Financial Reporting Fraud and Delegated Investment*

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Abstract

Following the public revelation of financial reporting fraud against a company in their portfolio, professional money managers decrease (increase) their holdings in stocks with high (low) expected financial reporting fraud risk, reduce the total risk level of their funds, and allocate their portfolios closer to their respective benchmarks. Portfolio managers exposed to financial reporting fraud rely less on accounting information in their trading decisions subsequently, suggesting that fraud alters the behavior of investment managers by reducing their trust in security issuers. The results provide insight into the implications of fraud for professional investment decisions.

JEL classification: G14, G40, K42

Keywords: Financial reporting fraud, trust, mutual funds, trading behavior

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1. Introduction

Exposure to financial reporting fraud erodes individual investors' trust and reduces their participation in capital markets (Giannetti and Wang 2016; Gurun et al. 2018). Yet relatively little is known about whether and how such fraud affects the behavior of professional money managers. A priori, the effect is unclear. On the one hand, professional investors could be particularly sensitive to fraud because of their ongoing exposure to capital markets, performance-sensitive compensation structures, and career concerns. On the other hand, professional investors could be less affected by fraud given that they are more sophisticated and less prone to psychological biases than retail investors (Cohen et al. 2002; Nagel 2005; Field and Lowry 2009). Understanding the implications of fraud for fiduciary investment is important because a large percentage of investment in modern capital markets is intermediated.[1]

In this paper, we explore the implications of fraud for delegated investment by identifying all SEC Accounting and Auditing Enforcement Releases (AAERs) issued for financial reporting fraud against publicly traded companies over the last four decades and study how mutual fund managers who hold the stock of a fraud firm at the time of revelation (treatment group) change their investment behavior relative to mutual fund managers who did not hold a fraud stock (control group). More specifically, we construct our exposure variable by calculating the loss experienced by a fund over the prior year due to holdings in fraud firms, measured as a percentage of the fund's total net assets. We then use this loss variable as a continuous treatment effect on mutual fund managers and evaluate its impact on changes in the composition of a fund's portfolio over subsequent quarters.

[1] The 2019 Investment Company Fact Book indicates that as of 2018 open-end mutual funds alone held total net assets in excess of $46 trillion worldwide (https://www.icifactbook.org/).

We find that exposure to financial reporting fraud (hereafter 'fraud') changes the investment behavior of professional money managers. First, exposed managers decrease their holdings in stocks with high expected fraud risk. Second, unlike individual investors who exit the equity market following fraud exposure, professional investors offset the selloff of high fraud risk securities with purchases of low fraud risk securities, so that their aggregate investment in the equity market remains unchanged. Third, exposed managers reduce the overall risk level of their portfolios beyond their sell-off of high fraud risk securities and shift the allocation of their portfolios closer to their respective benchmarks. Fourth, after experiencing fraud, managers reduce their reliance on accounting information in their trading decisions.

The effect of fraud on manager trading behavior is economically meaningful. Although on average only 14 companies receive a fraud-related enforcement action from the SEC in a given year, the top 10% of exposed funds in our sample experience a fraud-induced loss of 0.50% of their total net assets over the event quarter (equivalent to $6.37 million dollars). These funds reduce their holdings in fraud firms and firms with high-expected fraud risk by 20.75% and 3.64% from their original levels, respectively, in the subsequent quarter. Exposed managers also reduce their total portfolio risk and tracking errors to benchmarks in the subsequent quarter following the revelation of the fraud by 10.61% and 5.47%, respectively.[2]

We consider two separate, but not mutually exclusive, channels through which exposure to fraud could affect delegated portfolios – *trust* and *reputation*. Financial economists define trust in capital markets as "the subjective probability individuals attribute to the possibility of being cheated" (Guiso et al. 2008). Considering this definition, exposure to fraud could reduce

[2] We note that the economic impact of fraud on capital markets is likely larger than our tests indicate given that fraud could affect not only the managers who held equity in the fraud firm (our treatment group), but also other managers (our control group) as well. The main objective of our study is to provide insight on how fraud affects delegated portfolio management rather than quantifying the aggregate cost of fraud for capital markets.

professional money managers' trust in the market by increasing their subjective probability of being defrauded. Exposure to fraud could also damage the reputation of money managers. Consistent with the idea that professional investors exhibit strong reputation concerns is the fact that managers tend to window-dress their positions prior to disclosures of portfolio holdings (Lakonishok et al. 1991; Chevalier and Ellison 1997 and 1999b; Sias and Starks 1997; Agarwal et al. 2014).

Our baseline results are consistent with both channels. First, both a decrease in trust and an increase in reputation concerns imply that if exposed managers can identify securities with high fraud risk, then they will allocate their portfolios away from these securities. In our empirical analysis, we use two measures of fraud risk – the F-Score measure developed in Dechow et al. (2011) and the discretionary accruals-based measure following Jones (1991) and Bergstresser and Philippon (2006). With respect to both fraud risk measures, we find that mangers exposed to fraud over the previous year decrease their holdings in high fraud risk stocks and increase their holdings in low fraud risk stocks. The effect is relatively long-lived and persists for up to four quarters following the revelation of the fraud.

Our portfolio risk results are also consistent with both explanations. Identifying future fraud with high precision is difficult even for professional money managers. As a result, if fraud reduces trust, then managers exposed to fraud are expected to attach a certain probability for fraudulent reporting to all firms in the market moving forward. If fraud imposes reputational costs, then these costs would magnify expected losses on the downside. Thus, in both cases, the perceived risk of all individual securities in the market increases. As a result, managers exposed to fraud are expected reduce the overall risk level of their portfolios. We show that this risk-reduction effect

exists, is significant for both systematic and idiosyncratic risk, and is robust to a series of alternative exposure definitions.

Finally, fraud may induce managers to allocate their portfolios closer to their respective benchmarks. If managers lose trust in the quality and integrity of financial statements, then they are less likely to engage in information acquisition and security selection. As a result, the expected benefit of deviating from their benchmark decreases. Reputational concerns also create incentives for managers to allocate closer to their benchmarks because large deviations from the benchmark are more difficult to justify following negative events such as fraud (Chevalier and Ellison 1999b).

We conduct a series of additional tests to evaluate the relative importance of the trust and reputation channels for professional money managers' response to fraud. First, we assess manager responsiveness to public information. In particular, we explore whether the propensity of fund managers to respond to changes in security analysts' buy and sell recommendations changes following exposure to fraud. Analysts rely on information provided by firms when making their recommendations. If managers lose trust in the quality of accounting information, then they will place less weight on analyst recommendations. Thus, the trust channel predicts a *decrease* of fund manager reliance on analyst information. The reputation channel, on the other hand, predicts an *increase* in the reliance on analyst information because analyst recommendations could provide justification for manager stock selection. As a result, managers with strong career concerns are expected to follow these recommendations more closely (Graham 1999; Welch 2000; Lamont 2002). Consistent with the idea that fraud erodes managers' trust in equity markets, and inconsistent with the idea that fraud exacerbates reputation concerns, we find that following fraud shocks, managers decrease their reliance on analyst recommendations.

The reputation channel further predicts different responses to fraud conditional on the age of the fund and the magnitude of the fraud shock. Specifically, managers of young funds are expected to be more sensitive to fraud because these funds have relatively short track records. High-profile fraud cases could also be more damaging to managers holding equity in fraud firms because these cases receive more publicity. Inconsistent with the idea that fraud raises the reputational concerns of professional money managers, we find that manager response to fraud does not vary significantly with the age of the fund or the magnitude of the fraud. Of note, mutual funds holding fraud stocks also do not exhibit outflows of investment from their funds following revelation of the fraud.

In sum, our results suggest that professional money managers exposed to fraud change their behavior mostly due to reduced trust in capital markets.

The paper contributes to the literature on the implications of corporate financial misconduct for investor behavior. Existing research has found that fraud significantly affects individual investors. For example, Giannetti and Wang (2016) show that household stock market participation decreases following the revelation of corporate fraud in their state of residence. Gurun et al. (2018) find that residents of communities that were exposed to the Madoff Ponzi scheme subsequently withdrew assets from investment advisors and increased deposits at banks. We find that fraud affects professional managers as well but in different ways. First, while fraud tends to reduce the capital market participation of individual investors, it does not affect the aggregate capital market exposure of professional managers. Second, professional managers are sophisticated enough to identify and sell off securities with high expected fraud risk. Third, professional managers reduce the overall risk level of their investment and allocate their portfolios closer to their respective benchmarks. In totality, our results suggest that the implications of fraud

for capital markets are far-reaching and affect the allocations not only of retail investors but also of delegated portfolios. Professional managers, however, exhibit a more tempered and sophisticated response to fraud than individual investors. Therefore, our study identifies an additional way in which delegated portfolios could benefit their investors – better management of financial reporting fraud risk.

A growing literature in finance seeks to understand investment behavior in terms of individual characteristics and personal experiences. This literature has identified various personal factors related to investment behavior, such as intellectual ability (Chevalier and Ellison 1999a, Grinblatt et al. 2012), family background and socio-economic status (Pool et al. 2012, Chuprinin and Sosyura 2018), age, occupation, and political ideology (Greenwood and Nagel 2009, Betermier et al. 2017), and exposure to economic downturns (Malmendier and Nagel 2011). Moreover, Pool et al. (2019) study the implications of shocks to managers' personal wealth for their professional investments. We extend this literature by showing that another important managerial experience, exposure to fraud, affects the investment behavior of mutual fund managers, possibly by reducing their trust in security issuers.

The remainder of the paper is organized as follows. Section 2 discusses fraud and delegated portfolios. Section 3 presents our empirical research design. Section 4 reports the main results. Section 5 investigates the channels through which fraud affects managerial behavior. Section 6 concludes.

2. Financial Reporting Fraud and Delegated Investment

There are two primary channels through which fraud could affect the behavior of professional managers – *trust* and *reputation*. Extensive research in social psychology has shown that exposure to betrayal, crime, and negative financial shocks leads to the erosion individual's

general and relational trust (Blanco and Ruiz 2013; Gobin and Freyd 2014; Jetter and Kristoffersen 2018). Building on this research, financial economists have suggested that fraud could undermine investor trust in capital markets (Guiso et al. 2008). Consistent with this idea, existing empirical research finds that episodes of corporate financial misconduct reduce the capital market participation of individual investors (Giannetti and Wang 2016; Gurun et al. 2018).

Exposure to fraud could also exhibit an adverse effect on the reputation of mutual fund managers. Fraud is generally associated with negative publicity and mutual funds with large holdings in fraud firm securities could be negatively affected by this publicity. Solomon et al. (2014) show that media coverage of mutual fund holdings affects how investors allocate money across funds. There is also evidence that managers tend to rebalance their portfolios to disclose disproportionately higher (lower) holdings in stocks that have done well (poorly) over a reporting period (Lakonishok et al. 1991; Sias and Starks 1997; Ng and Wang 2004; Agarwal et al. 2014). Since fraud firms tend to be associated with poor performance and negative media coverage, their securities could be regarded as particularly toxic by mutual fund managers.

While fraud could affect professional money managers, its specific behavioral implications are not straightforward. For example, there is a general understanding among economists that trust could affect investor propensity to participate in capital markets (Arrow 1972; Guiso et al. 2008; Gennaioli et al. 2015). This intuition, however, applies mostly to the behavior of retail investors. Professional money managers are more financially sophisticated and experienced than individual investors. Most mutual fund managers also commit to particular investment styles and are expected to maintain exposure to the securities outlined in the fund prospectus unconditionally on their level of trust. As a result, managers' ability to enter and exit capital markets is limited and their expected response to fraud is unclear.

We consider two general ways in which professional investors could respond to fraud in the market. We outline these possibilities in two propositions below. First, both the trust and the reputation channels imply that fraud would prompt investors to perceive stocks as riskier. Investment mandates, however, prevent professional investors from leaving the equity market completely. As a result, they will respond to fraud within the limits of their institutional constraints. In addition, unlike unsophisticated individual investors, professional managers may be able to evaluate the expected fraud risk of different securities and adjust their portfolio accordingly. Thus, we propose following:

> *Proposition 1*. Following exposure to financial reporting fraud, professional money managers decrease their holdings in firms with high fraud risk and increase their holdings in firms with low fraud risk, so that their aggregate investment in the equity market remains unchanged.

Next, we contend that managers may reduce the overall risk in their portfolio following exposure to fraud. Ex ante, fraud is difficult to predict. Since managers' assessments of fraud risk are noisy, they will attach a certain probability of fraud to all stocks in the market. This may drive exposed managers to diversify in order to reduce the overall risk of their portfolios. Further, if exposure to fraud undermines managers' trust in the quality of accounting information provided by firms, then exposed managers will decrease their use of accounting information. As a result, for exposed managers, the perceived risk of all securities in the market increases, which prompts them to lower their portfolio risk.

