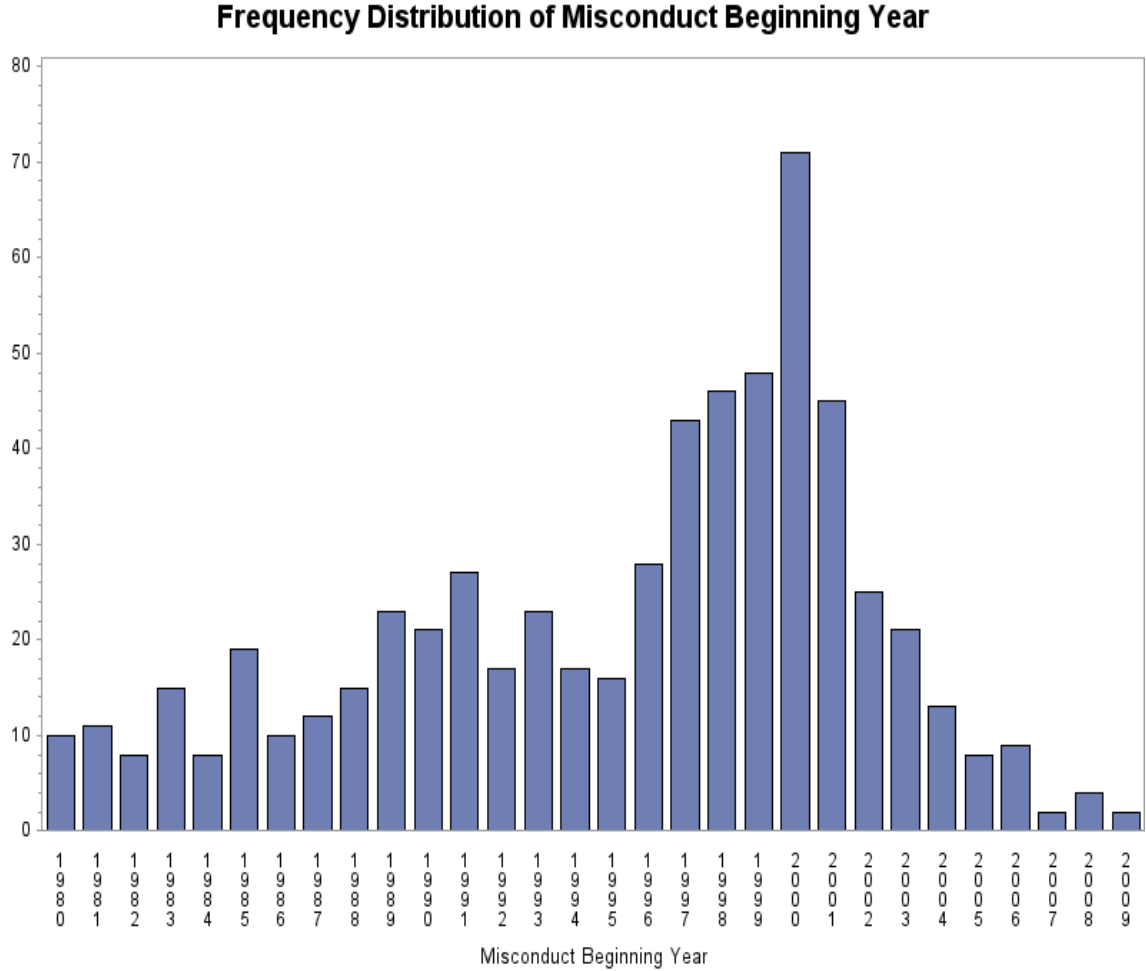
Figure 5: This figure illustrates the frequency of misconduct cases by fraud revelation year. The majority of violations was revealed to the public between 2000 and 2002, as well as 2005 and 2006.

Frequency Distribution of Misconduct Revelation Year
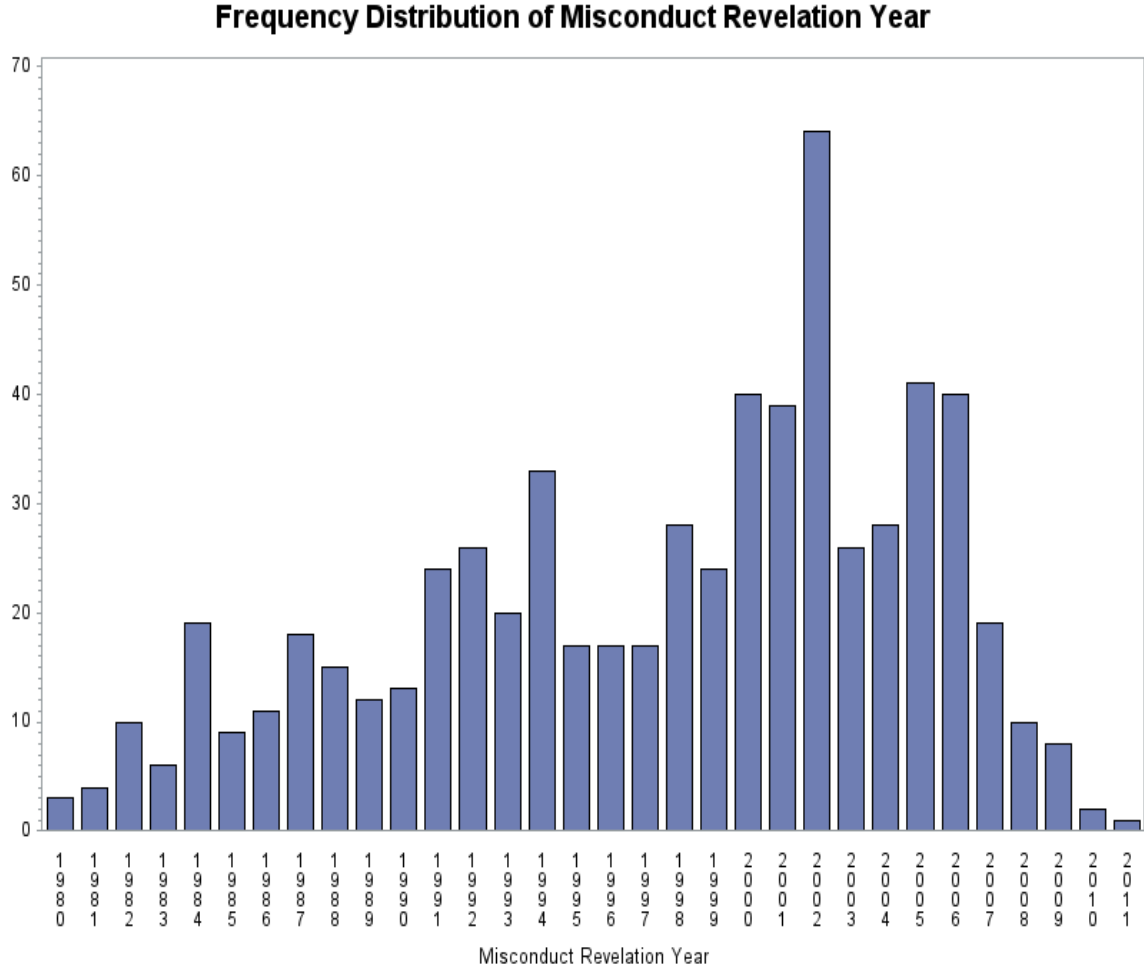
Figure 6: This figure shows the evolution of average stock ownership by various types of institutional investors, including banks, insurance companies, mutual funds, hedge funds, endowments and all others. The sample period is from 1980Q1 through 2012Q4.

