Hurting Fund Returns: Business Ties Constraints and Portfolio Misallocation*

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Abstract

This paper examines how business ties with portfolio firms affect the asset management strategies of mutual funds. By exploiting the revelation of mutual fund advisory misconduct as an exogenous shock to these business ties, I find that mutual fund management firms with collapsed trust tend to increase their portfolio weights in client stocks following the misconduct revelation. This shift towards client stocks effectively reduces the likelihood of business partnership termination. Additionally, I find that client stocks underperform compared to non-client stocks and exhibit indifference towards net-selling stocks held by the same mutual fund families. These findings raise concerns about fiduciary duty violations and underscore the need for vigilance in aligning investment decisions with shareholder interests.

Keywords: Mutual Funds, Conflicts of interests, Portfolio allocation, Trust, Misconduct

JEL Classification: G21, G23, G41.

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1. Introduction

Business ties with portfolio firms might create conflict of interests and distort optimal decisions for asset management firms (Cohen and Schmidt (2009), Davis and Kim (2007), Cvijanović et al. (2016)). As retirement assets have gained significant importance in mutual fund industry and earnings from corporate pension plans contribute substantial portion of fund family revenues (Davis and Kim (2007)), such lucrative business ties might bring conflicting incentives for mutual fund families, by favoring firms under the ties and hurting fund returns. Establishing empirically how these ties affect investment decisions of mutual fund management firms and which characteristics create greater conflicts is essential for our understanding of the conflict of interests in asset management industry.

In practice, it is generally difficult to find a setting in which business ties between asset management firm and portfolio firm change exogenously. As a result, the existing literature has generally not been able to provide causal evidence of the effect of these business ties on the investment decisions of asset managers. Furthermore, there are only a handful of papers analyzing the investment behavior of mutual fund families under these conflicts of interests (Davis and Kim (2007), Cohen and Schmidt (2009)). Given the importance of mutual funds for households and the relevance of the question, an analysis of providing causal evidence of the strategic investment behavior under conflicts of interest seems of utmost importance. This paper exploits the timing of the revelation of fraud committed by asset management firms to generate an exogenous change of trust between asset management firms and their 401(k) client firm and provide causal evidence of the effect of changes in the business relationships on asset management firm's investment behavior.

It is difficult to estimate the effects of changes in business relationships on investment decisions of asset management firms for primarily two reasons. First, the hiring or firing of asset management firms by 401(k) plan trustees is arguably endogenous and correlated with the characteristics of both asset management firms and pension plan sponsors (Goyal and Wahal (2008)). Thus, comparing the invest-

ment strategies of mutual fund companies with different exposure to business ties is likely to capture the effect of other unobserved characteristics rather than the effect of business relationships. Second, asset management firms might execute certain investment strategies to establish 401(k) pension business relationships with their portfolio firms (Cohen and Schmidt (2009)). Therefore, it is uncertain which one causes the other and is likely to involve reverse causality. To overcome these limitations, I require a setting in which trust between a mutual fund firm and its 401(k) client firm changes, while the shock is not foreseen by the market.

I argue that the revelation of fraud committed by asset management companies allows me to overcome the two limitations of the standard regression of investment strategy on business ties. First, the fraud is not targeted at pension plan sponsors but rather involves defrauding a specific group of retail investors or funds (e.g., misrepresentation, overstatement of assets, direct theft). Thus, the revelation of such misconduct is likely to be exogenous to pension plan sponsors. Second, empirically, such advisory fraud is detected with a irregular lag of years (Dimmock et al. (2018a)). This irregularity in detection timing creates an unexpected collapse of trust in the asset management firm, enabling me to test the unilateral impact of the trustee relationship, which is a function of trust between entities, on investment decisions of mutual fund companies. Furthermore, the revelation of fraud within pension business contracts allows me to exploit variation within each pair of business ties (asset management firm – 401(k) client firm) by using unique fixed effects (Management firm × Client stock). In other words, by comparing the pre and post period of fraud revelation within each business tie, I can primarily examine the change in investment behavior for each business tie, rather than comparing it with different asset management firms or non-client stocks. Hence, by exploiting the timing of fraud revelations, I can plausibly estimate a causal effect.

Conceptually, investment portfolio weights into client stocks could have a positive or negative relationship with the revelation of misconduct committed by fund management companies. On the one hand, regulatory action is known to trigger extreme

fund outflows, fire-sales, (Liang et al. (2020)), and there is a uniform re-balancing of their holdings (Coval and Stafford (2007)) during fire-sales. Thus, there might be no impact on the weights of their client stocks. If the magnitude of asset outflows is significant, they might sell stocks with high liquidity, including those of large clients, which could even reduce their portfolio weights on clients. On the other hand, as Goyal and Wahal (2008) shows, regulatory actions are one of the major determinants of the termination of business ties. So, given 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 by reducing the impact of its own fire sales on the price of client stocks. Recognizing the importance of trust, which is a crucial asset in maintaining contracts under agency problems (Guiso et al. (2008), Zingales (2015), Kostovetsky (2016), and Gurun et al. (2018)), mutual fund families might increase portfolio weights toward their major clients following a reputation-disrupting event.

The results show that asset management firms increase their portfolio weights on their pension client stocks by 0.08 pp, which is 25% of the unconditional mean of portfolio weights for the average asset management firms on each portfolio firm, following the announcement of regulatory action against them. This 'tilting-to-client' strategy is more pronounced when the size of 401(k) pension plans and service fee income is large, suggesting that monetary incentives from existing business ties are important drivers for this client-favoring investment strategy. Moreover, the magnitude of the 'tilting-to-client' strategy is weaker for asset management firms with smaller assets under management (AUM) and poorer past performance. Finally, I find that the effect is weaker among announcements by the SEC, implying that severe scrutiny by the main regulatory agency might reduce the incentive to increase portfolio weights in client stocks, which may violate the fiduciary duty they bear.

To understand the economic incentive behind this 'tilting-to-client' strategy, I next examine the treatment effect on the probability of termination of such business ties. Goyal and Wahal (2008) document that regulatory action may lead trustees of pension

plans to terminate business relationships with reputation-harmed asset management firms. Consistent with this finding, the fraud-revealed asset management firms are more likely to experience business termination by 11 pp. Given that the unconditional probability of termination in the 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 increases their equity investment portfolio weights on clients in a given quarter, and (ii) non 'tilting-to-client' fund company, which does not increase their portfolio weights on client stocks. I find evidence of the effectiveness of the 'tilting-to-client' strategy. It significantly reduces the probability of contract termination relative to the group of non 'tilting-to-client' strategies, and this divergence persists over five quarters following the revelation of fraud. This suggests that asset management firms might adjust their portfolios in favor of their pension clients to reduce the likelihood of being terminated by pension plan sponsors.

Finally, I further examine the performance of client stocks around the time of fraud revelation. If the 'tilting-to-client' strategy is a sub-optimal decision, it implies a violation of fiduciary duty. Admittedly, there is a limitation in inferring the optimal ex-ante choice of investment decisions for mutual funds and making statements about the validity of investment strategies. However, given that the average holding period of mutual funds is around 16 months (Tucker (2017)), it is reasonable to compare the stock performance of clients to other stocks within the same holdings of the same mutual fund companies around 16 months before and after the treatment shock. I find that client stocks underperform compared to the average non-client stocks in the same portfolio and show no significant difference compared to (net) selling non-client stocks in the same portfolio. This suggests that the 'tilting-to-client' strategy may harm households' welfare and benefit only fund companies and client stocks.

To measure business ties and regulatory actions against mutual fund companies, I use detailed mandatory disclosure filings made by investment advisory companies registered in U.S. Securities and Exchange Commission (Dimmock and Gerken

(2012), Dimmock et al. (2018a), and Liang et al. (2020)) and 401(k) pension plan sponsors (Davis and Kim (2007), Goyal and Wahal (2008), Ashraf et al. (2012), Cvijanović et al. (2016), and Cohen and Schmidt (2009)) from 2001 to 2015. These mandated filings include actual holdings in portfolios managed by mutual fund companies, the announcement date and agency of regulatory actions, the names of mutual fund companies 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 a panel dataset capturing pension business ties.