Fraud is also expected to induce managers to allocate their portfolios closer to their respective benchmarks. Since managerial performance is evaluated relative to a benchmark, managers generally allocate their portfolios close to their corresponding benchmarks and over

(under)-weight the securities with positive (negative) information (Treynor and Black 1973). If managers lose trust in the information provided by firms, then they will place less weight on this information and engage less in security selection. Career concerns further strengthen managers' incentives to allocate closer to their benchmark given that large deviations from the benchmark may be more difficult to justify following a negative event such as fraud. As a result, we propose the following:

> *Proposition 2*. Following exposure to financial reporting fraud, professional money managers reduce the risk level of their portfolios and allocate their funds closer to their respective benchmarks.

3. Research Design

We focus our analysis on financial reporting fraud as opposed to other forms of corporate misconduct for several reasons. First, prior research documents that financial misreporting is associated with extreme negative stock returns (e.g., Dechow et al. 1996; Karpoff et al. 2008). Second, since managers rely on firms' financial statements when making investment decisions, financial reporting fraud may significantly affect their investment behavior (Armstrong et al. 2013). Third, the economic implications of other forms of corporate misconduct to investors may be ambiguous. For example, often there is no large decrease in share prices after the market learns that insiders traded on private information. In fact, prior research has considered the circumstances under which insider trading leads to more informationally efficient stock prices (e.g. Fishman and Hagerty 1992). Further, Karpoff et al. (2005) find that when firms violate environmental regulations, the average loss is roughly equivalent to the size of the fine, which can be less than the value created from the misconduct. Finally, in contrast to financial reporting fraud, other forms

of misconduct (e.g. tax evasion) might not be directly related to a breach of trust between the firm and its shareholders.

3.1. Measuring exposure to financial reporting fraud

We identify financial reporting fraud using SEC Accounting and Auditing Enforcement Releases (AAERs) which summarize SEC investigations brought against the agents of firms for violations of SEC rules. AAERs have often been used in prior studies to measure cases of financial reporting fraud (e.g. Armstrong et al. 2013; Davidson et al. 2015; Feng et al. 2011). One advantage of using AAERs is that they distinguish intentional financial statement manipulation from legitimate reporting errors or estimates of legal earnings management. AAERs also generally provide precise information on which fiscal and calendar quarters were manipulated, allowing us to more accurately define the period the fraud occurred, and the fraud was revealed to the market.

AAERs represent a subset of all SEC Section 13(b) violations. Many Section 13(b) violations are unrelated to reporting fraud. For example, firms can violate Section 13(b)(2)(B) by failing to devise and maintain adequate internal controls even when their financial statements are accurate. Karpoff et al. (2017) compare several databases used in the literature to measure financial misconduct, including data on financial restatements and class action lawsuits, and find greater overlap between AAERs and all SEC Section 13(b) violations than for other databases. We are interested in money managers' response to being defrauded and, in this regard, AAER cases represent an appropriate sample of misconduct. Many firms issue restatements because of legitimate errors and many class action lawsuits never establish that managers committed fraud.[3]

[3] Giannetti and Wang (2016) measure misconduct using another data source that includes SEC Section 13(b) violations. However, this database is no longer publicly available, and as noted above, many violations of Section 13(b) are unrelated to financial reporting fraud.

To collect our sample, we examine 3,916 AAERs released between April 15, 1982 and December 12, 2017. We only include firms for which the content of the AAER allows us to determine whether the firm's financial statements were materially misstated and the reporting periods in which the fraud occurred. Following the literature, we eliminate AAERs unrelated to reporting fraud, related to the same event, and for firms with missing identifiers from CRSP; we are left with a sample of 489 unique firms which file fraudulent financial statements between 1982 and 2016.[4]

Figure 1 presents the number of sample AAERs each year over the period from 1982 to 2016. On average, 14 frauds are revealed to the market each year. The largest number of revealed cases (40) occurred in 2001. The average fraud lasts just under three years. Frauds lasting one year or less are most common and account for 38% of all sample cases.

3.2. Constructing the mutual fund sample

To construct our sample, we start with all U.S. equity mutual funds over the period between 1980 and 2016 covered in the CRSP Survivorship Bias Free Mutual Fund database. The CRSP database includes mutual fund characteristics such as fund returns, total net assets, fees, turnover ratios, and investment objectives. We exclude balanced, bond, international, and money market funds, as well as funds that, on average, hold less than 80% of their assets in common stock if their investment objective is missing.

To mitigate the incubation bias identified by Evans (2010), we also exclude funds which in the previous month managed less than $10 million of assets, funds with missing fund names in

[4] Of the 3,916 AAERs, 1,358 are missing or unrelated to reporting fraud; 754 do not have identifiers necessary to match with CRSP; 1,094 are duplicates related to the same firm and fraud; 216 do not have data available around the revelation of the fraud; and 5 are related to earnings understatement. For comparison, Armstrong et al. (2013) analyze 361 AAER firms in their study; Davidson et al. (2015) analyze 109 AAER firm; Efendi et al. (2007) analyze 190 restatement firms.

the CRSP database, and fund-year observations where the year for the observation is in the same year or in an earlier year than the reported fund starting year. Because our study is at the fund level, all mutual fund share classes are also aggregated at the fund level. We aggregate returns, expense ratios, and turnover ratios by value-weighting the corresponding characteristics of the individual share classes. The total net assets (TNA) of the fund is aggregated by adding the TNAs of the individual share classes and fund age is defined as the age of the oldest share class.

Our initial sample includes 4,488 equity mutual funds from 1982 to 2016. Next, we merge the CRSP mutual fund data with the Thomson-Reuters Mutual Fund Holdings database and the CRSP Stock Return Database using the MFLINKS from Wermers (2000) and available through Wharton Research Data Services (WRDS). The Thomson-Reuters data provide us with the quarterly equity holdings of mutual funds.

3.3. Methodology

While AAERs define the last quarter in which fraudulent financial statements are filed, they generally do not identify when the market was publicly made aware of the fraud. Attaching a time stamp to fraud revelation is challenging. Most financial reporting fraud cases are revealed gradually to the market. Every piece of news is further surrounded with uncertainty about the severity of the fraud and its legal implications. Prior research has examined responses to different event dates in the timeline of misreporting firms (e.g. the date a class action lawsuit is filed or the date the firm announces a restatement). Many of these events, however, could be unrelated to the fraud or occur after the fraud has been already revealed to the market (e.g. a class action lawsuit is often filed *because* fraud was discovered).

For these reasons, in our baseline analysis we use a time-based approach and use alternative revelation times in robustness analyses. Specifically, we assume that the fraud is revealed to the

market two quarters after the last reporting period with fraudulent financial statements. We make this assumption because firms generally file financial statements for the period 2-3 months after the reporting period ends. Given that fraudulent financial statements were filed, the market would not have been aware of the fraud before the filing date. And, given that fraudulent financial statements for the following quarter are never filed, we assume the market became aware of the fraud before this filing could take place. This will most often occur two quarters after the end of the fraud period. For example, consider the reporting fraud at MagnaChip Semiconductor. Beginning in 2011, MagnaChip started improperly recognizing revenue, in some cases booking fictitious revenue, and failed to record certain expenses. This practice continued through the first three quarters of 2013 and fraudulent financial statements for the third quarter (last quarter of fraudulent statements) were filed by the end of 2013. At that point, MagnaChip's board began questioning account balances and launched an internal investigation in January 2014 that uncovered and publicized the fraud (i.e., two quarters after the last quarter of fraudulent financial statements). In this case, the fraud was uncovered after the board started reviewing third quarter 2013 financial statements and before the firm was able to file the fourth quarter 2013 financial statements, which would have normally been filed in the first or second quarter of 2014. Following the public revelation of the fraud in the first quarter of 2014, MagnaChip stock price declined by 33.20% during that quarter.[5]

By assuming that the fraud was revealed to the market during the second quarter after the last fraudulent financial statement, we effectively eliminate the mistake of identifying fraud too early, i.e. even before the filing of the last fraudulent statement. We would expect the firm to stop reporting fraudulent financial statements after the fraud has been publicly recognized. The

[5] A summary and timeline of the MagnaChip case is provided in the Internet Appendix. Case details are available at: https://www.sec.gov/litigation/admin/2017/33-10352.pdf.

possibility of a delayed market detection of fraud after quarter two is uncommon and would likely bias us against finding an effect at our estimated time of fraud revelation.

As robustness checks, we also consider two alternative estimates for the fraud revelation quarter and all major results in the paper are robust to these alternative estimates. First, we use a returns-based estimate of fraud revelation which assumes that the fraud is revealed to the market in the quarter with the largest decline in share price over a four-quarter window starting at the last quarter of a fraud period. Consistent with our base-case assumption, we observe that the lowest abnormal quarterly returns of fraud firms are realized over the second quarter after the fraud period. We find that fraud firms in our sample earn an abnormal return of nearly negative 20 percent during the second quarter following the end of the fraud period. This is consistent with prior research. Dechow et al. (1996) find that alleged earnings manipulators experience an average decrease in stock price of 9 percent at the initial announcement of an accounting issue. Karpoff et al. (2008) find that firms targeted by the SEC for financial misrepresentation lose approximately 38 percent of their market value in the period following revelation as the market adjusts to information related to the size of the manipulation, the expected penalties to be imposed by regulators, and loss from damaged reputation. We note that this loss will occur over time as facts about the case are revealed.[6]

Second, we identify the revelation quarter based on the first mention of reporting fraud in public media records or press releases. To do this we review all public documents about fraud firms over a four-quarter window starting at the last quarter of a fraud period. The review identifies a revelation quarter for approximately 55 percent of fraud firms. We note, however, that this approach generates noisy and potentially biased estimates of the revelation date, primarily because,

[6] This suggests a potential limitation of the returns-based estimate of fraud revelation tied to the fact abnormal returns could be driven by different types of news unrelated to the fraud revelation time.

even for identified cases, an article may allude to possible accounting 'problems' or 'irregularities' without mentioning or alleging fraud. One must use judgment in identifying whether the content of an article reveals actual fraudulent behavior versus legitimate errors or potential irregularities. Therefore, we use this subsample in robustness analysis. We note that within this subsample of firms, the majority of the fraud cases are also revealed during the second quarter after the end of the fraud period.

A mutual fund manager is defined as exposed to fraud if she held a fraud security when the fraud was revealed to the market. To quantify exposure, we compute the quarterly fraud shock loss (*Q Fraud Shock*) as the quarterly percentage loss experienced by a fund during a fraud-revelation quarter due to its holdings of fraud firm securities. In particular, the quarterly loss is measured as a percentage of the fund's total dollar holdings at the time of the fraud revelation as follows:

$$Q\ Fraud\ Shock_{f,t} = \frac{\$\ loss\ due\ to\ fraud\ holdings_{f,t}}{total\ \$\ holdings_{f,t}}$$

$$= \frac{\sum_{j=1}^{M}\{Shares_{f,j,t-2} * Prc_{f,j,t-2} * R_{f,j,t} | j \in fraud\ revealed_t\}}{\sum_{i=1}^{N}\{Shares_{f,i,t-2} * Prc_{f,i,t-2}\}} \quad (1)$$

where fraud is revealed at quarter t. Returns of fraud firms are measured in the fraud revelation quarter *t*. Weights of fraud holdings are measured at quarter t-2, which is the last quarter of the fraud period (i.e. the last quarter for which fraudulent financial statements are filed). We measure the weights of fraud holdings during the last quarter of the fraud period, i.e., before the public revelation of fraud to control for any potential mechanical impact that the act of revelation may have had on the prices and portfolio weights of fraud firms.[7] Next, we define our baseline fraud

[7] Nevertheless, as robustness check, we calculate the weights of fraud firms using holdings at the end of the fraud revelation quarter (t) or at the end of quarter (t-1). Our findings remain robust.

shock (*Fraud Shock*) as the average quarterly loss experienced by a fund due to fraud holdings in the prior year:

$$Fraud\ Shock_{f,t} = \frac{\sum_{t=1}^{4}\{Q\ Fraud\ Shock_{f,t}\}}{4} \tag{2}$$

As an alternative exposure metric, instead of computing the loss experienced by a fund due to holdings in fraud securities, we compute the average portfolio weight of all fraud firms held by a fund. In particular, each quarter, we compute the fraud shock weight (*Q Fraud Shock wt*) as:

$$Q\ Fraud\ Shock\ wt_{f,t} = \frac{\$\ fraud\ holdings_{f,t}}{total\ \$\ holdings_{f,t}}$$

$$= \frac{\sum_{j=1}^{M}\{Shares_{f,j,t-2} * Prc_{f,j,t-2} | j \in fraud\ revealed_t\}}{\sum_{i=1}^{N}\{Shares_{f,i,t-2} * Prc_{f,i,t-2}\}} \tag{3}$$

Consistent with the construction of *Fraud Shock*, here we also average the quarterly fraud firm weights over the prior year to estimate *Fraud Shock (Weight)*.[8]

To investigate the relation between exposure to fraud and subsequent changes in the fund's portfolio allocation decisions, we estimate the following quarterly panel regression:

$$\Delta\ Allocation_{f,t} = \beta_1 \times Fraud\ Shock_{f,\{t-1,t-4\}} + \beta_2 \times Perf_{f,\{t-1,t-4\}} + \beta_3 \times Flow_{f,\{t-1,t-4\}} + \beta_4 \times Log(Age)_{f,t-4}$$

$$+ \beta_5 \times Log(TNA)_{f,t-4} + \beta_6 \times Exp_{f,t-4} + \beta_7 \times TO_{f,t-4} + \beta_t + \beta_s + \varepsilon_{f,t} \tag{4}$$

where $\Delta\ Allocation_{f,t}$ refers to changes in portfolio allocation decisions by fund *f* in quarter *t*, such as fund percentage holdings in stocks with high/low fraud-risk; percentage cash-holdings; portfolio

[8] We also consider two alternative measures of exposure – the number of fraud firms held by a fund over the total number of firms in the fund portfolio and an indicator variable for the presence of a fraud firm in the fund portfolio over the previous year. Our results are robust to these alternative measures.

risk (systematic and idiosyncratic); and deviations from benchmark portfolios (tracking error and active share).

