Whom Can You Trust?
A Study of Mutual Fund Governance[+]

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JEL classifications: G23, G28.

Keywords: Flow sensitivity, market monitoring, board of directors, trading practice.

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1. Introduction

In mutual funds, shareholders are also clients of funds. Due to this special organizational structure, conventional results in corporate governance studies may not apply in the fund industry. Fama and Jensen (1983) argue that boards of mutual financial institutions are less important in the management control process compared to those of non-financial corporations. Shareholders' ability to withdraw resources directly from funds serves as a form of liquidation. However, the effectiveness of this mechanism is unclear. Individual investors may lack the combination of knowledge and information to monitor funds, or the monitoring cost is too high relative to the benefit. The existing fund governance literature devotes little attention to the market monitoring mechanism but focuses on the board of directors[1].

This paper examines the effectiveness of investor monitoring in relation to the trading scandals that erupted in 2003. The market discipline carried out by investors is measured by flow sensitivity to past performance. Investors punish (reward) fund management by withdrawing money from (adding to) the fund following deterioration (improvement) in performance. Such punishment and rewarding behavior generates a positive relation between fund returns and subsequent net flows, namely flow sensitivity. When the flow sensitivity is high[2], increasing return becomes an appealing method to increase fund size. High returns benefit investors and expanding fund size is in the interest of management, because the management fee is calculated as a percentage of the total assets overseen. Therefore, high flow sensitivity can align the interest

[1] Tufano & Sevick (1997) study the relation between board characteristics and fees charged by open-end funds. Dann, Del Guercio, and Partch (2002) relate board characteristics to restructuring activities in close-end funds. Verma (2003) studies the influence of management in selecting board members.

[2] Brown, Harlow, & Starks (1996) and Chevalier & Ellison (1997) show that managers alter the risk of portfolios to increase returns and attract more flows. However, Busse (2001) shows that evidence in previous studies is spurious.

of the management and investors[3]. The fiduciary failure in the scandal is captured in three measures. First, whether the fund is indicted by the SEC or any other regulators for facilitating arbitrage trading. Second, whether management prevents arbitrage ex-anti by adopting "fair-value" pricing. Finally, what is the scale of arbitrage trades within the fund.

Indictments in the recent scandals allege that management cooperates with late traders and daily timers in exchange for assets or services, while these trading activities hurt the performance of funds. With a sample of 92 fund families, 10,220 funds*classes, this papers finds that funds in indicted families underperform those in non-indicted families by 44 basis points, while enjoying a higher growth rate of total net assets during 2001-2003. We can conjecture that such fiduciary failure is less likely to happen if the fund has high flow sensitivity. Consistently, this paper finds that flow sensitivity is on average significantly (at 1% level) lower in the indicted funds than in the non-indicted funds. A one standard deviation increase in flow sensitivity is related with a 15-52% (elasticity) decrease in the likelihood of indictment. This relation applies consistently at the fund and the family level and remains robust in the sub-sample of funds that are most susceptible to abuse, such as small cap and international funds.

These results are also robust to various measures of flow sensitivity. Flows control for those responding to aggregate market condition and fund styles. Returns use both total returns and excess returns relative to fund styles, and are measured at various horizons from three month to one year. All 12 measures of flow sensitivity explain fund behaviors significantly. Flow sensitivity to excess returns delivers relatively less significant results. However, this finding is

[3] The flow performance literature (Sirri and Tufano, Ippolito 1992, Guercio and Tkac 2002) documents that funds with better performance receive more flows subsequently. In Berk and Green (2004), investors's behavior of chasing past performance is the mechanism to drive the industry equilibrium that managers with higher abilities have larger funds. These studies imply that flows correlated with past performance can align the interests of management and investors. On the other hand, flows correlated with future returns cannot motivate managers' effort. First of all, short-term timing flows will dilute fund return. Second, if money is smart (Gruber 1996 and Zheng 1999), whether this future return will attract new flows still depends on the persistence of the chasing behavior.

consistent with the flows literature (Del Guercio and Tkac 2002, Evan 2004) that investors respond to total returns rather than adjusted returns of the funds.