My paper contributes to several strands of finance and economics literature. First, while the previous literature primarily focuses on fund managers' conflicts of interest in 401(k) pension business areas related to corporate governance, 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, from 401(k) pension market, on investment decision for managers.

Second, this article adds to the growing body of literature on financial misconduct in the investment advisory industry, demonstrating that advisory misconduct affects the careers of financial advisors (Egan et al. (2019)), working culture (Dimmock et al. (2018b)), the tendency to commit additional misconduct in the future (Dimmock and Gerken (2012)), and mutual fund outflows (Liang et al. (2020)). In this paper, I identify the investment decisions favoring clients over fund shareholders that arise due to the conflict of interest among managers.

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) indicates that mutual fund families invest more money into their 401(k) clients than other stocks they hold. Similarly, Cohen and Schmidt (2009) find that mutual funds overweight their client stocks and experience substantial inflows following business contracts, suggesting that managers invest in funds favorable to clients to attract big clients like 401(k) plan sponsors. These papers compare investment strategies on 401(k) client stocks with other non-

client stocks or other funds. In contrast, my paper examines the dynamics of investment decisions on client stocks following a collapse of trust, focusing on changes within individual business ties. Importantly, this is the first study to provide causal evidence of how conflicts of interest in the 401(k) pension market affect investment decisions by exploiting a unique shock of reputation damage, which is plausibly exogenous to the fundamentals of client stocks.

2. Hypothesis Development

According to Lakonishok et al. (1992) and Allen (2001), the fund management industry is exposed to significant conflicts of interest, and fund shareholders need to be vigilant about the agency problems inherent in asset management firms. These conflicts of interest arise from the challenges associated with assessing the quality of advice or investment decisions made behalf of their customers. In general, financial institutions possess greater information about financial products than their customers (Bolton et al. (2007), Baker et al. (2010), and Duan et al. (2018)), and their incentives are often misaligned with those of their clients, whose profits are directly tied to the (net) fund return. For instance, compensation for fund managers are primarily based on the assets under management (AUM) and advisors have strong incentive to maximize management fees, which are linked to AUM rather than the actual (net) fund returns (Deli (2002), Elton et al. (2003), and Golec and Starks (2004)). Consequently, as Kostovetsky (2016) demonstrates, trust in asset managers becomes a significantly valuable asset for investors, and the rupture of such a relationship may lead to investment redemptions by investors.

The 401(k) pension plans, which are is known as attractive businesses from the perspective of mutual fund companies, also harbor a significant 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 disruption in these relationships may impact the business ties between fund management compa-

nies and pension clients. Goyal and Wahal (2008) examine the types of events that affect the selection and termination of such relationships and show that regulatory actions against fund management companies are major factors leading to the termination of such business ties. As a result, it is expected that fund management companies may engage in strategic investment behavior to maintain these business ties when faced with regulatory actions. This is beneficial to managers, as there large clients constitute a significant source of their compensation.

The time-varying relationship between asset management firms and pension sponsors in the 401(k) pension business offer a unique venue to explore hypotheses concerning the investment strategies of fund management firms following regulatory actions against them. The first hypothesis is *tilting-to-client* strategy. I hypothesize that asset management firms have an incentive to preserve their existing business ties to maximize their management fees tied to AUM following a trust breakdown. This could lead them to adopt an investment strategy that favors their client stocks, even if it comes at the expense of fund returns. Consequently, if the incentives arising from these business ties are substantial enough to distort investment strategies, I would expect an increase in the weighting of client stocks within the equity portfolios of fund management firms. This hypothesis give rise to two related predictions. First, such a *tiling-to-client* strategy is likely to effectively reduce the probability of terminating existing business ties. Second, this investment strategy may be sub-optimal when viewed solely from the perspective of fund returns.

An alternative hypothesis is the *re-balancing* strategy, where fund management firms rebalance their equity holdings proportionally in response to significant asset withdrawals by their fund investors. This hypothesis is proposed in light of findings by Liang et al. (2020), which demonstrate significant fund outflows following regulatory actions against mutual fund firms. Furthermore, Coval and Stafford (2007) suggests that fund companies tend to uniformly rebalance their holdings in the events of extreme inflows or outflows, often referred to as fire-sales. Taken together, the

pronounced outflows triggered by announcements of regulatory actions are likely to result in a uniform rebalancing of their holdings, all else being equal.

Next, I directly investigate whether the portfolio rebalancing is driven by information or conflict of interests. If the increase in portfolio allocation in the client stocks is being driven by new information about the stock, 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 not be superior, at least, 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 were employed in this analysis: Institutional ownership data, business ties data, comprehensive disciplinary histories of SEC-registered investment advisory firms, and stock price data. This section provides a description of these sources and outlines the methodology for constructing the sample.

3.1 Business ties data

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

3.2 Institutional ownership data

Information on the portfolio holdings of asset management firms 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, asset management firms are categorized as 'business-tied' to a particular stock if the investment company entered into any contracts with pension plans to provide financial services to that firm; otherwise, they are classified as unrelated. Following a standard criterion employed in the literature, only funds with assets under management exceeding $1 million are included in the analysis. To merge the mutual fund family holdings data obtained from SEC Form 13F filings with the Form 5500 data, a name-matching algorithm was used in conjunction with web searches of company websites.

3.3 Regulatory action data

I gathered information on the historical record of regulatory actions taken against asset management firms by manually collecting data from SEC Form ADV. Every SEC-registered investment advisory firm and representative in the United States regulated by the Investment Advisers Act of 1940 is required to submit this form. As 401(k) plan assets are heavily invested in mutual funds[1], I assume the fraud events regarding mutual fund products as trust-collapsing events for 401(k) sponsors and use only such events in my sample. To link Form ADV data with institutional ownership data, I used a mapping table that correlates the CRD number in Form ADV with the Thomson Reuters MGRNO and MGRNAME identifiers.[2]

3.4 Summary Statistics

{Insert Table 1 about here.}

[1] 67% of 401(k) assets are invested in mutual funds (Investment Company Institute, 2021)

[2] I would like to express my gratitude to William Gerken for sharing this file.

Table 1 provides a summary of the sample characteristics. It indicates that my merged dataset comprises 28,996 observations for asset management firms, client stocks, and quarters, spanning from 2001 to 2015. On average, asset management firms hold approximately 0.328% of each client's portfolio. The average assets under management (AUM) for firms with 401(k) business ties amount to approximately $90 billion. The occurrence of misconduct revelations by asset management firms in my sample is rare, accounting for only around 1.1% of observations. This rarity underscores the significant reputation damage that such revelations can inflict on fraudulent asset management firms. The average size of pension plans involved with asset management firms is roughly $6 billion, highlighting the importance of pension operations for these firms. I define revenue dependency as the sum of direct and indirect compensation in 401(k) plan contracts, which are made between asset management firms and corporations, divided by 0.5% of assets under management as a fraction of the total assets held by the asset management firm. The average past performance, defined as the previous quarter's return of the entire portfolio managed by the investment company, stands at 2.13%. The average return for each client's stock in the previous quarter is 3.6%. In my sample, approximately 1.3% of business combinations are terminated, and about half of the sample increases portfolio weights on client stocks. This indicates that portfolio decisions in my sample are not heavily skewed in one specific direction.

4. Empirical Analysis

I examine comprehensive regulatory actions taken against asset management firms, specifically enforcement actions. This allows me to investigate post-behavior following a reputation downturn using both a difference-in-differences framework and an event study design centered around regulatory actions.

4.1 Difference-in-differences

To assess the impact of fraud revelations by asset management firms on their portfolio allocation to business clients, we face the challenge of potential confounding factors. These factors, specific to each investment company and 401(k) client, can influence their investment decisions. To mitigate this potential source of variation, I employ unique granular fixed effects.

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

where $Post_t$ is equal to 1 if any asset management firm in my sample, with a pension contract with a firm, has a public fraud revelation before or during quarter t. To gauge the exposure of client s to fraud revelations involving their business partners m, I create an indicator variable, $Fraudulent$, which is set to one for stocks whose managers entered into pension contracts with fraudulent fund companies. The coefficient β represents the average impact of fraud revelations on the investment in client stocks.

