# Portfolio Allocation and Business Connection: Evidence from Mutual Fund Misconduct*

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**Abstract**

I investigate whether mutual fund advisory misconduct influence the investment portfolio allocation of fund families regarding their portfolio firms with 401(k) business ties using a comprehensive data set. I find that mutual fund families significantly increase investment portfolio weights on their pension clients after mutual fund advisory misconduct is revealed to public. Increasing portfolio weights on pension client stocks is likely to be motivated by a strategic effort to minimize the probability of pension business termination induced by fraud-driven trust collapse. I find that client stocks are performing worse than non-client stocks in the same portfolio and indifferent with net selling non-client stocks. Overall, my results suggest that fund families sacrifice fund returns to keep pension clients for their private benefits and it implies the identification of systematic inferior investment decisions after fraud revelation.

Keywords: Mutual Funds, Conflicts of interest, Portfolio allocation, Trust, Misconduct
JEL Classification: G21, G23, G41.

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# 1. Introduction

As the *majority* of mutual funds are held as retirement assets (58% in 2021), the pension plan sponsors emerged as big clients in fund management industry because board members in sponsors make decision of business contracts with fund management (Goyal and Wahal (2008) and Cohen and Schmidt (2009)). However, the actual holders of such fund holders are households and they hold the most of mutual fund total net assets (88% in 2021).[1] With such misalignment of incentive for fund management companies, this agency problem might induce distortion in their behavior. This strategic distortion may harms households' financial well-being through the sub-optimal investment decision beneficial to fund managers not fund holders. Therefore, for regulators and investors, it is important to understand this fiduciary-violating investment.

Previous literature on the agency problems associated with such business ties between 401(k) plan sponsor firm and fund management company has concentrated on the corporate governance (Davis and Kim (2007), Ashraf et al. (2012), and Cvijanović et al. (2016)). Moreover, Cohen and Schmidt (2009) shows the overweight of client stocks in their portfolio conditional on the pre-existent ties. A broad literature on the conflicts of interest under such business ties examine how agency problem affects the behavior of fund companies in a *static* and *conditional* settings. In this paper, I focus instead on *dynamic* pattern of portfolio changes with an unique identification strategy exploiting plausibly exogenous variation in relationship disruption. Specifically, I examine a new channel through which mutual fund companies can maximize probabilities to maintain business ties with big clients following the burst of trust between them.

Conceptually, portfolio weights into clients could have a positive or a negative relation with the revelation of misconduct committed by fund management companies. On the one hand, regulatory action is known to be a trigger of extreme fund outflows (fire-sales) (Liang et al. (2020)) and there is an uniform re-balancing between their holding (Coval and Stafford (2007)) under the fire-sales. Thus, there might have no impact on the weights on their client stocks. If the magnitude of asset outflows is salient, they might sell stocks with high liquidity which includes big clients and it may even reduce their portfolio weights on clients. On the other hand, as Goyal and Wahal (2008) shows, the regulatory actions are one of the major

[1] See Investment Company Institute (for the full 2021 Investment Company Fact Book, visit https://www.icifactbook.org/pdf/2022_factbook.pdf

determinants of termination of business ties and so, under the importance of the business relationship in terms of their profits, relationship disruption could increase portfolio weights toward their client stocks and minimize the probability of contract termination. Under the recognition regarding the importance of trust, which is the crucial assets to maintain contract under agency problems (Guiso et al. (2008), Zingales (2015), Gurun et al. (2018), and Kostovetsky (2016)), mutual fund families might conduct increasing portfolio weights toward their big clients following the event of relationship disruption.

Taken together, whether changes in reputation cause change of investment strategy is an empirical question. In this paper, I exploit quasi-natural experiments of universal regulatory actions to identify whether trust shock affect portfolio strategies onto their client stocks.

To measure the business ties and regulatory actions against mutual fund companies, I use detailed mandatory disclosure filings made by financial advisory companies (see Dimmock and Gerken (2012), Dimmock et al. (2018a), and Liang et al. (2020)) and 401(k) pension plans sponsors (see Davis and Kim (2007), Ashraf et al. (2012), Cvijanović et al. (2016), Goyal and Wahal (2008), and Cohen and Schmidt (2009)). These mandated filings include actual holdings in portfolio managed by mutual fund company, the announcement date and agency of regulatory actions, the name of mutual fund companies that were hired by 401(k) pension plan sponsors, and the amount of compensation under the contracts. Using the detailed contracts between fund companies and 401(k) sponsors, I construct the panel data of the pension business ties.

Identifying whether regulatory action affects investment portfolio strategy is complicated by possible confounding variation. A potential endogeneity concern is that the situation in mutual fund industry or mutual fund families could affect both involvement in fraudulent behavior and their investment trading pattern. Moreover, the investment decision made on their client stocks might affect their tendency to commit misconduct. Using the announcement date of fraud detection by regulatory agency, I exploit the variation of trust against fund companies. Dimmock and Gerken (2012) shows the significant discrepancy in timing between actual fraud and its detection and it implies the announcement timing as a plausibly exogenous variation to trust shock irrelevant to economic situations that might confound the results.

Furthermore, I rely on multiple unique fixed effects for identification. Specifically, my baseline specification includes quarter and management company $\times$ client stock fixed effects. The quarter fixed effects control for any time-varying characteristics in overall econ-

omy or mutual fund industry. The management company × Client stock fixed effects remove any unique time-invariant heterogeneity across each business relationship, such as any unknown personal relationships, business histories, and individual trust between them (Cohen et al. (2008) and Cohen et al. (2010)). Moreover, it allows for a within business-relationship comparison of portfolio weight changes.

I find a strong positive relation between portfolio weights of their client stocks and the announcement of regulatory action. Mutual fund families are more likely to tilt portfolio towards client stocks following the fraud revelation. After the fund management company's fraud is revealed to public, they significantly increase portfolio weights of client stocks by 0.08 pp, which is 25% of unconditional mean of portfolio weights on every client stocks.

A potential concern is that the pre-existing increasing trends of portfolio weights on client stocks might to attract big clients (Cohen and Schmidt (2009) might induce mutual companies to conduct illegal activity since fraud can be viewed as one of risky borrowings (Andreoni (1992) and Dimmock et al. (2021)). To address this concerns, I conduct event study analysis to examine the dynamics of treatment effects around the revelation of misconduct committed in mutual fund market. This allow me to check the possibility of the existence of pre-trend. I find that there is no significant change of weights on client stocks prior the treatment shock and the magnitudes are even close to zero. Following the regulatory actions, fund company gradually increase equity portfolio weights into their client stocks.

In addition, each business ties between mutual fund company and 401(k) pension plan sponsors have their own unique relationships and such could affect both tendency to commit misconduct and their investment on client stocks. For instance, if there is salient heterogeneity in terms of the level of the portfolio weights on each client stocks, it might derive the baseline results irrelevant to the channel of conflict of interest. As each sponsors hire different mutual fund companies at different periods, this variation allows me to include management company × client stocks fixed effects and remove any time-invariant confounding variation attribute to each unique business relationships.

I next examine the treatment effect on the probability of termination of such business ties. Goyal and Wahal (2008) document that regulatory action is one of major determinants for pension plan sponsors for terminating business relationship with reputation-harmed fund management company. Consistent with this findings, the fraud-detected companies are more likely to experience business termination by 11 pp. Given that the unconditional probability of

termination in pension business is 13%, the treatment effect is economically significant. More importantly, I decompose the fraud revelation variable into (i) *tilting-to-client* fund company, which is the case when the fraudulent company increase their equity investment portfolio weights on clients at given quarter, and (ii) non *tilting-to-client* fund company, which does not increase their portfolio weights on client stocks. I find evidence of an effectiveness of *tilting-to-client* strategy. It significantly reduced the probability of contract termination relative to the group of non *tilting-to-client* strategy and the divergence persists over multiple quarters.

I further examine the performance of client stocks around the time of fraud revelation. If the *tilting-to-client* strategy is sub-optimal decision, it implies the violation of fiduciary duty imposed on every mutual fund companies. Admittedly, there is an limitation of inference to estimate the best ex-ante choice of invest decision for mutual funds and make statement of the validity of investment strategies. Given that, however, the average holding periods of mutual funds is around 16 months (Tucker (2017)), it is reasonable to compare the stock performance of clients to other stocks within same holdings of the same mutual fund companies around 16 months before and after the treatment shock. I find that client stocks underperform that the average non-client stocks in the same portfolio and and indifferent to (net) selling non-client stocks in the same portfolio. This suggests that *tilting-to-client* strategy may do harm for households' welfare and only beneficiary to fund companies and client stocks.

My paper is first to show that changes in trust under business ties affect affect the mutual funds' investment strategy. Cross-sectional test in the paper shed lights on the mechanisms that derive this relation. I argue that the evidence is most consistent with mechanisms based on conflict of interest.

My paper contributes to several strands of finance and economics literature. First, while previous literature mainly focus on fund managers' conflict of interest in 401(k) pension business in specific corporate events such as proxy voting (Davis and Kim (2007), Ashraf et al. (2012), Cvijanović et al. (2016), and Duan and Jiao (2016)), this paper provides a direct test of the impact of conflicts of interest on investment decision for managers.

Second, this article adds to the growing body of literature on financial misconduct in investment advisory industry, demonstrating that advisory misconduct affects the career for financial advisors (Egan et al. (2019)), working culture (Dimmock et al. (2018b), tendency to commit additional misconduct in future (Dimmock and Gerken (2012)), and mutual fund

outflow (Liang et al. (2020)). In this paper, I identify the client-favorable investment decisions attributable to conflict of interest of mangers against fund shareholders.