Evolution of Institutional Ownership From 1980 to 2012
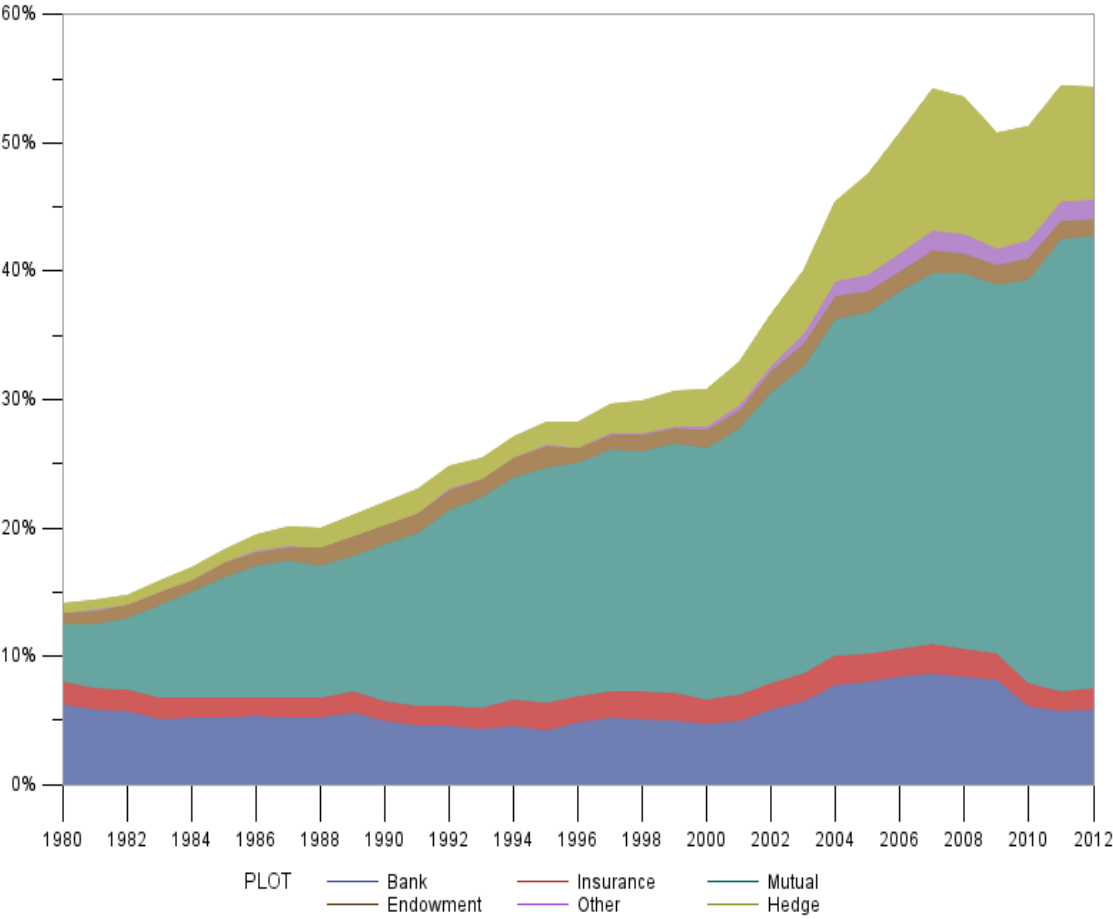
Table 1: Description of Financial Misconduct Sample

This table reports the number of samples firms, violation period in terms of months (violation period is from the date when firm begins fraud until the last date when firm ends fraudulent action), period from violation beginning to the date violation is revealed to public. In the last two columns total fines imposed on firms in the sample are reported.

	N	Violation Period (Months)		From Violation Beginning to Public Revelation (Months)		Total Fine (Millions)	
		Mean	Median	Mean	Median	Mean	Median
Full Sample	808	36	24	37	28	110.2	2.38

Table 2: Summary Statistics At the Pre-Fraud Quarter End

This table reports summary statistics of fraud firms at the pre-fraud quarter. All, Hedge Fund and Non-Hedge Fund are institutional ownership by all institutions, hedge funds and non-hedge funds, respectively, and are measured as the percentage of shares held divided by total shares outstanding at the quarter end. SP500 is a firm dummy equal to 1 if the firm is an S&P 500 component at the quarter end and and 0 otherwise. MOM3 is past three-month gross return. MOM9 is nine-month gross return preceding the quarter of filing. Size is market cap at the quarter end in millions. Book-to-market is book value for the fiscal year ended before the most recent June 30, divided by size as of December 31 during that fiscal year. Dividend Yield is dividends for the fiscal year ended before the most recent June 30, divided by size as of December 31 during that fiscal year. Price is the share price at the quarter end month. Volatility is the volatility of monthly returns over the past two years. Age is the number of months since first return observation appears in the CRSP. Turnover is the trading volume divided by shares outstanding, both measured at the last quarter.

