



## Litigation and mutual-fund runs<sup>☆</sup>

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### ABSTRACT

We investigate whether anticipation of adverse events (litigation about market timing and late trading) may trigger mutual-fund runs. We find that runs start as early as three months prior to litigation announcements. Pre-litigation runs accumulate to 31 basis points of the total net assets over a three-month window; post-litigation runs may last more than six months and accumulate to 1.25 percent over the first three-month window. Additionally, investors who run before litigation announcements earn significantly higher risk-adjusted and peer-adjusted returns than those who run after litigation. The difference in returns is particularly pronounced for funds holding illiquid assets. Finally, securities held by litigated fund families significantly underperform vis-à-vis other securities in terms of lower abnormal returns and liquidity. Our analysis suggests that a pro-rata ownership design is insufficient to prevent mutual-fund runs.

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### Introduction

The first-come–first-served principle governing deposit withdrawals at par motivates bank runs: depositors want to withdraw before others because those at the back of the line may not recover their deposits (Diamond and Dybvig, 1983; Chari and Jagannathan, 1988; Zhu, 2005; Chen and Hasan, 2006, 2008; Dwyer and Samartin, 2009; Aldasoro and Faia, 2016). In contrast, mutual funds allocate the proceeds from asset sales on a pro-rata basis, a design that should shield them from runs. However, mutual funds may be susceptible to runs when adverse information about the quality of management or about underlying assets is revealed, even though there is no physical queue of customers waiting to withdraw. This paper provides direct evidence of mutual-fund runs both before and after revelation of an adverse event and investigates the motivations behind mutual-fund runs.

We define a *fund run* as an abnormally concerted redemption of mutual-fund shares in anticipation of, or after revelation of,

an adverse event. The adverse events we focus on are the 2003 and 2004 litigations alleging that certain mutual funds permitted some investors to engage in late trading or market timing,<sup>1</sup> thereby allowing preferentially treated investors to enjoy profits at the expense of those investors who do not engage in such practices. When shareholders suspect or learn that fund managers do not serve the interests of all investors equally, the disadvantaged investors may discipline the implicated funds by withdrawing existing investments and/or withholding new investments.

Three reasons might motivate fund runs around litigation. First, prior to litigation some investors may become aware of grey-area trading practices via the media, hence lose confidence in the quality of fund management and vote with their feet. These investors may anticipate a possible future indictment and thus decide to exit before it occurs, creating a first wave of fund runs. Second, after litigation announcements, investors penalize management by withdrawing their investments and/or withholding new investments, creating a second wave of redemptions. Finally, post-litigation, funds may be forced to fire sale the underlying assets to meet the concerted withdrawals or, even worse, to completely liquidate the portfolios. The prospect of a fire sale motivates investors to withdraw early to avoid having to redeem shares at

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<sup>1</sup> Late trading is the purchase or sale of mutual-fund shares after 4:00 PM, the time when the net asset value (NAV) is determined. Market timing is short-term trading of mutual-fund shares to exploit price inefficiencies between the mutual-fund shares and the underlying securities in the fund portfolios.

undesirable times. Such a strategic complementarity amplifies fund runs (Chen et al., 2010).

In this paper, we document abnormal outflows both before and after the litigation, and investigate the motives for fund runs. To the extent that investors act on information leaked via the media, there should be abnormal fund outflows when such stories are published. Furthermore, if investors run funds to penalize management, the size of the runs should be larger for funds that suffer from poor reputation. Finally, if investors are concerned about fire-sale costs, fund runs should be more common among illiquid funds than among liquid funds. Moreover, if the strategic complementarity hypothesis holds, investors will benefit by redeeming shares before such adverse information becomes public. That is, pre-event runs should earn relatively higher returns than post-event runs. Concerted redemptions and the lack of new sales following litigation announcements will force funds to quickly liquidate assets, and this large trading volume may temporarily depress the underlying asset prices. Because shareholders who redeem shares at this time will incur losses, investors who can anticipate litigations and subsequent redemptions have an incentive to redeem shares early. By exiting early, informed investors avoid the fire-sale costs created by the subsequent concerted withdrawals. Therefore, the incentives for early runs will be greater for funds in which the return differences from the timing of the withdrawals are larger, either because they hold illiquid assets or because their poor reputations will drive large outflows.

Our paper empirically addresses the following questions: First, do runs occur both before (pre-event) and after (post-event) litigation? Second, do investors who run funds prior to litigation avoid the costs that investors who run post suffer from? Third, are fund runs larger for funds that have poorer reputation? Fourth, are the fire-sale costs larger for funds with illiquid assets?

We find that fund runs take place both before and after the litigation. Pre-event runs begin as early as three months before the litigation. First, in the three months before the litigation, abnormal monthly outflows from the investigated funds are 31 basis points of the total net assets (TNA), and in the three months following the litigation, abnormal outflows are 1.25 percent. Second, investors who run before the litigation earn significantly higher risk-adjusted and peer-adjusted returns (as much as 6 basis points) than those who run after the litigation. This difference in returns is more pronounced for litigated funds holding illiquid assets. Third, funds are not equally vulnerable to runs. Funds holding illiquid assets and stand-alone funds experience larger outflows.

Our results indicate that mutual-fund investors who anticipate outflows following litigation news have incentives to withdraw early to avoid fire-sale costs. We examine the abnormal returns and the liquidity of the underlying securities held by the investigated funds around the time of litigation. Illiquid stocks held by the investigated funds significantly underperform (in terms of cumulative abnormal returns following litigation) vis-à-vis other stocks. Furthermore, the bid-ask spread of illiquid stocks held by the investigated funds also increases.

When the timing of the action (a run) matters for the payoff (the return), strategic complementarities (Bulow et al., 1985) come into play, which amplify the impact of adverse events on the fundamentals and generate financial fragility. Nonetheless, mutual-fund runs may not occur unless there is a systemic liquidity shock to all fund investors (Chen et al., 2010). In the absence of such a shock, other investors will purchase the assets at fire sale prices and thus correct the mispricing.<sup>2</sup> Consequently, although there is a fund run,

<sup>2</sup> Chen et al. (2008) show that hedge funds that purchase the underlying assets of mutual funds at depressed prices during fire sales generate arbitrage profits with a similar magnitude to the profits of short sellers.

investors who are not motivated to exit will hold on to their shares and survive to price recovery. As a result, most of the indicted funds survive. The data reveal a survival rate of 80 percent for the investigated funds during the 2003–2007 period, which is similar to the average mutual-fund survival rate during the same period.

The financial fragility of the mutual-fund industry is underscored by the U.S. Treasury's decision to insure the holdings of eligible money-market mutual funds in the wake of the turmoil caused by the run on the Reserve Primary Fund in September 2008.<sup>3</sup> Our findings not only explain why mutual fund runs may occur, but also enlighten on how the events that led to the demise of Reserve Primary Fund reflect the fragility of the industry.<sup>4</sup>

Despite the significance of fund market fragility, there is a scarcity research on mutual-fund runs. Strahan and Tanyeri (2015) examine whether the money-market funds that were hit with the largest outflows following the Reserve Primary Fund breaking the buck changed their portfolio risk profiles. Chen et al. (2010) investigate the payoff complementarity by analysing the flow-return sensitivity of illiquid mutual funds. Our paper directly documents runs and silent runs in mutual funds by studying the Spitzer investigations of 2003 and 2004. Examining a period prior to the 2008 crisis is important because it showcases the vulnerability of mutual funds prior to the crisis. More importantly, we extend the findings of Chen et al. (2010) by looking at a specific adverse event and provide direct evidence of payoff complementarity in mutual funds.

The remainder of this article proceeds as follows: Section 2 develops the methodology; Section 3 describes the data; Section 4 outlines the empirical results; and Section 5 presents our conclusions.

## 2. Methodology

We address four research questions. First, do investors run investigated funds both before and after litigation? Second, do investors who run funds before litigation realize higher returns than those who run funds after litigation? Third, are some types of funds more susceptible to runs than others? Finally, are stocks that are in the portfolios of litigated funds affected by the illiquidity of the mutual funds that hold them?

### 2.1. Detecting pre-event runs

To document pre-event runs, we need benchmarks of normal flow, the first of which are flows to peers not named in the 2003 and 2004 lawsuits. We construct three groups of funds. The first treatment group comprises funds named in the litigations (*investigated funds*); the second treatment group comprises funds that are not named in the litigations *per se*, but are managed by companies that are named for other funds (*other funds in families with investigated funds*); the control group comprises funds managed by

<sup>3</sup> The U.S. Treasury expressed its concerns about uncertainties in the mutual-fund industry and justified its implementation of a guarantee program as follows: "Maintaining confidence in the money-market fund industry is critical to protecting the integrity and stability of the global financial system. ... This action should enhance market confidence and alleviate investors' concerns about the ability for money market mutual funds to absorb a loss. ..." (U.S. Treasury Department Press Release, September 19, 2008).

<sup>4</sup> Since the failure of Lehman Brothers, there has been a growing body of literature studying the causes and consequences of runs in the money-market industry (McCabe, 2010; Kacperczyk and Schnabl, 2010, 2013; Chernenko and Sunderam, 2014; Duca, 2013; Strahan and Tanyeri, 2015).

companies that are not involved in litigation (*funds in families with no investigated funds*).<sup>5</sup> We then compute the fund flows as follows:

$$Flow_{i,t} = [TNA_{i,t} - TNA_{i,t-1} * (1 + r_{i,t})] / TNA_{i,t-1}, \quad (1)$$

where  $Flow_{i,t}$  is the net flows of fund  $i$  in month  $t$ ,  $TNA_{i,t-1}$  and  $TNA_{i,t}$  are the total net assets of fund  $i$  in month  $t-1$  and  $t$ , respectively, and  $r_{i,t}$  is the return of fund  $i$  in month  $t$ . To detect whether the implicated funds have lower flows than the non-implicated funds, we compare the net flows of the three groups before and after the litigation dates

The second benchmark for normal flows is the estimated net flows from a model designed to capture the main determinants of fund flows. We develop a model that includes variables for fund characteristics, past returns, and industry-level and style-level flows. Previous studies show that past returns will predict future flows (Gruber, 1996; Chevalier and Ellison, 1997; Sirri and Tufano, 1998; Del Guercio and Tkac, 2002, 2008) and that industry-level and style-level flows also explain individual fund-level flows (Qian, 2011). To detect pre-litigation and post-litigation runs, we also construct event-window indicators and test the following model:

$$Flow_{i,t} = a + \sum b^j * fundcharacteristics_{i,t}^j + \sum c^j * pastreturns_{i,t}^j + \sum d^j * aggregateflows_{i,t}^j + \sum \gamma^j * Event-windowindicators_{i,t}^j + \varepsilon_{i,t}, \quad (2)$$

where fund characteristics are *size*, the log of TNA; *age*, the log of days since the first offer date; *expense ratio*, a fund's operating expenses as a ratio of the total investment; and *management fee*, the management fee as a ratio of the average TNA. *Past returns* include compounded returns during the past one ( $R_{i,t-1}$ ), three ( $\prod_{s=1,2,3} (1 + R_{i,t-s}) - 1$ ), and six months ( $\prod_{s=1,2,3,4,5,6} (1 + R_{i,t-s}) - 1$ ). *Aggregate flows* are industry-level and style-level flows: *industry-level flows* are the sum of flows in dollars ( $\sum_i (TNA_{i,t} - TNA_{i,t-1} * (1 + R_{i,t}))$ ) to all funds in the sample divided by the sum of the lagged TNA ( $\sum_i (TNA_{i,t-1})$ ), and *style-level flows* are the sum of flows in dollars to all funds with the same investment style divided by the sum of the lagged TNA. We define *event-window indicators* in four ways. First, we benchmark the first date that the fund litigation is mentioned in the newspapers to define three indicators: pre-litigation (-3, -1) for the three months before the litigation news date; news month (0) for the month of the litigation news; and post-litigation (+1, +3) for the three months after the litigation news. Second, we identify the date of the litigation filing to define the three indicators: the pre-litigation filing (-3, -1), the filing month (0), and the post-litigation filing (+1, +3). Third, we use both the litigation news and the filing dates to define the three indicators: pre-litigation includes the months between the first newspaper article and the litigation filing month, the filing month (0), and the post-litigation filing (+1, +3). Finally, thirteen indicators equal 1 if it is the  $n$ th month from the date of the litigation news, otherwise it is 0 ( $n = -6, \dots, -1, 0, 1, \dots, 6$ ).