As noted above, *Fraud Shock* $_{f,\{t-1,t-4\},}$ is defined as the average loss experienced by a fund due to holdings in fraud firms over the prior 4 quarters, as a percentage of the fund's total dollar holdings. The fund-level control variables are defined as follows: *Perf* $_{f,\{t-1,t-4\}}$ is the percentile performance ranking of the fund within the fund style category, based on the average fund returns over the prior year; *Flow* $_{f,\{t-1,t-4\}}$ is the average monthly flow over the prior 12 months; *Log(Age)* $_{f,\,t-4}$ is the logarithm of 1 plus fund age in the prior year; *Log(TNA)* $_{f,\,t-4}$ is the logarithm of fund total net assets in the prior year; *Exp* $_{f,\,t-4}$ is the fund's monthly expense ratio in the prior year; and *TO* $_{f,\,t-4}$ is the annual fund turnover ratio in the prior year. Our primary coefficient of interest is β_1, which measures the effect of exposure to fraud on changes of mutual fund manager trading behavior.

The regression model includes year- and style-fixed effects and the standard errors in all specifications are adjusted for clustering at the fund-level. We define nine different fund style categories based on the holdings of the mutual funds by sorting all funds in each time period sequentially into three groups based on the average market capitalization and then into three groups based on average book-to-market ratios of the stocks in their portfolios.

3.4. Summary statistics

Table 1 presents summary statistics for the main variables in the paper (defined in the Appendix). In our sample, fraud securities represent approximately 0.10% of mutual funds' total holdings (*Fraud Shock (Weight)*). Funds experience an average fraud induced loss (*Fraud Shock*) of 0.02% per quarter. This is expected given that on average fraud firms experience about 20% negative return during the fraud revelation quarter. Cross-sectionally, 26% of funds in our sample

experience a fraud shock. The average magnitude of the fraud shock-variable is reasonable given that there are only 489 fraud shocks over our sample period. However, fraud-induced loss can be quite large – for example, the top 10% of exposed funds experience an average fraud induced loss of 0.50% of their TNAs, which is equivalent to about $6.37 million dollars.

The average fund in our sample manages $1,274 million in total net assets and is approximately 13 years old. Funds experience a monthly return of 0.79% during our sample period. They have an average expense ratio of 1.15% per year and a turnover ratio of 84%. Moreover, funds on average hold 160 stocks and cash holdings account for 4.86% of funds' TNAs. We compute fund flows as the growth rate of the assets under management after adjusting for the appreciation of the mutual fund's assets.[9] Funds in our sample have an average monthly flow of 0.68% per year.

Fund total portfolio risk is estimated as the standard deviation of daily fund returns over the quarter, where daily fund returns are constructed by using quarterly released holdings and daily stock returns over the quarter.[10] The average quarterly risk of funds in our sample is 1.21% in terms of daily standard deviation, which is equivalent to 9.57% quarterly and 19.14% annually. We decompose fund risk into systematic and idiosyncratic components by estimating a CAPM market model using daily fund returns and the CRSP value-weighted index. Market Beta is estimated as the beta coefficient from this model. We use the volatility of the estimated residual to measure idiosyncratic risk. Funds have an average market beta of 1.05 and residual risk of 0.41%. In addition, for each fund we compute daily tracking errors against the market and style benchmarks. On average, funds in our sample experience a daily (quarterly) tracking error against

[9] We winsorize flows at both the top and bottom 2.5% level to mitigate the influence of outliers

[10] Since CRSP only reports daily fund returns starting from 1999, we compute risk measures using daily reported fund returns in CRSP as robustness checks in section 4.4.

the market of 0.46% (3.66%). The daily (quarterly) tracking error against the style benchmark is 0.38% (3.05%). Finally, the average active share of funds in our sample is 0.77.

4. Fund Manager Response to Fraud

4.1. Investment in high fraud risk stocks

In this section, we examine whether mutual fund managers change the allocation of their portfolios across stocks perceived as having high- and low-fraud risk following exposure to fraud. The first column of Table 2 shows that exposure to fraud does not significantly affect the percentage of the fund's assets allocated to cash. This result is consistent with Proposition 1 and is in contrast to prior research analyzing the trading behavior of retail investors, who tend to withdraw funds from equity markets following exposure to fraud.

The second column of Table 2 examines the impact of fraud shock over the prior year on changes in the portfolio weight of fraud firms held by exposed funds over the next quarter. To capture active trading in fraud firms and avoid any mechanical impact of price changes over the subsequent quarter, we compute fraud firm weights by using (split-adjusted) shares reported at the beginning and the end of the quarter and stock prices at the beginning of the quarter.

We find that exposed managers significantly reduce their holdings in fraud firms. Using funds experiencing an extreme fraud shock as an example (i.e. loss of 0.50% of their TNAs), the coefficient of -0.22 on the shock variable indicates that these funds subsequently reduce their holdings in fraud firms by 0.11% (as a percentage of their total net assets) over the next quarter.[11] Given that these funds on average hold 0.53% of their total net assets in fraud firms, this is equivalent to a 20.75% (83.02%) reduction in their total fraud holdings over the next quarter (year). If fraud firms are more likely to have their shares delisted in the period shortly following the public

[11] The top 10% of exposed funds in our sample experience a fraud-induced loss of 0.50% of their total net assets over the event quarter.

revelation of the fraud, then fund managers who held these securities would register a decline in their fraud firm holdings even if they do not intentionally sell the securities. However, we find that only 1.68% of fraud firms are delisted by the end of quarter t+1 following the fraud revelation, which cannot explain the magnitude of the reduction in fraud holdings that we observe.[12]

Exposed managers may react to fraud beyond simply reducing their holdings in fraud firms. To explore whether money managers are able to assess and manage financial fraud risk going forward, we next examine the impact of fraud on changes in the portfolio weights of stocks with high and low expected fraud risk. We utilize two forward looking fraud risk measures developed in the accounting literature. In Columns 3 and 4 of Table 2, fraud risk is defined based on the firm's F-Score, introduced by Dechow et al. (2011). The F-Score represents a firm's conditional probability of receiving an AAER scaled by the unconditional probability, where the conditional probability is a function of annual accounting adjustments, issuance of securities, soft assets (non-cash and non-PP&E assets), and changes in return on assets, cash sales, receivables, and inventory. Dechow et al. (2011) find that firms with F-Scores above 1.85 exhibit 'substantial' risk of fraud. We therefore define high fraud risk (*high F-Fraud risk*) as an indicator variable set to 1 for firms with F-Scores greater than 1.85 and 0 otherwise. 11 percent of the firm-year observations in our sample have F-Scores greater than 1.85. Remaining firms are defined as *low F-Fraud risk* firms.

In the last two columns of Table 2, fraud risk is estimated using the absolute value of total accruals less non-discretionary accruals computed using a modified Jones (1991) model as per Bergstressor and Philippon (2006) (*A-Fraud risk*). Accruals represent the difference between firms' operating performance and cash flows, often due to timing differences between when economic exchange occurs versus when cash is exchanged. Discretionary accruals are a subset of

[12] 23.52% (33.31%) of fraud firms are delisted by then end of quarter t+4 (quarter t+8) following the fraud period.

accounting adjustments that managers have some discretion over and predict both legal and illegal financial statement misrepresentation (Dechow et al. 2011). We define high accrual-based fraud risk (*high A-Fraud risk*) as an indicator variable set to 1 for firms with absolute discretionary accruals in the top quartile and 0 otherwise. *Low A-Fraud risk* is defined as 1 minus high A-Fraud risk.

Changes in the weight on high F-fraud risk stocks (Δ *high F-Fraud risk weight*) are computed as the difference in portfolio weights of *high F-fraud risk* stocks over a quarter. Portfolio weights are computed using share prices at the beginning of the quarter to capture active portfolio composition changes by exposed funds. Similarly, changes in weight on high A-fraud risk stocks (Δ *high A-Fraud risk weight*) are computed based on the *high A-Fraud risk* measure. Consistent with Proposition 1, we find that mutual fund managers exposed to fraud substitute holdings in firms with high fraud risk with holdings in firms with low fraud risk. The effect is economically meaningful. Using *F-Fraud risk* in column 3 as an example, the coefficient on the Fraud shock-variable of -0.65 indicates that funds experiencing a fraud induced loss of 0.50% will subsequently reduce their holdings in firms with high *F-fraud risk* by 0.33% (1.32%) in the subsequent quarter (year). Given exposed funds on average hold 8.80% of *high F-fraud risk* firms, this accounts for a 15.00% reduction of high fraud risk holdings in the subsequent year. Finally, as indicated by the significant positive coefficients in columns 4 and 6, instead of hoarding cash, exposed funds use the proceeds from the selloff of stocks with high fraud risk to buy stocks of firms with low fraud risk.

Table 3 examines the long-term impact of exposure to fraud. It reports coefficient estimates and standard errors from regressions of changes of mutual fund allocations in fraud firm stocks and stocks with high and low fraud risk over quarters t+1, t+2, t+3, and t+4 following the revelation

of fraud on the same set of independent variables. We observe that the trading patterns of exposed managers persist over the four quarters following the event with similar economic magnitudes. The statistical significance generally weakens over time.

4.2. Mutual fund risk-taking

We next focus our empirical analysis on the implications of fraud for the overall risk-taking behavior of mutual fund managers. Proposition 2 in Section 2 predicts that professional money managers will take less risk following exposure to fraud given that fraud is expected to increase the perceived riskiness of all securities in the market. Furthermore, exposed managers are expected to attempt to diversify away some of this risk and move closer to their benchmarks.

Table 4 reports coefficient estimates from regressions of changes in mutual fund portfolio risk following exposure to fraud over the previous year, where portfolio risk is estimated as the standard deviation of daily fund returns over a quarter. We find that exposed managers significantly reduce the total risk level of their portfolios. For example, in the subsequent quarter after the shock, the coefficient of -0.256 (column 1) is statistically significant at the 0.01 level. This indicates that managers who experience a fraud induced loss of 0.50% will reduce their quarterly total risk by 1.02% (= -0.256 x 0.5 x SQRT(62days)) in the subsequent quarter, which account for a 10.61% reduction in quarterly fund risk, given the average quarterly standard deviation is 9.58%. The effect persists for the next three quarters after the shock and becomes insignificant by the fourth quarter.

It is possible that the reduction of total portfolio risk documented in Table 4 proxies for the reduction of fraud risk documented in Table 3. The correlations between financial fraud risk (i.e. *F-Fraud risk* and *A-Fraud risk*) and fund return volatility are quite small at 0.01 and 0.05 (for *F-Fraud Risk* and *A-Fraud Risk*, respectively). Nevertheless, as a robustness test, we assess changes

in mutual fund total portfolio risk following the revelation of fraud excluding the fraud stock, the fraud stock industry, and stocks with high fraud risk based on the F-Fraud and A-Fraud measures. The results are presented in the last two columns of Table 4. We observe that the fraud shock variable remains significant in all specifications, suggesting that the impact of fraud on fund portfolio risk is not simply driven by stocks with high reporting fraud risk.

Table 5 explores the implications of fraud for mutual fund risk-taking behavior over the next four quarters. The model in the first column is the same as the baseline model from Table 4. We observe that mangers exposed to fraud tend to significantly reduce the total risk in their portfolios over the next three quarters following the revelation of the fraud. The economic significance of the exposure declines over time.

To shed further light on the risk reduction result, in the first two columns of Table 6, we decompose total portfolio risk into market beta and idiosyncratic risk. Market beta is estimated from a CAPM market model based on daily fund and market returns over a quarter. Residual risk is estimated as the standard deviation of the residuals from the quarterly market model. We report coefficient estimates and standard errors from regressions of changes in mutual fund market beta and idiosyncratic risk on the same set of independent variables as in Table 4. We observe that the coefficients on the fraud shock variable are negative and highly significant for both market beta and residual risk, suggesting that exposure to fraud in the prior year induces mutual fund managers to reduce both the systematic and idiosyncratic risk of their portfolios in the subsequent quarter. In the third column of Table 6, we evaluate the implication of fraud on the propensity of managers to diversify. Consistent with Proposition 2, we find that exposure to fraud induces managers to subsequently increase the number of stocks in their portfolios.