Variable	N	Mean	Median	Std Dev	Skewness	Kurtosis	Minimum	Maximum
All (%)	600	34.53	31.10	28.28	0.35	-1.14	0.00	96.44
Hedge Fund (%)	600	2.62	1.25	4.49	6.35	75.92	0.00	67.66
Non-Hedge Fund (%)	600	31.91	28.61	26.57	0.37	-1.12	0.00	91.84
SP500	600	0.15	0.00	0.36	1.97	1.87	0.00	1.00
Age	600	142	71	182.65	2.24	5.24	1	934
Volatility	502	0.17	0.15	0.14	5.03	41.66	0.04	1.72
MOM3	565	0.08	0.02	0.37	1.87	7.19	-0.93	2.35
MOM9	499	0.29	0.14	0.84	4.35	39.10	-0.92	10.00
Turnover	556	0.14	0.08	0.16	1.99	3.79	0.00	0.73
Price	585	21.70	15.25	21.86	2.73	14.18	0.06	210.00
Size ($Billions)	585	5.04	0.24	25.11	0.00	0.12	0.00	398.10
Book-to-Market	455	0.64	0.46	0.64	2.74	9.74	0.04	3.93
Dividend Yield	438	0.01	0.00	0.02	3.70	17.60	0.00	0.14
Short Ratio	399	0.02	0.00	0.03	3.11	10.02	0.00	0.16
Discretionary Accrual	310	0.00	-0.00	0.24	0.39	23.56	-1.45	1.49

Table 3: Summary Statistics At the Pre-Revelation Quarter End

This table reports summary statistics of fraud firms at the pre-revelation quarter. All, Hedge Fund and Non-Hedge Fund are institutional ownership by all institutions, hedge funds and non-hedge funds, respectively, and are measured as the percentage of shares held divided by total shares outstanding at the quarter end. SP500 is a firm dummy equal to 1 if the firm is an S&P 500 component at the quarter end and 0 otherwise. MOM3 is past three-month gross return. MOM9 is nine-month gross return preceding the quarter of filing. Size is market cap at the quarter end in millions. Book-to-market is book value for the fiscal year ended before the most recent June 30, divided by size as of December 31 during that fiscal year. Dividend Yield is dividends for the fiscal year ended before the most recent June 30, divided by size as of December 31 during that fiscal year. Price is the share price at the quarter end month. Volatility is the volatility of monthly returns over the past two years. Age is the number of months since first return observation appear in CRSP. Turnover is the trading volume divided by shares outstanding, both measured at the last quarter.

Variable	N	Mean	Median	Std Dev	Skewness	Kurtosis	Minimum	Maximum
All (%)	627	36.27	32.21	29.95	0.38	-1.19	0.00	99.47
Hedge Fund (%)	627	3.66	1.60	5.73	3.13	13.54	0.00	45.74
Non-Hedge Fund (%)	627	32.61	28.02	27.20	0.39	-1.18	0.00	94.00
SP500	627	0.13	0.00	0.34	2.22	2.92	0.00	1.00
Age	627	133	75	161.95	2.55	7.73	2	955
Volatility	574	0.18	0.16	0.12	4.43	36.46	0.03	1.44
MOM3	618	-0.04	-0.06	0.40	2.11	12.32	-0.91	3.24
MOM9	572	0.03	-0.06	0.58	2.14	9.66	-0.96	4.66
Turnover	607	0.18	0.11	0.21	3.17	15.22	0.00	1.79
Price	625	16.31	9.52	19.84	3.72	24.27	0.06	210.00
Size ($Billions)	625	3.88	0.17	21.67	0.01	0.14	0.00	342.56
Book-to-Market	518	0.62	0.41	0.62	2.49	8.18	0.04	3.93
Dividend Yield	505	0.01	0.00	0.02	4.22	20.55	0.00	0.14
Short Ratio	371	0.03	0.01	0.04	1.78	2.31	0.00	0.16
Discretionary Accrual	376	0.04	-0.00	0.42	1.94	12.61	-1.45	1.81

Table 4: Univariate Test On Institutional Ownership Levels

Panel A reports the univariate test results on institutional ownership levels at the pre-fraud quarters. Panel B limits the sample to fraud firms. Panel C restricts the sample to fraud firms and shows the mean of the first difference in institutional holdings. The second column shows the number of observations (in quarters). The third to fifth columns are institutional ownership by hedge funds, non-hedge funds, and all institutions, respectively, and are measured as the percentage of shares held divided by total shares outstanding at the quarter end.

	N	(1) All	(2) Non-Hedge Fund	(3) Hedge Fund
Panel A				
Pre-fraud Institutional Ownership Levels (%)	600	34.53	31.91	2.62
Institutional Ownership Levels otherwise (%)	756,493	28.93	25.73	3.2
Difference (%)		5.6	6.18	-0.58
p		<0.0001	<0.0001	0.0016
Panel B				
Institutional Ownership Levels in Violation Period(%)	8,013	40.76	37.41	3.35
Institutional Ownership Levels otherwise (%)	36,352	38.39	34.55	3.85
Difference (%)		2.37	2.87	-0.49
p		<0.0001	<0.0001	<0.0001
Panel C				
Δ Institutional Ownership Levels in Violation Period (%)	577	1.14	1.00	0.14
Δ Institutional Ownership Levels otherwise (%)	42,790	0.34	0.26	0.08
Difference (%)		0.84	0.74	-0.056
p		0.0071	0.0055	0.5769