## 2.2. The rationale for pre-event runs

What incentives exist for shareholders to run a mutual fund when proceeds from asset sales are determined by the prices of the underlying assets and are distributed pro-rata? First, litigation

may indicate how faithfully fund managers are serving the interests of the investors. Hence, investors may redeem shares as soon as they are informed, either publicly or privately, that the funds are engaging in abusive practices, such as market timing or late trading. When a sufficient number of investors learn of the fund's abusive behavior, a run may ensue. Shareholders who redeem shares at this point consequently will realize negative abnormal returns because the mutual funds must quickly liquidate assets to satisfy the share redemptions, and the large selling volume will temporarily depress the underlying asset prices.

We benchmark normal returns using five return models and introduce indicators (as defined in the flow models) for the pre- and post-event months to identify the return differences between investors who withdraw before and after litigation. These five return models are the market model (Sharpe, 1964; Lintner, 1965), the market model with lagged market returns (Scholes and Williams, 1977), the 3-factor Fama-French model (Fama and French, 1992, 1993), the Fama-French model with a fourth factor that captures momentum (Jegadeesh and Titman, 1993; Carhart, 1997), and the market model with a factor that captures liquidity (Pástor and Stambaugh, 2003):

$$r_{i,t} = \alpha + \beta * r_{m,t} + \sum \alpha^n * event-windowindicator^n + \varepsilon_{i,t}, \quad (3)$$

$$r_{i,t} = \alpha + \beta_1 * r_{m,t} + \beta_2 * r_{m,t-1} + \sum \alpha^n * event-windowindicator^n + \varepsilon_{i,t}, \quad (4)$$

$$r_{i,t} = \alpha + \sum \beta^j * FF_t^j + \sum \alpha^n * event-windowindicator^n + \varepsilon_{i,t}, \quad (5)$$

$$r_{i,t} = \alpha + \sum \beta^j * FF_t^j + \gamma_1 * MOM_t + \sum \alpha^n * event-windowindicator^n + \varepsilon_{i,t}, \quad (6)$$

$$r_{i,t} = \alpha + \beta * r_{m,t} + \gamma_2 * LIQ_t + \sum \alpha^n * event-windowindicator^n + \varepsilon_{i,t}. \quad (7)$$

where  $r_{i,t}$  is the excess returns (net of the risk-free rate) of fund  $i$  in month  $t$ , and  $r_{m,t}$  is the excess market return in month  $t$ .  $FF^j$  includes market returns, size (SMB), and value (HML) factors;  $MOM$  is the momentum factor; and  $LIQ$  is the liquidity factor.

We estimate the flow and return of Eqs. (2) through (7) in two ways. First, we run pooled regressions using the full sample of both the investigated funds and the non-investigated funds. Pooled regressions include fund and year-month fixed effects. Second, we run fund-level regressions using only the subsample of litigated funds. The pooled regressions are efficient in that they pool information from all of the funds; however, they may also be inefficient due to the fact that all fund coefficients must be the same. In fund-by-fund estimations, fund coefficients may vary but they are restricted to information on single funds.

We also use daily returns to examine the return impact of the withdrawal. We run pooled regressions using the five asset pricing models, Eqs. (3)–(7), at the daily fund return level and including both litigated funds and non-litigated funds.  $r_{i,t}$  is the excess returns

<sup>5</sup> When the first newspaper article appeared on September 3, 2003 it was not clear which funds would be named in the litigation. Hence, there may have also been outflows from the control group due to the possibility of future involvement. As such, we may underestimate the magnitude of the outflows observed in the investigated funds relative to the outflows of the control group funds.

(net of the risk-free rate) of fund  $i$  on day  $t$ , and  $r_{m,t}$  is the excess market return on day  $t$ . The pre-event indicator indicates  $[-20, -1]$  days before the litigation announcement, and the post-event indicator indicates  $[1, 20]$  days after the actual litigation. The event indicator indicates the days between the announcement and the litigation. Observations of the litigated funds cover these three event windows. Observations of the non-litigated funds cover the maximum number of calendar days of observations of all litigated funds.

### 2.3. The impact of fund characteristics and liquidity on fund flows and returns

Pre-event runs are motivated by worries about potential litigation and anticipation of the liquidation costs that will arise to satisfy the post-litigation redemptions. Hence, investor decisions to run are influenced by their belief about or awareness of abusive behaviour and by factors that will increase fire-sale costs. Worries about poor behaviour are affected by the reputation of the fund management company as well as by the investors' ability to collect and process information. We measure the fund reputation using the ownership structure and its history of SEC charges. Investors may assume that funds in conglomerate families will be less likely to engage in dishonest behaviour because a loss of reputation will hurt both the fund in question as well as other businesses in the conglomerate. Hence, illicit behaviour may have more serious consequences for conglomerates than for fund families that only manage mutual funds. Moreover, conglomerates, especially those with commercial bank subsidiaries, have a larger capacity to cope with liquidity shocks than stand-alone funds. Therefore, they will be less susceptible to runs motivated by attempts to avoid fire sales. Likewise, past actions may predict future decisions. Investors may assume that funds with no history of aberrant behaviour in the past will be less likely to behave poorly in the future.

To investigate whether the characteristics of funds and investors influence the susceptibility of funds to pre-event runs, we generate indicator variables for the following characteristics. The *conglomerate* and *charge history* indicators equal 1 if the fund is part of a conglomerate and if it had been subject to an SEC investigation within the past eight years, respectively; otherwise they are equal to 0.

The economic rationale for pre-event runs is the liquidation cost (the price depression) that funds will bear when they are forced to sell assets upon revelation of an adverse event. This liquidity cost increases with the illiquidity of the underlying assets as well as with the volume of the redemptions. Hence investors in funds with illiquid assets have stronger incentives to run because they may reap greater benefits. We therefore investigate the impact of underlying asset liquidity on the incentives to run and the benefits of running early by generating an indicator variable (*illiquid*) for illiquid funds. We categorize funds as illiquid based on the assets in which they invest using Lipper objective codes. Illiquid funds invest in small-cap stocks, international equity and bonds, and asset-backed securities (Lipper objective codes: corporate bonds low, derivative mortgages, growth or small or midcap equity, international bonds, and international equity), whereas liquid funds invest in large-cap stocks and treasury bills.<sup>6</sup> A second liquidity classification uses the cash holdings of the funds. When we limit the sample to domestic equity funds, we can also apply a third liquidity classification that computes the weighted average of the bid-ask spread of the underlying stocks as of June 30, 2003, (three months prior to the first

litigation). These two alternative liquidity measures classify funds with above the sample median weighted average bid-ask spread or below the sample median cash-holding ratio as illiquid funds.

We run fund-by-fund flows and return regressions in the subsamples of the funds grouped per SEC litigation history, whether the parent is a conglomerate, and the illiquidity of the fund portfolio.<sup>7</sup> The first step estimates the flow models and the return models for each fund using time-series observations. The control variables for the flow models include the accumulated returns in the past one, three, and six months, and the industry-level and style-level flows, management fees, expense ratio, size, age, and year indicators. The control variables for the return models include the year indicators and the relevant return factors in the five return models. The explanatory variables include the three indicators for the seven months surrounding the litigation (i.e., three indicators covering the litigation month, three months before and three months after). The second step compares the estimated flows and the risk-adjusted returns in the cross section. We investigate the cross-sectional differences according to funds' SEC charge history, ownership structure, and the liquidity of their underlying assets.

### 2.4. Returns and liquidity of the underlying assets

We analyse the returns to the underlying stocks in the portfolios of litigated funds to directly test whether mutual funds bear the costs associated with liquidating portfolio positions. We compile the holdings of the litigated and the non-litigated funds surrounding all the event months, from September 2003 to March 2004, and August and November 2004. For each litigation event, we compute the cumulative abnormal returns (CARs) in the  $[-3, 3]$ ,  $[-3, 10]$ ,  $[-3, 20]$ ,  $[-3, 40]$ , and  $[-3, 60]$  days around the litigation filing for all stocks listed on the CRSP.

The WRDS event study module estimates the market model—which uses the CRSP equally weighted portfolio as the market portfolio—using the daily returns from 282 days to 30 days prior to the litigation announcement. For each stock, we also construct, % *held by litigated funds*, which equals the shares of stock held by the litigated funds (in that litigation event) over the total outstanding shares. The *illiquid indicator* equals 1 if the stocks' bid-ask spread is above the median bid-ask spread of all the sample stocks. Finally, we examine how the interaction between litigated fund holdings of the stock and illiquidity (*interaction* equalling the percentage held by the litigated funds and the illiquidity indicator) affect CARs.

If the fire-sale proposition holds, the liquidity of the underlying assets may also be affected. We use a difference-in-difference approach to investigate this effect. We compute the average bid-ask spread of each stock for each event month as well as for June 2003. We then regress the difference of the bid-ask spread between the event month and June 2003 on % *held by litigated funds*, *illiquid indicator*, and *interaction*.

## 3. Data

To identify the funds and the fund families named in the market-timing and late-trading litigations, we conduct a keyword search in the *Financial Times* and the *Wall Street Journal*.<sup>8</sup> We also search the SEC litigation filings on EDGAR and in the Stanford Law School Securities Class Action Clearinghouse.<sup>9</sup> Table 1 summarizes the results

<sup>7</sup> The results of the pooled panel regressions of flows and returns, available upon request, are qualitatively the same.

<sup>8</sup> We use three keywords—investigation, mutual fund, and Spitzer—to search the *Financial Times* and the *Wall Street Journal* between September 3, 2003 and December 31, 2005.

<sup>9</sup> The Stanford Law School Securities Class Action Clearinghouse (available online at <http://securities.stanford.edu/index.html>) compiles detailed information on the

<sup>6</sup> Lan et al. (2015), in a classification of mutual funds according to their investment horizons, find that funds with long-term investment horizons invest in illiquid stocks. Share redemptions for funds with long-term investment horizons and illiquid stock holdings may have larger impacts on price.

**Table 1**

List of fund families involved in trading scandals. Table 1 lists the fund families named in litigations on market timing and late trading. Hedge funds, brokerage firms, and investment banking services are excluded. Litigation data is hand-collected from the Stanford Law School Securities Clearinghouse and SEC litigation news. MT stands for market timing and LT stands for late trading.

Fund family	Newspaper date	Litigation date	Settlement (in million \$)	Practice under investigation
Nations Funds Trust Family	3-Sep-03	5-Sep-03	535	MT & LT
One Group Family	3-Sep-03	9-Sep-03	90	MT & LT
Janus Family	3-Sep-03	5-Sep-03	226	MT & LT
Strong Family	3-Sep-03	5-Sep-03	175	MT
INVESCO Family	3-Sep-03	31-Oct-03	415	MT & LT
Putnam Family	3-Sep-03	21-Oct-03	194	MT
MFS Family	8-Sep-03	11-Dec-03	350	MT & LT
Alliance Bernstein Family	8-Sep-03	2-Oct-03	250	MT & LT
Federated Family	9-Sep-03	24-Oct-03	100	MT & LT
Franklin Family	8-Oct-03	6-Feb-04	49	MT
Alger Funds Family	16-Oct-03	31-Oct-03	45	MT
Salomon Smith Barney Family	22-Oct-03	9-Aug-04		MT
Scudder Family	5-Nov-03	22-Jan-04	208	MT
PBHG Family	13-Nov-03	14-Nov-03	90	MT
Excelsior Family	14-Nov-03	20-Nov-03	1	MT
Columbia Family	14-Nov-03	13-Feb-04	460	MT
Fremont Family	21-Nov-03	12-Mar-04	4	MT
PIMCO Family	13-Feb-04	20-Feb-04	90	MT
RS Growth and Value	3-Mar-04	12-Nov-04	30	MT
American Family	24-Mar-04	24-Mar-04		MT

Sources: Money Management Executive Compilation, January 31, 2004.