This paper introduces various new variables of board[4] structure, composition, and compensation to measure the board's effectiveness in monitoring, and fund and management characteristics to capture managerial incentives. These variables are controlled for in the analysis and the paper finds that the size of the fund has a convex relation with the likelihood of the indictment. A unitary board structure, where one board oversees all funds in the family, is negatively associated with the likelihood of the fund being indicted. Board members in the indicted funds are excessively compensated compared to those in the funds not indicted. Board composition has limited explanatory power for trading violations. This result differs from that in corporate boards, where board composition explains corporate fraud (Uzun, Szewczyk, and Varma 2004).

Indictments can be partially observed and endogenous to governance attributes (Pontiff 1999). To overcome this weakness, two other measures of fund behavior are introduced. They are stale pricing and volatility of abnormal flows. A stale price means that the current net asset value (NAV) of the fund does not equal the current value of the underlying securities. Arbitragers profit from stale pricing by catching the overnight price adjustment. Funds can adopt "fair-value-pricing" methods to reduce the staleness in prices[5]. Stale pricing therefore measures a fund's ex anti potential to be abused. Abnormal flows are flows due to opportunistic trading. The arbitrage trading is on an irregular and short-term basis, therefore, can be measured by the

[4] The Investment Act of 1940 specifies that mutual fund directors have a fiduciary responsibility to protect investors' interests and to oversee funds' compliance with federal securities laws (See section 2(a) (41) of the Investment Act of 1940). In most cases of indictments, late trading and timing activities are facilitated by brokers, transfer agents or investment advisors. The board of directors is responsible for evaluating the services provided by these agents and reviewing the fund's contract or sub-contract with them (Investment Act of 1940, release No. 8245 (Feb.25, 1974). The board could also minimize or detect these trading activities by hiring a third party for pricing services and auditing transaction histories (Section 2(a) 41, the 1940 Investment Act).

[5] The disadvantage of "fair-value-pricing" is to introduce a subjective adjustment in the price.

residual flows which are defined as total flows net of market-wide flows, style-wide flows, and fund-specific long-term flows. The paper finds that both the volatility of residual flows and stale pricing are negatively related with flow sensitivity to the past returns.

The overall findings in this paper are consistent with Fama and Jensen (1983)'s argument that investors' ability to directly withdraw from or add resources to funds is an effective market monitoring mechanism. The composition of board of directors in mutual funds does not explain fund behaviors as their counterpart do for corporations. In addition, there is some but weak evidence on the substitution effect between internal and external monitoring. That is, in funds with weak market monitoring measured by low flow sensitivity, the board of directors makes important differences in influencing fund behaviors.

This paper contributes to the fund governance literature by studying the monitoring role of investors. The existing studies of fund governance focus on the board of directors and conclude that boards of smaller size and higher independence are effective monitors. They negotiate lower fees for shareholders (Tufano and Sevick 1997) and are more likely approve open-ending decision of closed-end funds (Dann, Del Guercio and Partch 2002). This paper introduces measures that are special for boards in mutual funds such as unitary board structure, incentive payment, and compensation. They are found to be good measures of an effective board.

Herman (1981), Whisler (1984) and Mace (1986) show that management effectively chooses the board. Hence, individual board members are reluctant to step forward to oppose management when disagreements arise. Some studies suggest that collusion exists between the board and management. For example, Tufano and Sevick (1997) find that well-paid independent

directors approve higher fees for fund sponsors. The endogeneity problem[6] of board composition is reduced in this paper when the board and management are controlled for in one setting.

The rest of the paper is organized as following: Section 2 provides a brief background on mutual fund organization, regulations, conflicts of interest between shareholders and management, and the practice of timing and late trading. Section 3 describes sample data and introduces the measurements of market monitoring, board structure and composition, and fund behavior. Section 4 presents empirical relations between fund governance and fund behaviors with a focus on market monitoring by investors. Section 5 looks further into the board of directors and the measures of an effective board. This section also tests whether there is a substitution effect between the board and the market. Section 6 includes more robust tests. Section 7 discusses the caveats and implications of the findings. Section 8 concludes the paper.

2. Background

This section will briefly describe the background of mutual fund organization, the SEC regulation requirements on the board of directors, the conflicts of interest between shareholders and management, the practice of timing and late trading and why they are fiduciary failures of the management.