Proposition 2 predicts that, following exposure to fraud, professional money managers would be more likely to move closer to their benchmarks and become less active. The last three models in Table 6 report results from regressions of changes in mutual fund portfolio tracking error against the market, tracking error against the fund's style index, and fund active share on the fraud shock variable and additional controls. We observe that exposed managers allocate their portfolios closer to their respective benchmarks, as indicated by the significant negative coefficients on the tracking error and active share measures. The results are economically significant. For example, the coefficient of -0.042 on the tracking error against style benchmark (column 5) indicates that managers experiencing a fraud induced loss of 0.50% will reduce the quarterly tracking error of their fund by 5.47% in the following quarter.[13] In unreported tests, we find that exposed managers do not exhibit lower alphas or reduce their expense ratios despite becoming less active following the fraud shock.

4.3. Robustness tests

4.3.1. Fund-characteristics matched sample

Certain fund characteristics and investment styles may affect the probability of fraud exposure. Table A.1 in the Internet Appendix compares average fund characteristics across exposed and unexposed funds. We find that exposed funds tend to be larger than unexposed funds but otherwise exhibit similar returns, portfolio risk, flows, turnover, and age. Since funds are grouped based on fraud exposure, it's not surprising that shocked funds hold more fraud firms and firms with high fraud risk. Exposed funds also charge slightly lower fees.

[13] A coefficient of -0.042 indicates that funds experiencing a fraud induced loss of 0.50% will subsequently reduce their daily (quarterly) tracking error by -0.02% (-0.17%). Given that the average quarterly tracking error is 3.05%, this is equivalent to a 5.47% reduction.

To mitigate potential self-selection concerns with respect to mutual fund holdings, in this section, we replicate all baseline results using a matched sample created by classifying all funds in each quarter into nine style categories, two size categories (large versus small), and two risk categories (high versus low). This matching procedure generates 36 benchmark groups of funds based on style, size, and risk. We consider three measures of fund risk – the portfolio standard deviation, A-fraud risk exposure, and F-fraud risk exposure.

Afterwards, we match each fund exposed to fraud with funds that exhibit similar style, size, and risk over the prior year. We then re-estimate the baseline models presented in Table 2 (expected fraud risk) and Table 4 (portfolio risk) using the sample of exposed funds and matched unexposed funds. The results are presented in Panels A and B of Table A.2 (fraud risk) and Table A.3 (portfolio risk) of the Internet Appendix. The coefficient estimates of the fraud shock variable in the matched sample are similar to those reported earlier. Specifically, we find that fund managers reduce their holdings in stocks with high fraud risk and the overall risk level of their portfolio (for both systematic and idiosyncratic risk) following the revelation of fraud against firms in their portfolios.

To further address potential concerns regarding the initial level of fraud holdings and survivorship issues associated with fraud firms, we replicate the baseline tests in Table 2 by restricting the sample to funds that held the stocks of fraud firms (and stocks with high- and low-expected fraud risk) at the beginning of the shock quarter. Additionally, we use log ratios instead of changes in the weights of fraud firms (and the weights of stocks with high- and low-expected fraud risk) as dependent variables, so that our results are unaffected by the initial level of fraud holdings. The results are presented in Panel C of Table A.2 and are similar to the baseline results – managers experiencing a larger fraud shock are more likely to reduce their holdings in fraud

firms even when compared to other funds who also held fraud stocks at the beginning of the shock-quarter. Therefore, our results cannot be mechanically explained by self-selection regarding fraud exposure or delisting of fraud stocks.

4.3.2. Alternative definitions of the fraud revelation quarter

Although AAERs identify the last fiscal quarter for which fraudulent financial statements are filed, the quarter the fraud is revealed to the public is often unclear. We assume that the fraud is revealed to the market during the second quarter following the end of the fraud period (see Section 3). To verify that the results are robust to alternative definitions of the fraud revelation time, we re-estimate our baseline model using two alternative proxies for revelation time and report the results in Table A.4.

In Panel A, the fraud revelation quarter is defined as the quarter with the lowest abnormal return over quarters *t*, *t+1*, *t+2 and t+3*, where quarter *t* refers to the last fiscal quarter for which fraudulent financial statements were filed. In Panel B, we define the fraud revelation time as the first quarter a media article or press release indicates fraudulent reporting at the firm. All main results remain highly significant using these alternative measures.

4.3.3. Additional tests

Table A.5 of the Internet Appendix studies exposure to fraud and changes in mutual fund portfolio risk under alternative fraud shock measures. In panel A we define the fraud treatment effect as the average portfolio weight of fraud firms held by a fund; in Panel B, we define the fraud treatment effect as the number of fraud firms held by a fund; while in Panel C we define the fraud treatment effect as an indicator variable for the presence of a fraud firm in a mutual fund portfolio. All three quarterly measures are averaged over the previous four quarters. Here, we also observe that the main results are robust to these alternative definitions of exposure.

Table A.6 of the Internet Appendix presents several additional robustness tests. Specifically, Panel A presents results using estimates of risk measures based on actual fund returns reported in CRSP. Note that the number of observations here decreases significantly because daily fund returns are available only over the sub-period from 1999 to 2016. We observe that the coefficients on the fraud shock variable remain statistically significant in this alternative estimation.

Panel B reports results from the estimation of the baseline models with state fixed effects for the location of the fund. Giannetti and Wang (2016) show that state-level household stock market participation decreases after the revelation of corporate fraud in the state. As a result, we introduce state fixed effects to control for any possible local clientele effects on funds. We observe that both the statistical and economic significance of the coefficients on the fraud shock variable in these models remain similar to those in the baseline models, suggesting that our results reflect managerial rather than local investor decisions. Panel C indicates that all major results are also robust to the inclusion of fund fixed effects.

Finally, in Panel D of Table A.6, we re-estimate all models after excluding fraud cases revealed in 2001. Year 2001 saw the largest number of fraud cases compared to any other year. It also contains several large fraud cases that generated significant publicity (e.g. Enron, Worldcom). In addition, 2001 was a volatile year for the market with a large loss of value in the tech sector and the overall market following the September 11th terrorist attack. We exclude all fraud cases from year 2001 to control for the possibility that fund managers were under additional or different pressure and more public scrutiny during this period which may have caused extreme or uncommon investment behavior. The results in Panel D show that our baseline results are unaffected by the exclusion of frauds revealed during 2001.

5. The Relative Importance of Trust and Reputation

As discussed in Section 2, exposure to fraud could affect fund managers' behavior through two separate, but not mutually exclusive channels – *trust* and *reputation*. In this section, we perform a series of additional tests to understand the relative importance of these two channels.

5.1. The importance of accounting information

First, we evaluate manager responsiveness to public information. More specifically, we explore the propensity of portfolio managers to follow the buy and sell recommendations of financial securities analysts. Much of the information used by analysts in their evaluations is provided directly by firms. If exposure to fraud erodes trust in capital markets, then we expect that exposed managers will *decrease* their reliance on financial analyst information. Analyst recommendations, however, provide not only information, but also justification for stock selection choices which could be particularly valuable for portfolio managers (Chevalier and Ellison 1999b; Graham 1999; Welch 2000; Lamont 2002). As a result, if fraud raises the reputational concerns of managers, then we expect that exposed managers will *increase* their reliance on analyst information following exposure to fraud.

To measure managers' reliance on analyst recommendations, we compute two variables based on new analyst buy/sell recommendations. *Recommended Buy Value* (*Recommended Sell Value*) in a quarter is defined as the dollar purchases (sales) made by a fund during the quarter following analyst recommended buys (sells) in the previous quarter, divided by the total dollar purchases (sales) by the fund during the quarter. In addition, *Recommended Buy Number* (*Recommended Sell Number*) in a quarter is defined as the number of stocks purchased (sold) by a fund during the quarter following analyst recommended buys (sells) in the previous quarter, over the total number of stocks purchased (sold) by the fund during that quarter. We regard a stock as

having a buy recommendation in a quarter if analysts make an adjustment to their recommendation on the stock during the quarter and the mean recommendation is adjusted to a buy. Similarly, we regard a stock as having a sell recommendation if analysts on average adjust their recommendation of the stock to sell during the quarter.[14]

Table 7 presents the results from regressions of changes in recommended buys/sells in a mutual fund portfolio on the fraud shock variable and the additional control variables included in the baseline model. The dependent variables in the first two columns are change in *Recommended Buys* in terms of dollar value and number of shares. The dependent variables in the last two columns are changes in *Recommended Sells* in terms of value and number of shares. The coefficients on the fraud shock variable for recommended buys are negative and highly significant. In other words, after experiencing a fraud shock, mutual fund managers are less likely to follow the buy recommendations of financial analysts. As noted above, these results are consistent with the idea that fraud erodes investor trust in the financial information in capital markets. The results are also inconsistent with the idea that exposure to fraud exacerbates the reputational concerns of professional money managers. [15]

We do not find a significant exposure effect on the propensity of managers to follow sell recommendations. This may be expected given that roughly 99 percent of AAERs issued for fraud are related to fraudulently increasing net income or net assets, which should affect adversely the confidence in positive accounting information. In addition, given that mutual fund managers are often prevented from short selling, their ability to follow any sell recommendations is limited as

[14] I/B/E/S codes analyst recommendations from 1 to 5, with 1 indicating 'strong buy', 2 indicating 'buy, 3 'hold', 4 'sell', and 5 'strong sell'. We treat an average value of less than 3 as a buy recommendation and an average value of greater than 3 as a sell recommendation.

[15] Our *change in recommended buys (sells)* are trade-based measures that capture the consistency of the directions of analyst recommendations and mutual fund trades. This is different from the R-squared measure used in Kacperczyk and Seru (2007), though our results are -robust when using the R-squared measure as well.

they must already hold the stock in question to sell it following a change in analyst recommendations.

5.2. The importance of reputation effects

Here, we further explore the importance of reputational concerns as a mediating factor of the baseline results. First, we study whether changes in mutual fund investment behavior in response to fraud depend on the age of the fund. If reputational concerns are the primary determinant of our results, then we expect the risk reduction effect will be stronger for younger funds. Young funds have a shorter history and a limited track record and, as a result, any negative publicity is potentially more damaging to them (Chevalier and Allison, 1999b). In Table 8, we include an interaction term of the fraud shock variable with the fund age variable in our baseline models. We observe that the risk reduction of exposed managers is unrelated to fund age.

Several other tests also suggest that reputation is not the primary cause of our findings. Table 9 examines the effect of high-profile fraud cases. If reputation is driving the results, then we expect that high-profile cases will trigger stronger reputation concerns. We utilize three different proxies for 'high-profile' fraud cases: the magnitude of the fraud in dollars as estimated by the SEC and provided in the AAERs; the number of media articles and press releases about the firm around the time of the fraud (collected from Factiva); and inclusion of the fraud case on popular lists of high-profile accounting scandals (e.g. Forbes, Wikipedia[16]). We define frauds as high profile if they meet two of the following criteria: top 25 percent in magnitude; top 25 percent in media coverage; and inclusion on a high-profile list.[17] The procedure identifies 22 high profile cases including enforcement actions against Enron, HealthSouth, Tyco, Waste Management, and WorldCom. In Table 9, we report results of estimates of the baseline model excluding high-profile

[16] A list provided by Wikipedia is available at https://en.wikipedia.org/wiki/Accounting_scandals.
[17] Most 'high profile' lists include far fewer than 25% of fraud cases so this is the most limiting criterion.

fraud cases. Our results remain strong after excluding these high-profile cases. The economic magnitudes of the estimated coefficients here are largely similar to the magnitudes in our full-sample analysis.

Finally, in Table A.7 of the Internet Appendix, we explore the relation between exposure to fraud and subsequent mutual fund flows. We find no connection between fund holdings of fraud firms and subsequent capital flows. This is probably not surprising given that the average fund has a large number of investors and holds a highly diversified portfolio. Overall, our results suggest that the reputational damage to a manager from holding a fraud stock in their portfolio is relatively small and is an unlikely explanation of our findings. In contrast, deterioration in trust and reduced reliance on public information appear to explain (at least partly) the observed changes in manager behavior following exposure to financial reporting fraud.

6. Conclusion

Corporate financial misconduct exhibits direct costs to investors in fraud firms. The social costs of fraud, however, could extend well beyond these losses. Many economists and social scientists have argued that fraud could be damaging to the institutions in society conducive to economic and financial development. In particular, fraud could undermine investor trust. When investors lose trust, they could direct less investment towards capital markets in search of safe havens. Consequently, the cost of equity capital could increase for all firms in the market.

We find that the adverse effects of financial reporting fraud in capital markets extend beyond reduced retail investor participation. When the trust level of professional money managers decreases, they become more passive and conservative in their investment choices. Most investment in modern markets is intermediated. As a result, the decreased appetite for risk of professional money managers exposed to fraud could suppress the valuations of risky firms relative

to safer firms and increase their cost of capital. We also present evidence that financial reporting fraud could reduce professional money managers' incentives to use relevant investment information, which in turn could decrease capital market efficiency. Our conclusion is that the negative implications of fraud for capital markets extend to delegated portfolios and have far-reaching consequences for firms and investors.