Fund Scandal Scorecard, *Wall Street Journal*, April 27, 2004.

SEC Press Releases, September 2003–December 2004.

*Financial Times*, 2003–2005.

Stanford Law School Library Securities Class Action Clearinghouse.

of this search—including the names of the fund families; the activities for which they are investigated; the litigation announcement dates and the newspaper announcement dates; and the settlement in million dollars. We also use the Stanford Clearinghouse database to identify the funds within each fund family that are explicitly named in the litigation.

A formal investigation into the trading practices of mutual-fund companies began in September 2003, when New York Attorney General Eliot Spitzer filed a complaint in the New York Supreme Court alleging that the mutual-fund companies of Bank of America, Bank One, Janus Capital Group, and Strong Capital Management had allowed certain hedge fund managers to illegally trade in their fund units. Subsequently, between September 2003 and August 2004, the SEC, the New York State Attorney General, and other regulatory authorities filed litigation involving funds in twenty-five mutual-fund families.<sup>10</sup>

News articles on abusive trading practices by mutual funds predate the first litigation announcement in September 2003. In fact, the SEC was aware of fair pricing problems in mutual funds as far back as 1997, and a probe into hedge fund trades that took advantage of such problems had been underway since 2002. The first article indicating possible active involvement by mutual-fund management is dated March 5, 2003, and on March 26, 2003 Congress began considering options to strengthen mutual-fund regulation. It is highly probable that by March 2003 investors had already begun to suspect abusive behaviour and the possibility of a criminal investigation. The pre-event indicators in the flow models may capture whether investors who suspected aberrant behaviour redeemed their shares prior to the litigation announcements.

For the universe of mutual funds, we rely on the CRSP mutual-fund database (from WRDS), which provides monthly and daily

observations of the total net assets (*TNA*) and returns (*R*) of funds.<sup>11</sup> The sample covers the months from January 1999 to December 2007. We merge the list of litigated funds with the CRSP universe of funds to produce a sample in which the investigated funds are differentiated from the non-investigated funds. We exclude all funds with missing ticker and management code symbols, funds in their incubation period, funds with less than six months of observations around the litigation date, and funds with a TNA of less than 5 million USD. We also drop funds with outflows greater than the TNA and with inflows greater than five times the TNA.

Panels A, B, and C of [Table 2](#) provide a snapshot of the sample funds three months before, during the month of, and three months after the first litigation announcement. Specifically, the panels show the number of funds, the mean, and the aggregate TNA in the subsample of the investigated funds, of other funds in families with investigated funds, and of funds in families with no investigated funds. First, the average flow of investigated funds decreased from 1.1 percent in June 2003 to –0.2 percent in September 2003. Similarly, the average flow of other funds in the investigated families decreased from 0.5 percent to –0.5 percent. Furthermore, the negative flows persisted in December 2003 for both groups. The descriptive statistics indicate that the investigated funds suffered outflows in the event month and beyond. The average inflow for the control group (funds in families with no investigated funds) dropped from 1 percent in June 2003 to 0.7 percent in September 2003, but it recovered to 1.1 percent in December 2003.

The CRSP also provides information on fund characteristics, including the expense structure (*management fees and expense ratio*), investment style, age (*age*), and the cash holdings of each fund relative to the TNA. We also hand-collect data on the fund

prosecution, defense, and settlement of federal class-action securities fraud litigation.

<sup>10</sup> We are not able to identify the names of the individual funds investigated in five of the mutual-fund families. Therefore, [Table 1](#) and the sample only include twenty mutual-fund families.

<sup>11</sup> Sampling daily flows would be ideal to document fund runs. However, daily flow data are inferred from the daily fund survey of the TNA. The daily net inflow on date *t* is the difference between the fund TNA at the end of day *t* and the fund TNA at the end of day *t*–1, adjusted by the return on day *t*. In the survey, some funds report the TNA of *t* and others report the TNA of *t*–1 on survey day *t*. The same fund might report a TNA of *t* on some days and a TNA of *t*–1 on other days. There is no way to trace what and when funds report. As such, the daily flow data are not reliable.

**Table 2**  
Summary statistics: Overview of sample funds. Panels A, B, and C provide snapshots of three groups of funds: (1) investigated funds, (2) other funds in families with investigated funds, and (3) funds in families that are not investigated as of June, September, and December 2003. The table lists the total number of funds, the average TNA and the flow of each fund, and the aggregate TNA and the flow of all funds in the three groups.

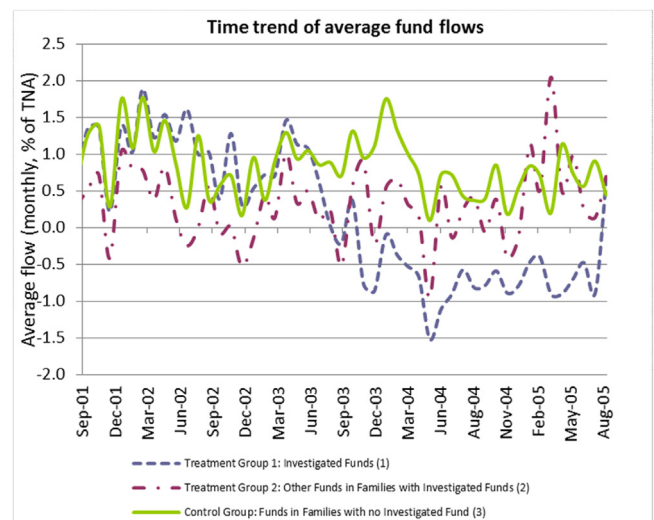
	Treatment Group 1: Investigated Funds	Treatment Group 2: Other Funds in Families with Investigated Funds	Control Group: Funds in Families with No Investigated Funds
Panel A: Snapshot on June 2003			
Total # of funds	1560	1408	4769
Average TNA of each fund (million \$)	738	313	485
Total TNA (million \$)	1,151,025	440,262	2,315,065
Average flow of each fund (%)	1.1	0.5	1.0
Total flow (million \$)	5846	1454	16,735
Panel B: Snapshot on September 2003			
Total # of funds	1560	1420	4825
Average TNA of each fund (million \$)	761	317	500
Total TNA (million \$)	1,187,109	449,813	2,412,347
Average flow of each fund (%)	-0.2	-0.5	0.7
Total flow (million \$)	-715	-945	12,347
Panel C: Snapshot on December 2003			
Total # of funds	1561	1460	4882
Average TNA of each fund (million \$)	823	331	552
Total TNA (million \$)	1,285,480	483,042	2,696,624
Average flow of each fund (%)	-0.9	-0.2	1.1
Total flow (million \$)	-4355	-4003	14,776

characteristics. We use SEC EDGAR filings and firm Web sites to determine whether the parent company is a conglomerate or an asset management company, and the SEC litigation filings to check whether the funds had a prior history of SEC charges. To estimate fund performance, we compile monthly data on market returns ( $r_m$ ); the risk-free rate ( $r_f$ ); and the value (SMB), size (HML), momentum (MOM), and liquidity (LIQ) factors using WRDS's Fama-French, momentum, and liquidity databases.

We create a cross-sectional dataset at the individual stock level covering all the stocks listed on the CRSP. We use the WRDS event study application to calculate 7-day (-3, +3), 14-day (-3, +10), 24-day (-3, +20), 44-day (-3, +40), and 64-day (-3, +60) cumulative abnormal returns around each litigation filing for each stock. We compile the bid-ask spread (calculated at the daily level as the ask minus the bid divided by the average of the bid and the ask) for all CRSP stocks. We calculate the average daily bid-ask spread in the month of each litigation filing (September 2003 through March 2004, August 2004, and November 2004) and the average daily bid-ask spread in the month of June 2003 (three months before the first litigation announcement). We define the *relative bid-ask spread* as the bid-ask spread of each stock in each event month relative to its bid-ask spread in June 2003 (the event-month bid-ask spread minus the June 2003 bid-ask spread). We classify the stocks as illiquid if the bid-ask spread of the stock was larger than the median bid-ask spread in June 2003. We then map the holdings of the mutual funds onto the CRSP stocks. We calculate % held by litigated funds as the number of shares held in each event month by the funds litigated in that month divided by the total number of shares outstanding.

#### 4. Empirical results

First, we investigate fund flows both before and after the litigation news and the filing dates. Second, we analyse whether investors who run prior to the litigation announcements earn higher risk-adjusted returns than investors who run post the litigation announcements. Third, we examine cross-sectional differences in the flows of litigated funds according to the liquidity of the securities in which they invest. Fourth, we investigate whether the liquidity and abnormal returns of stocks that the litigated funds hold are affected by the liquidity squeeze of their investors.



**Fig. 1.** Time-series trend of average fund flows.

The figure plots average monthly flows from September 2001 to September 2005 in three fund subsamples: treatment group one consists of investigated funds, treatment group two is consists of funds in families with investigated funds, and the control group consists of funds in families with no investigated funds. Flow<sub>i,t</sub> is calculated as  $[TNA_{i,t} - TNA_{i,t-1} * (1 + R_{i,t})] / TNA_{i,t-1}$ .

##### 4.1. Detecting pre-event runs

We detect pre-event runs using two benchmarks: a univariate analysis to benchmark the flows of investigated funds and other funds in the same family against the flows of funds in families with no investigated funds, and a multivariate analysis to benchmark the flows of investigated funds against the flows estimated using the normal-flow model. The average monthly flows of the three subsample funds from September 2002 to September 2004 are plotted in Fig. 1. As the figure shows, before June 2003 the flows of investigated funds are either higher than or not different from the flows of funds in families with no investigated funds, but thereafter they are consistently lower. That is, flows shifted three months before the first litigation filing, suggesting that investors ran funds both before and after the first litigation announcement.

Table 3 shows the average monthly flows for the two treatment groups and the control group from September 2002 to September

**Table 3**

A comparison of flows among fund groups over time. This table shows the average monthly flows for the three fund groups: investigated funds, other funds in families with investigated funds, and funds in families with no investigated funds from September 2002 to September 2004. The event month is the first month in which the litigation was announced (i.e., September 2003). Funds in families with no investigated funds are used as benchmarks to test for flow differences against the investigated funds and other funds in families with investigated funds. \*\* and \* denote significance at the 1% and 5% levels, respectively.

Months from September 2003	Date	Treatment Group 1: Investigated Funds	Treatment Group 2: Other Funds in Families with Investigated Funds	Control Group: Funds in Families with no Investigated Funds	Difference in Means Test	
					T-test	
		(1)	(2)	(3)	(1)=(3)	(2)=(3)
-12	Sep-02	1.02	0.56	0.38	[2.00]**	[0.58]
-11	Oct-02	0.39	-0.08	0.58	[-0.65]	[-2.15]*
-10	Nov-02	1.28	0.01	0.71	[1.81]*	[-2.54]**
-9	Dec-02	0.31	-0.53	0.16	[0.49]	[2.43]**
-8	Jan-03	0.53	-0.15	0.96	[-1.52]	[-3.84]**
-7	Feb-03	0.72	0.44	0.37	[1.99]*	[0.29]
-6	Mar-03	0.71	0.13	0.91	[-0.61]	[-2.29]**
-5	Apr-03	1.46	1.01	1.30	[0.51]	[-0.91]
-4	May-03	1.14	0.33	0.94	[0.72]	[-2.19]**
-3	Jun-03	1.07	0.50	1.05	[0.07]	[-1.52]
-2	Jul-03	0.63	0.10	0.86	[-0.72]	[-2.38]**
-1	Aug-03	0.03	0.23	0.89	[-3.07]**	[-2.26]**
0	Sep-03	-0.22	-0.53	0.71	[-4.03]**	[-5.20]**
1	Oct-03	0.37	0.56	1.31	[-2.66]**	[-2.22]**
2	Nov-03	-0.76	0.90	0.95	[-8.39]**	[-0.19]
3	Dec-03	-0.86	-0.22	1.11	[-6.56]**	[-4.01]**
4	Jan-04	-0.10	0.54	1.75	[-5.97]**	[-3.80]**
5	Feb-04	-0.37	0.66	1.32	[-7.09]**	[-2.20]**
6	Mar-04	-0.53	0.32	1.01	[-4.35]**	[-1.85]*
7	Apr-04	-0.67	0.14	0.72	[-5.70]**	[-2.08]*
8	May-04	-1.52	-0.95	0.10	[-7.12]**	[-4.42]**
9	Jun-04	-1.11	0.56	0.72	[-6.04]**	[-0.44]
10	Jul-04	-0.90	-0.14	0.72	[-5.18]**	[-2.54]**
11	Aug-04	-0.57	0.25	0.43	[-3.67]**	[-0.61]
12	Sep-04	-0.82	0.40	0.37	[-6.16]**	[0.10]

2004. The results in Table 3 confirm the visual trend in Fig. 1. Up until two months prior to the first litigation announcement, the flows to the investigated funds are larger (or smaller but insignificant) than the flows to the funds in families with no investigated funds. However, this trend is reversed prior to September 2003. Investigated funds that enjoyed large flows up to one year prior to the onset of litigation began to experience runs before September 2003 and continued to do so after September 2003.<sup>12</sup> In most of the twelve months following September 2003, the flows of the second treatment group (other funds in families with investigated funds) are also significantly lower than the flows of the control group (funds in families with no investigated funds). The results suggest that investors may see involvement in lawsuits as an indicator that fund family managers have failed to serve the investors' interests. As a result, they will punish all funds in the implicated families regardless of whether or not the fund in question allowed abusive practices.