Table 5: Panel Regression of Hedge Fund Ownership Around Violation Period

This table reports results of panel regressions of hedge fund ownership level around violation period. Violation period is defined as the period from fraud beginning to the end of the fraudulent action. The violation period dummy equals to one for each quarter during violation period for each fraud firm, and zero otherwise. Quarter, Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

| | (1) | (2) | (3) | (4) |
	IOR_HF	IOR_HF	IOR_HF	IOR_HF
4 qtr before Fraud Dummy	-0.005***	-0.007***	-0.005**	-0.007***
	(-2.61)	(-3.08)	(-2.23)	(-2.72)
3 qtr before Fraud Dummy	-0.004**	-0.006***	-0.006**	-0.007**
	(-2.42)	(-2.84)	(-2.21)	(-2.50)
2 qtr before Fraud Dummy	-0.004**	-0.006***	-0.006**	-0.007**
	(-2.46)	(-2.65)	(-2.37)	(-2.32)
1 qtr before Fraud Dummy	-0.005***	-0.007***	-0.008***	-0.009***
	(-2.83)	(-3.11)	(-3.27)	(-3.47)
Violation Period Dummy	-0.006***	-0.008***	-0.008***	-0.011***
	(-3.45)	(-4.24)	(-3.52)	(-4.74)

Table 5 Continued

Short ratio		0.201***		0.205***
		(12.32)		(12.27)
$|DAccruals|$			-0.001	-0.001
			(-1.44)	(-1.16)
SP500	-0.016***	-0.015***	-0.020***	-0.018***
	(-7.93)	(-7.66)	(-8.20)	(-7.32)
MOM3	-0.000	0.000	-0.000	0.000
	(-0.41)	(0.90)	(-0.38)	(0.82)
MOM9	-0.000	0.000	-0.000	0.001*
	(-0.68)	(1.20)	(-0.04)	(1.79)
Log(Size)	0.002***	0.001	0.002**	0.000
	(3.16)	(1.43)	(2.03)	(0.55)
Log(Book-to-market)	0.001***	0.002***	0.001*	0.001*
	(3.85)	(4.26)	(1.91)	(1.94)
Log(Dividend Yield)	-0.069***	-0.081***	-0.069***	-0.080***
	(-5.77)	(-5.83)	(-4.42)	(-4.59)
Log(Price)	0.003***	0.004***	0.005***	0.005***
	(5.49)	(5.38)	(5.84)	(5.60)
Log(Volatility)	0.001	0.000	-0.000	-0.001
	(1.17)	(0.25)	(-0.26)	(-1.26)
Log(Age)	0.009***	0.009***	0.013***	0.011***
	(9.48)	(8.83)	(9.03)	(7.63)
Log(Turnover)	0.027***	0.019***	0.023***	0.014***
	(9.32)	(6.30)	(7.44)	(4.39)
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
N	521,594	402,202	320,528	263,034
adj. R2	0.629	0.620	0.642	0.631

* p <0.10, ** p <0.05, *** p <0.01

Table 6: Panel Regression of Non-Hedge Fund Ownership Around Fraud-Beginning Period

This table reports results of panel regressions of institutional ownership level around violation period. Violation period is defined as the period from fraud beginning to the end of fraudulent action. The dependent variables are quarterly institutional ownership level for All institutional holdings (IOR_TOTAL) and Non-hedge funds (IOR_NonHF). Quarter, Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1) IOR_TOTAL	(2) IOR_NonHF
4 qtr before Fraud Dummy	-0.008	-0.001
	(-0.81)	(-0.09)
3 qtr before Fraud Dummy	-0.009	-0.002
	(-0.84)	(-0.17)
2 qtr before Fraud Dummy	-0.003	0.003
	(-0.30)	(0.29)
1 qtr before Fraud Dummy	-0.015	-0.006
	(-1.43)	(-0.61)
Violation Period Dummy	-0.012	-0.001
	(-1.48)	(-0.13)

Table 6 Continued

Short ratio	1.302***	1.097***
	(26.38)	(25.95)
$|DAccruals|$	-0.001	0.000
	(-0.41)	(0.16)
SP500	-0.043***	-0.025***
	(-5.10)	(-3.25)
MOM3	-0.037***	-0.038***
	(-13.44)	(-13.51)
MOM9	-0.012***	-0.012***
	(-9.07)	(-10.18)
Log(Size)	0.052***	0.051***
	(16.69)	(18.45)
Log(Book-to-market)	0.012***	0.011***
	(7.44)	(7.40)
Log(Dividend Yield)	-0.211***	-0.131***
	(-4.28)	(-2.87)
Log(Price)	0.035***	0.030***
	(10.90)	(10.15)
Log(Volatility)	-0.028***	-0.027***
	(-10.96)	(-10.90)
Log(Age)	0.041***	0.030***
	(9.97)	(7.93)
Log(Turnover)	0.019*	0.005
	(1.79)	(0.55)
Quarter Dummy	Yes	Yes
Industry Dummy	Yes	Yes
Firm Dummy	Yes	Yes
N	263,034	263,034
adj. R2	0.865	0.854

* $p <0.10$, ** $p <0.05$, *** $p <0.01$

Table 7: Panel Regression of Hedge Fund Ownership Around Fraud-Revelation Period

This table reports results of panel regressions around the quarter when misconduct is revealed to the public. The independent variables of interest are dummy variables for four pre-revelation quarters, one fraud revelation quarter, and four post-revelation quarters. Firm characteristics controls are included. Quarter, Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1) IOR_HF	(2) IOR_HF	(3) IOR_HF	(4) IOR_HF
4 qtr before Revelation Dummy	-0.004**	-0.006***	-0.006***	-0.009***
	(-2.37)	(-2.94)	(-2.75)	(-3.79)
3 qtr before Revelation Dummy	-0.005**	-0.007***	-0.007***	-0.012***
	(-2.32)	(-2.88)	(-3.04)	(-4.59)
2 qtr before Revelation Dummy	-0.004*	-0.008***	-0.006**	-0.011***
	(-1.86)	(-3.16)	(-2.33)	(-4.12)
1 qtr before Revelation Dummy	-0.001	-0.006*	-0.002	-0.007**
	(-0.47)	(-1.97)	(-0.59)	(-2.42)
Fraud Revelation Qtr Dummy	0.002	-0.002	0.003	-0.004
	(0.74)	(-0.77)	(0.84)	(-1.19)
1 qtr after Revelation Dummy	0.004	0.002	0.007*	0.003
	(1.25)	(0.62)	(1.67)	(0.81)
2 qtr after Revelation Dummy	0.004	0.001	0.005	0.002
	(1.06)	(0.33)	(1.28)	(0.46)
3 qtr after Revelation Dummy	0.002	0.002	0.003	0.003
	(0.86)	(0.71)	(0.86)	(0.76)
4 qtr after Revelation Dummy	0.004	0.004	0.003	0.004
	(1.24)	(1.24)	(0.94)	(1.02)