My paper is closely related to several papers that examine the correlation between 401(k) trustee fund families and their investment in client stocks. Using data on Fortune 1000 firms, Davis and Kim (2007) indicate that mutual fund families invest more money into their 401(k) clients than other stocks they hold. Similarly, Cohen and Schmidt (2009) find the existence of mutual funds overweight on their client stocks and substantial inflows to fund following the business contracts, suggesting that managers invest funds favorable to clients to attract big clients (i.e., 401(k) plan sponsors).

My article not only differs from, but also complements the aforementioned papers in several dimensions. First and foremost, I examine the *change* of investment strategy under pre-existent business ties exploiting a sharply discontinuous variation in the degree of trust between contract entities, while the previously referenced papers focus on the direct impact of business ties itself to the investment strategy of mutual fund families. My event study analysis examine the dynamic treatment effect around the negative trust shock against mutual fund companies. Second, my focus in on the testing the conflicts of interest between mutual fund managers and fund shareholders, and try to examine the inferiority of *tilting-to-client* strategy. Finally, as identification strategies, I exploit quasi-natural experiments of fraud revelation by regulatory agencies to measure the variation of trust under business ties and unique multiple fixed effects that have not been previously examined.

## 2. Hypothesis Development

According to Lakonishok et al. (1992) and Allen (2001), fund management industry is exposed to salient conflict of interest and fund shareholders need to be wary of such agency problem by financial institutions. The conflict of interest is rooted in the difficulties in ascertaining the quality of advice or investment decisions they make in behalf of their customers. In general, financial institutions have informational advantage about the financial product than customer (Bolton et al. (2007), Baker et al. (2010), and Duan et al. (2018)) but their incentive is out of alignment with the clients whose profit is equal to (net) fund return. For instance, advisory contract is based mostly on the funds asset under management (AUM) and advisors have strong incentive to maximize management fee which is based

on AUM not the actual (net) fund return (Deli (2002), Elton et al. (2003), and Golec and Starks (2004)). As a result, Kostovetsky (2016) shows that trust in asset management become a significantly valuable asset placed by investors and the crash of such relationship may bring investment redemption from investors.

The corporate 401(k) pension plans, which is known as an attractive business from mutual fund company's perspective, also incorporate salient degree of potential conflicts of interest (Davis and Kim (2007), Ashraf et al. (2012), Cohen and Schmidt (2009), and Ashraf et al. (2012)). Therefore, any events that trigger a relationship disruption may affect business relationship between fund management companies and pension clients. Goyal and Wahal (2008) examine the type of events affecting the selection and termination of such relationship and show that regulatory action on fund management company is one of major determinants invoking termination of the business ties. As a result, fund management companies are expected to distort or conduct strategic investment behavior to maintain such business ties when the regulatory action occurs to them, which is beneficial to managers since such big clients are the one of main source of their compensation.

The time-varying relationship of 401(k) pension business between mutual fund companies and pension sponsors offers a unique venue to entertain hypothesis regarding the investment strategy of fund management companies after the regulatory actions against them. The first is *tilting-to-client* strategy. I hypothesize that mutual fund companies have incentive to maintain their existent business ties to maximize their profits linked to AUM following the collapse of trust and conduct an investment strategy favorable to their client stocks while sacrificing fund returns. Therefore, if the incentives from business ties are significant enough to distort investment strategy, I would expect to see a increase in clients stocks weight in equity portfolio of fund management companies. The above hypothesis leads to two related additional predictions. First, such investment strategy effectively reduce the probability of termination of existent business ties. Second, such *tiling-to-client* strategy is sub-optimal from the perspective of fund return itself.

An alternative hypothesis, *re-balancing* strategy, is that fund management companies rebalancing their equity holdings proportionally following the salient withdraw of their assets from investors. Liang et al. (2020) show significant fund outflows following the regulatory actions against mutual fund companies. Coval and Stafford (2007) imply that fund companies uniformly transact their holdings in the events of extreme inflows or outflows (fire-sales).

Taken together, the extreme outflows attribute to the announcement of regulatory actions are likely to re-balance their holdings uniformly, ceteris paribus.

Next, I directly investigate whether the portfolio rebalancing is driven by information or conflict-of-interest. If the increase in portfolio allocation in the client stocks is being driven by inside information, than the performance of client stocks should be outperform than other stocks held in the same portfolio by the same mutual fund company. In the other hand, if the motivation to increase in portfolio allocation in the client stocks is from the effort to avoid termination of business ties, such rebalancing might not attribute to the information about the stock itself. Thus, the stock performance around the relation disruption should inferior to that of other stocks in the same portfolio held by same mutual fund company.

## 3. Data and Sample Construction

Four types of data sources are used for the analysis: Institutional ownership data, business ties data, comprehensive discipline histories on mutual fund management companies and stock information data. In this section I describe these sources and outline my sample construction.

### 3.1 Business ties data

I hand collect business ties data from Form 5500, filed annually with the IRS and the Department of Labor's Employee Benefits Security Administration by corporate pension plan sponsors. Schedule C includes information on service providers when the pension plans have 100 or more participants and the service provider is paid fees exceeding $5,000 from the plan. The IRS employer identification number (EIN) is used to match firms in Form 5000s to CRSP database.

### 3.2 Institutional ownership data

Information on the portfolio holdings of mutual fund management companies comes from Thomson Reuters Institutional Holdings (S34), which covers institutional investors and their security holdings from 13F forms files with the Securities and Exchange Commission (SEC) every quarter. Each quarter, mutual fund management companies are classified as business-tied to a given stock if the mutual fund management company made any contract of pen-

sion plans with that firm to provide financial services, and classified as unrelated otherwise. As a standard criteria used in the literature, only funds more than $1 million of assets under management are included. I then merge the mutual fund family holdings data obtained from SEC Form 13F filings with the Form 5500 data, by using a name-matching algorithm and web-searches of company websites.

### 3.3 Regulatory action data

Information on the historical record of regulatory action on mutual fund management company is hand collected from the Form ADV. All investment advisory firms and representatives in the United States regulated by the Investment Advisor Act of 1940 must file this form. I merge Form ADV with institutional ownership data by the mapping table between the CRD number in the Form ADV to the Thomson Reuters MGRNO and MGRNAME identifiers.[2]

### 3.4 Summary Statistics

{Insert Table 1 about here.}

Table 1 summarizes the sample characteristics. Table 1 shows that my merged data sets contains 28,996 mutual fund management company - client stock - quarter observations from 2001 to 2015. We can see that average portfolio holdings of mutual fund management company for their each client stocks is about 0.328%. The mutual fund companies that have business contract with corporations manage about $90 billion, implying that corporations usually manage pension plans of public corporations. The revelation of misconduct committed by mutual fund management company in my sample is occurred around 1.1% of my observations. This shows the fraud revelation is rare events and it might impose substantial reputation damage on the fraudulent mutual fund management company. The average size of pension plans that a mutual fund management company manages is about $6 billion, which imply the importance of pension operations for firms. I define revenue dependency as the the sum of direct and indirect compensation in 401(k) plan contracts, made between mutual fund management company and corporations, divided by 0.5% of assets under management from total assets mutual fund management company holds. The previous quarter return of entire portfolio managed by mutual fund management company is defined as past

[2]Thanks to William Gerken for sharing this file.

performance and 2.13% on average. The average previous quarter's return of each client stocks is 3.6%. Around 1.3% of business combination is terminated in my sample and half portion of sample increase portfolio weights on client stocks, which imply the portfolio decisions are not skewed on specific direction in my sample.

# 4. Empirical Analysis

I examine the comprehensive regulatory action on mutual fund management company. By focusing on enforcement action events, I can investigate the post-behavior after the reputation crash using both difference-in-differences framework and event study design around the regulator actions. Since some firms are not exposed to the fraud, I am able to estimate differences in the changes on investment strategy across mutual fund companies with different exposure to reputation shock.

## 4.1 Difference-in-differences

To investigate whether the revelation of fraud committed by mutual fund management company affect their portfolio allocation to their business clients is complicated as various unobservable factors might affect both their investment decisions. To remove such potentially confounding variation, I use unique granular fixed effects.

$$y_{m,s,t} = \eta_{m,s} + \lambda_t + \beta\, Post_{m,t} \times Fraudulent_{m,s} + \boldsymbol{X_{i,t-1}}\boldsymbol{\gamma} + \varepsilon_{m,s,t}\,, \tag{1}$$

where $Post_t$ is equals to 1 if fraud committed by any mutual fund management company, who has pension contract with firm in my sample, has been revealed to public before or at quarter $t$. To measure the exposure of client $s$ to fraud revelation committed by their business partners $m$, I create an indicator variable, $Fraudulent$, that is set to one for stocks whose managers made pension contract with fraudulent fund company. The coefficient $\beta$ represent the average impact of fraud revelation on their investment of client stocks.

To the best of my knowledge, I am the first to introduce a rigorous fixed effects to control unobservable factors that is critical to understand the behavior under this bilateral business relationship between two agents. The granular *Mutual fund management company* $\times$ *Client stock* fixed effect, $\eta_{m,s}$, remove all time-invariant heterogeneity across each individual business relationship. Each business relationship might based on its' unique characteristics, such as

relationship between executives of firm and mutual fund management company or the unobservable importance of the contract to mutual fund management company. This uniqueness under each business relationship should be removed to alleviate concerns that the change of behavior is endogenously related to factors for the formation of these business transactions. Introducing $\eta_{m,s}$ effectively allows for a within business-relationship comparison of portfolio weight changes. In other words, my key independent variable is the within-business-relationship change in portfolio investment and not its raw level.

Moreover, the quarter fixed effects, $\lambda_t$, remove the time-varying variation that occurred in financial market such as stock market or mutual fund industry. This alleviate concerns of macroeconomic factors affecting the portfolio strategies of mutual fund management companies. Additionally, it allows to control for the stock market situation that proportionally affect the money flows into mutual funds.