Organizational structure

A mutual fund is a special organizational structure compared to a conventional corporation. It out-sources all of its operations and may share with other funds one same board of directors representing its shareholders. The 1940 Act and the SEC rules give the board "responsibility of initial approval and periodical renewal of the contracts" with a management

[6] The idea is that management chooses the board and the board's action impacts firm characteristics, which in turn affects management behavior (Hermalin and Weisbach 1998).

company to provide services.[7] This service view of mutual funds gradually yields to a product view. "In the last 15 years, mutual funds have evolved to be a product" (Pozen 1998). This view treats the management company as a firm. It offers products – funds. Investors are customers who purchase these products. The board of directors protects customers' interest.

In open-end funds, new shares are continuously offered to the public and investment companies are required by law to redeem funds' outstanding shares at any time upon a shareholder's request. Investors' ability to withdraw from or add resources directly to the funds serves as a partial liquidation or takeover mechanism. Other governance mechanisms, perhaps for this reason, were less emphasized in the fund industry. However, a variety of problems have occurred during the history of the fund industry, which suggests that monitoring by investors may not be enough. The governance model of boards of director is introduced into mutual funds.

The board of directors

The 1940 Investment Company Act requires that at least 40% of the members of an investment company board be independent. The 1940 Act contains broad standards for classifying directors as independent[8] and these standards were substantially tightened in the 1970 Amendment. In January 2001, the SEC added three more amendments requiring majority

[7] This quote implies that the board can terminate the contract and hire another management company, if it is not satisfied with the current one. In the reality, however, management companies buy or sell funds as if they own the funds. For example, Strong is in negotiation with Wells Fargo & Co. and Nuveen Investments Inc. after being indicted for trading violation. The new Chairman and CEO, Kenneth Wessels said that one of the goals in negotiations with potential buyers is to keep a significant number of jobs at Strong's offices in Menomonee Falls. http://www.jsonline.com/bym/news/mar04/213506.asp.

[8] In section 2(a)(19) of the 1940 Act, the definition of "interested person" is such a person, who: (1). is an "affiliated person" of the fund, other than solely by reason of his or her directorship or ownership of fund shares; (2) has, at any time during the prior two years, served as legal counsel to the fund; or (3) is affiliated with a person who has, at any time during the prior six months, engaged in any portfolio transactions, as principal or as agent for, or distributed shares of, any fund or account advised by the fund's investment adviser.

In section 2(a)(3) of the 1940 Act, the term "affiliated person" is broadly defined to include any officer, employee or 5% shareholder of the fund, its investment adviser or principal underwriter or any person controlling, controlled by or under common control with such fund, investment adviser or principal underwriter.

In addition, the SEC has the authority to issue an order declaring a person an "interested person" of a fund if it finds that such person has or had, at any time during the prior two years, a "material business or professional relationship" with certain specified persons and entities, including some fund affiliates.

independence, an independent nomination committee and an independent legal counsel to the board. The Investment Company Institute (ICI) further recommends a two-thirds super-majority of independent directors. The board should appoint a leader among the independent directors, hold meetings of independent directors separately from management, and have experienced independent counsel[9]. The SEC makes those recommendations mandatory in 2004 and requires the board to perform self-assessment annually.

The directors' responsibilities fall into five broad categories: performance evaluation, contract and fee approval, pricing of fund shares, share distribution, and oversight of portfolio management and compliance issues[10]. These categories cover any transactions and operations that involve potential conflicts of interest among shareholders, management companies, advisers, and other affiliates. However, many people think that boards are passive in carrying out these duties.[11] The specific duty neglected in the scandal is the approval of trading practices and procedures.

Agency problems

Previous studies of fund governance focus on the role of boards in negotiating a lower management fee for investors. However, a lower fee does not necessarily imply a higher net return or performance because the returns and risks are not the same for portfolios held by different funds. The final product delivered to investors is the risk-adjusted performance after expenses and trading costs.

[9] ICI publication June 1999, "Report of the Advisory Group on Best Practices for Fund Directors: Enhancing a Culture of Independence and Effectiveness."
[10] ICI publication 1999, Investor Awareness Series: "Understanding the role of mutual fund directors." and ICI Perspective August 2003, "Mutual fund Independent directors: A model for Corporate America?"
[11] "Warren Buffett likes to say that mutual funds choose their directors from the kennels of Chihuahuas, not Dobermans." Quoted from "Take on the Street" by Authur Levitt.