We investigate whether pre-event outflows are driven by outflows prior to the first litigation in September 2003 or by outflows from funds that are litigated after the first litigation. First, we disaggregate the litigated funds into two groups. The first group covers litigated funds in the months before the month of their litigation filing (in the first specification) and the news date (in the second specification). The second group covers litigated funds in the month or months after their litigation filing and the news date. Second, we differentiate between institutional funds versus retail funds.

Appendices A1 and A2 present the results. Outflows following the September 2003 litigations are driven not only by funds litigated in that month but also by funds that are likely to be implicated but have not yet faced litigation. The table also shows that the flow patterns remain consistent regardless of the choice of the event date. Retail investors seem to be more responsive to litigation.

Table 4 reports the results of the pooled regression estimates for the flow model described in Equation (2). Monthly flows are regressed on indicators for the event-window (pre-event, the event month, and post-event) and four sets of controls—fund characteristics, past returns, fee structures, and aggregate flows. The regressions include fund and year-month fixed effects. The three specifications define the event time using the litigation news date, the filing date, and the window between the news date and the litigation date. Observations are at the month-fund level and cover the months from January 1999 to December 2007. The regressions use cluster-robust variance/covariance estimators in which the clusters are the funds.

The results in Table 4 confirm the outflows during and after the event month, as previously indicated in Fig. 1, Table 3, Appendix A and B. There are significant outflows from investigated funds during the event month (-56 basis points of the TNA in the second specification) and in the post-event period (-107 basis points of the TNA in the second specification). Funds, past returns, and aggregate flow controls are also significant. First, younger and larger firms enjoy significantly higher flows than do their older and smaller counterparts. Second, investors chase past returns. Third, fund-level flows increase (decrease) significantly with style-level (industry-level) flows.

Averaging a pre-event period may gloss over monthly variations in flows during each month. Therefore, we run the pooled regressions with 13 event-month indicators for the 12 months surrounding the litigation news. Appendix B presents the results. There are four sets of controls—fund characteristics, past returns,

<sup>12</sup> This pattern of lower flows persists more than two years after the event month in non-tabulated results. The longer time-series of flow comparisons in non-tabulated results also show that the significant flow differences between treatment group 2 and the control group during October 2002 and January 2003 is random rather than systematic; therefore, there is no alternative hypothesis to explain the later systematic flow patterns around the litigation.

**Table 4**  
 Detecting runs: Multivariate analysis of monthly flows. The table runs three specifications of the flow model:  $\text{Flow} = a + \sum b_j \cdot \text{fund characteristics}_j + \sum c_j \cdot \text{past returns}_j + \sum d_j \cdot \text{aggregate flows}_j + \sum \gamma_j \cdot \text{Event-window dummies}_j + \varepsilon$ . The dependent variable is computed as  $\text{Flow}_{i,t} = [\text{TNA}_{i,t} - \text{TNA}_{i,t-1} \cdot (1 + R_{i,t})] / \text{TNA}_{i,t-1}$ . The pre-event indicator equals 1 if the fund is litigated and the month falls within three months before the event; otherwise it is 0. The event-month indicator equals 1 if the fund is litigated and the month falls within the event month; otherwise it is 0. The post-event indicator equals 1 if the fund is litigated and the month falls within 3 months after the event; otherwise it is 0. The first specification uses the newspaper dates as the event dates. The second specification uses the litigation filing dates as the event dates. The third specification uses the months between the news announcement and the litigation filing as the pre-event period. Fund characteristics include size (the log of the TNA in million USD), age (the log of days since the first offer date), the expense ratio (the fund's operating expenses as a ratio of the total investment), and the management fee (the management fee as a ratio of the average investment). Past returns include cumulative returns in the past one, three, and six months. Aggregate flows include industry-level and style-level flows. Industry-level flows are the sum of flows in dollars ( $\text{TNA}_{i,t} - \text{TNA}_{i,t-1} \cdot (1 + R_{i,t})$ ) to all funds in the sample divided by the sum of the lagged TNA ( $\text{TNA}_{i,t-1}$ ). Style-level flows are the sum of flows in dollars to all the funds with the same investment style divided by the sum of the lagged TNA. Fund and year-month fixed effects are included. Observations are monthly (for both litigated and non-litigated funds) and they cover the period from January 1999 to December 2007. Robust t-statistics are in brackets. \* indicates significance at 5% and \*\* indicates significance at 1%.

	News Date as Event Date	Litigation Filing as Event Date	Time between News Date and Litigation Filing
Pre-event [-3,-1]	-0.03 [0.29]	0.03 [0.31]	0.10 [0.85]
Event Month [0]	-0.07 [0.45]	-0.56 [5.17]**	-0.55 [5.10]**
Post-event [1,3]	-0.91 [9.71]**	-1.07 [13.00]**	-1.06 [12.78]**
Log (age)	-2.68 [29.85]**	-2.68 [29.85]**	-2.68 [29.85]**
Size	1.12 [23.38]**	1.12 [23.39]**	1.12 [23.38]**
Return in the past 1 month	0.03 [6.60]**	0.03 [6.60]**	0.03 [6.60]**
Cumulative Return in the past 3 months	0.01 [3.53]**	0.01 [3.54]**	0.01 [3.53]**
Cumulative Return in the past 6 months	0.06 [26.98]**	0.06 [26.99]**	0.06 [27.00]**
Expense Ratio	1.78 [8.02]**	1.78 [8.03]**	1.78 [8.03]**
Management Fee	-2.06 [9.26]**	-2.06 [9.28]**	-2.06 [9.28]**
Industry-Normalized Flow	-0.97 [10.81]**	-0.97 [10.81]**	-0.97 [10.81]**
Style-Normalized Flow	0.53 [22.09]**	0.53 [22.07]**	0.53 [22.08]**
Constant	-0.93 [2.24]*	-0.93 [2.25]*	-0.93 [2.25]*
Fund Fixed Effects	Yes	Yes	Yes
Year-Month Fixed Effects	Yes	Yes	Yes
# of Observations	782,903	782,903	782,903
# of Unique Funds	10,463	10,463	10,463
R <sup>2</sup>	2.81%	2.82%	2.82%

fee structures, and aggregate flows—and year and fund fixed effects. The table shows significant outflows of the investigated funds starting as early as three months prior to the litigation announcements, and these significant outflows continued during the six months following the litigation. The size of the runs ranges from -52 to -88 basis points during the month before the litigation announcement, and from -100 to -122 in the month following the litigation announcement. Such significant outflows indicate that investors run implicated funds as soon as they suspect there will be forthcoming litigation in the case of pre-litigation outflows and as soon as litigation is filed in the case of post-litigation outflows.

#### 4.2. Costs associated with running early versus costs associated with running late

We also investigate what benefits exist for investors who run implicated funds prior to the litigation announcements. We estimate models of normal returns to identify the return differences to investigated funds in the months surrounding the litigation announcements. The monthly returns from January 1999 to December 2007 are regressed on the risk factors and the indicator variables for the event-window months, as described in Equations (3) through (7). To detect the return differences, we also test for differences in the coefficients of the event-window indicators. All regressions use cluster-robust variance-covariance estimators in which the clusters are mutual funds.

Panel A of Table 5 shows that coefficients of pre-litigation and post-litigation indicators are negative and significant. Furthermore, investors who exit investigated funds after the litigation announcements experience returns 8 basis points lower than investors who run before litigation. Panel B shows that the difference is significant.

As in the regressions for flows, averaging over a pre-event period may miss the monthly variations in returns. In Appendix C, we run return regressions with 13 event-month indicators. Panel A of Appendix C shows that investors who run implicated funds after litigation announcements put up with low returns. Indeed, the estimates from the market model indicate that the cost of exiting investigated funds in the month following a litigation announcement is 52 basis points. In contrast, investors benefit from exiting investigated funds in the month prior to a litigation announcement. The results of the four other return models are qualitatively similar.

Our results are consistent with Coval and Stafford's (2007) argument that the prices of underlying assets become depressed when there is a large volume of asset sales. The results indicate that investors who exit implicated funds before other investors avoid lower returns. Table 4 shows that mutual funds face large outflows following litigation and thus they may suffer fire-sale costs when they try to liquidate their portfolios to satisfy the high volume of redemption. These fire-sale costs explain the lower returns observed following the litigation.

Panel B of Appendix C analyses whether investors benefit from exiting implicated funds prior to litigation announcements. Specif-



**Table 5**

Fund returns before and after litigation. Pooled regressions of fund returns on pricing factors using the market model, Fama-French 3-factor model, Carhart 4-factor model, and market models with lagged returns and liquidity factors are run. The observations are from January 1999 to December 2007. The dependent variable is the monthly fund returns (in%). The pre-litigation indicator equals 1 if the observations fall within 3 months prior to litigation filing; otherwise it is 0. The litigation-month indicator equals 1 if the observations fall in the litigation month; otherwise it is 0. The post-litigation indicator equals 1 if the observations fall within 3 months after litigation filing. Panel A presents the regression results. The fund and year-month fixed effects are included. The observations are monthly (for both the litigated and the non-litigated funds) and cover the period from January 1999 to December 2007. Robust t-statistics are in brackets. \* indicates significance at 5% and \*\* indicates significance at 1%. Panel B tests for differences between the pre-litigation alpha and the post-litigation alpha.