### 4.2 Event study design

To further identify the dynamics of treatment impact on their portfolio allocation to their business clients, I estimate following regression design:

$$y_{m,s,t} = \eta_{m,s} + \lambda_t + \sum_{\tau=-8}^{8} \phi_\tau D_{m,t}^{\tau} + \boldsymbol{X}'_{m,s,t-1}\Gamma + \varepsilon_{m,s,t}\,, \tag{2}$$

where $D_{m,t}^{\tau}$ is a relative event-time dummy that equals to 1 if the revelation of misconduct committed by mutual fund management company $m$ is occurred exactly $\tau$ quarters ago if $\tau > 0$ or $\tau$ years after if $\tau < 0$. Following the recent event study analysis (e.g., McCrary (2007); Atkin et al. (2018); Borusyak and Jaravel (2017); Higgins (2019)), I do not drop observations that are further than 8 years prior or 8 years after the shock, but rather binning the endpoints by setting $D_{m,t}^{-8} = 1$ if $\tau \leq -8$ and $D_{m,t}^{8} = 1$ if $\tau \geq 8$. The specification also includes management company $\times$ client and quarter fixed effects.

Identifying the dynamic treatment effect is crucial in terms of several identification perspectives. The time series of treatment impact can confirm that there is no pre-trend before the event. Moreover, it may clarify the mechanism hidden under the average treatment effect. Importantly, I am the first to show , to my knowledge, the dynamics of portfolio strategy of mutual fund management company. Therefore, this will show more complete and clear picture of the their investment decisions for each periods.

### 4.3 Definition of variables

The main dependent variable is a measure of equity investment portfolio weight. For each mutual fund management company $m$, I have the holdings of each client stock $s$ at the end of quarter $t$, $H_{m,s,t}$, and market price of each client stock $s$, $P_{s,t}$, in dollar terms. To alleviate the effect of stock split, stock holdings $H_{m,s,t}$ and stock price $P_{s,t}$ is split-adjusted variables. I define equity portfolio weight of mutual fund management company on their client stocks as:

$$\%Portfolio_{m,s,t} = \frac{H_{m,s,t} \times P_{s,t}}{\sum_{s=1}^{n} H_{m,s,t} \times P_{s,t}}, \tag{3}$$

I next define the termination of business contract using the time series of business contract. A binary variable, $BusinessTies_t$, is defined when client firm make pension contract with mutual fund management company at quarter $t$. I then define the variable *replacement* as a termination of business relationship as the following construction:

$$Replacement_{m,s,t} = \begin{cases} 1, & \text{if } Business\ Ties_{t+1} = 0. \\ 0, & \text{otherwise.} \end{cases} \tag{4}$$

Finally, to analyze the consequences of heterogeneous investment strategies around the fraud revelation, I distinguish the investment behavior into two groups.

$$Portfolio - Tilting_{m,s,t} = \begin{cases} 1, & \text{if } (\%Portfolio_{m,s,t} - \%Portfolio_{m,s,t-1} > 0). \\ 0, & \text{otherwise.} \end{cases} \tag{5}$$

## 5. Main Results

### 5.1 Investment portfolio pattern

I first examine the effects of exposure to fraud detection on investment decision by estimating Eq. (1). To control for differences between mutual fund management companies and client stocks that may be correlated with investment behavior, I include a number of controls in the analysis. I include age of mutual fund company, size of 401(k) plan under each business contract, the revenue dependency of fees from 401(k) plan for mutual fund company, past performance at mutual fund company level, stock returns of clients, net flow of mutual fund company, and AUM of mutual fund company.

In addition, all regression specifications include *Manager* × *Client* fixed effects, which absorb any time-invariant characteristics related to mutual fund company and client stocks. Finally, I include quarter fixed effects, where control for any time-variant common trend in mutual fund industry or 401(k) market at least. Standard errors are clustered by manager-client to allow allow correlation within each business ties.

Table 2, column (1) shows that fraudulent mutual fund management companies significantly increase their portfolio weights about 0.06pp on their client stocks after the fraud is revealed to the public. Using additional time fixed effects (Column 2 and Column 3) shows more higher coefficients, which is around 0.08. Given that the average portfolio weight on every stock holdings is 0.328%, the magnitude of the impact is around 24% of average weights, which implies the economic significance.

{Insert Table 2 about here.}

A number of mechanisms may explain the the consistent patterns of positive relation between fraud revelation and the investment strategy to client stocks. First, fraudulent mutual fund company in general may have more tendency to have more portfolio tiling towards their clients regardless of fraud revelation. That is, mutual fund companies that has been increasing portfolio weights on their clients as a favor to keep business relation may involve in illegal behavior to make up those sub-optimal investment strategy. Additionally, those investment patterns may incurred from stock performance. In other words, client stocks may have positive shock to stock price, either in short term or long term, coincident with the timing of fraud revelation committed by mutual fund companies who are having business relationship with the stock price. Even though it is not a realistic explanation that drives the result, I cannot rule out the possibility.

To explore the mechanisms above, I conduct event study analysis to examine the dynamic treatment effects around the event of fraud revelation by estimating Eq. (2). The omitted period is the quarter of the treatment. Estimates are displayed in Figure 1.

{Insert Figure 1 about here.}

I find little evidence of prior differential trends between control, who are not disciplined in the market because of their past illegal behavior, and treated group, whose fraud is revealed. This dynamic patter shed lights on the invalidity of the first alternative mechanisms

addressed above in that fraudulent mutual company execute similar investment behavior to the control group. Thus, change of investment strategy is indeed triggered when their reputational capital is damaged in the public.

Furthermore, as I explore in Section 3, I report the dynamics of client stock performance around the event on the short-run and long run. It shows that return of client stocks are overall lower than other weight-increasing stocks and indifferent to (net) weight-decreasing stocks both in the short-run and long-run. Thus, investment companies are not increasing their portfolio weights on client stocks just because their stocks seems to better perform afterwards.

### 5.2 Detailed pattern

To investigate which factors of the portfolio weight measurement in Eq. (3) is driving the results, I estimate Eq. (2) on both numerator (AUM; $H_{m,s,t} \times P_{s,t}$) and denominator (nominal stock investment; $\sum_{s=1}^{n} H_{m,s,t} \times P_{s,t}$) of Eq. (3).

In Figure 2 shows the estimates from the analysis on AUM dynamics. Following the fraud disclosure, the asset managed by the fraudulent investment companies significantly decrease by 0.4 pp in the following four quarters. Afterwards, the effects gradually dissipate and bouncing back to previous level same as the prior events. This evidence squares with the literature showing significant fund outflows of mutual funds after mutual fund advisory misconduct committed by their managing investment company.[3] In other words, this adds up the evidence of market discipline from investors in mutual fund market. Moreover, as no differential trends between groups happen prior to fraud revelation, parallel trend assumption holds in this analysis.

{Insert Figure 2 about here.}

To test whether investment company actually increase their investment size to their client stocks, moreover, I run dynamic analysis for nominal dollar size of investment on client stocks and the Figure 3 shows the results. Interestingly, in the midst of substantial financial distress situation, as it shown in Figure 2, fraudulent investment companies increase their actual investment about 0.5 pp in four to five quarters, which is economically significant in that the effect is 60% of average of dependent variable, but statistically insignificant. The ef-

[3]For example, Liang et al. (2020) reports about 31% monthly outflows from mutual fund advisory misconduct events

fects gradually dissipate and shows no significant differential trends both in prior events and long run between control and treated groups.

Additionally, strongly supports mechanism that investment companies do favorable gesture to their clients after their illegal behavior is announced in the market by regulatory institutions because of economic motivation to keep profitable 401(k) business relationship. More importantly, this can imply that those fraud-revealed investment companies manage mutual funds in expense of mutual fund returns to main external business contracts, which directly violates fiduciary duty imposed on every mutual fund management companies. Under the Investment Advisers Act of 1940, any investment advisor, including mutual investment company, owes fiduciary duty and the duty can be interpreted as *"...(investment advisers) must act all times in the best of interest of the fund..."* (*SEC v. Tambone, 2008*).

{Insert Figure 3 about here.}

Combining results on every factors affecting my main measure of Eq. (3) shed lights on the underlying mechanism under the previous positive pattern of investment to client stocks from mutual fund management companies after their fraud is revealed in the market. Although there is a significant dwindling fund outflows after fraud revelation, making them have to re-balance their position on equity investment as showin in Figure 2, fraudulent investment companies increase, or be sticky at least, their portfolio weights on their client stocks so that their re-balancing investment does not make negative influence to clients as shown in Figure 3.

One possible explanation for those client-favor investment pattern is that those behavior might be the outcome of strategic decisions to maintain profitable business connections with the clients. Prior literature reports that regulation actions on investment management firms is the one of major determinants for the termination of 401(k) plan business contract (e.g., Goyal and Wahal (2008)). Given that the existence of high termination probability due to fraud revelation, the fraudulent investment company might execute strategic investment decision as one of the channels to minimize the probability of those termination.

Thus, to better understand the motivation of such investment-tilting to client stocks after regulatory action on investment management companies, I conduct additional analysis focusing on the termination of investment management firms by plan sponsors around the events. I present results on the termination of investment managers in the following Section 5.3.

### 5.3 Termination of business relationship

In this section, I examine the probability of business termination between investment company and their 401(k) clients around the fraud revelation period. The 401(k) sponsor firms make decision for hiring or termination of business partners regarding corporate 401(k) plans, based on various factors such as investment performance, reputation, regulatory action and etc. (e.g., Goyal and Wahal (2008)). Therefore, investigation on the termination trend around the events might shed light on to the motivation of main results showing portfolio-tilting to clients stocks after events.

Three versions of analysis are conducted in this Section 5.3. First of all, the long-run impact of fraud revelation on their probability of experiencing replacement as business partners is estimated in Section 5.3.1. To further understand the underlying motivation for positive trends of investment portfolio weights on client stocks, secondly, I estimate the dynamic effects on the termination by using Eq. (2) in Section 5.3.2. This analysis can provides insights of interactions between investment company and sponsor firms and how sponsor firms reacts to fraud detection. As a last analysis, more importantly, I explore heterogeneous effects by different fraudulent investment company groups based on tiling-to-client behavior. This might enlighten the consequences of doing tilting-to-client investment strategy, which might imply why investment company increase their investment portfolio weights on their client stocks after their fraud is revealed.