Table 7 Continued

Short ratio		0.201***		0.205***
		(12.33)		(12.30)
$|DAccruals|$			-0.001	-0.001
			(-1.41)	(-1.13)
SP500	-0.016***	-0.015***	-0.020***	-0.018***
	(-7.95)	(-7.68)	(-8.21)	(-7.34)
MOM3	-0.000	0.000	-0.000	0.000
	(-0.35)	(0.91)	(-0.33)	(0.82)
MOM9	-0.000	0.000	-0.000	0.001*
	(-0.63)	(1.22)	(-0.00)	(1.82)
Log(Size)	0.002***	0.001	0.002*	0.000
	(3.09)	(1.37)	(1.95)	(0.46)
Log(Book-to-market)	0.001***	0.002***	0.001*	0.001*
	(3.85)	(4.29)	(1.94)	(1.98)
Log(Dividend Yield)	-0.069***	-0.081***	-0.069***	-0.079***
	(-5.77)	(-5.83)	(-4.41)	(-4.58)
Log(Price)	0.003***	0.004***	0.005***	0.005***
	(5.50)	(5.38)	(5.87)	(5.62)
Log(Volatility)	0.001	0.000	-0.000	-0.001
	(1.14)	(0.22)	(-0.29)	(-1.29)
Log(Age)	0.009***	0.009***	0.013***	0.011***
	(9.49)	(8.83)	(9.04)	(7.62)
Log(Turnover)	0.027***	0.019***	0.023***	0.014***
	(9.32)	(6.29)	(7.43)	(4.38)
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
N	521,594	402,202	320,528	263,034
adj. R2	0.629	0.620	0.642	0.631

* p <0.10, ** p <0.05, *** p <0.01

Table 8: Panel Regression of Non-Hedge Fund Ownership Around Fraud-Revelation Period

This table reports results of panel regressions around the quarter when misconduct is revealed to the public. The dependent variables are quarterly institutional ownership level for Non-hedge funds (IOR_NonHF) and All institutional holdings (IOR_TOTAL). The independent variables of interest are dummy variables for four pre-revelation quarters, one fraud revelation quarter, and four post-revelation quarters. Firm characteristics controls are included. Quarter, Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1)	(2)
	IOR_TOTAL	IOR_NonHF
4 qtr before Revelation Dummy	-0.012	-0.002
	(-1.34)	(-0.31)
3 qtr before Revelation Dummy	-0.018*	-0.006
	(-1.93)	(-0.77)
2 qtr before Revelation Dummy	-0.020**	-0.008
	(-2.21)	(-1.07)
1 qtr before Revelation Dummy	-0.023**	-0.015*
	(-2.38)	(-1.77)
Fraud Revelation Qtr Dummy	-0.024**	-0.021**
	(-2.51)	(-2.33)
1 qtr after Revelation Dummy	-0.024***	-0.027***
	(-2.71)	(-3.47)
2 qtr after Revelation Dummy	-0.029***	-0.031***
	(-2.90)	(-3.47)
3 qtr after Revelation Dummy	-0.021**	-0.024***
	(-2.36)	(-3.07)
4 qtr after Revelation Dummy	-0.011	-0.015*
	(-1.29)	(-1.98)

Table 8 Continued

Short ratio	1.304***	1.099***
	(26.47)	(26.02)
$|DAccruals|$	-0.001	0.000
	(-0.41)	(0.14)
SP500	-0.043***	-0.025***
	(-5.09)	(-3.24)
MOM3	-0.037***	-0.038***
	(-13.31)	(-13.38)
MOM9	-0.012***	-0.013***
	(-9.27)	(-10.17)
Log(Size)	0.051***	0.051***
	(16.72)	(18.47)
Log(Book-to-market)	0.012***	0.011***
	(7.41)	(7.38)
Log(Dividend Yield)	-0.211***	-0.131***
	(-4.27)	(-2.87)
Log(Price)	0.035***	0.029***
	(10.88)	(10.11)
Log(Volatility)	-0.028***	-0.027***
	(-10.91)	(-10.85)
Log(Age)	(9.98)	(7.94)
Log(Turnover)	0.019*	0.005
	(1.80)	(0.57)
Quarter Dummy	Yes	Yes
Industry Dummy	Yes	Yes
Firm Dummy	Yes	Yes
N	263,034	263,034
adj. R2	0.865	0.854

* p <0.10, ** p<0.05, *** p <0.01

Table 9: Panel Regression of Changes in Hedge Fund Ownership Around Violation Period

period dummy plus firm characteristics. Violation period starts from fraud beginning to the end of fraudulent activity. The violation period dummy equals to 1 for each quarter during violation period for each fraud firm, and zero otherwise. Quarter, Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1) ΔIOR_HF	(2) ΔIOR_HF	(3) ΔIOR_HF	(4) ΔIOR_HF
4 qtr before Fraud Dummy	-0.002**	-0.002**	-0.002*	-0.002*
	(-2.14)	(-2.20)	(-1.86)	(-1.80)
3 qtr before Fraud Dummy	-0.000	-0.001	-0.002	-0.002
	(-0.60)	(-0.64)	(-1.40)	(-1.35)
2 qtr before Fraud Dummy	0.000	0.000	-0.000	-0.000
	(0.09)	(0.14)	(-0.01)	(-0.08)
1 qtr before Fraud Dummy	-0.001	-0.001	-0.002*	-0.002**
	(-0.99)	(-1.09)	(-1.91)	(-2.34)
Violation Period Dummy	-0.000	-0.001*	-0.000	-0.001
	(-0.90)	(-1.69)	(-0.65)	(-1.53)