Management fees are calculated as a percentage of total assets overseen. The larger asset size is, the higher fee is. The management's goal is to increase the size of assets overseen. Money flows can be attracted by good performance of funds and other channels. Therefore, the major conflict between investors and fund management is performance vs. sales. Good fund governance insures that no practice is taken to improve sales at the cost of performance. The violations that triggered the trading scandals in 2003 relate to the kind of behavior that breaches this fiduciary duty.

Trading practices indicted

The SEC's investigation of fund scandals focuses on two practices known as: "late trading" and "market timing." "Late trading" means purchasing fund shares after the market is closed at the same-day NAV, which is determined by values of underlying assets at 4:00 pm. It violates the rule 22c-1 on "forward pricing" in the 1940 Act. The rule requires that orders received today, but after the market is closed, should be executed at the next day's NAV. "Market timing" means to buy and sell fund shares rapidly. "Late trading" is clearly an illegal action. Timing, however, cannot be precisely defined and has a vague legal status (Braceras 2004). In the scandals investigated, fund management deliberately cooperates with or approves of timing activities to exploit stale prices.

A stale price is a price that does not fully reflect the information available. It can be due to the procedure used to calculate funds' net asset values, nonsynchronous trading, illiquidity of the underlying securities, and exchanges' different time zones. For example, consider a Japanese equity fund. The stock market in Japan closes before the US market opens. Movements in the US equity market usually predict the next day's movements in the Japanese market. When the fund calculates its NAV at 4:00pm US Eastern Time, the price becomes stale even if the same

day's price is applied to positions in Japanese equity[12]. Daily timers arbitrage the staleness in prices. Their profit is the long-term investors' loss. There is an example of how the late trading and market timing are conducted in the appendix A.2 of the paper.

3. Data and methodology

This section describes the sample selection process and data resources, then introduces measures of fund behavior and governance mechanisms in the mutual fund industry. It also provides summary statistics of the fund and management characteristics and univariate analysis between the indicted and non-indicted groups. Finally, it summarizes the estimated market monitoring and fund behaviors in details.

3.1. Sample description

The sample selection starts with all funds appeared in the CRSP Mutual Fund Database during 2000 to 2003. This database provides fund information such as return, total net assets, strategy etc, and the name of management companies and portfolio managers. The indicted families are identified by the "Scandal Scorecard" in *Money Management Executive Compilation* on January 31st 2004. The list is updated with the Wall Street Journal's "Scandal Scorecard", Morningstar's *Fund Investigation Update*, and the SEC's press releases. The corresponding charge of each family is identified through the same sources. Data on the board of directors are collected from the SEC's EDGAR filings: 485APOS or 485BPOS forms. Reports with their effective dates closest to January 2001 are chosen. Managerial information is collected from those reports and firm websites.

[12] Stale pricing not only allows these trading schemes, but also causes problems in evaluating portfolio performance, testing market efficiency, and pricing securities in academic research. See Getmansky, Lo, and Makarov (2003), Chen, Ferson, and Peters (2005), and Qian (2005) for methods of correction and applications.

Hand collecting the board and managerial information is very time consuming. Balancing the cost and benefit, I exclude fund families that manage less than ten funds. Two of those excluded are indicted. More funds are excluded due to missing information on the board, management, fund returns, or characteristics. The final sample includes 92 fund management companies, of which 25 firms are indicted for trading practices. The names of indicted firms, their corresponding charges, regulators involved, initial news date and parent firms are presented in the appendix A.1. The final sample of funds includes 10,220 funds*class overseeing $5 trillion assets as of January 2001, which covers about 70% of assets of the industry. Among the funds managed by indicted firms, 300 of them are identified as the funds that involved in trading and late trading.