#### 5.3.1 Long run impact

To investigate the trends on business termination, I now define my variable $Replacement_{t+1}$ as a indicator variable equals to one if clients terminate their existent 401(k) plan contract with investment company at next period $t+1$. Table 3 demonstrates the permanent impact of fraud revelation on existent business relationship. Following fraud revelations, the average probability of business termination between clients and fraud-revealed investment companies significantly increases by 10.9%. Given that the unconditional mean of replacement probability in 401(k) plan sponsor market is 13%, the average change is also economically significant.

This results square with the stream of literature in that negative reputation-wise shock to investment company face significant loss of their pre-existent clients of corporate pension industry. Even though this permanent shocks to business relationship

might imply the strong motivation of investment companies to alter their investment strategies after their illegal activities are disclosed in the market, I cannot deny the possibility that investment companies who predicts significant chance of business relationship might commit fraud to make up such losses.

{Insert Table 3 about here.}

#### 5.3.2 Dynamics of business termination

To better understand, importantly, the reason why the investment companies increase their portfolio weights towards their clients, I introduce event study analysis on business termination. Figure 4 displays coefficients from estimation of Eq. (2) on my business termination measure. The omitted period is the period when the fraud is detected and revealed to market by any regulatory agencies.

{Insert Figure 4 about here.}

Following fraud detection, clients significantly tends to replace business partners of current fraudulent companies in the following two quarters. The treatment coefficients at the following second quarter is almost 10%, which is economically significant given that the unconditional probability of termination in my sample is about 13%. Afterwards, the treatment effect converges to almost zero afterwards.

Although these results are showing significant up-trend of business termination at the following second time period, it shows large variations (standard errors) following the second quarter. In the light of heterogeneous behavior that investment companies may make following the revelation of their fraud to the market, cross-sectional analysis on different groups of investment companies might show the impact of such client-favor investment strategies on the pre-existed business relationship.

#### 5.3.3 The impact of *tiling-to-client* on business relationship

To shed light, importantly, on the mechanism behind such favorable strategies to their clients, I examine the cross-sectional test on the previous analysis regarding the dynamics of business termination. I now define my variable $\mathbb{1}_{\Delta\%Portfolio_{i,j,t}>0}$ as an indicator variable equals to one if the investment company $i$ increases their portfolio weights on their client $j$ at quarter $t$.

Table 4, column (1), shows that investment strategy tilting toward the clients do strengthen the existent business relationship between them. Investment companies of such strategies experience about 5 pp less probability of business termination relative to other investment companies. Given that the unconditional mean of probability of business termination is about 13%, the average treatment effects is also economically significant. This is consistent with the large literature showing the positive effect of support by institutional investors on firms (e.g., Golez and Marin (2015)).

Table 4, column (2), presents result for differential effect of investment strategies under the shocking events which is the news of illegal behavior by investment company. When investment company faces regulatory action for their illegal activity, such *tiling-to-client* investments bring the significant change of chance of being replaced for pre-existed business relationship by 19 pp less than other investment companies. This further provide additional evidence that such favorable investment behavior to client is to minimize the chance of getting fired as business partner.

{Insert Table 4 about here.}

To explore the dynamics of this differential impact, I introduce event study analysis along different groups of investment companies based on whether they execute *tilting-to-client* investment strategy. The residuals from the estimation of Eq. (2) on replacement measure are displayed at Figure 5 by heterogeneous group based on $\mathbb{1}_{\Delta\%Portfolio_{i,j,t}>0}$ variable. For example, the coefficient at $t = 2$ for $\mathbb{1}_{\Delta\%Portfolio_{i,j,t}>0}$ group shows the residual at $D^2_{m,t}$ (from Eq. (2)) for group treated in $\mathbb{1}_{\Delta\%Portfolio_{i,j,t}>0}$.

Prior to events, heterogeneous investment strategies shows homogeneous trends of business termination and mostly every coefficients shows no significant variations. Moreover, investment companies who does no do *tilting-to-client* are more likely to experience business termination than *tilting-to-client* group in most time periods.

Afterwards, following the events, differential effect significantly diverges after 2 quarters since the shock. Until the second quarter, both groups experience significant increase of chance to be getting fired as business partners by about 9 pp. However, heterogeneous groups start to experience opposite trend. While investment companies not increasing their portfolio weights on their clients after their fraud revelation experience escalated chance of business trends, other *tilting-to-client* group face sharp decrease.

Taken together, the observed results shed lights on the mechanism under the *tilting-to-client* strategies. The firms' recognition of fraudulent behavior committed by investment company may bring up the instantaneous damage to its reputation and increase the chance of firms to replace their current fraudulent business partner. After fraud revelation, investment company strategically change their investment strategy to maintain current business relationship. Consistent with literature that showing investment company do favorable behavior, including overweight investment and proxy voting, to attract clients (e.g., Cvijanović et al. (2016), Davis and Kim (2007), Cohen and Schmidt (2009), and Ashraf et al. (2012)). Rather than overall overweight position in client stocks (e.g., Cohen and Schmidt (2009)), my findings suggests that investment companies dynamically shift their investment behavior to maintain business contract under negative shock to their relationship.

{Insert Figure 5 about here.}

Still, other possible mechanism may derive the observed results. Client stocks may exhibit systematic price increase either in short-run or long-run after the detection of fraud committed by service provider for their 401(k) pension plans. Despite of its unrealistic possibility, investment company might increase their portfolio weights on client stocks under private information acquired from their pre-existed business relationship (e.g., Duan et al. (2018)). Thus, *tilting-to-clients* might be the natural behavior based on informational advantage rather than favorable gesture.

### 5.4 Client stock performance

To test the possibility that the *tilting-to-client* strategy is based on expectation or private information about potential stock performance, I examine analysis on performance of client stocks around the events.

To test this, I calculate the cumulative average abnormal returns of client stocks around the fraud revelations. To construct the measure, firstly, I measure clients' monthly returns in excess of the equal-weighted average return of all stocks held by the same investment company at the start of the month. Then, the average and standard error of the abnormal returns are calculated.

Figure 6 displays the downward trend of abnormal returns, implying the inferiority of client stocks relative to other stocks held by the same investment company.

Both prior and posterior to the events, the stock performance of the client stocks is significantly worse than the average of other holding stocks. The stock returns of the clients are about 10 pp wore than average non-client stock in one and a half year. This shed lights on the underlying mechanism of the *tilting-to-client* strategy and eliminate the possibility of information advantage hypothesis.

{Insert Figure 6 about here.}

To further examine the inferiority of performance of client stocks, I compare their monthly excess returns against other stocks that were (net) sold by the same investment company at the given month. The cumulative average abnormal returns are displayed in Figure 7. As can be seen, the client stock performance is indifferent with (net) selling stocks by the same investment company. This suggests that client stocks might should have been sold in terms of both ex-ante and ex-post and investment companies systematically execute the opposite strategies following the detection of their fraud.

These results provide important insight into the connection between mutual fund and firms under the situation of conflict of interest, where mutual fund must execute the investment strategy diligently for their fund shareholders. Consistent with Cohen and Schmidt (2009) who find that investment company reluctantly sell their client stocks when others are selling, my observed pattern provides additional evidence that they might sacrifice fund returns to keep their 'big' clients after the negative shock to the reputation of mutual fund family.

{Insert Figure 7 about here.}

Taken together, the results in both Figure 6 and Figure 7 show that *tilting-to-client* strategy, effectively reduces the probability of getting fired as a business partner ex post, seems unlikely to be the optimal investment decision in terms of fund returns. Even though such investment strategy seems to violate *fiduciary duty*, it sill may based on the private information of long-term cash flows outside the periods under my analysis.

Given that, however, the average holding periods of mutual funds seems to be around 16 months (Tucker (2017)), which is covered in my sample periods, the *tiling-to-client* strategies do harm the average households investment returns and their welfare eventually. Therefore, in perspective of average mutual fund holders, it is more certain that such investment deci-

sions to maintain the business connections is beneficial to investment company, not the fund returns (holders) and it may imply the violation of *fiduciary duty*.

## 6. Mechanisms

Given rich heterogeneity in the data, I explore heterogeneous effect by the context of business contract, investment company and enforcement action. I examine the effects of exposure to portfolio weights on client stocks and the probability of contract replacement by estimating the following regression design similar to Eq. (1):

$$y_{m,s,t} = \eta_{m,s} + \lambda_t + \beta\, Post_{m,t} \times \boldsymbol{X_{m,s,t-1}} + \gamma Post_{m,t} + \delta \boldsymbol{X_{m,s,t-1}} + \boldsymbol{\Gamma'_{t-1}}\zeta + \varepsilon_{m,s,t}\,, \tag{6}$$

where $Post_t$ is equals to 1 if fraud committed by mutual fund management company $m$, who has pension contract with firm $s$ in my sample, has been revealed to public before or at quarter $t$. To measure the impact of heterogeneous characteristics of several context in my sample, such characteristics are interacted with post-treatment indicators. The coefficient $\beta$ represent the differential impact of heterogeneity on the outcomes.

### 6.1 Contract differences

I first explore differential responses by business contracts between investment company and their client firms. I estimate Eq. (6) on investment portfolio weights on client firms and the probability of replacement as business partners.