Table 9 Continued

Short ratio		0.011**		0.011*
		(2.05)		(1.94)
$|DAccruals|$			0.000	0.000
			(0.83)	(0.99)
SP500	0.000	0.000	0.000	0.000
	(0.76)	(1.11)	(0.71)	(1.21)
MOM3	0.003***	0.004***	0.003***	0.004***
	(11.70)	(9.26)	(10.29)	(8.41)
MOM9	0.000***	0.001***	0.000***	0.001***
	(3.53)	(3.38)	(2.74)	(2.84)
Log(Size)	-0.000	-0.000	-0.000*	-0.000**
	(-1.06)	(-0.98)	(-1.97)	(-2.40)
Log(Book-to-market)	0.000***	0.000***	0.000***	0.001***
	(3.82)	(4.09)	(3.88)	(3.81)
Log(Dividend Yield)	0.005**	0.006**	0.004	0.005
	(2.30)	(2.58)	(1.20)	(1.36)
Log(Price)	0.001***	0.001***	0.001***	0.001***
	(7.65)	(6.82)	(7.46)	(6.90)
Log(Volatility)	0.001***	0.001***	0.001***	0.001***
	(4.62)	(4.74)	(3.77)	(3.68)
Log(Age)	0.000**	0.000	0.000*	0.000
	(2.39)	(1.49)	(1.83)	(1.24)
Log(Turnover)	-0.003***	-0.004***	-0.003***	-0.004***
	(-3.66)	(-3.80)	(-3.54)	(-3.52)
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
N	517312	398252	318391	260929
adj. R2	0.008	0.015	0.011	0.016

* p <0.10, ** p <0.05, *** p <0.01

Table 10: Panel Regression of Changes in Non-Hedge Fund Ownership

This table reports results of panel regressions of institutional ownership level on violation period dummy plus firm characteristics. Violation period starts from fraud beginning to the end of fraudulent action. The violation period dummy equals to 1 for each quarter during violation period for each fraud firm, and zero otherwise. The dependent variables are quarterly institutional ownership level for hedge funds (IOR_HF), mutual funds (IOR_MF), Non-hedge funds (IOR_NonHF) and All institutional holdings (IOR_TOTAL). Quarter, Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1) ΔIOR_TOTAL	(2) ΔIOR_NonHF	(3) ΔIOR_TOTAL	(4) ΔIOR_NonHF
4 qtr before Fraud Dummy	0.002	0.004		
	(0.43)	(1.00)		
3 qtr before Fraud Dummy	-0.001	0.001		
	(-0.15)	(0.20)		
2 qtr before Fraud Dummy	0.005	0.005		
	(1.12)	(1.18)		
1 qtr before Fraud Dummy	-0.001	0.001		
	(-0.21)	(0.37)		
Violation Period Dummy	0.001	0.002		
	(0.85)	(1.31)		
4 qtr before Revelation Dummy			-0.002	-0.000
			(-0.43)	(-0.07)
3 qtr before Revelation Dummy			-0.006*	-0.004
			(-1.88)	(-1.30)
2 qtr before Revelation Dummy			0.002	0.002
			(0.46)	(0.70)
1 qtr before Revelation Dummy			-0.004	-0.006
			(-0.65)	(-1.02)
Fraud Revelation Qtr Dummy			-0.025***	-0.027***
			(-3.46)	(-3.88)
1 qtr after Revelation Dummy			-0.009**	-0.013***
			(-2.43)	(-3.16)
2 qtr after Revelation Dummy			-0.003	-0.005
			(-0.81)	(-1.13)
3 qtr after Revelation Dummy			0.002	0.000
			(0.39)	(0.06)
4 qtr after Revelation Dummy			0.001	0.002
			(0.21)	(0.63)

Table 10 Continued

Short ratio	0.077***	0.066***	0.078***	0.067***
	(6.05)	(5.94)	(6.10)	(6.00)
$|DAccruals|$	0.001*	0.000	0.001*	0.000
	(1.74)	(1.04)	(1.74)	(1.04)
SP500	0.001	0.001	0.002	0.001
	(1.46)	(1.07)	(1.51)	(1.12)
MOM3	0.021***	0.017***	0.021***	0.017***
	(13.14)	(12.95)	(13.12)	(12.92)
MOM9	0.006***	0.005***	0.006***	0.005***
	(8.72)	(7.44)	(8.71)	(7.43)
Log(Size)	-0.002***	-0.002***	-0.002***	-0.002***
	(-4.87)	(-4.59)	(-4.83)	(-4.51)
Log(Book-to-market)	0.001***	0.001***	0.001***	0.001***
	(4.67)	(2.96)	(4.64)	(2.93)
Log(Dividend Yield)	0.015	0.010	0.015	0.010
	(1.37)	(1.00)	(1.36)	(0.98)
Log(Price)	0.009***	0.008***	0.009***	0.008***
	(17.55)	(16.49)	(17.54)	(16.50)
Log(Volatility)	-0.000	-0.001*	-0.000	-0.001*
	(-0.38)	(-1.84)	(-0.36)	(-1.81)
Log(Age)	-0.006***	-0.006***	-0.006***	-0.006***
	(-5.86)	(-6.23)	(-5.84)	(-6.20)
Log(Turnover)	-0.027***	-0.024***	-0.027***	-0.024***
	(-9.30)	(-9.33)	(-9.31)	(-9.33)
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
N	260,929	260,929	260,929	260,929
adj. R2	0.088	0.084	0.088	0.084