3.2. Measuring fund governance

Flow sensitivity - market monitoring

Flow sensitivity to past performance measures market monitoring by investors. The intuition is how investors respond to performance of the funds when allocating their investment. The existing literature studies the flow performance relation by running cross-sectional regressions with fund flows on the left hand side and past performance on the right (Sirri and Tufano (1997), Gruber 1996, Ippolito 1992, Del Guercio and Tkac 2002). The estimated coefficients from these regressions measure how performance competes for flows in the industry at a given time point. The flow sensitivity in this paper is defined, fund-by-fund, as the time series correlation or regression coefficient between flows and past performance. This sensitivity measures how each fund's flow responds to its own past performance[13].

[13] The relation between the two measures can be understood as the following. The cross section analysis plots flows on y-axis and performance on x-axis. At each point on the line plotted, we can draw a tangent line. The correlation

The simplest measure is to take the correlation between flows and past returns. Past returns are accumulated over past several months, and fund flows are backed out from the fund returns and total net assets as following

$$Flow_{i,t} = (TNA_{i,t} - TNA_{i,t-1}(1+R_{i,t}))/TNA_{i,t-1;} \quad (1a)$$

$$Flow\ sensitivity_i = corr\ (Flow_{i,t},\ Fund\ returns_{i,t-k:t-1});\qquad K=3,6,12 \quad (1b)$$

where $TNA_{i,t-1}$ denotes the total net assets of fund i in month t, $R_{i,t}$ means the return of fund i in month t, $Flow_{i,t}$, is the net flow of fund i in month t, and $Fund\ returns_{i,t-k:t-1}$ is the cumulative return of fund i from month t-k to month t-1. The duration K takes 3, 6, or 12 months.

The flow sensitivity can also take the regression coefficient between flows and past returns. The advantage of using coefficient is that regression can control for the flows responding to market conditions and fund styles.

$$Fund\ Flow_{i,t} = a_i + b_i * industry\ flow_t + c_i * Style\ flow_t + \gamma_i * Fund\ returns_{i,t-k:t-1} + \varepsilon_{i,t}$$

$$K = 3,\ 6,\ 12 \quad (1c)$$

where $Industry\ flow_t$ denotes the aggregate net flow to the fund industry in month t and $Style\ flow_t$ denotes the aggregate net flow to the fund style that fund i belongs to. The coefficient γ_i measures the market monitoring by investors in fund i. The convex relation in the flow performance literature motivates a quadratic term into the time series regression.

$$Fund\ Flow_{i,t} = a_i + b_i * industry\ flow_t + c_i * Style\ flow_t + \gamma_{i1} * Fund\ returns_{i,t-k:t-1}$$

$$+\gamma_{i2} * Fund\ return_{i,t-k:t-1}^2 + \varepsilon_{i,t} \qquad K=3,6,12 \quad (1d)$$

The coefficients, γ_{i1} and γ_{i2}, estimated from Eq. (1d), both measure the market monitoring by investors in fund i.

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from time series analysis in this study is the slope of that tangent line. It locates where the fund should be on the flow-performance line.

The fund returns can be the raw unadjusted returns or returns excess of style average. [14]

$$Fund\ returns_{i,t-k:t-1} = \Pi^{k}(1+R_{i,t-k})-1 \text{ or } \Pi^{k}(1+R_{i,t-k})- \Pi^{k}\ (1+\Sigma^{s} w_i R_{i\ t-k}) \qquad (1e)$$

where the weights, w_i , uses the ratio of fund i's TNA over sum of the TNAs of all funds within the same style. These four measures of flow sensitivities: correlation in Eq.(1b), regression coefficients in Eq.(1c), and the slope and convexity in Eq. (1c), (1d) are estimated with the flow and return data from January 2001 to August 2003. The correlation and linear coefficient measures of flow sensitivity are highly correlated and each has its own advantage. The coefficient measure of sensitivity has a direct economic meaning of how much money is attracted for each one percent of increase in the return. The correlation measure of sensitivity adjusts for the volatility of fund flows.

The board of directors

The board of directors is characterized by its structure, size, composition, independence, and its members' age, compensation, and professional experience. The corporate governance literature finds that boards with smaller size and higher independence are better monitors (Yermack 1996; Eisenberg, Sundgren, and Wells 1998; Dahya and McConnell 2003)[15]. This study will test the robustness of this result in the mutual fund industry. In addition, it measures the board composition with the presence of an independent chairman, nomination committee, and gray ratio of independence. An independent director is defined as gray if he/she was an insider of the firm or is currently sitting on the board of an affiliated firm. Professional experience is a score based on the director's background in sales, management, and the financial investment. Panel D in the appendix A.3 presents the construction these measures.