This paper introduces an unique fixed effects to address the challenge of unobservable factors in understanding the dynamics within this bilateral business relationship between two parties. The granular 'asset management firm $\times$ client stock' fixed effect, represented as $\eta_{m,s}$, systematically eliminates all time-invariant heterogeneity across individual business relationships. These relationships may be influenced by distinctive features, such as the interactions between executives of the firm and the asset management company, or the unobservable variables that hold particular importance for specific clients of the asset management firm. By standardizing these aspects across each business relationship, this approach mitigates concerns that behavioral changes are endogenously tied to factors influencing the formation of these business agreements. The introduction of $\eta_{m,s}$ enables a comparison within each business relationship, focusing on changes in portfolio investments rather than their absolute levels.

Furthermore, the quarter fixed effects, denoted as λ_t, eliminate time-varying variations that might have occurred in the financial markets, including changes in the stock market or the mutual fund industry. This help mitigate concerns related to macroeconomic factors affecting the portfolio strategies of mutual fund management companies. Additionally, it allows for control over the overall condition of the stock market, which can have a proportional impact on the inflow of funds into mutual funds.

4.2 Event study design

To gain deeper insights into the dynamics of the treatment's impact on portfolio allocation to business clients, I employ the following regression design:

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

Here, $D_{m,t}^{\tau}$ represents a relative event-time dummy that equals 1 if the revelation of misconduct committed by asset management firm m occurred exactly τ quarters ago for $\tau > 0$, or τ years later for $\tau < 0$. In line with recent event study analysis methods (McCrary (2007), Borusyak and Jaravel (2017), Atkin et al. (2018), Higgins (2019)), I retain observations that are up to 8 years prior or 8 years after the event. To achieve this, I use binning at the endpoints, setting $D_{m,t}^{-8} = 1$ for $\tau \leq -8$ and $D_{m,t}^{8} = 1$ for $\tau \geq 8$. The specification also includes fixed effects for management company $\times$ client and quarter.

Identifying the dynamic treatment effect is crucial from various identification perspectives. The time series of treatment impact can help confirm the absence of a pretrend before the event. Furthermore, it may elucidate the mechanisms underlying the average treatment effect. Importantly, to the best of my knowledge, I am the first to showcase the dynamics of portfolio strategies employed by asset management firms amidst this significant conflict of interest. Consequently, this provides a more comprehensive and clear picture of their investment decisions across different periods.

4.3 Definition of variables

The primary dependent variable is a measure of equity investment portfolio weight. For each asset management firm m, it holds each stock s at the end of quarter t, denoted as $H_{m,s,t}$, and the market price of each stock s, denoted as $P_{s,t}$, in dollar terms. To account for the effect of stock splits, both stock holdings ($H_{m,s,t}$) and stock prices ($P_{s,t}$) are adjusted.

I define the equity portfolio weight of asset management firm (m) on specific stocks (s) as:

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

Next, I define the termination of a business contract using the time series of business contracts. I introduce a binary variable, $BusinessTies_t$, which is set to 1 when a client firm enters into a pension contract with an asset management firm in quarter t.

I then define the variable *replacement* to represent the termination of a business relationship using the following construction:

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

To analyze the consequences of varying investment strategies following the fraud revelation, I categorize 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 decision

First, I examine the investment strategies of asset management firms following the revelation of their fraudulent behavior in the market.

5.1.1 Difference-in-difference

I begin by examining the effects of fraud detection on investment decisions through the estimation of Eq. (1). To account for other factors that may influence investment decisions regarding 401(k) client stocks, I incorporate several control variables into the analysis. These controls encompass the age of the mutual fund company, the size of the 401(k) plan under each business contract, revenue dependency related to fees from the 401(k) plan for the mutual fund company, past performance at the mutual fund company level, client stock returns, net flow of the mutual fund company, and the assets under management (AUM) of the mutual fund company.

Furthermore, all regression specifications incorporate *Manager* $\times$ *Client* fixed effects, which account for time-invariant characteristics associated with mutual fund companies and client stocks. Lastly, I include quarter fixed effects to control for any time-variant common trends in the mutual fund industry or the 401(k) market. Standard errors are clustered by manager $\times$ client to account for correlation within each business tie.

{Insert Table 2 about here.}

In Table 2, Column (1) indicates that fraudulent asset management firms significantly increase their portfolio weights by approximately 0.06 percentage points on their client stocks after the fraud is revealed to the public. When incorporating additional time fixed effects in Column (2) and Column (3), the coefficients become higher, at around 0.08 percentage points. Considering that the average portfolio weight on all stock holdings is 0.328%, the magnitude of this impact is roughly 24% of the average weights, highlighting its economic significance.

Several mechanisms may explain the consistent patterns of a positive relationship between fraud revelations and investment strategies regarding client stocks. Firstly, fraudulent asset management firms may, in general, exhibit a greater tendency to tilt their portfolios towards their clients, irrespective of fraud revelations. This suggests that mutual fund companies that increase portfolio weights on their clients as a way to maintain business relationships may engage in illegal activities to compensate for these suboptimal investment strategies. Additionally, these investment patterns may be influenced by stock performance. In other words, client stocks may experience a positive shock to their stock prices, either in the short term or long term, coinciding with the timing of fraud revelations committed by mutual fund companies with business relationships tied to those stock prices. While this may not be a realistic driving force behind the results, it's a possibility that cannot be entirely ruled out.

To investigate the mechanisms described above, I perform an event study analysis to assess the dynamic treatment effects surrounding the event of fraud revelation. This is achieved by estimating Eq. (2), with the omitted period being the quarter of the treatment. The resulting estimates are presented in Figure 1.

{Insert Figure 1 about here.}

I find little evidence of differential trends between the control group, which has not faced market discipline due to past illegal behavior, and the treated group, where fraud is revealed. This dynamic pattern casts doubt on the validity of the first alternative mechanisms discussed earlier, as it suggests that fraudulent asset management firms exhibit similar investment behavior to the control group. Therefore, the change in investment strategy appears to be triggered when their reputational capital is publicly damaged.

Furthermore, as explored in Section 3, I present the dynamics of client stock performance around the event in both the short-run and long-run. These findings indicate that the returns of client stocks are generally lower than those of other weight-increasing stocks, and they do not significantly differ from (net) weight-decreasing

stocks, both in the short-run and long-run. Thus, it appears that investment companies are not increasing their portfolio weights in client stocks simply because these stocks seem to perform better afterward.

5.1.2 Dynamic pattern

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

In Figure 2, the estimates from the analysis on AUM dynamics reveal that following the fraud disclosure, assets managed by fraudulent investment companies decrease significantly by 0.4 percentage points in the subsequent four quarters. Subsequently, the effects gradually dissipate, returning to the previous levels, similar to the pre-event period. These findings align with the existing literature, which demonstrates significant fund outflows from mutual funds after advisory misconduct by their managing investment companies (Liang et al. (2020)). This evidence underscores the impact of market discipline from investors in the mutual fund market. Furthermore, since no differential trends between groups are observed prior to the fraud revelation, the parallel trend assumption holds in this analysis.

{Insert Figure 2 about here.}

To test whether investment companies indeed increase the size of their investments in client stocks, I conducted a dynamic analysis of the nominal dollar size of investments in client stocks. The results, as depicted in Figure 3, reveal an interesting pattern. During substantial financial distress, as observed inFigure 2, fraudulent investment companies increase their actual investments by approximately 0.5 percentage points over four to five quarters. While this effect is economically significant, accounting for about 60% of the average dependent variable, it is statistically insignificant. Furthermore, the effects gradually dis-

sipate and show no significant differential trends, both in prior events and in the long run, between the control and treated groups.

Furthermore, this strongly supports the mechanism in which investment companies make favorable gestures toward their clients after their illegal behavior is exposed by regulatory institutions. This is primarily driven by economic motivations to maintain profitable 401(k) business relationships. Importantly, this suggests that these investment companies may prioritize managing mutual funds at the expense of mutual fund returns to uphold external business contracts. Such actions directly contradict the fiduciary duty imposed on all mutual fund management companies. Under the Investment Advisers Act of 1940, every investment advisor, including mutual investment companies, is obligated to act at all times in the best interest of the fund, as stated in *SEC v. Tambone, 2008*.