* p <0.10, ** p <0.05, *** p <0.01

Table 11: Logit Regression Modeling the Probability of Fraud

This table reports results of a logit regression modeling the probability of fraud. The dependent variable is a binary variable that equals one if a firm conduct fraud in the quarter, and 0 otherwise. Parameter estimates include institutional ownership level and change, plus firm characteristics. A year and Fama-French 48 industry fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1)	(2)	(3)	(4)	(6)
IOR_TOTAL	-0.094				
	(-0.17)				
IOR_NonHF		0.079			
		(0.14)			
IOR_HF			-3.352***		-3.077**
			(-2.58)		(-2.32)
ΔIOR_HF				-2.947**	-1.928
				(-2.29)	(-1.10)
Short ratio	6.580***	6.390***	7.055***	6.635***	7.154***
	(2.97)	(2.89)	(3.43)	(3.19)	(3.48)
$|DAccruals|$	0.198	0.198	0.194	0.197	0.192
	(1.05)	(1.04)	(1.02)	(1.04)	(1.02)
SP500	0.057	0.061	0.006	0.057	0.007
	(0.30)	(0.32)	(0.03)	(0.31)	(0.04)
MOM3	0.150	0.159	0.141	0.164	0.149
	(1.02)	(1.09)	(0.99)	(1.17)	(1.08)
MOM9	0.056	0.059	0.054	0.060	0.057
	(0.74)	(0.78)	(0.76)	(0.90)	(0.85)
Log(Size)	0.316***	0.310***	0.315***	0.314***	0.316***
	(5.03)	(4.82)	(5.13)	(4.97)	(5.13)
Log(Book-to-market)	-0.046	-0.053	-0.033	-0.049	-0.034
	(-0.58)	(-0.66)	(-0.45)	(-0.67)	(-0.46)
Log(Dividend Yield)	-5.375	-5.226	-5.741	-5.280	-5.708
	(-0.91)	(-0.89)	(-0.98)	(-0.90)	(-0.96)
Log(Price)	-0.010	-0.025	0.005	-0.015	0.006
	(-0.07)	(-0.17)	(0.05)	(-0.13)	(0.05)
Log(Volatility)	0.380	0.390	0.384	0.384	0.383
	(1.51)	(1.54)	(1.48)	(1.47)	(1.47)
Log(Age)	-0.075	-0.075	-0.080	-0.078	-0.083
	(-0.94)	(-0.95)	(-1.01)	(-1.00)	(-1.05)
Log(Turnover)	-0.159	-0.198	-0.069	-0.167	-0.069
	(-0.21)	(-0.26)	(-0.09)	(-0.21)	(-0.09)
Industry Dummy	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes
N	202,844	202,844	202,844	201,760	201,760
pseudo R2	0.078	0.078	0.079	0.079	0.079

* p <0.10, ** p <0.05, *** p <0.01

Table 12: Alternative Hedge Fund Ownership Measures

This table reports summary statistics for the total hedge fund ownership of fraud firms at the pre-fraud and pre-revelation quarter, and three alternative hedge fund ownership holdings. Total IOR_HF is the total hedge fund holdings of fraud firms, which is reported in Table 2 and Table 3. Firm Concentrate HF is defined as the sum of shares of fraud firms, in which hedge funds holdings are in the top quartile, divided by total shares outstanding. Fund Concentrate HF is defined as the sum of shares of fraud firms, in which hedge funds investment are in the top quartile of their total AUM, divided by total shares outstanding. Firm-Fund Concentrate is the sum of shares by hedge funds that meet both requirements of Firm Concentrate HF and Fund Concentrate HF. Panel A summarize Pre-Fraud period results, and panel B summarize Pre-Revelation period results.

				Panel A Pre-Fraud Period					
Variable	N	Mean	Median	Std Dev	Skewness	Kurtosis	Minimum	Maximum
TOTAL IOR_HF (%)	600	2.62	1.25	4.49	6.35	75.92	0.00	67.66
Firm Concentrate HF (%)	600	1.96	0.41	4.15	7.83	107.35	0.00	67.66
Fund Concentrate HF (%)	600	1.39	0.00	3.81	10.00	155.95	0.00	67.66
Firm-Fund Concentrate (%)	600	1.26	0.00	3.77	10.39	164.90	0.00	67.66

				Panel B Pre-Revelation Period					
Variable	N	Mean	Median	Std Dev	Skewness	Kurtosis	Minimum	Maximum
TOTAL IOR_HF (%)	627	3.66	1.60	5.73	3.13	13.54	0.00	45.74
Firm Concentrate HF (%)	627	2.84	0.68	5.11	3.52	17.24	0.00	45.10
Fund Concentrate HF (%)	627	1.68	0.00	3.84	4.47	30.35	0.00	43.43
Firm-Fund Concentrate (%)	627	1.55	0.00	3.69	4.73	34.44	0.00	43.43

Table 13: Panel Regression Using Alternative Hedge Fund Ownership Measures

This table reports results of panel regressions of hedge fund ownership level on violation period dummy plus firm characteristics. Model (1) shows the regression result of total hedge fund ownership level on violation period dummy and firm characteristics. Model (2) uses hedge funds whose holdings are ranked in the top quartile in the firm. Model (3) uses hedge funds whose holdings in the firm account for the top quartile of their AUM. Model (4) uses regression results of hedge funds that meet the requirements of both hedge funds ownership measures in Model (2) and (3). Quarter and Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by both firm and quarter.