Panel A: Pooled regressions of fund returns on pricing factors and litigation-window indicators					
	Market Model	Fama-French 3-Factor Model	Carhart 4-Factor Model	Market Model with Lagged Returns	Market Model with Liquidity Factor
Pre-litigation (−3, −1)	−0.14 [4.36]**	−0.14 [4.36]**	−0.14 [4.36]**	−0.14 [4.27]**	−0.15 [4.39]**
Litigation-month (0)	−0.18 [3.05]**	−0.18 [3.05]**	−0.18 [3.05]**	−0.18 [3.00]**	−0.18 [3.07]**
Post-litigation (1, 3)	−0.23 [7.18]**	−0.23 [7.18]**	−0.23 [7.18]**	−0.22 [7.05]**	−0.23 [7.21]**
Market Returns	0.49 [63.74]**	0.54 [83.45]**	0.54 [80.94]**	0.60 [92.58]**	0.49 [71.34]**
SMB		0.15 [35.55]**	0.14 [36.42]**		
HML		0.04 [10.58]**	0.04 [9.53]**		
Momentum			0.01 [5.50]**		
Lagged Market Returns				0.13 [54.82]**	
Liquidity Factor					0.00 [0.78]
Intercept	−0.49 [16.12]**	−0.51 [17.11]**	−0.56 [21.14]**	0.13 [5.96]**	−0.49 [16.21]**
Fund Fixed Effects	Yes	Yes	Yes	Yes	Yes
Year-Month Fixed Effects	Yes	Yes	Yes	Yes	Yes
# of Observations	831,152	831,152	831,152	819,724	737,009
Number of Groups	11,124	11,124	11,124	11,069	10,444
R <sup>2</sup>	38.3%	38.3%	38.3%	38.5%	38.0%

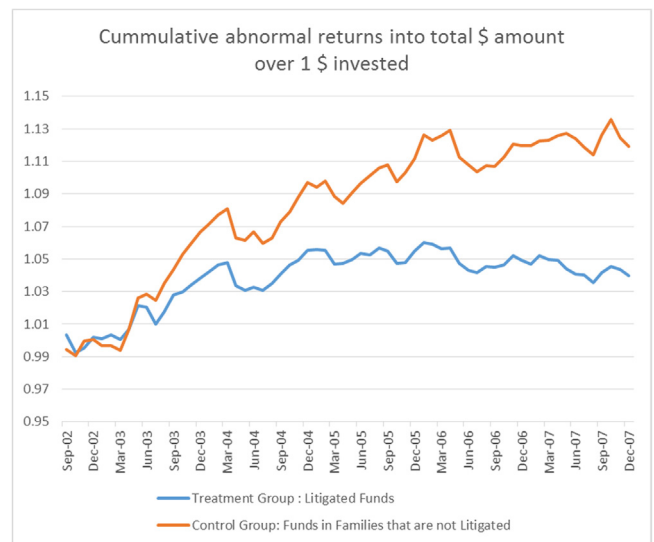
  

Panel B: Performance Difference: Pre-litigation (−3, −1) indicator − post-litigation (1, 3) indicator					
Diff	0.08**	0.08**	0.08**	0.08**	0.08**
F-test	[5.54]	[5.54]	[5.54]	[5.43]	[5.49]
p-value	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]

ically, the first rows list the differences between the accumulated coefficients of one to three months of event-month indicators before and after the litigation announcements. The second rows report the F-statistics for the test in which the difference is equal to 0. For the one-month window, the difference in the market-model coefficients of the pre- and post-announcement indicators is 70 basis points, which is statistically significant. For the two-month window, the accumulated differences remain positive and significant. However, for the three-month window, the accumulated difference is negative and mostly insignificant, suggesting that investors can avoid fire-sale losses by holding through the fire-sale period or by exiting early.

The evidence on the pre-event runs and the return differences suggests that the timing of the redemption matters for the returns, despite the pro-rata distribution of proceeds from mutual-fund asset sales. Furthermore, if investors want to penalize management, it is rational for them to do so before the adverse information becomes public.

It is economically important to see the long-term effects on returns. We run regressions on the monthly returns for the litigated funds and the non-litigated funds using the specifications in Equations (3) through (7), adding year-month fixed indicators and adding interactions for year-month indicators and litigated fund indicators. The interactions (for year-month and litigated fund indicators) capture the monthly abnormal returns of litigated funds from September 2002 to September 2006. Fig. 2 plots the cumulative abnormal returns of litigated funds using the coefficients for the interaction terms. The cumulative abnormal returns are rep-



**Fig. 2.** Comparison of the cumulative abnormal returns for litigated and non-litigated funds.

We run pooled regressions (with fund and year-month fixed effects) of fund returns using the market model. The observations are from January 1999 to December 2007. The dependent variable is the monthly fund returns (in%). We use monthly indicators to capture alpha (abnormal returns in each month) for both litigated and non-litigated funds. We then plot the cumulative abnormal returns over a 4-year period around the litigation from September 2002 to December 2007 for the litigated funds and the non-litigated funds.

**Table 6**  
Cross sectional differences in fund flows and returns. This table summarizes the results of the individual fund-level estimates from the flow model in Panel A and return model in Panel B. In a two-step analysis, we first run time series regressions of the flows as in Equation (2) (see Panel A) and of the returns as in Equation (6) (see Panel B) for each fund. We compare these fund-level estimates across the fund groups classified per SEC charge history, whether the fund is stand-alone or part of a financial conglomerate, and whether the underlying assets in the portfolio are liquid (using the style classification). Panel A and Panel B present the cross sectional means and t-statistics of the coefficients on the pre-and post-event indicators from the individual fund flows and returns models, respectively. T-statistics are in parentheses. \* indicates significance at 5% and \*\* indicates significance at 1%.

	Full sample	Charge history (Yes-No)	Parent company (Stand-alone–conglomerate)	Portfolio liquidity (illiquid–liquid)
Panel A – Fund-level flow regressions				
Pre-litigation, (–3, –1) months	–0.31 [–2.51]*	–0.43 [–1.44]	–0.16 [–0.48]	–0.22 [–0.86]
Post-litigation, (+1, 3) months	–1.25 [–10.74]**	0.84 [2.84]**	–1.28 [–3.79]**	–0.49 [–2.08]*
Panel B – Fund-level return regressions using Carhart 4-factor model				
Pre-litigation, (–3, –1) months	–0.06 [–2.98]**	0.13 [2.47]*	0.23 [3.68]**	–0.05 [–1.27]
Post-litigation, (+1, 3) months	–0.12 [–5.69]**	–0.09 [–1.48]	0.28 [4.23]**	–0.02 [–0.48]

**Table 7**  
Fund liquidity and flows. The table reports the results of pooled fund flow regressions, which include litigation-window indicators interacted with the illiquidity indicator. We identify illiquid funds using three classifications. The first measure uses the fund style and identifies illiquid funds as funds with Lipper objective codes: Corporate Bonds Low, Derivative Mortgages, Growth or Small or MidCap Equity, International Bonds, and International Equity. The second measure uses the cash holdings as a percentage of the TNA and identifies illiquid funds as funds with cash holdings less than the sample median. The third liquidity measure uses the bid-ask spread of stock funds held in their portfolios and only includes domestic equity funds. Illiquid funds are defined as those funds whose underlying portfolio weighted average bid-ask spread is higher than the sample median.

	All Funds Fund style classification	All Funds Cash holding classification	Domestic Funds Bid-ask spread classification
Pre-litigation [–3, –1]	0.19 [1.39]	0.41 [2.51]*	0.04 [0.16]
Pre-litigation * illiquid indicator	–0.39 [2.07]*	–0.52 [2.61]**	–0.26 [0.77]
Litigation month [0]	–0.47 [3.35]**	–0.09 [0.58]	0.00 [0.01]
Litigation month * illiquid indicator	–0.21 [1.06]	–0.65 [3.24]**	–1.11 [2.98]**
Post-litigation [+3, +1]	–0.84 [8.59]**	–0.80 [6.46]**	–1.11 [4.78]**
Post-litigation * illiquid indicator	–0.55 [3.43]**	–0.39 [2.56]*	–0.77 [2.34]*
Illiquid indicator	0.63 [1.83]	–0.27 [6.57]**	
Age	–2.69 [30.10]**	–2.63 [13.92]**	–3.08 [15.97]**
Size	1.12 [23.36]**	1.54 [16.93]**	1.18 [12.13]**
Return (1-month lagged)	0.03 [6.58]**	0.05 [5.73]**	0.05 [4.76]**
Cumulative Return (3-months)	0.01 [3.52]**	0.02 [3.86]**	0.03 [3.71]**
Cumulative Return (6-months)	0.06 [26.90]**	0.05 [16.11]**	0.08 [16.78]**
Expense Ratio	1.78 [8.00]**	2.84 [8.22]**	2.06 [5.28]**
Management fee	–2.07 [9.30]**	–3.33 [9.76]**	–2.16 [4.72]**
Industry-Normalized Flow	–0.98 [10.87]**	0.59 [2.11]*	–0.93 [3.92]**
Style-Normalized Flow	0.54 [22.40]**	0.59 [14.89]**	0.34 [4.56]**
Constant	–1.18 [2.66]**	–2.65 [3.58]**	–1.15 [1.37]
Fund Fixed Effects	Yes	Yes	Yes
Year-Month Fixed Effects	Yes	Yes	Yes
Observations	782,903	399,041	186,358
Number of Funds	10,463	8763	2010
R <sup>2</sup>	2.8%	1.8%	3.6%

resented as the dollar amount over 1 USD that is hypothetically invested. Fig. 2 shows that prior to litigation announcements, there is no abnormal return difference between the two groups of funds. However, after litigation announcements, non-litigated funds consistently perform better than litigated funds.

#### 4.3. Cross-sectional differences in flows and returns

We conduct fund-by-fund estimations of the cross-sectional differences in fund runs and returns before and after litigation. Specifically, we add indicators to the flows and return models

**Table 8**

Evidence from the daily fund returns. Pooled regressions (with fund and year-month fixed effects) of daily returns are run using the market model, the Fama-French 3-factor model, the Carhart 4-factor model, and market models with lagged returns and liquidity factors (inclusive of the FF equations). The pre-litigation indicator indicates [−20, −1] days before the litigation announcement, the post-litigation indicator indicates [1,20] days after the litigation filing. The event indicator indicates the days between the news date and the litigation filing date. The sample covers both litigated and non-litigated funds. The non-litigated fund observations cover the maximum of the litigated funds' observation window. The t-statistics are in brackets below the coefficient estimates. \* and \*\* indicate the significance level at the 5% and the 1% levels, respectively.

Pooled regressions of fund returns on pricing factors, fund characteristics and event-window indicators					
	Market Returns	Fama-French	FF+ Liquidity Factor	Carhart 4-Factor + Liquidity Factor	All + Lagged Market Returns
Pre-litigation (−20, −1) days	−0.58 (2.33)*	−1.44 (5.90)**	−1.47 (6.00)**	−1.36 (5.56)**	−1.33 (5.45)**
Days between litigation news and filing	0.07 −0.28 (2.54)*	−0.57 (2.25)*	−0.63 (2.47)*	−0.53 (2.06)*	−0.49 (−1.93)*
Post-litigation (1, 20) days	−0.64 (2.54)*	−1.37 (5.49)**	−1.44 (5.76)**	−1.34 (5.36)**	−1.31 (5.21)**
Market Return	0.17 (1067)**	0.14 (1044)**	0.18 (1042)**	0.18 (1041)**	0.15 (1041)**
SMB		0.11 (422.16)**	0.11 (421.68)**	0.11 (420.88)**	0.09 (419.49)**
HML		0.09 (235.86)**	0.09 (235.01)**	0.09 (233.77)**	0.09 (233.08)**
Liquid Factor			0.02 (5.87)**	0.02 (7.34)**	0.02 (7.73)**
Momentum				0.03 (9.80)**	0.03 (9.20)**
Lagged Market Return					−0.01 (3.54)**
Size	0.57 (16.36)**	0.49 (14.23)**	0.48 (14.07)**	0.48 (14.04)**	0.49 (14.15)**
Log (age)	−0.83 (15.47)**	−0.35 (6.69)**	−0.42 (7.72)**	−0.4 (7.43)**	−0.4 (7.39)**
Expense Ratio	0.03 (17.49)**	0.02 (12.35)**	0.02 (12.49)**	0.02 (12.70)**	0.02 (12.81)**
Constant	−0.02 (8.68)**	−0.02 (9.01)**	−0.02 (8.35)**	−0.02 (8.63)**	−0.02 (8.76)**
Fund Fixed Effects	Yes	Yes	Yes	Yes	Yes
Date Fixed Effects	Yes	Yes	Yes	Yes	Yes
# of Observations	7,957,529	7,957,529	7,957,529	7,957,529	7,957,529
Number of Funds	8934	8934	8934	8934	8934
R <sup>2</sup>	13%	15%	15%	15%	15%

(Equations (2) to (7)) for the three months in the pre-litigation and post-litigation windows. Table 6 summarizes the fund-level estimates and compares them across the subsample funds per the liquidity of the underlying portfolio, SEC litigation history, and whether the fund is a stand-alone or part of a conglomerate.