{Insert Figure 3 about here.}

Combining the results of various factors affecting my main measure in Eq. (3) shed lights on the underlying mechanism behind the observed positive pattern of investment in client stocks by mutual fund management companies after their fraud is exposed in the market. Despite significant fund outflows following the fraud revelation, which necessitate a rebalancing of their equity investments as shown in Figure 2, fraudulent investment companies increase their portfolio weights on their client stocks, or at least maintain them at elevated levels, ensuring that their rebalancing investments do not negatively impact their clients, as demonstrated in Figure 3.

One possible explanation for these client-favoring investment patterns is that they may result from strategic decisions aimed at maintaining profitable business connections with clients. Previous literature has reported that regulatory actions against investment management firms are a major determinant of the termination of 401(k) plan business contracts (Goyal and Wahal (2008)). Given the elevated probability of termination due to fraud revelation, fraudulent investment companies may strategically adjust their investment decisions as one of the channels to minimize the likelihood of contract 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 5.2.

5.2 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. (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. Firstly, in Section 5.2.1, I estimate the long-run impact of fraud revelations on the probability of investment companies experiencing business termination as business partners with 401(k) clients. Secondly, in Section 5.2.2, I estimate the dynamic effects on termination by using Eq. (2). This analysis provides insights into the interactions between asset management firms and 401(k) sponsor firms and how 401(k) sponsor firms react to fraud revelations. Finally, I explore heterogeneous effects in the last analysis, based on different groups of fraudulent investment companies characterized by their tilting-to-client behavior. This exploration sheds light on the consequences of employing a tilting-to-client investment strategy, which may help explain why investment companies increase their investment portfolio weights in client stocks after their fraud is revealed.

5.2.1 Difference-in-difference

To investigate trends in business termination, I define the variable $Replacement_{t+1}$ as an indicator variable equal to one if clients terminate their existing 401(k) plan

contract with an investment company in the next quarter, $t+1$. Table 3 illustrates the lasting impact of fraud revelations on existing business relationships. Following fraud revelations, the average probability of business termination between clients and the fraud-revealed investment companies significantly increases by 10.9%. Given that the unconditional mean of replacement probability in the 401(k) plan sponsor market is 13%, this average change is also economically significant.

{Insert Table 3 about here.}

These results align with the body of literature indicating that negative trust shocks to investment companies result in significant losses of their pre-existing clients in the corporate pension industry (Goyal and Wahal (2008), Gurun et al. (2018), Egan et al. (2019)). While these permanent shocks to business relationships suggest a strong motivation for investment companies to alter their investment strategies after their illegal activities are disclosed, it is important to acknowledge the possibility that investment companies anticipating significant business relationship losses might resort to fraudulent activities to mitigate these losses.

5.2.2 Dynamics of business termination

To gain a better understanding of why investment companies increase their portfolio weights towards their clients, I conduct an event study analysis on business termination. Figure 4 displays the residuals from the estimation of Eq. (2) using my business termination measure. The omitted period corresponds to the period when the fraud is detected and revealed to the market by regulatory agencies.

{Insert Figure 4 about here.}

After fraud detection, clients tend to significantly replace business partners of current fraudulent companies in the following two quarters. The treatment coefficient in the second quarter following the event is almost 10%, which is economically significant, especially considering that the unconditional probability of termination in my sample is about 13%. Subsequently, the treatment effect converges to almost zero.

While these results indicate a significant uptrend in business termination in the second quarter following the event, there are large variances or confidence intervals in the subsequent periods. Given the potential for heterogeneous behavior among investment companies following the revelation of their fraud to the market, conducting a cross-sectional analysis on different groups of investment companies may help reveal the impact of such client-favoring investment strategies on pre-existing business relationships.

5.2.3 Effectiveness of *tiling-to-client* strategy

To gain further insight into the mechanism behind these favorable strategies toward their clients, I conduct a cross-sectional test based on the previous analysis of business termination dynamics. I define the variable $\mathbb{1}_{\Delta\%Portfolioi,j,t>0}$ as an indicator variable equal to one if management firm i increases their portfolio weights on their client j in quarter t.

{Insert Table 4 about here.}

Table 4, column (1), reveals that investment strategies tilting toward clients strengthen the existing business relationships between them. Investment companies employing such strategies experience a probability of business termination that is approximately 5 percentage points lower than other investment companies. Considering that the unconditional mean of the probability of business termination is about 13%, the average treatment effect is also economically significant. This finding aligns with a large body of literature demonstrating the positive effect of institutional investor support on firms (Golez and Marin (2015)).

Column (2) of Table 4 presents result for differential effect of investment strategies under the shocking events which is the announcement of detection for 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 invest-

ment companies. This further provide additional evidence that such favorable investment behavior to client is to minimize the chance of getting fired as business partner.

To examine the dynamics of this differential impact, I conducted an event study analysis on various groups of investment companies based on whether they implemented the 'tilting-to-client' investment strategy. The residuals from the estimation of Eq. (2) on the replacement measure are depicted in Figure 5, segmented by heterogeneous groups defined by the $\mathbb{1}_{\Delta\%Portfolioi,j,t>0}$ variable. For example, the coefficient at $t = 2$ for the $\mathbb{1}_{\Delta\%Portfolioi,j,t>0}$ group represents the residual at $D^2_{m,t}$ (from Eq. (2)) for the group treated with $\mathbb{1}_{\Delta\%Portfolio_{i,j,t}>0}$.

Prior to events, heterogeneous investment strategies exhibit homogeneous trends in business termination, with most coefficients showing no significant variations. Additionally, investment companies that do not employ 'tilting-to-client' strategies are generally more likely to experience business termination than the "tilting-to-client" group in most time periods.

Following the events, differential effects become significant, diverging after the second quarter since the shock. In the initial period up to the second quarter, both groups experience a significant increase in the likelihood of business termination, approximately by 9 percentage points. However, heterogeneous groups then begin to exhibit opposing trends. Investment companies that do not increase their portfolio weights on their clients, after their fraud revelation, experience an escalation in the likelihood of business termination, while the rest of the 'tilting-to-client' group faces a sharp decrease.

Taken together, the observed results provide insights into the mechanism behind the adoption of 'tilting-to-client' strategies. When investment companies recognize fraudulent behavior within their ranks, it can lead to immediate damage to their reputation and increase the likelihood of clients seeking to replace them as business partners. In response, these investment companies strategically adjust their investment strategies to preserve their existing business relationships. This aligns with existing literature that highlights how investment firms engage in favorable behaviors,

such as overweighting investments and proxy voting, to attract and retain clients. (Davis and Kim (2007), Cohen and Schmidt (2009), and Ashraf et al. (2012), Cvijanović et al. (2016)). Rather than maintaining an overall overweight position in client stocks, as seen in previous studies, my findings suggest that investment companies dynamically shift their investment behavior to safeguard their business contracts in the face of negative shocks to their relationships.

{Insert Figure 5 about here.}

However, it's worth noting that there could be other mechanisms at play that contribute to the observed results. For instance, client stocks might exhibit systematic price increases, either in the short run or long run, following the detection of fraud committed by the service provider for their 401(k) pension plans. Additionally, investment companies might increase their portfolio weights on client stocks based on private information obtained through their pre-existing business relationships (Duan et al. (2018)). Therefore, the 'tilting-to-clients' behavior could be a natural response driven by informational advantages rather than solely as a favorable gesture.

5.3 Client stock performance

To investigate whether the tilting-to-client strategy is influenced by expectations or private information regarding potential stock performance, I conducted an analysis of the performance of client stocks around the events.

To test this, I compute the cumulative average abnormal returns of client stocks around the events of fraud revelation. To construct the measure, firstly, I calculate the monthly returns of clients, which exceeded the equal-weighted average return of all stocks held by the same investment company at the beginning of the month. Subsequently, I calculated the average and standard error of these abnormal returns.