Table 5 displays estimated treatment effects from estimation of Eq. (6). Columns (1)-(2) shows the treatment effects attributable to the size of 401(k) pension plan where investment company involved with their client firms. I find significantly positive estimates for the impact of the business size. If the size of business increase by 1%, the differential impact of such business extension is positively correlated as of 0.17 pp. Given that the average investment portfolio weights on their client stocks is about 0.3%, the treatment impact is economically significant. Even though the treatment impact on the *Replacement* variable is statistically insignificant, the coefficient show significant impact relative to the average probability of replacement. This suggest that investment company response more sensitively to more im-

portant client. However, client firms reacts to the exposure indifferently no matter how the size of pension plan is. In other hands, the pension size might be the coarse measure to look at the direct involvement of manger to the pension plans.

Table 5, columns (3)-(4), shows the differential impact attributable to the direct monetary income for investment company from business with their 401(k) clients. The revenue dependency on the business contract is measured as direct compensation fee (investment company receives as their service for pension plans) divided by fund management fee (0.2% of AUM), which is standard measure in the literature. I find significantly positive impacts both on portfolio weights and business replacement. Since this *revenue dependency* measures direct relevance of exposure to investment company, it shows stronger significance than column (1)-(2). This suggest that high revenue dependency to a pension plan brings more incentive to do favorable investment decision for their clients. In other hands, in perspective of client firms, the exposure to fraudulent managers brings more punishment or crash of trust on them and significantly increase chance to replace the fraudulent management companies when clients have been acknowledged themselves as an important client.

{Insert Table 5 about here.}

Taken together, the results highlight the salience of economic incentive for managers to conduct *tilting-to-client* strategy. Following the fraud revelation, higher attractive business might brings more incentive to invest their funds favorable to their clients to maintain business connection which provides significant beneficial compensation to investment managers. Consistent with prior literature showing that mutual fund companies do favorable action to their clients of corporate 401(k) pension business, I find evidence that monetary incentive do affect such favorable actions to keep the business relationship (Ashraf et al. (2012), Davis and Kim (2007), Cvijanović et al. (2016), Cohen and Schmidt (2009)).

### 6.2 Differences in investment companies

Next, I explore from the perspective of clients. To test differential effects by investment manager context, I estimate Eq. (6) in terms of both the size and past performance of investment companies.

Table 6, columns (1)-(2), shows the treatment effects by differential size of investment companies. I find significantly large coefficients on the probability of replacement and small, in-

significant coefficient on portfolio weights. My findings suggest that clients do prefer famous brand of investment companies. In other words, the market leader in investment advisory industry is less impacted by the crash of their reputation in the market of corporate 401(k) pension plans since they have more market power than others.

The impacts of managerial ability is displayed at Table 6, columns (3)-(4). I find negative estimate on portfolio weights and it is statistically insignificant. This might imply that competent managers are attractive enough to not distort investment decision favorable to clients. For the probability of replacement, I find significantly negative estimates. This suggest that clients are reluctant to replace competent investment company after the exposure.

{Insert Table 6 about here.}

Taken together, it shed lights on the motivation of clients behind the main results. Even if their trust burst following the fraud revelation, they are reluctant to replace the business ties if the managers have ability to perform better or have more reputations than others. Given that business ties is the outcome of interaction between investment companies and firms, it is important to understand the economics from the perspective of clients intertwined with such strategic investment behavior by investment company.

### 6.3 Differences in regulatory actions

To examine how disciplinary actions are related to investment strategies, I run Eq. (6) by exploiting detailed reports of regulatory actions imposed on every cases.

In columns (1)-(2) of Table 7, I explore the variation of regulatory agencies (SEC vs. non-SEC). I find that, relative to non-SEC agencies, SEC-imposed sanctions appear less likely to conduct *tilting-to-client* strategy. Moreover, discipline announcement by SEC trigger more chance to get replaced than announcement by other agencies and it is statistically insignificant. As SEC is a major agency specialized to financial fraud and media usually spotlight their announcement, this suggest that SEC regulation may bring more national wide attention. Thus, such attention-invoking events may attenuate myopic investment decision harming their fund returns including *tilting-to-client* strategy (at least until about 2 years in Figure 6). Moreover, the news of fraud detection by SEC have more chance to reach firms connected to fraudulent investment company than detection by other agencies so that it enhance the tendency to replace the service contract.

Table 7, columns (3)-(4), shows the how the variation of the amount of penalty affects the outcome. First, I find that the amount of fine are negatively related to the *tilting-to-client* strategy and it is significantly insignificant. Given that the penalty should be in the form of cash and liquidation of assets for investment companies is costly, more fines bring less buffer to conduct sub-optimal investment decision including *tilting-to-client* strategy. Secondly, result shows that the amount of penalty is positively correlated to the probability of getting fired as business partner regarding 401(k) plans. As more penalty means more serious fraud committed by the investment company, significant amount of penalty may imply substantial crash of reputation (or trust) on the investment advisors. In other words, more serious fraud detection are related to more harsh responses from firms against the fraudulent investment company.

{Insert Table 7 about here.}

Taken together, the results shed lights on the mechanism how fraud detection affects the behavior of both investment companies and their client firms. If their fraud detection invoke significant attention from both regulatory agency and investors, investment companies shows attenuated *tiling-to-client* strategy, which is not optimal for fund returns in 2 years following the fraud event. In other hands, such major events enhance the chance that such news reaches to their client firms and might deteriorate their reputation or social capital from (potential) clients.

## 7. Conclusion

In this paper, I explore how mutual fund management companies respond to relation disruption in their business ties with big clients. I measure distrust shock using validated mutual fund advisory misconduct in mandatory regulatory fillings, and I identify big clients using detailed 401(k) pension contract between sponsors and mutual fund companies in mandatory filings. I find an increasing trend of portfolio weights on client stocks following the announcement of misconduct, and many of these misconduct events are intentional illegal activities, such as misinformation and churning. I also show that such client-favor trading behavior effectively reduce the probability of termination as business partner. The results are stronger for business ties with larger compensation, and for weaker for mutual fund managers with high performance. Furthermore, I find that the stock performance of clients is lower than average stocks in the same portfolio at least 18 months before and after the treatment time. My

finding that mutual fund companies alter their investment portfolio tilting to client stocks, showing inferior stock performance than other stocks in the same portfolio, implies a need for regulators to monitor the violation of *fiduciary duty* and whether such investment strategy is the optimal decision for fund shareholder or fund returns.

My finding that increasing portfolio weights on the stocks of under-performing big client stocks suggests important welfare implications. As the importance of retirement assets is growing in mutual fund universe, the incentive under this specific agency problem could be more salient. Given that the average holding periods of mutual funds for households is around 16 months (Tucker (2017)), such tilting-to-client investment decisions do harm the financial welfare of households who are the actual fund shareholders. Therefore, my study suggests that policymakers or investors should be aware pf these conflict-of-interest-based investment pattern, which directly related to financial wealth of households.

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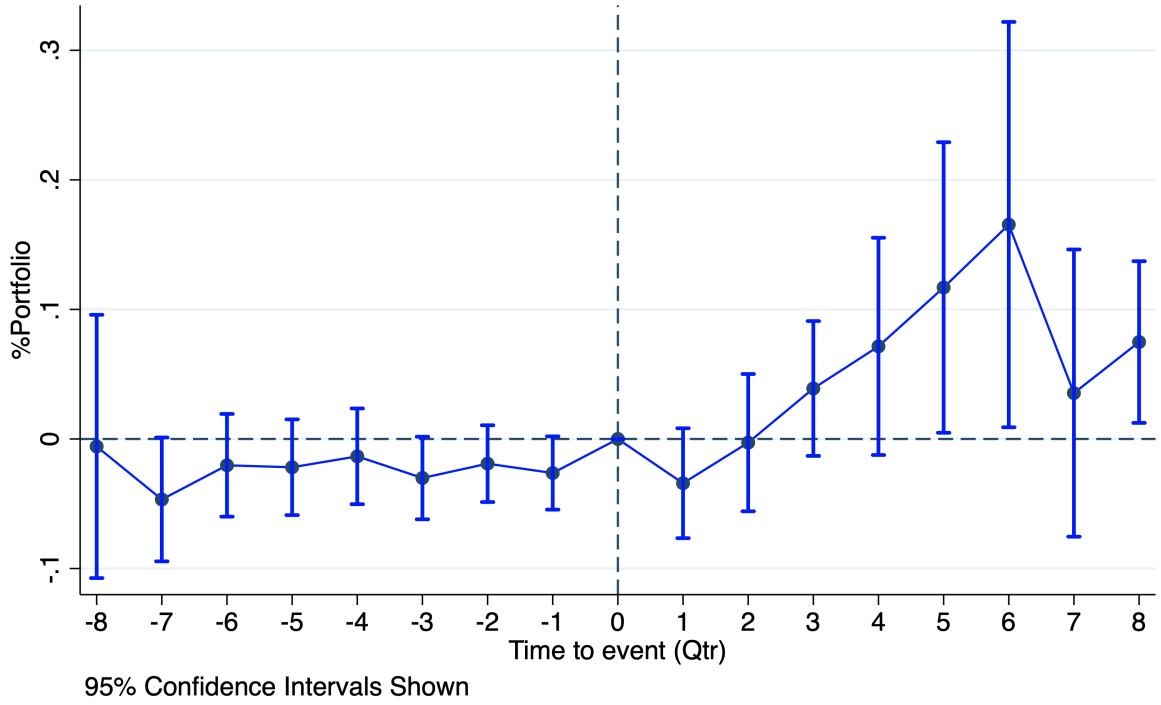
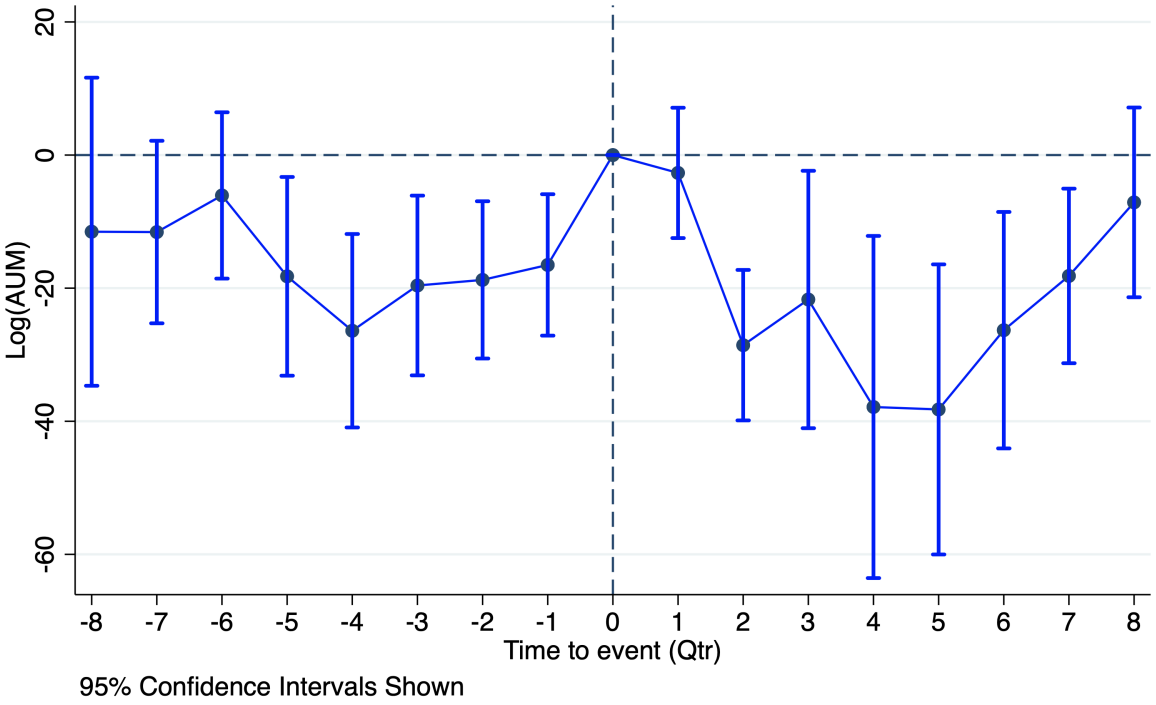
**Figure 1**