Panel A of Table 6 reports the cross-sectional mean of the coefficients for three-month pre-litigation and post-litigation month indicators and the corresponding t-statistics in the full sample and the subsamples. Abnormal flows in the three months before and after the litigation are significant and negative in the full sample, indicating that investors run funds both before and after litigation. Furthermore, post-litigation runs are larger than pre-litigation runs (−1.25 percent vs. −0.31 percent). The post-litigation abnormal outflows of illiquid funds (illiquid funds invest in small-cap stocks, international equity and bonds, and asset-backed securities) relative to liquid funds are significantly larger. These results are consistent with our hypothesis that investors in illiquid funds, that are susceptible to higher costs upon redemption, are more likely to run the litigated funds.

Panel B of Table 6 reports a comparison of the coefficient estimates on the three months pre- and post-event indicators from the return models. The first column presents the return benefits for all investigated funds, whereas the remaining columns list the average return differences and the t-statistics across funds, subsampled according to the liquidity of the underlying portfolio, prior the SEC litigation history, and whether the fund is a stand-alone or part of a conglomerate. The risk-adjusted returns (alphas, as measured by the difference in the coefficients of the 3-months pre-event indicators and the 3-months post-event indicators) are significantly

higher in the pre-event window than in the post-event window, especially for funds holding illiquid assets.

We further investigate the effect of illiquidity on fund flows by running pooled regressions that include event-window indicators and their interaction with the fund illiquidity indicators, controlling for the fund characteristics. Three liquidity classifications are used. The first classification measures fund illiquidity per the Lipper objective code. Liquid funds invest in large-cap stocks and treasury bills, whereas illiquid funds invest in small-cap stocks, international equity and bonds, and asset-backed securities. The second measure relies on the cash holdings to classify the funds. The proportion of cash in the portfolio of illiquid (liquid) funds is below (above) the sample median. The third measure classifies funds as illiquid (liquid) if the value-weighted average bid-ask spread of the stocks in the portfolio is above (below) the sample median. The third measure restricts the sample of funds to domestic equity funds due to the availability of data on the bid-ask spread. Table 7 shows that pre-event and event-month outflows of litigated funds are more pronounced (and statistically significant) for illiquid funds. Post-event fund runs are salient for all litigated funds but even more so for illiquid funds. Appendix D presents the results of similar regressions with the 13 event-month indicators. Overall, the evidence is consistent with the conjecture that payoff complementarity is stronger for illiquid funds.

Both reputation and liquidity may affect fund runs and return differences. In fact, a good reputation may alleviate investor suspicions of mismanagement and thus reduce runs, which in turn may decrease the probability of financial contagion. To disentangle motivations related to fire-sale costs from those related to penalizing management, we run flow regressions in funds, subsam-

**Table 9**  
Liquidity and cumulative abnormal returns of stocks and ownership by investigated funds. The table runs regressions of CARs (7-day, 14-day, 24-day, 44-day, and 64-day) and the relative bid-ask spread on % of shares held by litigated funds, illiquid indicator, and an interaction term for the illiquid indicator and the percentage of shares held by litigated funds. The regressions cover all CRSP stocks with bid-ask and CAR data regardless of whether or not they are held by litigated funds. Panel A, B and C reports the regression results for all months, for September 2003 and October 2003, respectively. \* and \*\* denote significance at the 5% and 1% level, respectively.

	CAR [-3,3]	CAR [-3,10]	CAR [-3,20]	CAR [-3,40]	CAR [-3,60]	Relative bid-ask
Panel A: All litigation months						
Held by litigated funds (%):	0.00 [0.22]	0.00 [0.24]	0.00 [0.17]	0.00 [0.11]	0.00 [0.02]	0.00 [0.18]
Illiquid stock indicator	-0.01** [17.22]	-0.01** [16.63]	-0.03** [28.09]	-0.05** [32.95]	-0.07** [40.04]	-0.01** [95.51]
Interaction	0.12 [1.93]	-0.02 [0.25]	0.11 [0.90]	0.12 [0.73]	0.21 [0.98]	0.02 [1.45]
Constant	0.00 [1.31]	0.00** [6.88]	0.00** [4.57]	0.00 [0.54]	-0.00* [2.35]	-0.00** [4.65]
Observations	82,130	82,130	82,130	82,130	82,130	81,436
R <sup>2</sup>	0.36%	0.34%	0.96%	1.31%	1.93%	10.14%
Panel B: September 2003						
Held by litigated funds (%):	-0.08 [0.47]	-0.02 [0.09]	0.08 [0.26]	-0.15 [0.33]	0.09 [0.16]	-0.03 [0.70]
Illiquid stock indicator	0.02** [11.15]	0.03** [13.04]	0.00 [1.20]	0.00 [0.05]	-0.02** [4.48]	-0.01** [26.51]
Interaction	-0.01 [0.03]	-1.26* [2.23]	-1.39* [2.05]	-0.94 [0.95]	-0.11 [0.08]	0.16 [1.83]
Constant	0.00 [1.01]	0.00 [0.92]	0.01** [3.20]	0.02** [6.38]	0.04** [9.40]	-0.00* [2.53]
Observations	9775	9775	9775	9775	9775	9771
R <sup>2</sup>	1.30%	1.75%	0.06%	0.02%	0.21%	6.78%
Panel C: October 2003						
Held by litigated funds (%):	0.00 [0.03]	0.00 [0.11]	0.00 [0.12]	0.00 [0.07]	0.00 [0.01]	0.00 [0.06]
Illiquid stock indicator	-0.01** [5.03]	-0.01** [3.25]	-0.03** [12.53]	-0.07** [24.05]	-0.06** [16.37]	-0.01** [52.15]
Interaction	-0.08 [0.59]	-0.49* [2.41]	-0.58* [2.19]	-1.11** [3.01]	-1.23** [2.79]	0.07* [2.24]
Constant	0.00** [5.42]	0.01** [10.21]	0.01** [9.53]	0.03** [11.93]	0.03** [12.13]	-0.00** [4.79]
Observations	19,476	19,476	19,476	19,476	19,476	19,464
R <sup>2</sup>	0.14%	0.09%	0.86%	3.03%	1.46%	12.30%

pled according to liquidity and reputation. Panel A of [Appendix E](#) runs fund-level regressions of flows on fund characteristics and 13 month indicators around the litigation announcements in the subsamples of funds classified according to liquidity (using the style classification) and reputation. The four subsamples are: no SEC charge history and liquid; no SEC charge history and illiquid; SEC charge history and liquid; SEC charge history and illiquid. The last four columns in [Appendix E](#) report the *t*-tests for the equality of the pre-event window and the post-event window coefficients in the four subsamples. [Appendix E](#) shows that even when we control for prior SEC charge history, illiquid funds suffer from more outflows (around 4 percent more) in the six months following the litigation news.

Panel B of [Appendix E](#) runs fund-level regressions of the net returns using the Carhart 4-factor model depicted in Equation (6) through (7) and the 13 event-month indicators. The funds are subsampled into four groups per liquidity (using the style classification) and reputation. Both the illiquidity of the fund portfolio and a poor reputation hurt returns in the 6 months following the litigation news. The effect of illiquidity and a poor reputation seem also to matter in the 6 months before the litigation news but the statistical significance is not as robust.

#### 4.4. Evidence from the daily data and the holding data

We use daily return data to investigate the impact of litigation on fund returns. We run pooled regressions using the five asset-

pricing models, Equations (3) through (7). The regressions cover both litigated and non-litigated funds. As [Table 8](#) shows, litigated funds significantly underperform non-litigated funds in the three event windows. The magnitude of the underperformance is as high as 1.44 basis points daily, which is nearly 25 basis points during the 20-day window. If the fund run lasts much longer than 20 days, the total underperformance will be larger than 25 basis points.

[Table 9](#) investigates the liquidity and abnormal returns of stocks held by litigated funds. We run regressions of the CARs (7-day, 14-day, 24-day, 44-day, and 64-day) around the litigation filings and the relative bid-ask spread on % of shares held by litigated funds, the illiquid indicator, and an interaction term for the illiquid indicator and the percentage of shares held by litigated funds. The regression includes all CRSP stocks with bid-ask and CAR data regardless of whether or not they are held by litigated funds. The six regression specifications use as independent variables 7-day, 14-day, 24-day, 44-day, and 64-day CARs and the relative bid-ask spread, respectively. Panel A of [Table 10](#) reports the regression results for all the litigation filings and all the stocks; Panel B reports the regression results for all the litigation filings in September 2003; and Panel C reports the regression results for all the litigation filings in October 2004.

The results of the full sample (in Panel A) indicate that funding illiquidity of mutual funds does not seem to affect the abnormal returns and the liquidity of the stocks that they hold in their portfolio. However, we cannot precisely measure if or when a mutual fund sells the stock in their portfolios. Furthermore, we show that

the funding illiquidity of mutual funds (large outflows) is most pronounced in the immediate aftermath of litigation. As such, we also look at the subsample results in the first two months of litigation, September and October 2003. The interaction term between illiquid stocks and the proportion held by litigated funds shows that large outflows of litigated mutual funds result in significantly lower CARs in the 14-day and 24-day windows in September and lower CARs in the 14-day through the 64-day windows in October. The results also indicate that the relative bid-ask spread of illiquid stocks that are held by litigated funds increases, indicating a further decrease in the illiquidity of the already illiquid stocks.<sup>13</sup>

## 5. Conclusion

This paper documents mutual-fund runs. We find that pre-event runs start as early as three months prior to an announcement of litigation and the size of the pre-event run is smaller than that of the post-event run. The timing and size of the runs are also affected by fund and investor characteristics, such as the reputation and liquidity of the underlying assets. Furthermore, because concerted runs trigger fire sales that result in significant costs, investors who run funds prior to litigation announcements realize higher returns than those who run funds after litigation announcements, especially when the funds are less-liquid. Evidence from the holding data on performance and liquidity also supports the proposition that fire-sale costs are an important motivation behind fund runs. These results suggest that the pro-rata distribution of proceeds from asset sales is not sufficient to prevent fund runs.

The rationale for exiting early has critical implications for stability in the fund industry: once the timing of an action matters for the payoff, strategic complementarities prevail. In such a situation, investors may run funds in the expectation that other investors will do so as well, which will amplify the impact of adverse events or random shocks on financial market fundamentals. Nonetheless, because depressed prices during fire sales may soon be recovered as long as the liquidity shock does not embrace all sectors, the self-fulfilling mechanism and the devastating consequences of a bank run are not likely to be manifested in the fund industry. Rather, fund runs caused by fund mispricing will cease when the price is reset at a fair value, and fund runs caused by mismanagement will cease when the reputation of management is restored or a new client profile equilibrium is reached.

## Appendix A.

Table shows the average monthly flows from September 2002 to September 2004 for three groups of funds: investigated funds prior to the litigation month, investigated funds during or after the litigation month, and funds in families with no investigated funds. Funds in families with no investigated funds are used as benchmarks to test for the flow differences against the investigated funds. Panel A uses all funds, and the event month is identified using: the litigation filing date (first specification) and the first date when newspaper articles about litigation appeared (second specification). Panel B groups the funds per their prior SEC charge history and identifies the event month using the litigation news date. T-statistics are in brackets. \*\* and \* denote significance at the 1% and 5% levels, respectively.