{Insert Figure 6 about here.}

As shown in Figure 6, there is a noticeable downward trend in abnormal returns, indicating the relative underperformance of client stocks compared to other

stocks held by the same management company. This underperformance is evident both before and after the events, with client stocks consistently exhibiting significantly worse returns than the average of non-client stocks. Over the course of approximately one and a half years, client stocks underperform non-client stocks by approximately 10 percentage points. These findings provide insights into the underlying mechanism of the "tilting-to-client" strategy and appear to counter the hypothesis of information advantage as a driving factor.

{Insert Figure 7 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.

To further assess the relative performance of client stocks, I compare their monthly excess returns to those of other stocks that were (net) sold by the same investment company during the same month. The cumulative average abnormal returns are depicted in Figure 7. As shown, the performance of client stocks is similar to that of (net) selling stocks by the same management company, indicating that client stocks should have been sold both before and after the events. Asset management firms appear to systematically adopt the opposite strategies following the detection of their fraud.

Taken together, the results from both Figure 6 and Figure 7 suggest that the *tilting-to-client* strategy, which effectively reduces the probability of being terminated as a business partner ex post, appears unlikely to be the optimal investment decision in terms of fund returns. While this investment strategy may seem to violate fiduciary duty, it is still possible that it is based on private information about long-term cash flows that extend beyond the periods covered by 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 decisions 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

Considering the substantial heterogeneity present in the datasets, I examine the diverse effects within the context of business contracts, asset management firms, and enforcement actions. Our analysis focuses on evaluating the impact of exposure to portfolio weights on client stocks and the likelihood of contract replacement. I employ the following regression design similar to the one presented in Eq. (1):

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

where $Post_t$ is equals 1 if fraud committed by asset management firm m, holding a pension contract with firm s within our sample, has been publicly revealed before or at quarter t. To explore the influence of various contextual factors within my sample, I interact these characteristics with the post-treatment indicators. The coefficient β in the regression models represents the differential impact of these heterogeneous characteristics on the outcomes.

6.1 Characteristics of contract

Initially, I examine differential responses based on the types of business contracts between asset management firms and their client firms. I estimate Eq. (6) to ana-

lyze how these contracts impact investment portfolio weights on client firms and the probability of replacement as business partners.

Coefficient estimates from the analysis of Eq. (6) are presented in Table 5. Columns (1)-(2) specifically focus on the treatment effects associated with the size of the 401(k) pension plan that the investment company has with its client firms. Notably, the impact of business size is statistically significant and positive. For every 1% increase in the size of the business, there is a corresponding positive treatment effect of approximately 0.17 percentage points. Given that the average investment portfolio weight on client stocks is around 0.3%, this treatment impact holds substantial economic significance. Although the treatment impact on the 'Replacement' variable lacks statistical significance, the coefficient still holds significance relative to the average probability of replacement. This suggests that investment companies are more sensitive and responsive to larger, more significant clients. Conversely, client firms appear to respond indifferently, regardless of the size of the pension plan. It is worth noting that pension plan size may serve as a somewhat coarse measure when considering the direct involvement of managers with these pension plans.

In Table 5, columns (3)-(4) provide insight into the differential impact associated with the direct monetary income that investment companies derive from their 401(k) clients. This income dependency on the business contract is quantified as the ratio of direct compensation fees (received by the investment company for their services related to pension plans) to the fund management fee (typically 0.2% of assets under management), a standard metric in the literature. Notably, both portfolio weights and business replacement exhibit significantly positive impacts in response to income dependency. This metric, which directly gauges the relevance of exposure to the investment company, demonstrates stronger significance compared to columns (1)-(2). This implies that a high degree of income dependency on a particular pension plan provides a stronger incentive for investment companies to make favorable investment decisions for their clients. From the perspective of client firms, exposure to fraudulent managers may result in more severe consequences or a breakdown of

trust, significantly increasing the likelihood of replacing these fraudulent management companies, particularly when clients perceive themselves as important clients.

{Insert Table 5 about here.}

Collectively, these findings underscore the pivotal role of economic incentives in motivating managers to adopt a 'tilting-to-client' strategy. In the wake of a fraud revelation, a more financially attractive business arrangement appears to provide stronger incentives for investment managers to favorably allocate their funds towards their clients. This approach helps maintain the business connection, which in turn offers substantial and beneficial compensation to investment managers. These results align with prior research that has documented mutual fund companies engaging in favorable actions towards their clients in the realm of corporate 401(k) pension business. They provide empirical evidence that financial incentives indeed play a significant role in driving such favorable actions aimed at preserving business relationships (Davis and Kim (2007), Cohen and Schmidt (2009), Ashraf et al. (2012), Cvijanović et al. (2016)).

6.2 Characteristics of asset management firms

Subsequently, I investigate these effects from the perspective of clients. To test differential impacts based on the asset manager's context, I employ the estimation of Eq. (6) while considering both the size and past performance of asset management firms.

In Table 6, columns (1)-(2), the treatment effects are analyzed with respect to the differential size of asset management firms. Significantly large coefficients are observed for the probability of replacement, while small and insignificant coefficients are observed for portfolio weights. This implies that clients tend to prefer well-established, larger asset management firms. In essence, market leaders in the investment advisory industry may be less affected by reputational damage in the corporate 401(k) pension plan market due to their greater market influence.

In Table 6, columns (3)-(4) present the impacts of managerial ability. A negative estimate is observed for portfolio weights, although it is statistically insignificant. This suggests that competent managers may not be as inclined to distort investment decisions in favor of clients. Regarding the probability of replacement, significantly negative estimates are found, indicating that clients are reluctant to replace competent investment companies after exposure.

{Insert Table 6 about here.}

In summary, these findings shed light on the motivations of clients underlying the main results. Even when their trust is shaken following the revelation of fraud, clients appear reluctant to sever their business ties with investment managers who possess superior abilities or stronger reputations compared to others. This highlights that business relationships are the result of ongoing interactions between investment companies and firms. Therefore, it is essential to comprehend the economic dynamics from the perspective of clients, particularly in light of the strategic investment behavior exhibited by investment companies.

6.3 Characteristics of 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 in regulatory agencies (SEC vs. non-SEC). I find that, relative to non-SEC agencies, SEC-imposed sanctions appear less likely to lead to the adoption of a *tilting-to-client* strategy. Moreover, disciplinary announcements by the SEC trigger a higher chance of replacement compared to announcements by other agencies, although this effect is statistically insignificant. As the SEC is a major agency specialized in financial fraud, and the media usually spotlights its announcements, this suggests that SEC regulation may attract more national attention. Thus, such attention-invoking events may discourage myopic investment decisions that harm fund returns, including the *tilting-to-client* strategy (at least until

about 2 years in Figure 6). Moreover, the news of fraud detection by the SEC has a greater chance of reaching firms connected to fraudulent investment companies than detection by other agencies, increasing the likelihood of replacing the service contract.

In Table 7, columns (3)-(4) examine how the variation in the amount of penalty affects the outcomes. First, I find that the amount of fines is negatively related to the *tilting-to-client* strategy, although this relationship is statistically insignificant. Given that the penalty should be in the form of cash and that liquidation of assets for investment companies is costly, higher fines leave less room to engage in suboptimal investment decisions, including the *tilting-to-client* strategy. Secondly, the results show that the amount of the penalty is positively correlated with the probability of being replaced as a business partner regarding 401(k) plans. More substantial fines are indicative of more serious fraud committed by the investment company, and a significant amount of penalty may imply a substantial erosion of reputation (or trust) in the investment advisors. In other words, more serious fraud detection is associated with more severe responses from firms against the fraudulent asset management firm.

{Insert Table 7 about here.}

Taken together, the results shed light on the mechanism of how fraud detection affects the behavior of both asset management firms and their client firms. When their fraud detection invokes significant attention from both regulatory agencies and investors, management firms show attenuated *tilting-to-client* strategies, which are not optimal for fund returns in the two years following the fraud event. On the other hand, such major events enhance the chance that this news reaches their client firms and might deteriorate their reputation or social capital in the eyes of (potential) clients.

7. Conclusion

In this paper, I investigate how asset management firms respond to disruptions in their business relationships with major clients. To measure the impact of

a trust shock, I utilize validated instances of mutual fund advisory misconduct identified in mandatory regulatory filings. I identify significant clients through detailed 401(k) pension contracts between sponsors and mutual fund companies, as disclosed in mandatory filings.