We also would like to note, however, that the overall response of professional investors to fraud appears more sophisticated than the response of individual investors. For example, mutual fund managers are able to identify correctly securities with high fraud risk and substitute them with securities with low fraud risk. Therefore, individual investors could benefit from the way delegated portfolios manage financial reporting fraud risk.

References

Agarwal, V., G. Gay, and L. Ling. 2014. Window dressing in mutual funds. *Review of Financial Studies* 27, 3133–3170.

Armstrong, C., D. Larcker, G. Ormazabal, and D. Taylor. 2013. The relation between equity incentives and misreporting: The role of risk-taking incentives. *Journal of Financial Economics* 109, 327-350.

Arrow, K. 1972. Gifts and exchanges. *Philosophy and Public Affairs* 1, 343-362.

Bergstresser, D., and T. Philippon. 2006. CEO incentives and earnings management. *Journal of Financial Economics* 80, 511–529.

Betermier, S., L. Calvet, and P. Sodini. 2017. Who are the value and growth investors? *Journal of Finance* 72, 5-46.

Blanco, L., and I. Ruiz. 2013. The impact of crime and insecurity on trust in democracy and institutions. *The American Economic Review* 103(3), 284-288.

Chevalier, J., and G. Ellison. 1997. Risk taking by mutual funds as a response to incentives. *Journal of Political Economy* 105, 1167–200.

Chevalier, J., and G. Ellison. 1999a. Are some mutual fund managers better than others? Cross-sectional patterns in behavior and performance. *Journal of Finance* 54, 875–899.

Chevalier, J., and G. Ellison. 1999b. Career concerns of mutual fund managers. *Quarterly Journal of Economics* 114, 389–432.

Chuprinin, O., and D. Sosyura. 2018. Family descent as a signal of managerial quality: Evidence from mutual funds. *Review of Financial Studies* 31, 3756–3820.

Cohen, R., P. Gompers, and T. Vuolteenaho. 2002. Who underreacts to cash-flow news? Evidence from trading between individuals and institutions. *Journal of Financial Economics* 66, 409-462.

Davidson, R., A. Dey, and A. Smith. 2015. Executives' "off-the-job" behavior, corporate culture and financial reporting risk. *Journal of Financial Economics* 117, 5-28.

Dechow, P., W. Ge, C. Larson, and R. Sloan. 2011. Predicting material accounting misstatements. *Contemporary Accounting Research* 28, 17-82.

Dechow, P., R. Sloan, and A. Sweeney. 1996. Causes and consequences of earnings misstatement: An analysis of firms subject to enforcement actions by the SEC. *Contemporary Accounting Research* 13, 1– 36.

Efendi, J., A. Srivastava, and P. Swanson. 2007. Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics* 85, 667-708.

Evans, R. 2010. Mutual fund incubation. *The Journal of Finance* 65, 1581-1611.

Feng, M., W. Ge, S. Luo, and T. Shevlin. 2011. Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics* 51, 21-36.

Field, L., and M. Lowry. 2009. Institutional versus individual investment in IPOs: The importance of firm fundamentals. *Journal of Financial and Quantitative Analysis* 4, 489– 516.

Fishman, M., and K. Hagerty. 1992. Insider trading and the efficiency of stock prices. *The RAND Journal of Economics* 23, 106-122.

Gennaioli, N., A. Shleifer, and R. Vishny. 2015. Money doctors. *Journal of Finance* 70, 91-114.

Giannetti, M., and T. Wang. 2016. Corporate scandals and household stock market participation. *Journal of Finance* 71, 2591-5636.

Gobin, R. and J. Freyd. 2014. The impact of betrayal trauma on the tendency to trust. *Psychological Trauma: Theory, Research, Practice, and Policy* 6(5), 505-5011.

Graham, J. 1999. Herding among investment newsletters: Theory and evidence. *Journal of Finance* 54, 237–268.

Greenwood, R., and S. Nagel. 2009. Inexperienced investors and bubbles. *Journal of Financial Economics* 93, 239–58.

Grinblatt, M., M. Keloharju, and J. Linnainmaa. 2012. IQ, trading behavior, and performance. *Journal of Financial Economics* 104, 339–362.

Guiso, L., P. Sapienza, and L. Zingales. 2008. Trusting the stock market. *Journal of Finance* 63, 2557-2600.

Gurun, U., N. Stoffman, and S. Yonker. 2018. Trust busting: The effect of fraud on investor behavior. *Review of Financial Studies* 31, 1341–76.

Jetter, M., and I. Kristoffersen. 2018. Financial shocks and the erosion of interpersonal trust: Evidence from longitudinal data. *Journal of Economic Psychology* 67, 162–176.

Jones, J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 29, 193-228

Kacperczyk, M., and A. Seru. 2007. Fund manager use of public information: New evidence on managerial skills. *Journal of Finance* 62, 485-528.

Karpoff, J., A. Koester, D. Lee, and G. Martin. 2017. The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis* 43, 581-612.

Karpoff, J., D. Lee, and G. Martin. 2008. Proxies and databases in financial misconduct research. *The Accounting Review* 92, 129-163.

Karpoff, J., J. Lott, and E. Wehrly. 2005. The reputational penalties for environmental violations: empirical evidence. *Journal of Law and Economics* 68, 653-675.

Lakonishok, J., A. Shleifer, R. Thaler, and R. Vishny. 1991. Window dressing by pension fund managers. *American Economic Review* 81, 227–31.

Lamont, O. 2002. Macroeconomic forecasts and microeconomic forecasters. *Journal of Economic Behavior and Organization* 48, 265–280.

Malmendier, U., and S. Nagel. 2011. Depression babies: Do macroeconomic experiences affect risk taking? *Quarterly Journal of Economics* 126, 373-416.

Nagel, S. 2005. Short sales, institutional investors, and the cross-section of stock returns. *Journal of Financial Economics* 78, 277–309.

Ng, L., and Q. Wang. 2004. Institutional trading and the turn-of-the-year effect, *Journal of Financial Economics* 74, 343−366.

Pool, V., N. Stoffman, and S. Yonker. 2012. No place like home: Familiarity in mutual fund manager portfolio choice. *Review of Financial Studies* 25, 2563–99.

Pool, V., N. Stoffman, S. Yonker, and H. Zhang. 2019. Do shocks to manager personal wealth affect risk taking in delegated portfolios? *Review of Financial Studies* 32, 2019, 1457–1493.

Sias, R., and L. Starks. 1997. Institutions and individuals at the turn-of-the-year. *Journal of Finance* 52, 1543–62.

Solomon, D., E. Soltes, and D. Sosyura. 2014. Winners in the spotlight: Media coverage of fund holdings as a driver of flows. *Journal of Financial Economics* 113, 53–72.

Treynor, J., and F. Black. 1973. How to use security analysis to improve portfolio selection. *The Journal of Business* 46, 66–86.

Welch, I. 2000. Herding among security analysts. *Journal of Financial Economics* 58, 369–39.

Wermers, R. 2000. Mutual fund performance: An empirical decomposition into stock-picking talent, style, transactions costs, and expenses. *Journal of Finance* 55, 1655-1695.

Appendix. Variable Definitions

Variable	Description and Data-sources
Fraud shock	The average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets (equation (2)). Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the second quarter following the last quarter with fraudulent financial statements. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP
Fraud shock (weight)	The average portfolio weight of fraud firm stocks held by a fund over the prior year. It is defined in equation (3); quarterly fraud holding weights are averaged over the prior year. Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the second quarter following the last quarter with fraudulent financial statements. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP
Fraud shock (number)	The average number of fraud firms held by a fund over the prior year. Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the second quarter following the last quarter with fraudulent financial statements. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP
Fraud shock (Timing 1)	The average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as a percentage of the fund's total net assets (equation (2)). Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the quarter with the lowest quarterly abnormal return among the 3 quarters after the last quarter with fraudulent financial statements. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP
Fraud shock (Timing 2)	The average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as a percentage of the fund's net assets (equation (2)). Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the first quarter the accounting fraud was mentioned in public media records or press releases. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP, Factiva
Fraud firm weight	The quarterly portfolio weight of fraud firm stocks for all frauds revealed during the previous year. Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the second quarter following the last quarter with fraudulent financial statements. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP
Change in Fraud firm weight	Change in the quarterly portfolio weight of fraud firm stocks for all frauds revealed during the previous year. Fraud firm weights at the beginning and the end of a quarter are computed by using (split adjusted) shares at the beginning and at the end of the quarter and stock prices at the beginning of the quarter. Fraud firms are identified based on SEC Accounting and Auditing Enforcement Releases (AAERs). Fraud revelation time is defined as the second quarter following the last quarter with fraudulent financial statements. *Source*: SEC Accounting and Auditing Enforcement Releases (AAERs), CRSP
High (Low) F-Fraud risk weight	The quarterly portfolio weight of firms with high (low) expected F-Fraud risk estimated at the end of the quarter. Firms are classified as having high (low) F-Fraud risk if their F-Score, as per Dechow et al. (2011), is greater (smaller) than 1.85. *Source*: Compustat

High (Low) A-Fraud risk weight	The quarterly portfolio weight of firms with high (low) expected A-Fraud risk estimated at the end of the quarter. Firms are classified as having high (low) A-Fraud risk if their absolute discretionary accruals (ADA) fall into (below) the top ADA quartile. The absolute value of total accruals less non-discretionary accruals is computed using a modified Jones (1991) model as per Bergstresser and Philippon (2006). *Source*: Compustat
Change in High (Low) F-Fraud risk weight	Quarterly change in the portfolio weight of high (low) F-fraud risk stocks over a quarter, where portfolio weights are computed using share prices at the beginning of the quarter. *Source*: Compustat
Change in High (Low) A-Fraud risk weight	Quarterly change in the portfolio weight of high (low) A-fraud risk stocks over a quarter, where portfolio weights are computed using share prices at the beginning of the quarter. *Source*: Compustat
Raw return	The monthly fund return. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Performance (Perf)	The percentile performance ranking of a fund within its fund style category, based on the fund's annual return. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Flow	The average monthly new money growth (flow) of the fund over the year. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Age	The number of years since the fund's inception. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Size	The total net assets (TNA) of the fund. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Expense (Exp)	The annual expense ratio of the fund. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Turnover (TO)	The annual fund turnover ratio. *Source*: CRSP Mutual Fund, Thomson Reuters Mutual Fund Holdings
Percentage of cash	The cash holdings of the fund, divided by the fund's total net assets. *Source*: CRSP Mutual Fund
Number of stocks	The number of equity holdings in the fund's portfolio. *Source*: Thomson Reuters Mutual Fund Holdings
TE against market	The standard deviation of daily fund returns in excess of the returns of the market portfolio. *Source*: Thomson Reuters Mutual Fund Holdings, Ken French's website
TE against style	The standard deviation of daily fund returns in excess of the returns of its style benchmark portfolio. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. *Source*: Thomson Reuters Mutual Fund Holdings, Ken French's website
Active share	The percentage of stock holdings in a fund portfolio that deviate from the benchmark index. *Source*: Antti Petagjisto's website
Total portfolio risk	The standard deviation of daily fund returns over a quarter. Daily fund returns are either daily holdings-based returns computed using quarterly holdings and daily stock returns over the entire sample period or the CRSP-reported daily fund returns available starting from 1999. *Source*: Thomson Reuters Mutual Fund Holdings, Ken French's website
Market beta	The beta coefficient from estimating a CAPM market model using daily fund returns and daily market returns over a quarter.

	Source: Thomson Reuters Mutual Fund Holdings, Ken French's website
Residual risk	The standard deviation of the residuals from estimating a CAPM market model using daily fund returns and daily market returns over a quarter. *Source*: Thomson Reuters Mutual Fund Holdings, Ken French's website
New buy/sell	The number of newly recommended buy/sell recommendations over the quarter *Source*: Thomson Reuters Mutual Fund Holdings, I/B/E/S
Change in recommended buys (sells) – Dollar value	The dollar value of analyst recommended purchases (sells) divided by the total dollar value of purchases (sells) made by the fund during a quarter. A stock is a buy (sell) recommendation if analysts on average adjusted their recommendation to buy (sell) during the previous quarter. *Source*: Thomson Reuters Mutual Fund Holdings, I/B/E/S
Change in recommended buys (sells) – Num. shares	The number of analyst recommended purchases (sells) divided by the total number of purchases (sells) made by the fund during a quarter. A stock is a buy (sell) recommendation if analysts on average adjusted their recommendation to buy (sell) during the previous quarter. *Source*: Thomson Reuters Mutual Fund Holdings, I/B/E/S

Figure 1
SEC Enforcement Actions over Time

This figure reports the number of firms receiving their first SEC issued Accounting and Auditing Enforcement Release (AAER) for financial reporting fraud each year over the sample period from 1982 to 2016. In total, 489 unique firms receive a fraud related AAER.