**Effects on portfolio weight of client stocks**

This figures shows event study time-dummies coefficients and 95% confidence intervals from estimating Eq. (2) on the portfolio weight on client stocks. Includes time-varying controls used in Table 2. Standard errors are clustered by Manager × Client. Sample includes portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

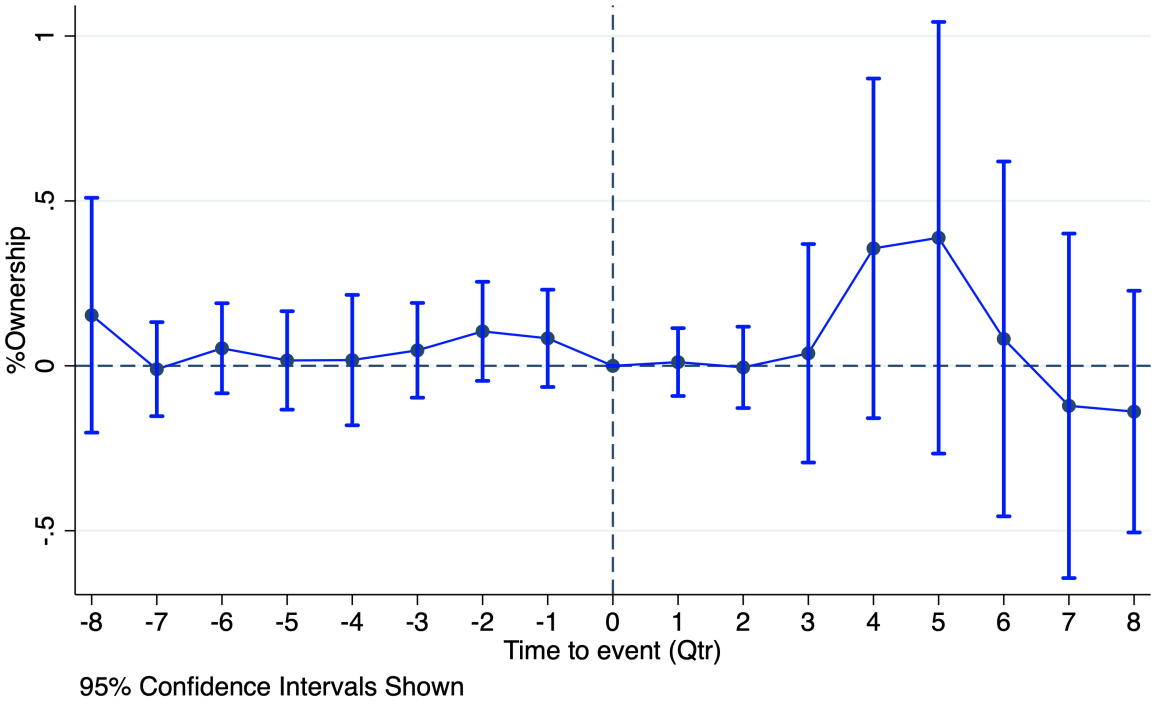
**Figure 2**




**Effects on Log(AUM)**

This figures shows event study time-dummies coefficients and 95% confidence intervals from estimating Eq. (2) on the logarithm of AUM managed by mutual fund companies. Includes time-varying controls used in Table 2. Standard errors are clustered by Manager $\times$ Client. Sample includes portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

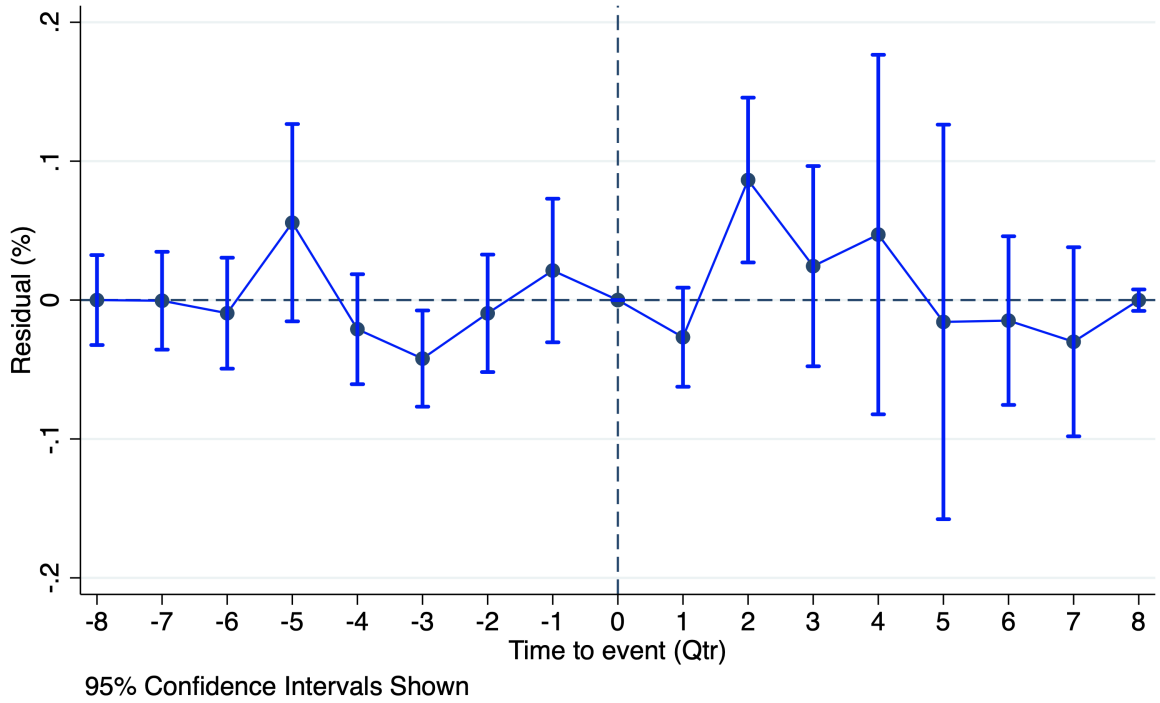
**Figure 3**




**Effects on (Stock holding/Total Share Outstanding)**

This figures shows event study time-dummies coefficients and 95% confidence intervals from estimating Eq. (2) on the nominator of Eq. (3) managed by mutual fund companies. Includes time-varying controls used in Table 2. Standard errors are clustered by Manager $\times$ Client. Sample includes portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