I discover an increasing trend in portfolio weights allocated to client stocks following the announcement of misconduct. Many of these misconduct events involve intentional illegal activities, such as misinformation and churning. Moreover, I find that this client-favorable trading behavior effectively reduces the probability of termination as a business partner. The strength of these results varies with the compensation received from the client, with larger compensation leading to stronger effects. Conversely, mutual fund managers with high performance exhibit weaker responses.

Furthermore, my analysis reveals that the stock performance of clients is consistently lower than that of average stocks in the same portfolio for at least 18 months before and after the treatment event. The observation that mutual fund companies adjust their investment portfolios to favor client stocks, which subsequently exhibit poorer performance compared to other stocks in the same portfolio, raises questions about potential violations of fiduciary duty and whether such investment strategies are in the best interest of fund shareholders or fund returns.

Overall, this study highlights the complex dynamics of investment strategies and business relationships in the asset management industry, underscoring the need for regulators to monitor potential breaches of fiduciary duty and assess whether these strategies truly benefit fund shareholders.

My finding that investment firms increase their portfolio weights in underperforming stocks of major clients has significant implications for welfare. With the increasing importance of retirement assets in the mutual fund industry, the incentives related to this specific agency problem become even more pronounced.

Given that the average holding period for mutual funds by households is approximately 16 months (Tucker (2017)), such client-favorable investment decisions can have detrimental effects on the financial well-being of households, who are the actual fund

shareholders. As a result, my study underscores the importance of policymakers and investors being vigilant about these conflict-of-interest-driven investment patterns, as they directly impact the financial wealth of households.

Addressing these issues and ensuring that investment decisions prioritize the best interests of fund shareholders is crucial for maintaining the integrity and trustworthiness of the mutual fund industry.

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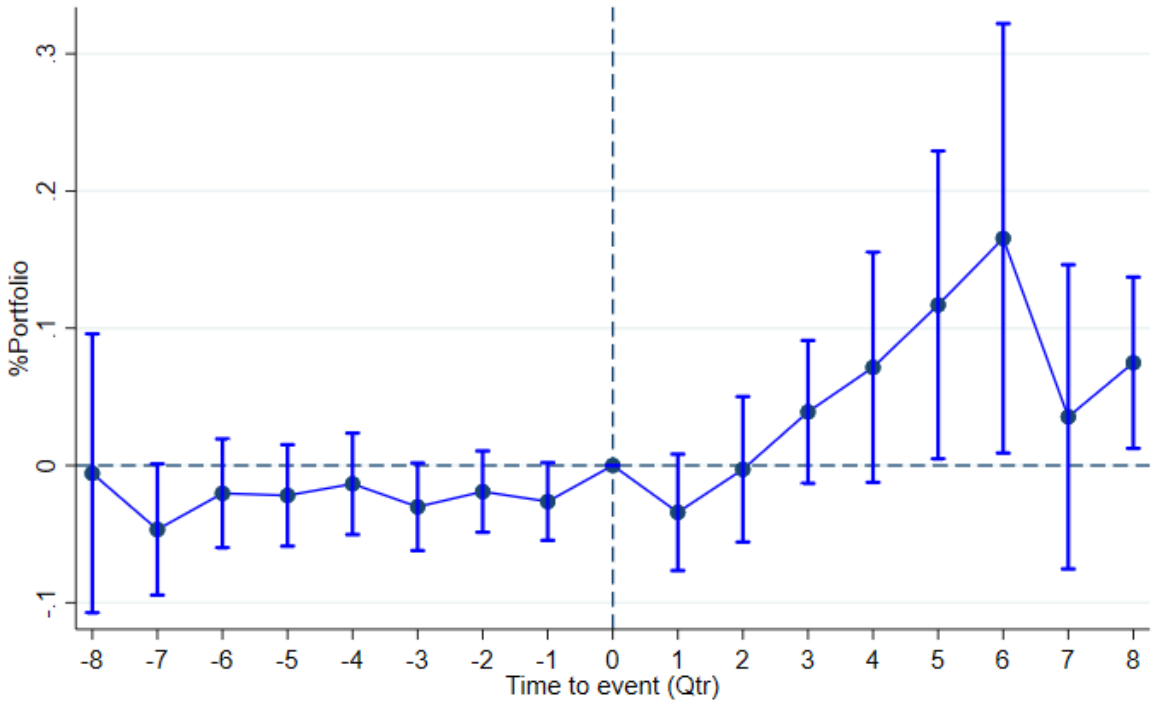
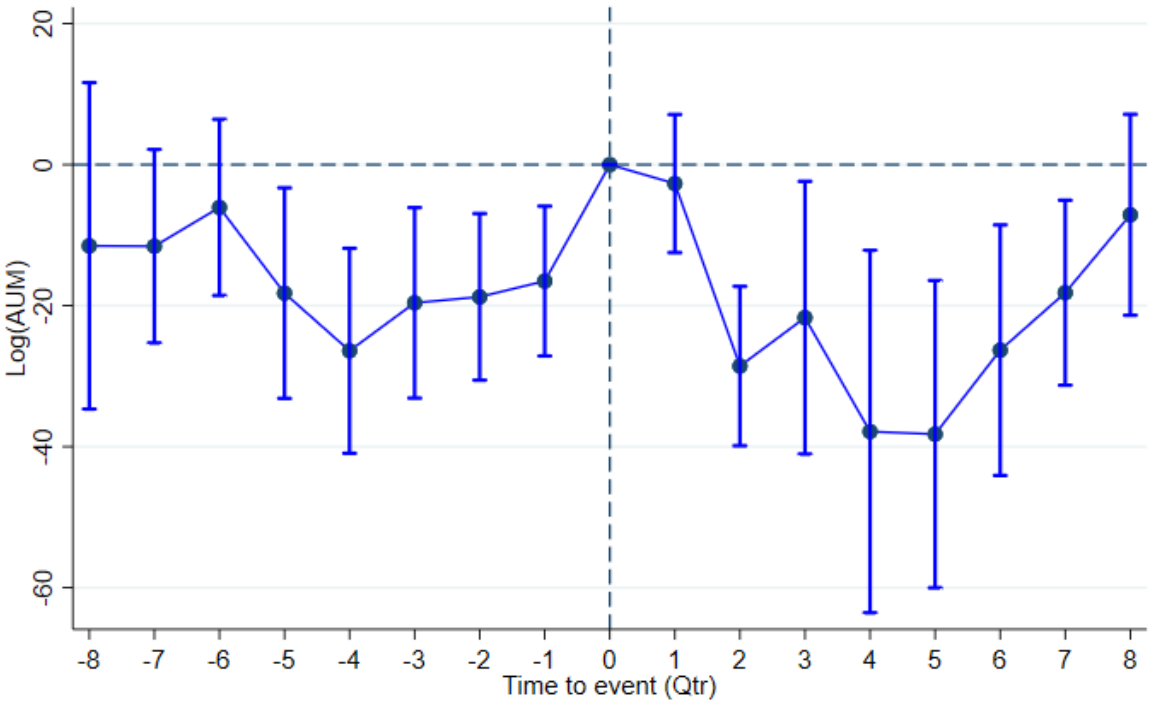
Figure 1