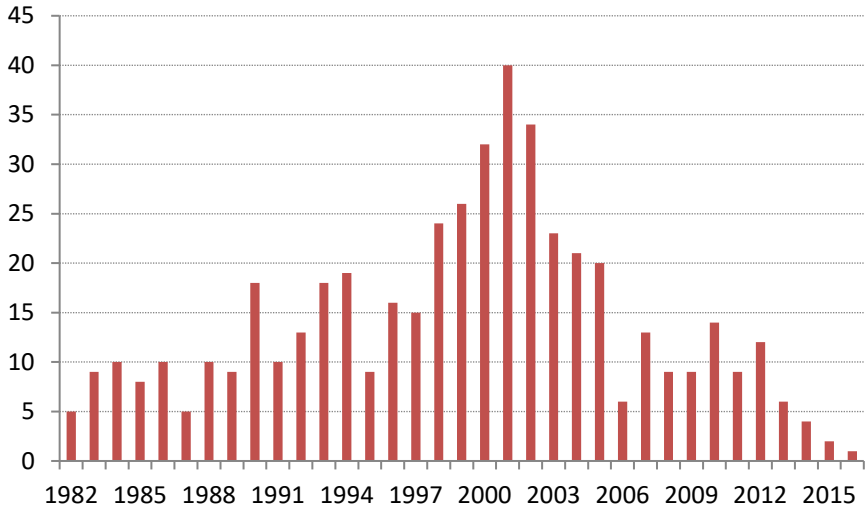

Table 1
Summary Statistics

The table reports distributional characteristics of all variables in the sample. Panel A presents levels of the corresponding variables, while Panel B presents changes. Precise variable definitions are provided in the Appendix.

Panel A. Levels

Variable Name	Mean	St. Deviation	**Variable Name**	Mean	St. Deviation
Fraud shock	0.021	0.082	Raw return	0.789	1.698
Fraud shock (weight)	0.099	0.308	Age	12.760	13.343
Fraud shock (number)	0.121	0.325	Size	1274.062	5494.550
Fraud shock (Timing 1)	0.035	0.117	Expense	0.096	0.041
Fraud shock (Timing 2)	0.018	0.093	Turnover	0.840	1.242
Total portfolio risk	1.206	0.689	Flow	0.683	2.950
Market beta	1.054	0.249	Cash	0.049	0.090
Residual risk	0.408	0.304	New buy	3.399	171.844
TE against market	0.461	0.358	New sell	0.636	32.314
TE against style	0.384	0.299	Percentage of cash	0.049	0.090
Fraud firm weight	0.376	1.151	No. of stocks	160	299
High A-Fraud risk weight	9.686	7.969	Active share	0.770	0.226
High F-Fraud risk weight	7.043	6.877			

Panel B. Changes

Variable Name	Mean	St. Deviation	**Variable Name**	Mean	St. Deviation
Fraud firm weight	0.000	0.561	Total portfolio risk	0.001	0.587
High A-Fraud risk weight	-0.151	4.638	Market beta	0.000	0.164
High F-Fraud risk weight	-0.088	3.603	Residual risk	-0.002	0.186
Percentage of cash	-0.269	6.671	Change in recommended buys – Dollar value	0.505	20.049
Number of stocks	0.267	9.427	Change in recommended buys – Num. shares	0.525	15.104
TE against market	-0.003	0.221	Change in recommended sells – Dollar value	0.004	6.689
TE against style	-0.002	0.192	Change in recommended sells – Num. shares	0.006	5.173
Active share	-0.002	0.034			

Table 2

Exposure to Financial Reporting Fraud and Changes in Mutual Fund Allocation in High and Low Fraud Risk Stocks

The table reports coefficient estimates and standard errors from regressions of quarterly changes of mutual fund percentage cash holdings and allocations in fraud firm stocks and stocks with high and low estimated fraud risk over the next quarter following the revelation of financial reporting fraud at companies in their portfolio on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund total net assets; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. Column 1 presents results on quarterly changes in the percentage of fund assets allocated in cash; Column 2 presents results for quarterly changes in portfolio holdings in fraud firm stocks; Columns 3 and 4 present results on quarterly changes of the portfolio weight of stocks with high (low) F-fraud risk, estimated based on the firm's F-Score defined in Dechow et al. (2011); and Columns 5 and 6 present results on quarterly changes of the portfolio weight in stocks with high (low) A-fraud risk, estimated based on the absolute values of total accruals less non-discretionary accruals computed as per Bergstressor and Philippon (2006), following fraud exposure. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

			Changes in Mutual Fund Exposure to Fraud Risk			
	Change in Percentage of cash	Change in Fraud firm weight	High F-Fraud risk weight	Low F-Fraud risk weight	High A-Fraud risk weight	Low A-Fraud risk weight
Fraud shock	-0.091	-0.215**	-0.647**	0.862***	-0.422**	0.638***
	(0.445)	(0.091)	(0.315)	(0.269)	(0.199)	(0.230)
Performance	0.082	0.005	0.028	-0.034	-0.212***	0.207***
	(0.141)	(0.007)	(0.042)	(0.042)	(0.052)	(0.052)
Flow	-0.039**	0.001	-0.008*	0.007*	-0.017***	0.016***
	(0.016)	(0.001)	(0.004)	(0.004)	(0.005)	(0.005)
Log(Age)	0.037	0.001	-0.005	0.004	0.013	-0.014
	(0.036)	(0.003)	(0.013)	(0.013)	(0.017)	(0.017)
Log(TNA)	-0.056***	-0.001	-0.005	0.006	-0.003	0.004
	(0.013)	(0.001)	(0.006)	(0.006)	(0.008)	(0.008)
Expense	0.244	-0.066	-0.995***	1.060***	-1.218***	1.284***
	(1.054)	(0.055)	(0.264)	(0.265)	(0.344)	(0.347)
Turnover	-0.161	-0.005	-0.017	0.022	-0.051**	0.056***
	(0.183)	(0.004)	(0.013)	(0.013)	(0.020)	(0.021)
Constant	-0.035	0.015	0.124**	-0.139**	0.283***	-0.298***
	(0.181)	(0.012)	(0.059)	(0.060)	(0.075)	(0.076)
Observations	33,006	73,673	73,673	73,673	73,673	73,673
R-squared	0.013	0.003	0.017	0.017	0.013	0.013

Table 3
Exposure to Financial Reporting Fraud and Changes in Mutual Fund Allocation in High and Low Fraud Risk Stocks: Long-term Effects

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund allocations in cash, fraud firm stocks, and stocks with high and low estimated fraud risk over next 4 quarters following the revelation of financial reporting fraud at companies in their portfolio on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. Panel A presents results for quarterly changes in portfolio holdings in fraud firm stocks; Panels B and C present results on quarterly changes of the portfolio weight of stocks with high (low) F-fraud risk, estimated based on the firm's F-Score defined in Dechow et al. (2011); and Panels D and E present results on quarterly changes of the portfolio weight in stocks with high (low) A-fraud risk, estimated based on the absolute values of total accruals less non-discretionary accruals computed as per Bergstressor and Philippon (2006), following fraud exposure. All independent variables are measured over the previous year; controls are not tabulated for brevity. All models include year- and style-fixed effects. Standard errors are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Qtr. (t+1)	Qtr. (t+2)	Qtr. (t+3)	Qtr. (t+4)
	Panel A. Changes in weight on fraud firm stocks			
Fraud shock	-0.215**	-0.183*	-0.214**	-0.237
	(0.091)	(0.097)	(0.093)	(0.170)
	Panel B. Changes in weight on high F-fraud risk stocks			
Fraud shock	-0.647**	-0.366	-0.880***	-0.253
	(0.315)	(0.310)	(0.217)	(0.184)
	Panel C. Changes in weight on low F-fraud risk stocks			
Fraud shock	0.862***	0.549**	1.094***	0.490*
	(0.269)	(0.267)	(0.260)	(0.289)
	Panel D. Changes in weight on high A-fraud risk stocks			
Fraud shock	-0.422**	-0.731***	-0.319	-0.308
	(0.199)	(0.178)	(0.207)	(0.317)
	Panel E. Changes in weight on low A-fraud risk stocks			
Fraud shock	0.638***	0.914***	0.533***	0.545
	(0.230)	(0.211)	(0.185)	(0.463)
Observations	73,673	73,499	62,907	61,584

Table 4

Exposure to Financial Reporting Fraud and Change in Mutual Fund Total Portfolio Risk

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund total portfolio risk over the next quarter following the revelation of financial reporting fraud at companies in their portfolio on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. The first model estimates the risk of the total mutual fund portfolio; the second model excludes all fraud firms; the third model excludes all stock from the fraud firms' industry; while the last two models exclude stocks with high expected fraud risk based on the *F-Fraud risk* (as defined in Dechow et al. (2011)) and *A-Fraud risk* (as defined in Bergstressor and Philippon (2006)) measures. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Change in Mutual Fund Total Portfolio Risk					
	All Stocks in the Portfolio	Excluding Fraud Firms	Excluding Fraud Firms' Industries	Excluding Stocks with High F-Fraud risk	Excluding Stocks with High A-Fraud risk
Fraud shock	-0.256***	-0.250***	-0.244***	-0.255***	-0.248***
	(0.021)	(0.020)	(0.018)	(0.021)	(0.020)
Performance	0.001	0.001	-0.000	0.000	0.002
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Flow	-0.002***	-0.002***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.002***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.003***	-0.048***	-0.062***	-0.048***	-0.044***
	(0.000)	(0.014)	(0.015)	(0.014)	(0.014)
Expense	-0.048***	0.001	0.002***	0.001	0.001
	(0.014)	(0.001)	(0.001)	(0.001)	(0.001)
Turnover	0.001	0.038***	0.041***	0.038***	0.037***
	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)
Observations	143,043	143,043	142,906	143,031	143,029
R-squared	0.066	0.066	0.058	0.068	0.069

Table 5
Exposure to Financial Reporting Fraud and Changes in Mutual Fund Total Portfolio Risk: Long-term Effects

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund portfolio risk over the next four quarters following the revelation of financial reporting fraud at companies in their portfolio on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Change in Mutual Fund Total Portfolio Risk			
	Qtr. (t+1)	Qtr. (t+2)	Qtr. (t+3)	Qtr. (t+4)
Fraud shock	-0.256***	-0.239***	-0.038***	0.025
	(0.021)	(0.025)	(0.011)	(0.015)
Performance	0.001	-0.007*	-0.002	0.004
	(0.004)	(0.004)	(0.004)	(0.003)
Flow	-0.002***	-0.001**	-0.001**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.002***	0.001	0.000	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Log(TNA)	-0.003***	-0.002***	0.003***	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-0.048***	0.012	0.149***	-0.076***
	(0.014)	(0.018)	(0.023)	(0.016)
Turnover	0.001	0.002**	0.001	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	143,043	127,652	133,457	128,922
R-squared	0.066	0.028	0.065	0.023

Table 6
Exposure to Financial Reporting Fraud and Changes in Mutual Fund Systematic Risk, Residual Risk, and Activeness

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund portfolio market beta, idiosyncratic risk, number of stocks, tracking error against the market, tracking error against a style index, and active share measure over the next quarter following the revelation of financial reporting fraud at companies in their portfolio on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Market beta* is estimated as the beta coefficient from the market model estimated based on daily fund and market returns over a quarter. *Residual risk* is estimated as the standard deviation of the residuals from the market model estimated based on daily fund and market returns over a quarter. *TE against market (style)* is the standard deviation of daily fund returns in excess of the returns of the market (style benchmark) portfolio over a quarter. *Active share* is the percentage of stock holdings in a fund portfolio that deviate from the benchmark index. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Change in Systematic vs Idiosyncratic Risk			Change in Fund Activeness		
	Market beta	Residual risk	Number of stocks	TE against market	TE against style	Active Share
Fraud shock	-0.041***	-0.045***	0.833**	-0.042***	-0.042***	-0.004**
	(0.006)	(0.005)	(0.355)	(0.006)	(0.005)	(0.002)
Performance	0.000	-0.005***	0.196*	-0.004***	-0.004***	0.002***
	(0.001)	(0.001)	(0.103)	(0.002)	(0.001)	(0.000)
Flow	-0.001***	-0.000**	0.039***	-0.001***	-0.000***	-0.000*
	(0.000)	(0.000)	(0.013)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.001***	0.000	-0.088**	-0.001***	-0.000	-0.000
	(0.000)	(0.000)	(0.042)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.001***	-0.001***	-0.056***	-0.000***	-0.000*	-0.000
	(0.000)	(0.000)	(0.019)	(0.000)	(0.000)	(0.000)
Expense	-0.015***	-0.003	-2.617**	-0.008	-0.001	0.003
	(0.005)	(0.007)	(1.044)	(0.008)	(0.007)	(0.004)
Turnover	-0.001***	-0.000	0.019	-0.001*	-0.001**	0.000
	(0.000)	(0.000)	(0.021)	(0.000)	(0.000)	(0.000)
Constant	0.010***	0.006***	0.873***	0.008***	0.004***	-0.004***
	(0.001)	(0.001)	(0.187)	(0.002)	(0.002)	(0.001)
Observations	143,043	143,043	95,690	143,043	142,861	53,080
R-squared	0.012	0.048	0.009	0.047	0.039	0.016