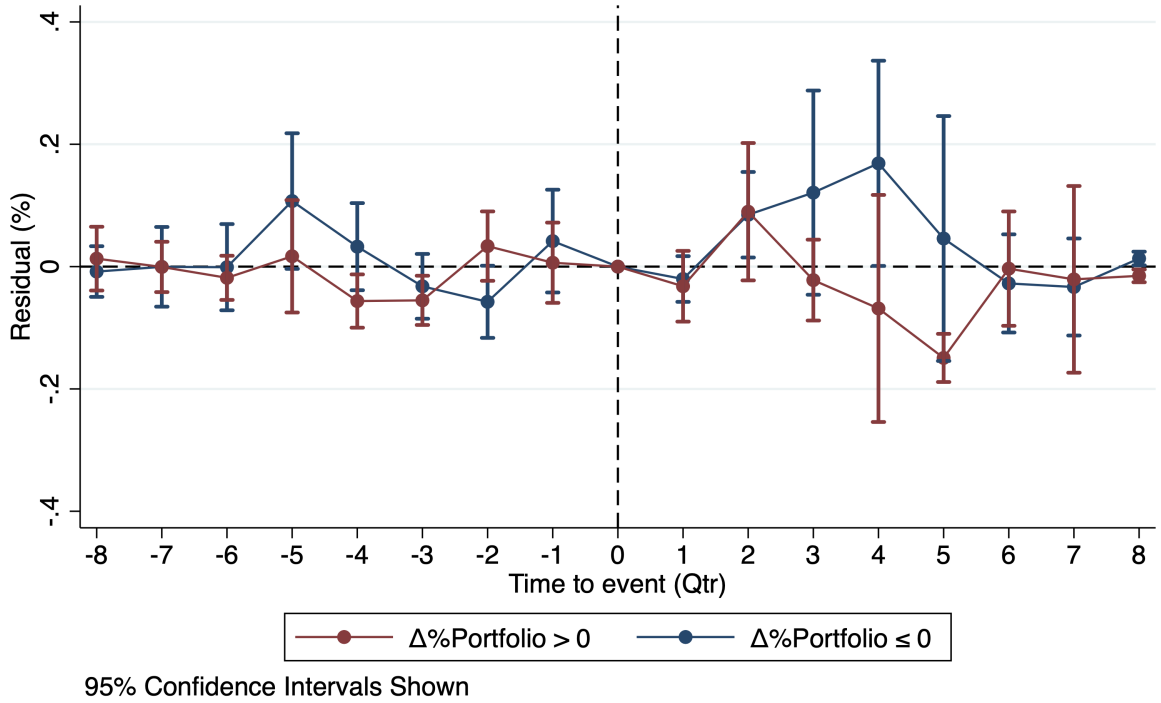
**Figure 4**




**Effects on Prob(Replacement)**

This figures shows residuals from event study time-dummies coefficients and 95% confidence intervals from estimating Eq. (2) on the Eq. (4). Includes time-varying controls used in Table 2. Standard errors are clustered by Manager $\times$ Client. Sample includes portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

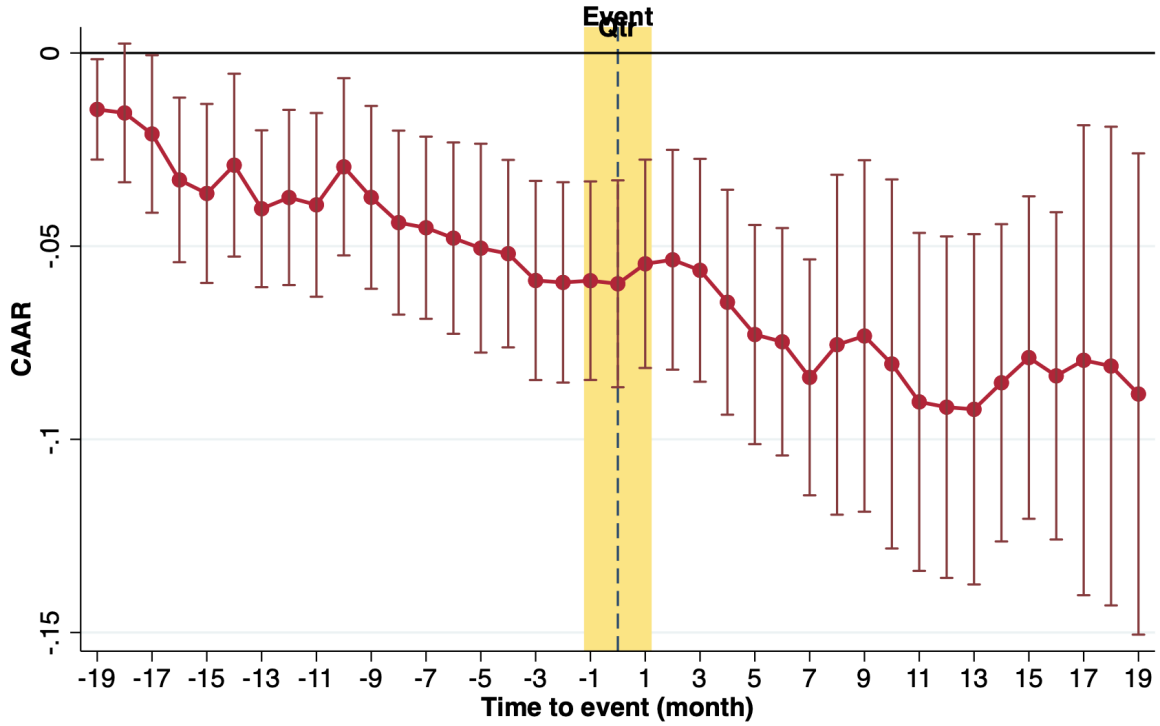
**Figure 5**




**Effects on Prob(Replacement)**

This figures shows residuals from event study time-dummies coefficients and 95% confidence intervals from estimating Eq. (2) on the Eq. (4). Red line represents mutual fund companies conducted *tilting-to-client* strategy and blue line otherwise. Includes time-varying controls used in Table 2. Standard errors are clustered by Manager × Client. Sample includes portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

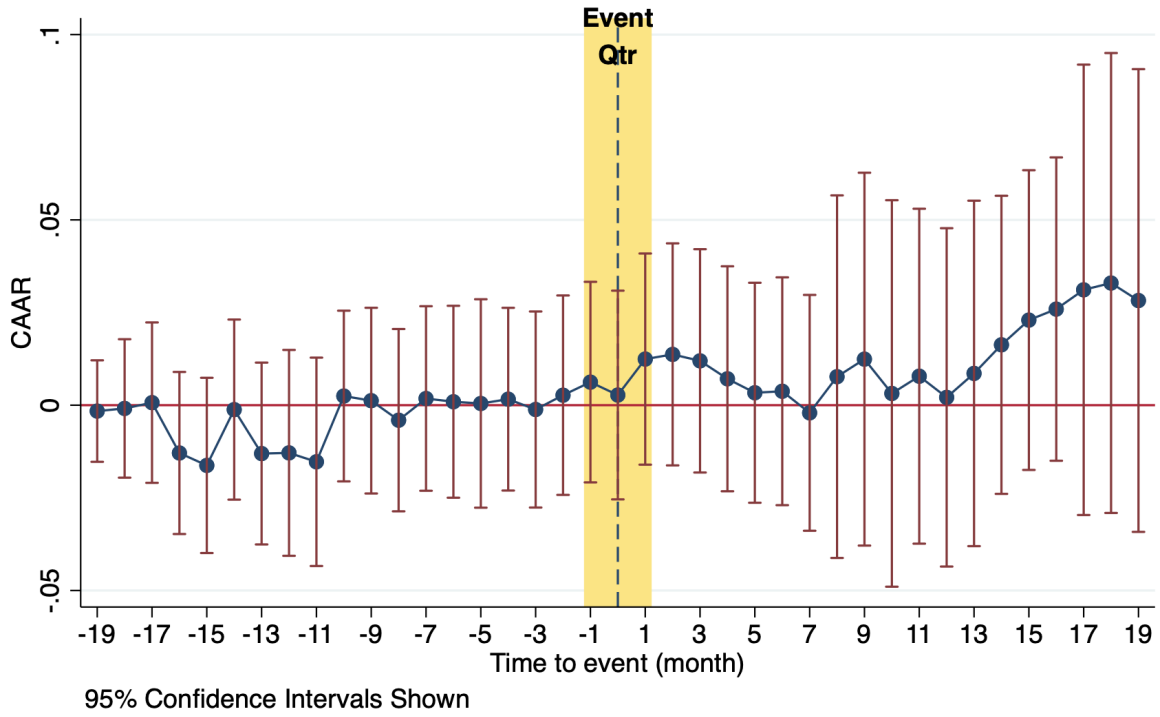
**Figure 6**




**Cumulative Average Abnormal Returns of Client stocks:**
**vs. average holding stocks**

This figures shows cumulative average abnormal returns (CAARs) of client stocks around regulatory action against mutual fund companies. CAARs are measured client stocks' monthly return in excess of the equal-weighted average return of all stocks held by the same mutual fund companies. Time series mean and standard error of the means are calculated for statistical inference.

**Figure 7**




**Cumulative Average Abnormal Returns of Client stocks:**
**vs. (net) selling stocks**

This figures shows cumulative average abnormal returns (CAARs) of client stocks around regulatory action against mutual fund companies. CAARs are measured client stocks' monthly return in excess of the equal-weighted average return of (net) selling stocks sold by the same mutual fund companies. Time series mean and standard error of the means are calculated for statistical inference.

**Table 1. Summary Statistics**

| | Mean | Std.Dev. | p25 | p50 | p75 | Obs |
|---|---|---|---|---|---|---|
| %Portfolio ($\times$100) | 0.328 | 1.524 | 0.005 | 0.034 | 0.211 | 28,996 |
| AUM($mil) | 89,770 | 117,539 | 10,297 | 35.637 | 130,451 | 28,996 |
| Fraud | 0.011 | 0.106 | 0.000 | 0.000 | 0.000 | 28,996 |
| Plan Size($mil) | 6,119 | 14207 | 164 | 921 | 3,796 | 28,996 |
| Log Plan Size | 20.367 | 2.877 | 18.914 | 20.641 | 22.057 | 28,996 |
| Revenue Dependency(%) | 2.130 | 8.611 | 0.013 | 0.098 | 0.671 | 28,996 |
| Log(Age) | 4.344 | 0.644 | 4.159 | 4.564 | 4.779 | 28,996 |
| Past Performance | 0.024 | 0.091 | -0.019 | 0.027 | 0.085 | 28,996 |
| Stock Return | 0.037 | 0.212 | -0.058 | 0.032 | 0.125 | 28,996 |
| Netflow | 0.059 | 6.385 | -0.029 | 0.000 | 0.027 | 28,996 |
| Replacement | 0.130 | 0.337 | 0.000 | 0.000 | 0.000 | 28,996 |
| $\mathbb{1}_{\Delta\%Portfolio_t>0}$ | 0.474 | 0.499 | 0.000 | 0.000 | 1.000 | 28,996 |

This table displays the summary statistics for the mutual fund company-quarter and client-quarter level data and fraud related variables used in the study. Summary statistics include data from the year 2001 to 2015. Business contract between fund company and 401(k) sponsor data are collected from From 5500 filed with the Department of Labor and fraud data are from SEC Form ADV. Mutual fund holdings data is from Thomson Reuters Institutional Holdings (S34).