Effects on portfolio weight of client stocks

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

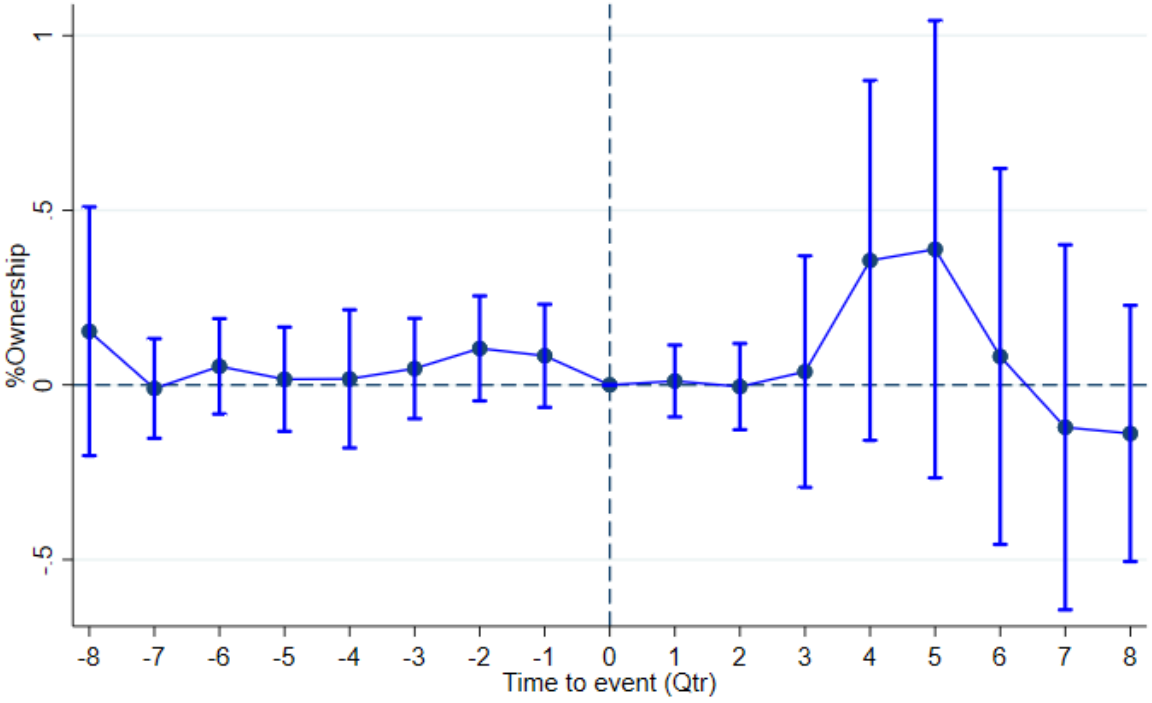
Figure 2



Effects on Log(AUM)

This figure displays the coefficients for event study time-dummies and 95% confidence intervals from estimating Eq. (2) on the logarithm of AUM managed by asset management firms. It includes time-varying controls used in Table 2. Standard errors are clustered by Manager $\times$ Client. The sample comprises portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

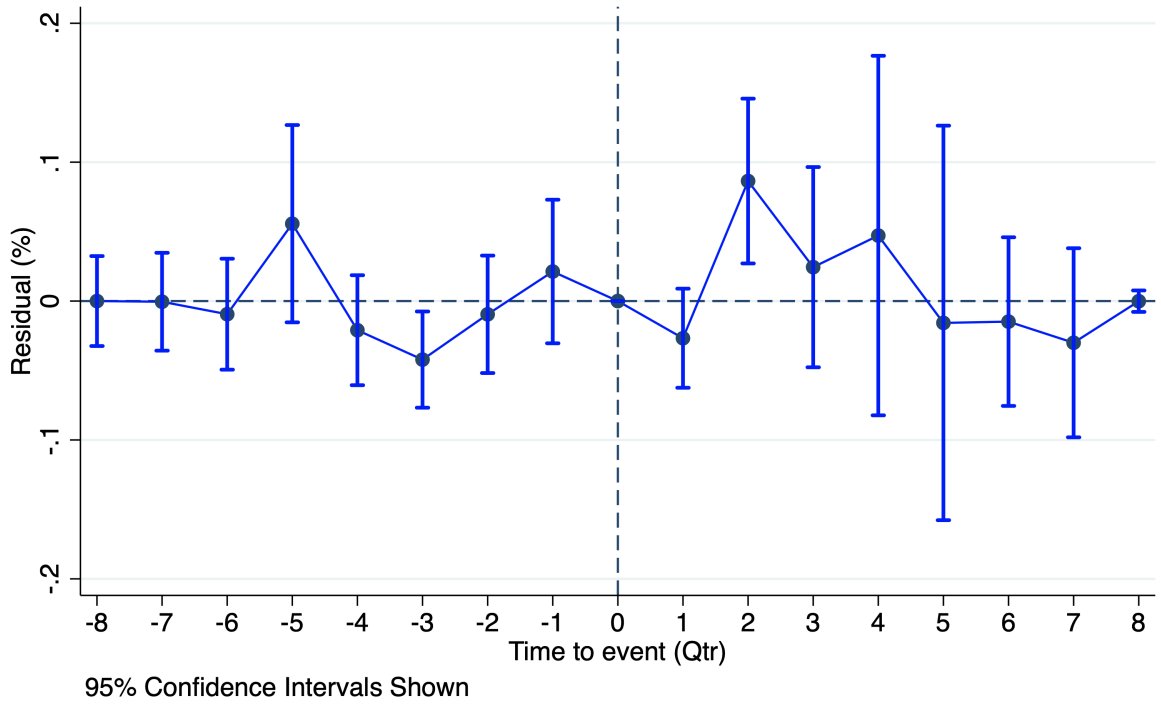
Figure 3



Effects on (Stock holding/Total Share Outstanding)

This figure displays the coefficients for event study time-dummies and 95% confidence intervals from estimating Eq. (2) on the nominator of Eq. (3) managed by asset management firms. It includes time-varying controls used in Table 2. Standard errors are clustered by Manager $\times$ Client. The sample comprises portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

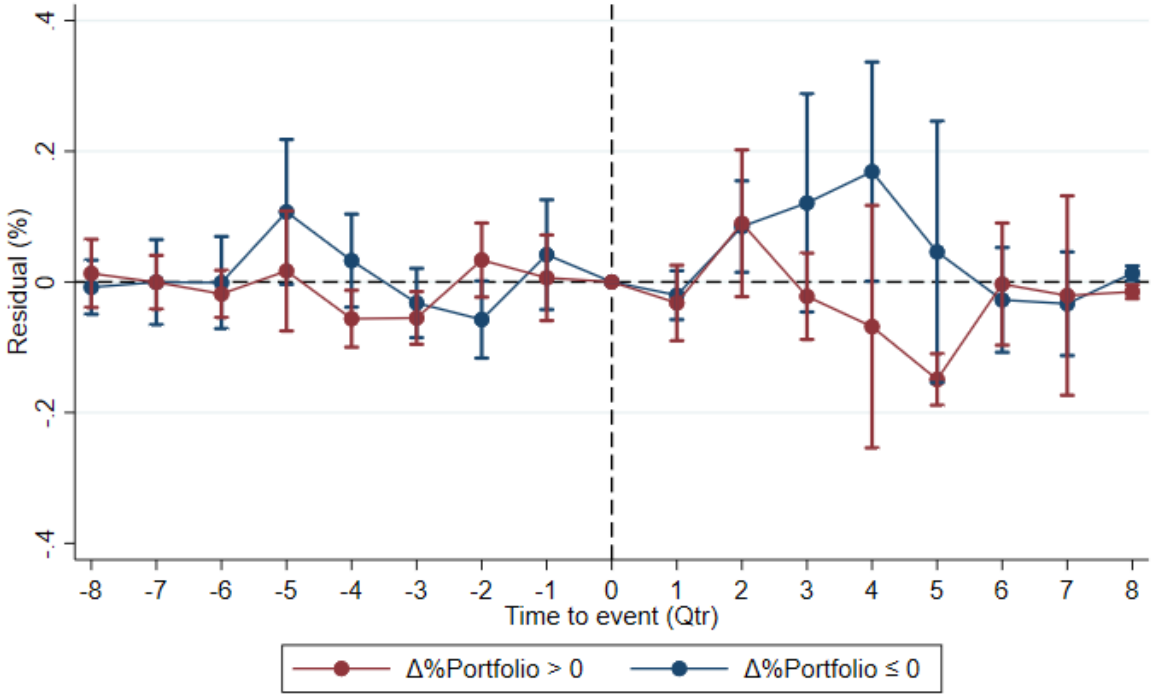
Figure 4



Effects on Prob(Replacement)