Table 7

Exposure to Financial Reporting Fraud and Reliance on Analyst Recommendations

The table reports coefficient estimates and standard errors from regressions of changes in recommended buys and sells in a mutual fund portfolio over the next quarter following the revelation of financial reporting fraud at companies in their portfolio on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; *Turnover*, the annual fund turnover ratio; and the changes in number of new buys/sells, defined as number of newly issued buy/sell recommendations. The dependent variable in the first two (second two) columns is defined as the change in the ratio of recommended purchases (sales) relative to total purchases (sales) by a mutual fund in a given quarter expressed in terms of both dollar volume and number of shares. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Change in the Recommended Buys		Change in Recommended Sells	
	Dollar Value	Num. Shares	Dollar Value	Num. Shares
Fraud shock	-3.299***	-1.842***	-0.249	0.012
	(0.663)	(0.500)	(0.212)	(0.145)
Performance	0.003	-0.027	0.025	0.013
	(0.153)	(0.122)	(0.051)	(0.040)
Flow	0.003	-0.005	0.009**	0.004
	(0.010)	(0.008)	(0.004)	(0.004)
Log(Age)	-0.048	-0.047*	0.020*	0.019**
	(0.031)	(0.027)	(0.011)	(0.009)
Log(TNA)	0.034**	0.035***	-0.013***	-0.007*
	(0.014)	(0.012)	(0.005)	(0.004)
Expense	-0.044	0.058	0.046	-0.204
	(0.588)	(0.481)	(0.322)	(0.194)
Turnover	-0.012	-0.046	-0.070	-0.030
	(0.032)	(0.037)	(0.051)	(0.026)
New buys	0.001	0.003***		
	(0.000)	(0.000)		
New sells			0.016***	0.018***
			(0.001)	(0.001)
Observations	106,941	106,954	106,808	107,255
R-squared	0.017	0.026	0.007	0.014

Table 8

Exposure to Financial Reporting Fraud and Mutual Fund Allocation Decisions: Conditioning on Fund Age

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund weight on stocks with high fraud risk, total portfolio risk, market beta, residual risk, and tracking error against a style-based benchmark on the following independent variables with a fund age interaction effect: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Weight on high fraud risk stocks* is based on the *F-Fraud risk* measure (as defined in Dechow et al. (2011)) calculated at the end of quarter. *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. *Market beta* is estimated as the beta coefficient from the market model estimated based on daily fund and market returns over a quarter. *Residual risk* is estimated as the standard deviation of the residuals from the market model estimated based on daily fund and market returns over a quarter. *TE against style* is the standard deviation of daily fund returns in excess of the returns of the style benchmark portfolio over a quarter. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Changes of Mutual Fund Portfolio Allocation Decisions				
	Weight on high fraud risk stocks	Total portfolio risk	Market beta	Residual risk	TE against style
Fraud shock	-0.860***	-0.276***	-0.027**	-0.033***	-0.044***
	(0.270)	(0.046)	(0.013)	(0.012)	(0.014)
Fraud shock * Log(Age)	0.131	0.009	-0.007	-0.006	0.001
	(0.161)	(0.022)	(0.007)	(0.006)	(0.006)
Performance	0.030	0.001	0.000	-0.005***	-0.004***
	(0.042)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.008*	-0.002***	-0.001***	-0.000**	-0.000***
	(0.014)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.008	-0.003***	-0.001***	0.000	-0.000
	(0.014)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.005	-0.003***	-0.001***	-0.001***	-0.000*
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-1.007***	-0.048***	-0.015***	-0.004	-0.001
	(0.264)	(0.014)	(0.005)	(0.007)	(0.007)
Turnover	-0.017	0.001	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.127	0.039***	0.010***	0.006***	0.004***
	(0.059)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,491	143,043	143,043	143,043	142,861
R-squared	0.017	0.066	0.012	0.048	0.039

Table 9
Exposure to Financial Reporting Fraud and Mutual Fund Allocation Decisions: Excluding High Profile Fraud Cases

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund weight on high fraud risk stocks, total portfolio risk, market beta, residual risk, and tracking error against a style-based benchmark on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Weight on high fraud risk stocks* is calculated based on the *F-Fraud risk* (as defined in Dechow et al. (2011)) estimated at the quarter. *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. *Market beta* is estimated as the beta coefficient from the market model estimated based on daily fund and market returns over a quarter. *Residual risk* is estimated as the standard deviation of the residuals from the market model estimated based on daily fund and market returns over a quarter. *TE against style* is the standard deviation of daily fund returns in excess of the returns of the style benchmark portfolio over a quarter. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. The sample excludes all high-profile fraud cases, defined as cases who meet two of the following three criteria: 1) 1 of the 25 largest frauds in dollars based on data from SEC AAERs; 2) 1 of the 25 largest frauds based on number of media articles about the firm in the quarter following public revelation of the fraud; and 3) presence on a list of major accounting scandals https://en.wikipedia.org/wiki/Accounting_scandals. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Changes of Mutual Fund Portfolio Allocation Decisions				
	Weight on high fraud risk stocks	Total portfolio risk	Market beta	Residual risk	TE against style
Fraud shock	-0.778**	-0.299***	-0.038***	-0.043***	-0.046***
	(0.325)	(0.026)	(0.010)	(0.007)	(0.008)
Performance	0.030	0.002	0.000	-0.005***	-0.004***
	(0.041)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.008*	-0.002***	-0.001***	-0.000**	-0.000***
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.005	-0.002***	-0.001***	0.000	-0.000
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.005	-0.003***	-0.001***	-0.001***	-0.000*
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-0.993***	-0.048***	-0.015***	-0.004	-0.001
	(0.264)	(0.014)	(0.005)	(0.007)	(0.007)
Turnover	-0.017	0.001	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.119**	0.036***	0.010***	0.006***	0.004**
	(0.058)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.066	0.011	0.048	0.039

INTERNET APPENDIX

MagnaChip Semiconductor Fraud Case

MagnaChip is a South-Korea-based semiconductor company which has been publicly traded in the United States since its Initial Public Offering ("IPO") in 2011. Shortly after its IPO, MagnaChip began engaging in a variety of practices to inappropriately inflate its revenues and meet the gross margin targets it previously had announced to the public. In several instances, the improper accounting practices involved employees throughout the company, including some employees directed and overseen by MagnaChip's former Chief Financial Officer. From mid-2011 through December 2013 (the "relevant period"), it engaged in a variety of practices that artificially boosted revenue, improperly delayed or avoided expenses or reductions in revenue, smoothed reported gross margin, and concealed delays in collections.

Beginning in the Fall of 2013, members of MagnaChip's Board and Audit Committee began to question management in Korea about the Company's rising accounts receivable balances. In late 2013, MagnaChip's Audit Committee initiated an independent internal investigation that in January 2014 uncovered certain revenue recognition problems. At that time, the Company self-reported the revenue issues to the SEC, the issues were made public. During the ensuing investigation, additional fraudulent practices were uncovered. As a result, the Company restated its financial statements in early 2015, reducing its previously reported revenue during the relevant period by $121 million.

https://www.sec.gov/litigation/admin/2017/33-10352.pdf

MagnaChip Semiconductor Fraud Timeline

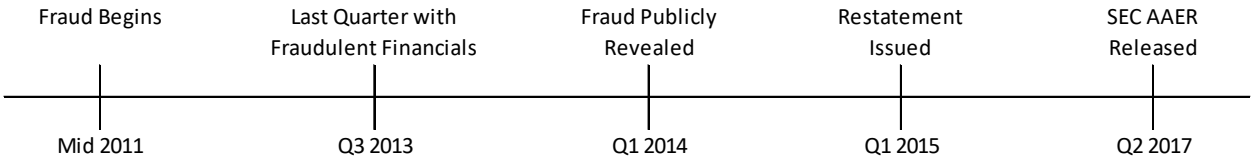

Table A.1
Summary Statistics

The table presents mean values of the main variables in the sample across managers exposed to financial reporting fraud and managers not exposed. The last column reports the difference between the mean values and standard errors from a test that the differences are significantly different from zero. Precise variable definitions are provided in the Appendix.

	Unexposed	Exposed	Difference
Raw return	0.923	0.916	-0.007
			(0.056)
Flow	0.602	0.525	-0.078
			(0.079)
Size	854.141	1611.98	757.836***
			(182.6)
Age	14.664	14.322	-0.341
			(0.460)
Expense	0.100	0.085	-0.014***
			(0.002)
Turnover	0.845	0.814	-0.031
			(0.034)
Total portfolio risk	1.111	1.115	0.004
			(0.020)
Fraud firm weight	0.217	0.531	0.314***
			(0.081)
High F-Fraud risk weight	7.062	8.796	1.734**
			(0.73)
High A-Fraud risk weight	10.155	11.878	1.723**
			(0.805)

Table A.2
Changes in Mutual Fund Allocation in High and Low Fraud Risk Stocks following Exposure to Financial Reporting Fraud: Alternative Specifications

The table reports coefficient estimates and standard errors from regressions of quarterly changes of mutual fund allocations in fraud firm stocks and stocks with high and low estimated fraud risk over the next quarter following the revelation of financial reporting fraud on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets;; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. Column 1 presents results for quarterly changes in portfolio holdings in fraud firm stocks; Columns 2 and 3 present results on quarterly changes of the portfolio weight in stocks with high (low) A-fraud risk, estimated based on the absolute values of total accruals less non-discretionary accruals computed as per Bergstressor and Philippon (2006); and Columns 4 and 5 present results on quarterly changes of the portfolio weight of stocks with high (low) F-fraud risk, estimated based on the firm's F-Score defined in Dechow et al. (2011). In Panel A (Panel B), the baseline model is estimated over the sample of funds experiencing a fraud and a control group of funds with similar style, size, and F-fraud risk (A-fraud risk) measured over the previous year, while in Panel C, the dependent variables over a quarter are calculated as the log ratio of the corresponding weights at the end and the beginning of the quarter. Control variables are not tabulated for brevity. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

		A-fraud risk		F-fraud risk	
	ΔFraud firm weight	ΔWeight on high fraud risk stocks	ΔWeight on low fraud risk stocks	ΔWeight on high fraud risk stocks	ΔWeight on low fraud risk stocks
Panel A. Matching with funds of similar style, size, and F-fraud risk					
Fraud shock	-0.051	-0.583***	0.634***	-0.570**	0.621**
	(0.089)	(0.186)	(0.227)	(0.279)	(0.243)
Observations	47,693	47,693	47,693	47,693	47,693
R-squared	0.009	0.029	0.028	0.032	0.028
Panel B. Matching with funds of similar style, size, and A-fraud risk					
Fraud shock	-0.256***	-0.537***	0.793***	-0.544*	0.801***
	(0.080)	(0.189)	(0.220)	(0.280)	(0.261)
Observations	47,801	47,801	47,801	47,801	47,801
R-squared	0.031	0.027	0.024	0.029	0.027
Panel C. Dependent variables are calculated as log ratios over a quarter					
Fraud shock	-0.143***	-0.108***	0.015*	-0.068**	0.010**
	(0.040)	(0.032)	(0.009)	(0.027)	(0.004)
Observations	13,639	61,608	62,668	60,605	62,677
R-squared	0.008	0.015	0.011	0.017	0.017

Table A.3
Exposure to Financial Reporting Fraud and Change in Mutual Fund Total Portfolio Risk: Matched Sample Estimation

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund total portfolio risk, market beta, idiosyncratic risk, and tracking error against a style-based benchmark over the next quarter following the revelation of financial reporting fraud on the following independent variables using a matched sample: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets;; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. The sample consists of all funds exposed to financial reporting fraud and a control group of unexposed funds with similar style, size, and Total portfolio risk. All models include year- and style-fixed effects. *Total portfolio risk* is defined as the standard deviation of daily fund returns over a quarter. *Market beta* is estimated as the beta coefficient from a quarterly market model estimated based on daily fund and market returns. *Residual risk* is estimated as the standard deviation of the residuals from a market model estimated based on daily fund and market returns over a quarter. *TE against style* is the standard deviation of daily fund returns in excess of the returns of the style benchmark portfolio over a quarter. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. All independent variables are measured over the previous year. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Changes of Mutual Fund Portfolio Risk Measures			
	Total portfolio risk	Market beta	Residual risk	TE against style
Fraud shock	-0.177***	-0.050***	-0.023***	-0.028***
	(0.015)	(0.005)	(0.005)	(0.005)
Performance	-0.000	0.001	-0.008***	-0.012***
	(0.007)	(0.002)	(0.003)	(0.003)
Flow	-0.003***	-0.003***	-0.001***	-0.001***
	(0.001)	(0.000)	(0.000)	(0.000)
Log(Age)	0.000	-0.003***	-0.001	-0.002***
	(0.002)	(0.001)	(0.001)	(0.001)
Log(TNA)	-0.001*	-0.001***	-0.000	0.000
	(0.001)	(0.000)	(0.000)	(0.000)
Expense	-0.030	0.007	-0.057***	-0.052***
	(0.032)	(0.012)	(0.011)	(0.012)
Turnover	0.003***	0.000	0.001***	0.000
	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.000	0.017***	0.006**	0.011***
	(0.007)	(0.002)	(0.003)	(0.003)
Observations	77,777	77,777	77,777	77.726
R-squared	0.072	0.026	0.064	0.066

Table A.4
Exposure to Financial Reporting Fraud and Change in Mutual Fund Portfolio Risk Measures: Alternative Fraud Revelation Times

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund weight on high fraud risk stocks, portfolio total risk, market beta, residual risk, and tracking error against style-based benchmark over the next quarter following the revelation of financial reporting fraud on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Weight on high fraud risk stocks* is calculated based on *F-Fraud risk* (as defined in Dechow et al. (2011)). *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. *Market Beta* is estimated as the beta coefficient from a quarterly market model estimated based on daily fund and market returns. *Residual risk* is estimated as the standard deviation of the residuals from a market model estimated based on daily fund and market returns over a quarter. *TE against style* is the standard deviation of daily fund returns in excess of the returns of the style benchmark portfolio over a quarter. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. Panel A defines the fraud revelation time as the quarter with the lowest abnormal return among the last fraud quarter and the three subsequent quarters, while Panel B defines the fraud revelation time as the first quarter fraud is mentioned in connection with the firm in media articles or press releases. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Table A.4 (contd.)