Panel A: Full sample									
Date	Control Group Funds in Families with no Investigated Funds	Treatment Group (using litigation filing date)				Treatment Group (using newspaper date)			
		1: Investigated Funds Prior to the Litigation Month	t(Diff)	2: Investigated Funds on or After the Litigation Month	t(Diff)	1: Investigated Funds Prior to the Newspaper Date	t(Diff)	2: Investigated Funds on or After the Newspaper Date	t(Diff)
Sep-02	0.38	1.02	[2.00]*	.	.	1.02	[2.00]*	.	.
Oct-02	0.58	0.39	[-0.65]	.	.	0.39	[-0.65]	.	.
Nov-02	0.71	1.28	[1.81]	.	.	1.28	[1.81]	.	.
Dec-02	0.16	0.31	[0.49]	.	.	0.31	[0.49]	.	.
Jan-03	0.96	0.53	[-1.52]	.	.	0.53	[-1.52]	.	.
Feb-03	0.37	0.72	[1.99]*	.	.	0.72	[1.99]*	.	.
Mar-03	0.91	0.71	[-0.61]	.	.	0.71	[-0.61]	.	.
Apr-03	1.30	1.46	[0.51]	.	.	1.46	[0.51]	.	.
May-03	0.94	1.14	[0.72]	.	.	1.14	[0.72]	.	.
Jun-03	1.05	1.07	[0.07]	.	.	1.07	[0.07]	.	.
Jul-03	0.86	0.63	[-0.72]	.	.	0.63	[-0.72]	.	.
Aug-03	0.89	0.03	[-3.07]**	.	.	0.03	[-3.07]**	.	.
Sep-03	0.71	-0.08	[-3.16]**	-0.97	[-3.19]**	0.12	[-1.97]*	-0.57	[-4.00]**
Oct-03	1.31	1.22	[-0.19]	-0.80	[-4.56]**	2.07	[1.15]	-0.28	[-4.48]**
Nov-03	0.95	0.73	[-0.84]	-2.64	[-12.15]**	2.59	[2.66]**	-1.12	[-9.80]**
Dec-03	1.11	0.40	[-1.65]	-2.02	[-7.66]**	2.19	[1.15]	-1.19	[-7.32]**
Jan-04	1.75	0.77	[-2.21]*	-0.72	[-6.14]**	2.62	[0.95]	-0.39	[-6.61]**
Feb-04	1.32	0.59	[-1.28]	-0.56	[-7.22]**	2.40	[1.03]	-0.51	[-7.50]**
Mar-04	1.01	0.34	[-0.64]	-0.64	[-4.40]**	.	.	-0.53	[-4.35]**
Apr-04	0.72	-0.34	[-1.57]	-0.71	[-5.54]**	.	.	-0.67	[-5.70]**
May-04	0.10	-1.46	[-2.39]*	-1.52	[-6.74]**	.	.	-1.52	[-7.12]**
Jun-04	0.72	-0.61	[-1.50]	-1.17	[-5.90]**	.	.	-1.11	[-6.04]**
Jul-04	0.72	-0.69	[-1.52]	-0.93	[-4.96]**	.	.	-0.90	[-5.18]**
Aug-04	0.43	-0.09	[-0.16]	-0.58	[-3.67]**	.	.	-0.57	[-3.67]**
Sep-04	0.37	1.49	[0.48]	-0.83	[-6.22]**	.	.	-0.82	[-6.16]**
Oct-04	0.39	1.72	[0.54]	-0.80	[-5.84]**	.	.	-0.78	[-5.78]**
Nov-04	0.85	.	.	-0.59	[-5.89]**	.	.	-0.59	[-5.89]**
Dec-04	0.19	.	.	-0.89	[-4.45]**	.	.	-0.89	[-4.45]**

<sup>13</sup> For an excellent review on interconnectivity of markets and how financial distress spreads between markets, the interested reader may refer to [Silva et al. \(2017\)](#).

Panel B: Institutional Funds versus Retail Funds

Date	Institutional Funds					Retail Funds				
	Control	Treatment Group				Control	Treatment Group			
	Funds in Families with no Investigated Funds	1: Investigated Funds Prior to the News Date	t(Diff)	2: Investigated Funds on or After the News Date	t(Diff)	Funds in Families that are Not Investigated	1: Investigated Funds Prior to the News Date	t(Diff)	2: Investigated Funds on or after the News Date	t(Diff)
Sep-02	0.93	1.80	[0.72]	.	.	0.18	0.90	[2.49]*	.	.
Oct-02	0.63	0.70	[0.11]	.	.	0.56	0.34	[-0.70]	.	.
Nov-02	0.87	4.65	[3.78]**	.	.	0.65	0.74	[0.29]	.	.
Dec-02	-0.14	2.07	[3.17]**	.	.	0.27	0.03	[-0.74]	.	.
Jan-03	1.24	2.24	[1.15]	.	.	0.86	0.26	[-2.09]*	.	.
Feb-03	0.58	1.90	[2.45]*	.	.	0.30	0.53	[1.32]	.	.
Mar-03	0.92	2.54	[1.52]	.	.	0.90	0.42	[-1.49]	.	.
Apr-03	0.96	4.32	[2.72]**	.	.	1.42	1.00	[-1.55]	.	.
May-03	0.56	2.85	[3.49]**	.	.	1.07	0.86	[-0.68]	.	.
Jun-03	1.30	1.73	[0.36]	.	.	0.96	0.97	[0.03]	.	.
Jul-03	0.68	1.32	[0.60]	.	.	0.92	0.52	[-1.27]	.	.
Aug-03	1.24	-0.04	[-1.20]	.	.	0.76	0.04	[-2.96]**	.	.
Sep-03	0.99	1.67	[0.69]	-0.01	[-0.97]	0.61	-0.13	[-2.53]*	-0.65	[-3.97]**
Oct-03	1.50	7.53	[3.03]**	0.35	[-0.98]	1.25	0.69	[-0.91]	-0.36	[-4.42]**
Nov-03	0.57	5.06	[3.75]**	0.11	[-0.73]	1.09	1.51	[0.59]	-1.29	[-10.60]**
Dec-03	0.46	3.35	[1.74]	-0.27	[-0.82]	1.34	1.68	[0.30]	-1.32	[-7.88]**
Jan-04	1.28	5.14	[2.23]*	0.07	[-1.23]	1.92	1.52	[-0.38]	-0.45	[-6.86]**
Feb-04	1.34	3.48	[0.87]	1.37	[0.03]	1.32	1.99	[0.60]	-0.76	[-8.90]**
Mar-04	1.44	.	.	0.50	[-1.12]	0.86	.	.	-0.67	[-3.86]**
Apr-04	0.93	.	.	0.09	[-1.12]	0.65	.	.	-0.78	[-5.65]**
May-04	0.27	.	.	-0.66	[-1.45]	0.04	.	.	-1.64	[-6.90]**
Jun-04	0.31	.	.	-0.24	[-0.81]	0.87	.	.	-1.23	[-6.11]**
Jul-04	1.65	.	.	0.00	[-1.26]	0.39	.	.	-1.03	[-5.62]**
Aug-04	0.14	.	.	0.49	[0.65]	0.53	.	.	-0.72	[-3.95]**
Sep-04	0.31	.	.	-0.45	[-1.17]	0.39	.	.	-0.87	[-6.64]**
Oct-04	0.49	.	.	-0.32	[-1.02]	0.36	.	.	-0.85	[-6.77]**
Nov-04	0.74	.	.	0.28	[-0.59]	0.89	.	.	-0.71	[-6.49]**
Dec-04	0.24	.	.	0.26	[0.03]	0.17	.	.	-1.05	[-5.52]**

**Appendix B. Detecting runs: Multivariate analysis of monthly flows with 13 event-month dummies**

Table runs four specifications of the flow model:  $Flow = a + \sum b_j$  \* fund characteristics $_j + \sum c_j$  \* past returns $_j + \sum d_j$  \* aggregate flows $_j + \sum \gamma_j$  \* Event-window dummies $_j + \varepsilon$ . The dependent variable is computed as  $Flow_{i,t} = [TNA_{i,t} - TNA_{i,t-1} * (1 + Ri,t)] / TNA_{i,t-1}$ . The fund characteristics include size (log of TNA in million USD), age (log of days since the first offer date), expense ratio (the fund's operating expenses as a ratio of the total investment), and management fee (the management fee as a ratio of the average investment). Past returns include cumulative returns in the past one, three, and six months. Aggregate flows include industry-level and style-level flows. Industry-level flows are the sum of the flows in dollars ( $TNA_{i,t} - TNA_{i,t-1} * (1 + Ri,t)$ ) to all funds in the sample divided by the sum of the lagged TNA ( $TNA_{i,t-1}$ ). Style-level flows are the sum of the flows in dollars to all the funds with the same investment style divided by the sum of the lagged TNA. The event-window indicator (n month) equals 1 if it is the nth month to the date of the first litigation news and 0 otherwise (n = -1, -2, . . . -6, 0, 1, 2, . . . 6). Observations are monthly and cover the years from January 1999 to December 2007. Robust t-statistics are in brackets. \* indicates significance at 5% and \*\* indicates significance at 1%.

	Pooled regressions		Regressions with fund and year fixed effects	
	(1)	(2)	(3)	(4)
Month Indicator (-6 months)	0.55	0.46	0.62	0.45
	[1.98]*	[1.63]	[2.23]*	[1.61]
Month Indicator (-5 months)	0.85	0.7	0.87	0.62
	[2.31]*	[1.87]	[2.36]*	[1.69]
Month Indicator (-4 months)	-0.11	-0.1	-0.15	-0.22
	[0.99]	[0.93]	[1.23]	[1.85]
Month Indicator (-3 months)	-0.09	-0.15	-0.17	-0.3
	[0.45]	[1.34]	[0.82]	[2.54]*

Month Indicator (-2 months)	-0.4	-0.32	-0.47	-0.46
	[1.49]	[1.65]	[1.79]	[2.36]*
Month Indicator (-1 month)	-0.82	-0.52	-0.88	-0.65
	[5.65]**	[3.99]**	[5.82]**	[4.87]**
Event month (0 month)	-0.94	-0.75	-1.00	-0.88
	[5.72]**	[4.53]**	[6.02]**	[5.29]**
Month Indicator (+1 month)	-1.15	-1.00	-1.22	-1.16
	[10.78]**	[9.47]**	[11.25]**	[10.65]**
Month Indicator (+2 month)	-1.91	-1.73	-1.88	-1.8
	[14.72]**	[13.33]**	[14.50]**	[13.84]**
Month Indicator (+3 month)	-1.52	-1.36	-1.4	-1.37
	[13.03]**	[11.83]**	[11.96]**	[11.83]**
Month Indicator (+4 month)	-0.97	-1.22	-0.69	-1.07
	[4.70]**	[12.50]**	[3.48]**	[11.12]**
Month Indicator (+5 month)	-1.18	-1.11	-0.89	-0.93
	[11.64]**	[11.01]**	[8.55]**	[8.90]**
Month Indicator (+6 month)	-1.11	-0.87	-0.79	-0.65
	[11.11]**	[9.05]**	[7.81]**	[6.78]**
Age	-1.49	-1.34	-2.68	-2.64
	[54.24]**	[48.39]**	[33.73]**	[29.41]**
Size	0.35	0.28	0.91	1.09
	[36.62]**	[26.92]**	[22.73]**	[22.87]**
Return (1-month lagged)	0.03	0.02	0.02	0.01
	[6.95]**	[4.38]**	[4.40]**	[2.09]*
Cumulative Return (3-months)	0.01	0.00	0.02	0.01
	[4.40]**	[1.17]	[6.79]**	[3.02]**
Cumulative Return (6-months)	0.06	0.05	0.07	0.06
	[32.88]**	[28.39]**	[35.81]**	[30.17]**
Expense Ratio	-0.51	-0.51	-0.51	1.71
		[13.63]**		[7.73]**
Management Fee	0.04	0.04	0.04	-2.02
		[0.50]		[9.05]**
Industry-Normalized Flow	0.18	0.18	0.18	0.23
		[4.20]**		[5.49]**
Style-Normalized Flow	0.6	0.6	0.6	0.59
		[26.19]**		[24.34]**
Intercept	1.34	1.91	0.34	-1.58
	[22.13]**	[22.04]**	[1.54]	[3.96]**
Observations	814,857	782,903	814,857	782,903
R <sup>2</sup>	2.51%	2.72%	2.28%	2.64%
Number of Funds			10,898	10,463

### Appendix C. Fund returns before and after litigation announcements

Table reports pooled regressions (with fund and year fixed effects) of monthly fund returns on pricing factors using the market model, the Fama-French 3-factor model, the Carhart 4-factor model, the market model with lagged returns, and the market model with liquidity factors. The dependent variable is monthly fund returns (in%). The event-window indicator (n month) equals 1 if it is the nth month to the date of the first litigation news and 0 otherwise (n = -1, -2, . -6, 0, 1, 2, . 6). Observations are monthly and cover the years from January 1999 to December 2007. Panel A presents the regression results. Panel B tests for differences in the accumulated abnormal returns using litigation month indicators. Robust t-statistics are in brackets. \* indicates significance at 5% and \*\* indicates significance at 1%.