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

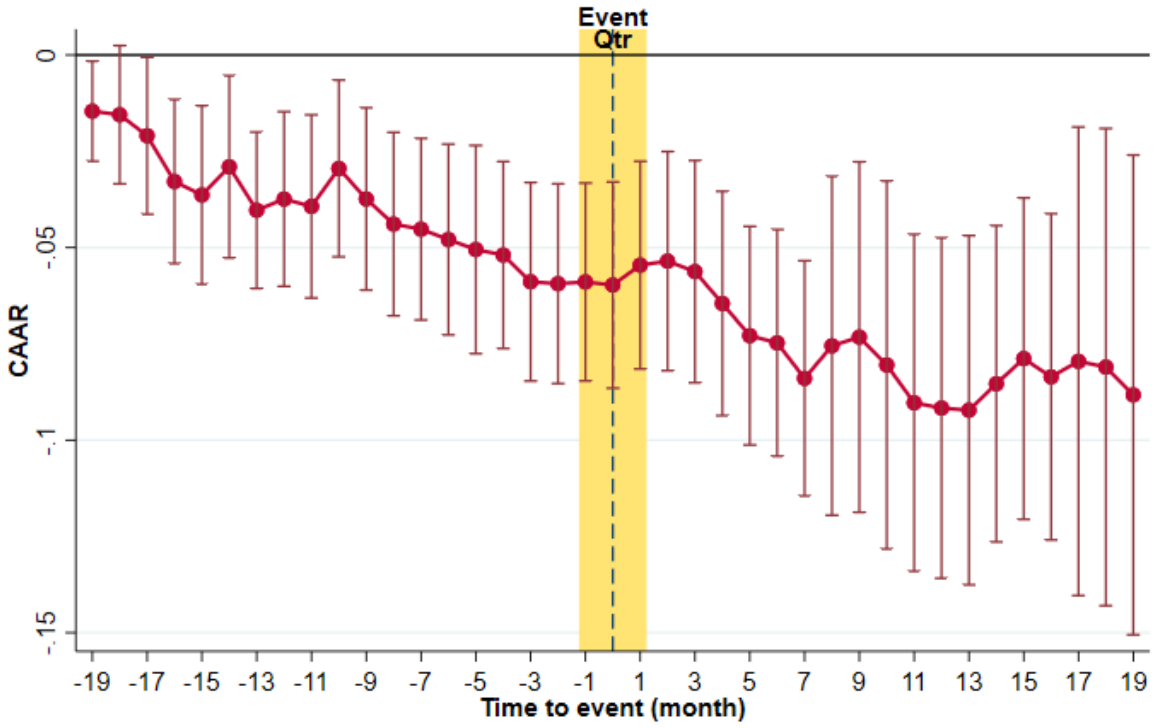
Figure 5



Effects on Prob(Replacement)

This figure displays the residuals from event study time-dummies coefficients and 95% confidence intervals from estimating Eq. (2) on the Eq. (4). The red line represents asset management firms conducted *tilting-to-client* strategy, while the blue line represents all other cases. It includes time-varying controls used in Table 2. Standard errors are clustered by Manager $\times$ Client. The sample comprises portfolio weights on client stock data from 2001 to 2015. The dotted vertical line represents the omitted period.

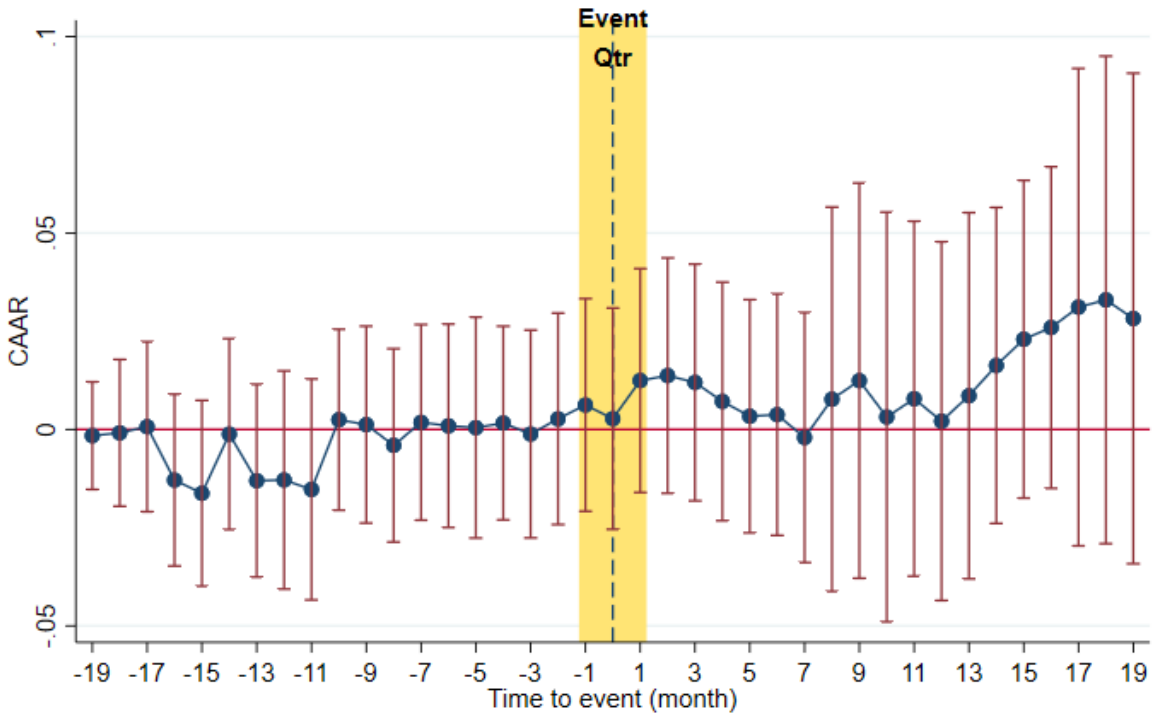
Figure 6



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

This figures shows the cumulative average abnormal returns (CAARs) of client stocks around regulatory actions taken against asset management firms. CAARs are measured as the 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 figure shows the cumulative average abnormal returns (CAARs) of client stocks around regulatory actions taken against asset management firms. CAARs are measured as the 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 both mutual fund company-quarter and client-quarter level data, including variables related to fraud used in the study. The summary statistics include data from the year 2001 to 2015. Data on business contract between asset management firms and 401(k) sponsors 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$\times$ 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%

This table presents the results of a regression on portfolio weights in client stocks following the revelation of fraud committed by asset management firms. The sample period is from 2001 to 2015, and the unit of analysis is the manager-client stock-quarter level. The dependent variable is portfolio weight on client stocks defined in Eq. (3). The $Post(Fraud)$ is an indicator variable set to one since the detection of fraud committed by asset management firms. 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 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$\times$ 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

This table presents the results of a regression on the the probability of termination of business ties following the revelation of fraud committed by asset management firms. It includes the same controls as Table 2. The sample period is from 2001 to 2015 and the unit of analysis is the manager-client stock-quarter level. The dependent variable is equal to one if there is no business ties between a given asset management firm and its' client at the given quarter and defined in Eq. (4). The *Fraud* is an indicator variable set to one if the detection of fraud committed by asset management firms occured in 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 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

This table presents the results of the regression on the probability of termination of business ties following the revelation of fraud committed by asset management firms. It includes the same controls as presented in Table 2. The sample period is from 2001 to 2015, with the unit of analysis is the manager-client stock-quarter level. The dependent variable is equal to one if there is no business ties between a given asset management firm and its' client at the given quarter and defined in 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 asset management firms 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

This table presents the results of Eq. (6) interacted with the logarithm of pension plan size where asset management firms involved with and the proportion of business revenue from the contract relative to the total revenue that asset management firms earns. It includes the same controls as Table 2. The sample period is from 2001 to 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

This table presents the results of Eq. (6) interacted with the logarithm of AUM managed by asset management firms (*Log(AUM)*) and the asset management firms' performance from previous quarter(*Manager Past Performance*). It includes the same controls as Table 2. The sample period is from 2001 to 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 asset management firms 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

This table presents the results of Eq. (6) interacted with the indicator whether the regulatory agency is SEC (*SEC Announcement*) and the logarithm of total amount of penalty imposed in regulatory actions (*Log(Penalty)*). It includes the same controls as Table 2. The sample period is from 2001 to 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.