**Table 2. The Effect of Fraud Revelation on Portfolio Weight on Client Stocks**

| | %Portfolio$_t$ | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Post(Fraud) | 0.062*** | 0.080*** | 0.082*** |
| | (0.018) | (0.023) | (0.024) |
| Log Age$_{t-1}$ | -0.095 | 0.105 | 0.097 |
| | (0.058) | (0.103) | (0.101) |
| Plan Size$_{t-1}$ | -0.010 | -0.009 | -0.010 |
| | (0.007) | (0.007) | (0.007) |
| Revenue Dependency(%)$_{t-1}$ | 0.563* | 0.626* | 0.843** |
| | (0.317) | (0.336) | (0.391) |
| Past Performance$_{t-1}$ | 0.132 | 2.242 | 2.225 |
| | (0.081) | (1.597) | (1.597) |
| Stock Return$_{t-1}$ | 0.054** | 0.072*** | 0.073*** |
| | (0.022) | (0.016) | (0.016) |
| Netflow$_{t-1}$ | 0.002 | -0.000 | -0.003 |
| | (0.003) | (0.003) | (0.003) |
| Log AUM$_{t-1}$ | | | 0.053 |
| | | | (0.035) |
| Quarter FE | N | Y | Y |
| Manager× Client FE | Y | Y | Y |
| $R^2$ | 0.914 | 0.915 | 0.915 |
| Observations | 26,157 | 26,157 | 26,157 |
| Mean of Dependent Variable | 0.328% | 0.328% | 0.328% |

Standard errors in parentheses

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

This table presents the results of the regression on the portfolio weights in client stocks following the revelation of fraud committed by fund management company. The sample period is 2001-2015 and the unit of analysis is the manager-client stock-quarter level. The dependent variable is Eq. (3). The $Post(Fraud)$ is an indicator variable set to one since the detection of fraud committed by mutual fund company occurred. Parentheses enclose standard errors. Standard errors are clustered at the Manager × Client level. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

**Table 3. The Effect of Fraud Revelation on Prob(Termination of Business Ties**

| | (1) Replacement$_{t+1}$ | (2) Replacement$_{t+1}$ | (3) Replacement$_{t+1}$ |
|---|---|---|---|
| Fraud$_t$ | 0.165*** | 0.175*** | 0.109*** |
| | (0.028) | (0.031) | (0.025) |
| Controls | Y | Y | Y |
| Quarter FE | N | N | Y |
| Manager× Client FE | N | Y | Y |
| $R^2$ | 0.020 | 0.142 | 0.576 |
| Observations | 26,394 | 26,162 | 26,162 |
| Mean of Dependent Variable | 0.13 | 0.13 | 0.13 |

Standard errors in parentheses

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

This table presents the results of the regression on the the probability of termination of business ties following the revelation of fraud committed by fund management company. Includes the same controls as Table 2. The sample period is 2001-2015 and the unit of analysis is the manager-client stock-quarter level. The dependent variable is Eq. (4). The *Fraud* is an indicator variable set to one if the detection of fraud committed by mutual fund company occurred at quarter $t$. Parentheses enclose standard errors. Standard errors are clustered at the Manager × Client level. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

**Table 4. The Effect of Fraud Revelation on Prob(Termination of Business Ties: Cross-section Test**

| | (1) Replacement$_{t+1}$ | (2) Replacement$_{t+1}$ |
|---|---|---|
| $\mathbb{1}_{\Delta\%Portfolio_t>0}$ | -0.049*** | -0.047*** |
| | (0.004) | (0.004) |
| Fraud$_t$ $\times$ $\mathbb{1}_{\Delta\%Portfolio_t>0}$ | | -0.188*** |
| | | (0.054) |
| Fraud$_t$ | | 0.217*** |
| | | (0.043) |
| Controls | Y | Y |
| Quarter FE | Y | Y |
| Manager$\times$ Client FE | Y | Y |
| $R^2$ | 0.579 | 0.580 |
| Observations | 26,162 | 26,162 |
| Mean of Dependent Variable | 0.13 | 0.13 |

Standard errors in parentheses

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

This table presents the results of the regression on the the probability of termination of business ties following the revelation of fraud committed by fund management company. Includes the same controls as Table 2. The sample period is 2001-2015 and the unit of analysis is the manager-client stock-quarter level. The dependent variable is Eq. (4). The *Fraud* is an indicator variable set to one if the detection of fraud committed by mutual fund company occurred at quarter $t$. $\mathbb{1}_{\Delta\%Portfolio_t>0}$ is equal to one if mutual fund company increased their portfolio weights of clients stocks at quarter $t$.Parentheses enclose standard errors. Standard errors are clustered at the Manager $\times$ Client level. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

**Table 5. Effects by Business Contracts**

| $X_{t-1}$ | Log(Plan Size) | | Compensation/Total Revenue | |
|---|---|---|---|---|
| | (1) %Portfolio$_t$ | (2) Replacement$_{t+1}$ | (3) %Portfolio$_t$ | (4) Replacement$_{t+1}$ |
| Post $\times$ $X_{t-1}$ | 0.017** | -0.001 | 0.337* | 0.543*** |
| | (0.007) | (0.588) | (0.201) | (20.375) |
| Post | -0.249** | 0.091 | 0.074*** | 0.066*** |
| | (0.123) | (11.641) | (0.025) | (1.876) |
| $X_{t-1}$ | -0.000 | -0.000** | 0.008** | -0.001 |
| | (0.000) | (0.002) | (0.004) | (0.100) |
| Controls | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y |
| Manager$\times$ Client FE | Y | Y | Y | Y |
| $R^2$ | 0.915 | 0.572 | 0.915 | 0.572 |
| Observations | 26,157 | 26,157 | 26,157 | 26,157 |
| Mean of Dependent Variable | 0.328% | 0.13 | 0.328% | 0.13 |

Standard errors in parentheses

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

This table presents the results of the Eq. (6) interacted with the logarithm of pension plan size where mutual fund company involved with and the proportion of business revenue from the contract relative to total revenue mutual fund company earns. Includes the same controls as Table 2. The sample period is 2001-2015 and the unit of analysis is the manager-client stock-quarter level. The *Post* is an indicator variable set to one since the detection of fraud committed by mutual fund company occurred. Parentheses enclose standard errors. Standard errors are clustered at the Manager $\times$ Client level. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

**Table 6. Effects by Mutual Fund Companies**

| $X_{t-1}$ | Log(AUM) | | Manager Past Performance | |
|---|---|---|---|---|
| | (1) %Portfolio$_t$ | (2) Replacement$_{t+1}$ | (3) %Portfolio$_t$ | (4) Replacement$_{t+1}$ |
| Post $\times$ $X_{t-1}$ | -0.007 | -0.0381*** | -0.032 | -0.177** |
| | (0.016) | (0.919) | (0.063) | (6.912) |
| Post | 0.248 | 1.011*** | 0.082*** | 0.079*** |
| | (0.400) | (22.352) | (0.024) | (1.881) |
| $X_{t-1}$ | 0.001 | 0.000 | 0.022 | -0.002* |
| | (0.000) | (0.008) | (0.016) | (0.111) |
| Controls | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y |
| Manager$\times$ Client FE | Y | Y | Y | Y |
| $R^2$ | 0.915 | 0.572 | 0.915 | 0.572 |
| Observations | 26,157 | 26,157 | 26,157 | 26,157 |
| Mean of Dependent Variable | 0.328% | 0.13 | 0.328% | 0.13 |

Standard errors in parentheses

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

This table presents the results of the Eq. (6) interacted with the logarithm of AUM managed by mutual fund companies (*Log(AUM)* and the mutual fund families performance from previous quarter(*Manager Past Performance*). Includes the same controls as Table 2. The sample period is 2001-2015 and the unit of analysis is the manager-client stock-quarter level. The *Post* is an indicator variable set to one since the detection of fraud committed by mutual fund company occurred. Parentheses enclose standard errors. Standard errors are clustered at the Manager $\times$ Client level. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.

**Table 7. Effects by Regulatory Actions**

| X | SEC Announcement | | Log(Penalty) | |
|---|---|---|---|---|
| | (1) %Portfolio$_t$ | (2) Replacement$_{t+1}$ | (3) %Portfolio$_t$ | (4) Replacement$_{t+1}$ |
| Post × X | -0.031** | 0.061 | -0.001 | 0.008*** |
| | (0.015) | (4.370) | (0.001) | (0.249) |
| Post | 0.082*** | 0.077*** | 0.083*** | 0.071*** |
| | (0.024) | (1.901) | (0.024) | (1.866) |
| Controls | Y | Y | Y | Y |
| Quarter FE | Y | Y | Y | Y |
| Manager× Client FE | Y | Y | Y | Y |
| $R^2$ | 0.915 | 0.572 | 0.915 | 0.572 |
| Observations | 26,157 | 26,157 | 26,157 | 26,157 |
| Mean of Dependent Variable | 0.328% | 0.13 | 0.328% | 0.13 |

Standard errors in parentheses

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

This table presents the results of the Eq. (6) interacted with the indicator whether regulatory agency is SEC (*SEC Announcement* and the logarithm of total amount of penalty imposed on regulatory action (*Log(Penalty)*. Includes the same controls as Table 2. The sample period is 2001-2015 and the unit of analysis is the manager-client stock-quarter level. The *Post* is an indicator variable set to one since the detection of fraud committed by mutual fund company occurred. Parentheses enclose standard errors. Standard errors are clustered at the Manager × Client level. *, **, and *** denote statistical significance at 10%, 5%, and 1%, respectively.