Panel A: Pooled regressions of monthly returns on pricing factors and litigation-month indicators

	Market Factor	Fama-French	Carhart 4-Factor	Market Model with Lagged Returns	Market Returns with Liquidity Factor
Month Indicator (-6 months)	-0.24 [3.66]**	-0.20 [3.04]**	-0.19 [2.88]**	-0.24 [3.67]**	-0.22 [3.28]**
Month Indicator (-5 months)	-0.23 [2.82]**	-0.31 [3.76]**	-0.28 [3.40]**	-0.31 [3.68]**	-0.23 [2.77]**
Month Indicator (-4 months)	-0.24 [3.28]**	-0.49 [6.65]**	-0.46 [6.23]**	-0.38 [5.17]**	-0.28 [3.83]**
Month Indicator (-3 months)	-0.51 [9.18]**	-0.62 [10.97]**	-0.62 [10.98]**	-0.60 [10.64]**	-0.55 [9.76]**
Month Indicator (-2 months)	-0.66 [8.61]**	-0.83 [10.75]**	-0.83 [10.73]**	-0.68 [8.87]**	-0.67 [8.72]**
Month Indicator (-1 month)	0.18 [2.93]**	0.02 [0.40]	0.01 [0.22]	0.16 [2.64]**	0.17 [2.72]**
Event month (0 month)	0.36 [5.81]**	0.30 [4.81]**	0.29 [4.58]**	0.33 [5.36]**	0.39 [6.28]**
Month Indicator (+1 month)	-0.52 [7.19]**	-0.61 [8.47]**	-0.64 [8.78]**	-0.52 [7.25]**	-0.51 [6.98]**
Month Indicator (+2 month)	-0.24 [5.56]**	-0.27 [6.56]**	-0.28 [6.78]**	-0.32 [7.50]**	-0.22 [5.13]**
Month Indicator (+3 month)	-0.19 [3.78]**	-0.10 [2.02]*	-0.10 [2.05]*	-0.23 [4.44]**	-0.18 [3.43]**
Month Indicator (+4 month)	-0.01 [0.27]	-0.14 [3.38]**	-0.14 [3.49]**	-0.08 [1.85]	0.03 [0.82]
Month Indicator (+5 month)	-0.22 [5.20]**	-0.04 [1.05]	-0.03 [0.76]	-0.23 [5.34]**	-0.23 [5.26]**
Month Indicator (+6 month)	-0.15 [3.26]**	-0.06 [1.38]	-0.05 [1.12]	-0.12 [2.51]*	-0.17 [3.63]**
Market Returns	0.61 [104.93]**	0.61 [114.81]**	0.62 [117.69]**	0.61 [104.97]**	0.60 [100.10]**
SMB		0.11 [38.83]**	0.10 [40.18]**		
HML		0.07 [20.82]**	0.07 [20.96]**		
Momentum			0.01 [5.65]**		
Lagged Market Returns				0.03 [33.96]**	
Liquidity Factor					0.01 [20.85]**
Intercept	0.02 [0.90]	0.07 [5.06]**	0.05 [4.02]**	0.06 [3.06]**	0.01 [0.67]
Observations	831,152	831,152	831,152	819,724	737,009
Number of groups	11,124	11,124	11,124	11,069	10,444
R <sup>2</sup>	36.4%	37.2%	37.2%	36.8%	36.2%

Panel B: Performance Difference

	Market Factor	Fama-French	Carhart 4-Factor	Market Model with Lagged Returns	Market Returns with Liquidity Factor
Indicator (-1 months)		0.70	0.64	0.65	0.68
- Indicator (+1 month)		[107.23]**	[88.49]**	[91.17]**	[103.72]**
Accumulated (-1 to -2)		0.28	0.08	0.10	0.32
- Accumulated (+1 to +2)		[14.72]**	[1.42]	[2.29]*	[20.00]**
Accumulated (-1 to -3)		-0.05	-0.44	-0.41	-0.05
- Accumulated (+1 to +3)		[0.21]	[21.31]**	[19.32]**	[0.29]

#### Appendix D. Fund flows in subsamples of funds grouped according to liquidity with monthly event dummies

Table reports the results of pooled fund flow regressions in subsamples of funds grouped according to liquidity. The dependent variable is monthly fund returns (in%). The event-window indicator ( $n$  month) equals 1 if it is the  $n$ th month to the date of the first litigation news and 0 otherwise ( $n = -1, -2, \dots, -6, 0, 1, 2, \dots, 6$ ). Observations are monthly and cover the years from January 1999 to December 2007. Three classification approaches are used to group the funds. The first measure uses the fund style and identifies illiquid funds as funds with the following Lipper objective codes: Corporate Bonds Low, Derivative Mortgages, Growth or Small or MidCap Equity, International Bonds, and International Equity. The second measure uses the cash holdings as a percentage of the TNA and identifies illiquid funds as funds with cash holdings less than the sample median. The third liquidity measure uses the bid-ask spread of the stock funds held in their portfolios. Illiquid funds are defined as those funds whose underlying portfolio weighted average bid-ask spread is higher than the sample median. Robust t-statistics are in brackets. \* indicates significance at 5% and \*\* indicates significance at 1%.

	All Funds		All Funds		Domestic Funds	
	Fund style classification		Cash holding classification		Bid-ask spread classification	
	Liquid	Illiquid	Liquid	Illiquid	Liquid	Illiquid
Month Dummy	0.38	0.50	1.15	0.38	0.39	-0.57
(-6 months)	[2.19]*	[0.81]	[2.00]*	[1.73]	[1.38]	[1.92]
Month Dummy	0.76	0.55	1.57	0.41	3.95	0.28
(-5 months)	[1.38]	[1.21]	[1.94]	[2.33]*	[1.31]	[0.40]
Month Dummy	0.07	-0.36	0.30	-0.13	0.90	-0.81
(-4 months)	[0.53]	[1.85]	[1.50]	[0.92]	[2.60]**	[1.70]
Month Dummy	0.02	-0.43	0.27	-0.28	1.04	-0.93
(-3 months)	[0.12]	[2.57]*	[1.45]	[1.91]	[2.19]*	[2.28]*
Month Dummy	-0.06	-0.71	-0.14	-0.02	0.90	-0.86
(-2 months)	[0.23]	[2.95]**	[0.56]	[0.05]	[2.57]*	[3.07]**
Month Dummy	-0.46	-0.66	-0.30	-0.29	0.37	-1.18
(-1 month)	[2.96]**	[2.97]**	[1.39]	[1.58]	[1.31]	[3.66]**
Event month	-0.43	-1.21	-0.11	-0.90	0.02	-1.82
(0 month)	[1.72]	[6.47]**	[0.32]	[7.36]**	[0.06]	[4.56]**
Month Dummy	-0.82	-1.30	-0.58	-1.06	-0.72	-1.61
(+1 month)	[6.50]**	[7.07]**	[3.02]**	[8.43]**	[2.64]**	[4.33]**
Month Dummy	-1.38	-2.20	-1.45	-1.76	-1.84	-3.69
(+2 month)	[8.90]**	[9.96]**	[6.83]**	[10.21]**	[3.68]**	[8.56]**
Month Dummy	-1.14	-1.66	-0.98	-1.29	-0.75	-2.53
(+3 month)	[6.69]**	[11.92]**	[6.35]**	[7.08]**	[3.27]**	[8.88]**
Month Dummy	-0.88	-1.65	-1.05	-1.1	-0.39	-2.13
(+4 month)	[7.16]**	[10.52]**	[6.08]**	[9.46]**	[1.52]	[7.08]**
Month Dummy	-1.05	-1.17	-0.79	-1.07	-0.89	-1.85
(+5 month)	[8.12]**	[7.19]**	[5.07]**	[7.21]**	[3.34]**	[8.37]**
Month Dummy	-0.79	-0.97	-0.7	-0.62	-0.57	-1.01
(+6 month)	[7.58]**	[5.48]**	[5.11]**	[4.14]**	[2.64]**	[1.72]
Age	-1.15	-1.60	-1.30	-1.13	-1.19	-1.57
	[31.41]**	[36.91]**	[26.85]**	[17.89]**	[14.97]**	[17.09]**
Size	0.25	0.32	0.28	0.26	0.2	0.27
	[18.80]**	[19.33]**	[16.60]**	[13.38]**	[6.82]**	[8.75]**
Return	0.02	0.01	0.03	0.02	0.01	0.03
(1-month lagged)	[2.45]*	[3.46]**	[4.00]**	[2.24]*	[1.51]	[3.99]**
Cumulative Return	0.00	0.00	0.01	0.01	-0.01	0.01
(3-months)	[0.30]	[1.20]	[2.66]**	[1.11]	[1.25]	[1.02]
Cumulative Return	0.06	0.04	0.06	0.05	0.06	0.04
(6-months)	[18.28]**	[20.81]**	[18.08]**	[13.13]**	[15.83]**	[11.43]**
Expense Ratio	-0.45	-0.53	-0.88	-0.95	-0.64	-0.56
	[8.55]**	[9.96]**	[13.54]**	[16.43]**	[6.00]**	[5.19]**
Management Fee	-0.04	0.08	0.73	-0.05	0.17	0.32
	[0.33]	[0.74]	[5.97]**	[0.42]	[0.76]	[1.70]
Industry-Normalized Flow	0.00	0.21	0.27	0.44	0.32	0.12
	[0.02]	[3.08]**	[3.31]**	[4.44]**	[2.75]**	[0.65]
Style-Normalized Flow	0.54	0.79	0.57	0.51	0.18	0.79
	[19.82]**	[22.34]**	[11.88]**	[10.41]**	[3.00]**	[6.00]**
Intercept	1.61	2.20	1.70	1.65	2.05	2.39
	[13.98]**	[15.95]**	[10.16]**	[9.30]**	[7.56]**	[8.47]**
Observations	427,594	355,309	199,553	199,488	93,293	93,065
R <sup>2</sup>	2.2%	3.4%	3.2%	2.1%	1.9%	3.4%



## Appendix E. Cross-sectional differences in flows and returns: fund subsamples according to the liquidity of the underlying portfolio and the reputation of the fund

Table summarizes the results of the individual fund flow regressions in Panel A and the return regressions in Panel B. In a two-step analysis, we first run time-series regressions of the flows with 13 litigation-month indicators, as in Equation (2) (Panel A) and of returns as in Equation (6) (Panel B) for each fund. We compare the fund-level estimates across the fund groups classified per the SEC charge history and whether the underlying assets in the portfolio are liquid. Panel A and B present the cross-sectional means and t-statistics of the coefficients on the pre- and post-litigation indicators from the individual fund flows and the return models, respectively. T-statistics are in brackets. \* indicates significance at 5% and \*\* indicates significance at 1%.

	(1) No charge history & liquid	(2) No charge history & illiquid	(3) Charge history & liquid	(4) Charge history & illiquid	(1)=(2)	(3)=(4)	(1)=(3)	(2)=(4)
Panel A – Fund-level flow regressions								
Pre-litigation, (–6, –1) months	–1.16 [–1.04]	–1.62 [–0.84]	–3.19 [–1.15]	–1.07 [–0.49]	–0.47 [–0.22]	2.12 [0.57]	–2.03 [–0.81]	0.56 [0.17]
Post-litigation, (+1, 6) months	–8.12 [–7.68]**	–12.17 [–7.77]**	–6.01 [–4.57]**	–9.73 [–3.46]**	–4.05 [–2.22]*	–3.71 [–1.29]	2.11 [1.07]	2.44 [0.81]
Panel B – Fund-level return regressions								
Pre-litigation, (–6, –1) months	0.71 [4.46]**	–0.17 [–0.68]	0.06 [0.27]	–0.68 [–1.61]	–0.87 [–3.11]**	–0.74 [–1.66]	–0.65 [–2.15]*	–0.51 [–1.07]
Post-litigation, (+1, 6) months	0.99 [7.16]**	–0.21 [–0.91]	0.14 [0.57]	–0.25 [–0.73]	–1.20 [–4.77]**	–0.38 [–0.95]	–0.85 [–3.08]**	–0.04 [–0.09]

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