	(1)	(2)	(3)	(4)
				Firm-Fund Concentrate
	TOTAL	Firm Concentrate	Fund Concentrate	
	IOR_HF	IOR_HF	IOR_HF	
				IOR_HF
4 qtr before Fraud Dummy	-0.007***	-0.007**	-0.006***	-0.006***
	(-2.72)	(-2.58)	(-2.79)	(-2.76)
3 qtr before Fraud Dummy	-0.007**	-0.007***	-0.005**	-0.006**
	(-2.50)	(-2.64)	(-2.36)	(-2.46)
2 qtr before Fraud Dummy	-0.007**	-0.006**	-0.006***	-0.006***
	(-2.32)	(-2.30)	(-2.98)	(-3.00)
1 qtr before Fraud Dummy	-0.009***	-0.009***	-0.009***	-0.009***
	(-3.47)	(-3.95)	(-4.69)	(-4.80)
Violation Period Dummy	-0.011***	-0.010***	-0.009***	-0.009***
	(-4.74)	(-4.90)	(-5.43)	(-5.50)

Table 13 Continued

Short ratio	0.205***	0.172***	0.109***	0.104***
	(12.27)	(11.78)	(10.02)	(9.94)
$|DAccruals|$	-0.001	-0.001	-0.001*	-0.001*
	(-1.16)	(-1.24)	(-1.77)	(-1.72)
SP500	-0.018***	-0.013***	-0.009***	-0.008***
	(-7.32)	(-5.76)	(-5.10)	(-4.59)
MOM3	0.000	0.001	0.003***	0.003***
	(0.82)	(1.25)	(5.65)	(5.42)
MOM9	0.001*	0.000	0.001***	0.001**
	(1.79)	(1.26)	(2.63)	(2.27)
Log(Size)	0.000	0.001	0.005***	0.005***
	(0.55)	(0.62)	(8.38)	(7.82)
Log(Book-to-market)	0.001*	0.001	0.001***	0.001***
	(1.94)	(1.46)	(3.95)	(3.79)
Log(Dividend Yield)	-0.080***	-0.073***	-0.058***	-0.055***
	(-4.59)	(-4.40)	(-5.00)	(-4.79)
Log(Price)	0.005***	0.003***	0.004***	0.004***
	(5.60)	(3.60)	(6.58)	(6.11)
Log(Volatility)	-0.001	-0.001	-0.003***	-0.002***
	(-1.26)	(-1.35)	(-4.46)	(-4.09)
Log(Age)	0.011***	0.009***	0.002**	0.002**
	(7.63)	(6.79)	(2.45)	(2.27)
Log(Turnover)	0.014***	0.009***	0.007***	0.006***
	(4.39)	(3.33)	(3.69)	(3.17)
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes
N	263,034	263,034	263,034	263,034
adj. R2	0.631	0.601	0.520	0.509

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 14: Hedge Fund Ownership Level vs. Fraud Severity Around Fraud-Beginning Period

This table reports estimation results for cross-sectional regressions of hedge fund ownership on fraud severity measure and firm controls. The fraud severity measure is total ex-post fine, measured as the sum of all fines imposed on fraud firm, scaled by the size of the firm at regression point. Controls include firm size, momentum (MOM3 and MOM9), Book-to-market ratio, and Short interest ratio. Model (1)–(5) show regression results from the two quarters before fraud beginning to the two quarters after fraud starts, respectively. T-statistics in parentheses are adjusted for heteroskedasticity.

	(1) IOR_HF(Lag2)	(2) IOR_HF(Lag1)	(3) IOR_HF(Fraud Qtr)	(4) IOR_HF(Lead1)	(5) IOR_HF(Lead2)
Total Fine	-0.005***	-0.005***	-0.005***	-0.006***	-0.003***
	(-2.73)	(-3.12)	(-3.13)	(-3.20)	(-2.91)
Log(Size)	-0.000	-0.001	-0.000	-0.000	0.000
	(-0.16)	(-0.50)	(-0.50)	(-0.16)	(0.14)
MOM3	-0.002	-0.003	-0.005	-0.001	0.011
	(-0.34)	(-0.58)	(-0.88)	(-0.09)	(1.44)
MOM9	-0.001	-0.001	-0.001	0	0.002
	(-0.32)	(-0.28)	(-0.96)	(-0.06)	(-0.55)
Log(Book-to-market)	0.002	0.003	0.003	0.005	0.003
	(0.79)	(0.93)	(0.9)	(1.64)	(0.99)
Short ratio	0.16	0.124	0.285**	0.309**	0.196***
	(1.37)	(1.5)	(2.04)	(2.22)	(2.62)
$|DAccruals|$	-0.000	-0.01	-0.008	-0.003	0.008
	(-0.02)	(-0.98)	(-1.04)	(-0.33)	(1.03)
N	237	240	247	249	263
adj. R2	0.023	0.026	0.071	0.077	0.047

* p <0.10, ** p <0.05, *** p <0.01

Table 15: Regulation Fair Disclosure Effect

This table reports results of panel regressions of institutional holdings on fraud-related quarter dummies, Regulation FD dummy and interactions terms of fraud-related dummy and Regulation FD dummy. Firm characteristics controls include SP500 dummy, past quarter return, 9 months return preceding the beginning of current quarter, size, book-to-market ratio, dividend yield, price, past 24 months volatility, age and turnover, short interest ratio, and discretionary accrual. The dependent variables are quarterly institutional ownership level for hedge funds (IOR_HF), Non-hedge funds (IOR_NonHF) and All institutional holdings (IOR_TOTAL). Quarter and Fama-French 48 industry and firm fixed effects are included. T-statistics in parentheses are adjusted for heteroskedasticity and within correlation clustered by firm.

	(1)	(2)	(3)	(4)	(5)	(6)
	IOR_TOTAL	IOR_NonHF	IOR_HF	IOR_TOTAL	IOR_NonHF	IOR_HF
1 qtr before fraud dummy	0.002	0.008	-0.006**			
	(0.26)	(0.95)	(-2.20)			
Violation Period Dummy				-0.010	-0.000	-0.010***
				(-1.03)	(-0.01)	(-3.74)
Reg FD Dummy	-9.329	-6.307	-2.983	-9.335	-6.328	-2.969
	(-0.00)	(-0.00)	(-0.00)	(-0.00)	(-0.00)	(-0.00)
1 qtr before fraud X Reg FD Dummy	-0.045**	-0.043**	-0.002			
	(-2.56)	(-2.58)	(-0.36)			
Violation Period X Reg FD Dummy				-0.002	-0.001	-0.001
				(-0.14)	(-0.10)	(-0.22)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Dummy	Yes	Yes	Yes	Yes	Yes	Yes
N	263,034	263,034	263,034	263,034	263,034	263,034
adj. R2	0.865	0.854	0.631	0.865	0.854	0.631

* p <0.10, ** p <0.05, *** p <0.01