Panel A. Fraud revelation time is defined as the quarter with Min CAR					
	ΔWeight on high fraud risk stocks	ΔTotal portfolio risk	ΔMarket beta	ΔResidual risk	ΔTE against style
Fraud Shock (Timing 1)	-0.325**	-0.140***	-0.032***	-0.041***	-0.033***
	(0.156)	(0.009)	(0.006)	(0.004)	(0.004)
Performance	0.029	0.003	0.000	-0.005***	-0.004**
	(0.041)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.009**	-0.002***	-0.001***	-0.000***	-0.000***
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.007	-0.002***	-0.001***	0.000	-0.000
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.004	-0.003***	-0.001***	-0.000***	-0.000
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-0.975***	-0.047***	-0.014***	-0.003	0.000
	(0.262)	(0.014)	(0.005)	(0.007)	(0.007)
Turnover	-0.016	0.001	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.113*	0.035***	0.010***	0.006***	0.004**
	(0.058)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,828	143,683	143,683	143,683	143,501
R-squared	0.017	0.066	0.012	0.049	0.039
Panel B. Fraud revelation time is defined based on article searches					
	ΔWeight on high fraud risk stocks	ΔTotal portfolio risk	ΔMarket beta	ΔResidual risk	ΔTE against style
Fraud Shock (Timing 2)	-0.572***	-0.380***	-0.018***	-0.054***	-0.041***
	(0.209)	(0.018)	(0.006)	(0.005)	(0.004)
Performance	0.027	-0.001	0.000	-0.006***	-0.004**
	(0.041)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.009**	-0.002***	-0.001***	-0.000**	-0.000***
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.005	-0.002***	-0.001***	0.000	-0.000
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.006	-0.003***	-0.001***	-0.001***	-0.000*
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-0.984***	-0.033***	-0.014***	-0.001	-0.000
	(0.264)	(0.014)	(0.005)	(0.007)	(0.007)
Turnover	-0.016	0.001	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.123**	0.040***	0.009***	0.006***	0.004**
	(0.058)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.068	0.011	0.049	0.039

Table A.5
Exposure to Financial Reporting Fraud and Changes in Mutual Fund Portfolio Risk: Alternative Fraud Shock Measures

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund weight on high fraud risk stocks, portfolio total risk, market beta, residual risk, and tracking error against style-based benchmark over the next quarter following the revelation of financial reporting fraud on the following independent variables: *Fraud shock,* defined differently for Panels A, B, and C below; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Weight on high fraud risk stocks* is calculated based on *F-Fraud risk* (as defined in Dechow et al. (2011)). *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. *Market Beta* is estimated as the beta coefficient from a quarterly market model estimated based on daily fund and market returns. *Residual risk* is estimated as the standard deviation of the residuals from a quarterly market model estimated based on daily fund and market returns. *TE against style* is the standard deviation of daily fund returns in excess of the returns of the style benchmark portfolio. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. Panel A defines the fraud shock as the average portfolio weight of fraud firms held by a fund, averaged over the previous four quarters (*Fraud shock (weight)*). Panel B defines the fraud shock as the number of fraud firms held by a fund, averaged over the previous quarter (*Fraud shock (number)*). Panel C defines the fraud shock as an indicator variable for the presence of a fraud firm in a mutual fund portfolio over the previous four quarters (*Fraud shock (indicator)*). All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

Panel A. Fraud shock is defined based on the portfolio weight of fraud firms

	ΔWeight on high fraud risk stocks	ΔTotal portfolio risk	ΔMarket beta	ΔResidual risk	ΔTE against style
Fraud shock	-13.380***	-0.111***	-0.011***	-0.018***	-0.016***
(weight)	(4.409)	(0.004)	(0.001)	(0.001)	(0.001)
Performance	0.031	0.001	0.000	-0.005***	-0.004***
	(0.041)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.009**	-0.002***	-0.001***	-0.000***	-0.000***
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.005	-0.003***	-0.001***	-0.000	-0.000
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.006	-0.003***	-0.001***	-0.000***	-0.000*
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-1.000***	-0.051***	-0.015***	-0.004	-0.002
	(0.264)	(0.014)	(0.005)	(0.007)	(0.007)
Turnover	-0.018	0.000	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.129**	0.049***	0.011***	0.008***	0.006***
	(0.059)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.068	0.012	0.049	0.039

Panel B. Fraud shock is defined based on number of fraud firms in the portfolio					
	ΔWeight on high fraud risk stocks	ΔTotal portfolio risk	ΔMarket beta	ΔResidual risk	ΔTE against style
Fraud shock (number)	-0.154***	-0.063***	-0.005***	-0.006***	-0.006***
	(0.039)	(0.004)	(0.001)	(0.001)	(0.001)
Performance	0.033	0.002	0.000	-0.005***	-0.004**
	(0.041)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.008*	-0.001***	-0.001***	-0.000**	-0.000**
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.008	-0.004***	-0.001***	-0.000	-0.001*
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.004	-0.002***	-0.001***	-0.000***	-0.000
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-1.126***	-0.152***	-0.023***	-0.014*	-0.011
	(0.270)	(0.016)	(0.006)	(0.008)	(0.008)
Turnover	-0.018	0.001	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.136**	0.048***	0.010***	0.007***	0.005***
	(0.059)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.066	0.011	0.048	0.039

Panel C. Fraud shock is defined based on an indicator variable for exposure to fraud					
	ΔWeight on high fraud risk stocks	ΔTotal portfolio risk	ΔMarket beta	ΔResidual risk	ΔTE against style
Fraud shock (indicator)	-0.083***	-0.012***	0.002**	-0.002***	-0.002***
	(0.027)	(0.002)	(0.001)	(0.001)	(0.001)
Performance	0.032	0.003	0.001	-0.005***	-0.004**
	(0.041)	(0.004)	(0.001)	(0.001)	(0.001)
Flow	-0.009**	-0.001***	-0.001***	-0.000**	-0.000***
	(0.004)	(0.000)	(0.000)	(0.000)	(0.000)
Log(Age)	-0.008	-0.002***	-0.001***	0.000	-0.000
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Log(TNA)	-0.004	-0.003***	-0.001***	-0.000***	-0.000
	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
Expense	-1.111***	-0.070***	-0.012**	-0.008	-0.005
	(0.270)	(0.014)	(0.006)	(0.007)	(0.007)
Turnover	-0.017	0.001	-0.001***	-0.000	-0.001**
	(0.013)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.136**	0.036***	0.009***	0.006***	0.004**
	(0.059)	(0.004)	(0.001)	(0.001)	(0.002)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.065	0.011	0.048	0.039

Table A.6 Exposure to Financial Reporting Fraud and Changes in Mutual Fund Risk Measures: Alternative Model Specifications

The table reports coefficient estimates and standard errors from regressions of changes of mutual fund weight on high fraud risk stocks, portfolio total risk, market beta, residual risk, and tracking error against style-based benchmark over the next quarter following the revelation of financial reporting fraud on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. *Weight on high fraud risk stocks* is calculated based on *F-Fraud risk* (as defined in Dechow et al. (2011)). *Total portfolio risk* is estimated as the standard deviation of daily fund returns over a quarter. *Market Beta* is estimated as the beta coefficient from a market model estimated based on daily fund and market returns over a quarter. *Residual risk* is estimated as the standard deviation of the residuals from a quarterly market model estimated based on daily fund and market returns. *TE against style* is the standard deviation of daily fund returns in excess of the returns of the style benchmark portfolio over a quarter. Funds are classified into 9 style categories based on the size and book-to-market characteristics of the funds' holdings. Panel A estimates the risk measures based on daily fund returns reported in CRSP; Panel B estimates the baseline models including state fixed effects for the location of the fund; Panel C estimates the baseline model with fund fixed effects; while Panel D excludes all fraud cases from year 2001. Control variables are not tabulated for brevity and are defined in the Appendix. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	ΔWeight on high fraud risk stocks	ΔTotal portfolio risk	ΔMarket beta	ΔResidual risk	ΔTE against style
Panel A. Risk measures calculated based on CRSP daily fund returns (1999-2018)					
Fraud shock	N.A.	-0.243***	-0.038***	-0.051***	-0.048***
	N.A.	(0.023)	(0.005)	(0.006)	(0.005)
Observations	N.A.	111,772	111,772	111,772	111,772
R-squared	N.A.	0.082	0.012	0.078	0.050
Panel B. Including fund state fixed effects					
Fraud shock	-0.645**	-0.257***	-0.041***	-0.045***	-0.043***
	(0.316)	(0.021)	(0.006)	(0.005)	(0.005)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.066	0.012	0.048	0.039
Panel C. Including fund fixed effects					
Fraud shock	-0.644*	-0.278***	-0.039***	-0.051***	-0.046***
	(0.357)	(0.023)	(0.005)	(0.006)	(0.006)
Observations	73,673	143,891	143,891	143,891	142,861
R-squared	0.042	0.070	0.018	0.055	0.047
Panel D. Excluding fraud cases in 2001					
Fraud shock	-0.537*	-0.270***	-0.042***	-0.049***	-0.046***
	(0.328)	(0.023)	(0.006)	(0.006)	(0.006)
Observations	73,673	143,043	143,043	143,043	142,861
R-squared	0.017	0.066	0.012	0.048	0.039

Table A.7
Exposure to Financial Reporting Fraud and Mutual Fund Flows

The table reports coefficient estimates and standard deviations from regressions of mutual fund flows over the next four quarters following the revelation of financial reporting fraud of a company in their portfolio over the previous year on the following independent variables: *Fraud shock*, the average loss experienced by a fund over the prior year due to fraud firm stock holdings, measured as the percentage of the fund's total net assets; *Performance*, the percentile performance ranking of the fund within its style category; *Flow*, the average monthly flows into the fund; *Log(Age)*, the logarithm of 1 plus fund age; *Log(TNA)*, the logarithm of fund TNA; *Expense*, the monthly fund expense ratio; and *Turnover*, the annual fund turnover ratio. All independent variables are measured over the previous year. All models include year- and style-fixed effects. Standard errors in all models are adjusted for clustering at the fund level. The last two rows report the total number of observations and adjusted R-squared of each regression. (***), (**), and (*) indicate statistical significance at the 0.01, 0.05 and 0.10 level, respectively.

	Qtr. (t+1)	Qtr. (t+2)	Qtr. (t+3)	Qtr. (t+4)
Fraud shock	-0.201*	0.099	-0.084	0.221
	(0.118)	(0.132)	(0.149)	(0.173)
Performance	1.935***	1.722***	1.453***	1.218***
	(0.037)	(0.040)	(0.042)	(0.043)
Flow	0.508***	0.395***	0.311***	0.250***
	(0.005)	(0.006)	(0.007)	(0.007)
Log(Age)	-0.020	-0.055***	-0.067***	-0.063***
	(0.013)	(0.016)	(0.018)	(0.020)
Log(TNA)	-0.141***	-0.166***	-0.189***	-0.208***
	(0.006)	(0.008)	(0.009)	(0.010)
Expense	-2.667***	-3.557***	-4.313***	-4.930***
	(0.276)	(0.334)	(0.375)	(0.407)
Turnover	0.037***	0.041***	0.046***	0.043**
	(0.013)	(0.015)	(0.016)	(0.018)
Constant	0.034	0.419***	0.787***	1.038***
	(0.061)	(0.074)	(0.084)	(0.090)
Observations	146,582	144,919	143,187	141,430
R-squared	0.282	0.202	0.148	0.116