[14] Previous literature finds that most mutual fund investors use unadjusted raw return (Del Guercio and Tkac 2002 and Evans (2004) or excess return (Ippolito 1992, Kane, Santini and Aber 1991, and Lakonishok, Shleifer, and Vishny 1992) in their investment decision.

[15] MacAvoy et al. (1983), Hermalin and Weisbach (1991), Mehran (1995), Klein (1998), and Bahgat and Black (2000) report insignificant relations between board independence and firm performance.

Some board characteristics are special for mutual fund industry. For example, the unitary board structure, where one same board oversees all the funds in the fund family. The board structure takes a dummy variable equal to one if a unitary board structure is in presence. The board compensation is measured with the total payment to the board and average payment to each member. The incentive compensation is proxied by the participation ratio of the deferred payment program, through which part of directors' compensation are invested in the funds they oversee.[16]

Managerial Incentives

The managerial incentives are measured by management ownership, past violation records, the age of the firm, the age of its funds, and the total assets overseen. Funds that have been previously charged might be more cautious in getting caught in illegal maneuvers. The age of the firm, the age of the fund and the size of assets overseen are proxies for reputation stake. A squared term of the fund size is also used, because the fund size may have a nonlinear relation with indictment. On one hand, larger funds have higher reputation stake and are reluctant to strike illegal deals for relatively smaller benefits. On the other hand, larger funds are more likely to be approached by arbitragers because it is easier to hide abnormal flows in larger funds.

All firms are classified into four categories based on the majority ownership of the firm: (1) a subsidiary of a commercial bank, (2) a subsidiary of a assets management company, (3) a subsidiary of a financial service group, and (4) a fund management firm privately owned by partners or employees. Such classification is motivated by the different regulation, assets diversification, and internal governance of different organizations. Panel C in appendix A.3 presents the construction these measures.

[16] The disclosure of directors' holding in the prospectus is very uninformative. It is categorized by either higher or lower than a threshold, and provides few variations in cross section.

Panel E lists fund characteristics that capture some monitoring mechanisms at the fund level. For example, loads proxy for monitoring costs, clientele measures the sophistication of investors, and distribution channels also influence investor decisions (Christofferson, Evans, and Musto 2005). Most of the governance variables are observed at the beginning of the sample period, so that they are pre-determined compared to fund behaviors. This choice is to avoid any reverse causality relation between the board composition and fund behaviors.

3.3. Measuring fund behavior

Indictments

The first measure of indictment is a dummy variable which equals one if the fund is named in any one of the four scandal scorecard sources mentioned earlier. The second measureof trading violations is a series of ranking based on the legality difference of the practices for which the fund is indicted. "Late trading" violates "forward pricing". It is clearly an illegal practice. However, "market timing" cannot be precisely defined as illegal and is hard to completely avoid. Current indictments and the SEC's investigations focus on companies that enter agreements with timers in exchange for benefits. Based on the legality difference, I categorize violations into timing and late trading[17].

It is also appealing to rank the indictment by whether the charge is formal, the case is settled, or anyone is convicted. However, most charges are settled out of court with indicted firms neither admitting nor denying the charges and there are few convictions. Indictments may not be accurate measures of fiduciary failure because it can be partially observed and endogenously related with fund characteristics (Pontiff 2001; Li 2004). For example, the SEC

[17] The late trading indictment is almost always accompanied with market timing and the pricing violation indictment is always accompanied with trading violation in the sample.

may look into large funds only because their impact is large. Funds who conduct timing may not be all discovered. To overcome this weakness, flow volatility and stale pricing are also used as dependent variables. They are directly related to actually timing or late trading activities.

Stale pricing

Practitioners believe that timing activity is wide spread in the industry with more or less severity across funds (Braceras 2004). Since stale pricing indicates the profit potential a fund has for arbitrageurs, it tells how the fund has ex anti reduced its vulnerability effectively. The ideal measure would be whether and how often "fair-value" pricing is implemented in the fund. Unfortunately, this information is not disclosed and staleness left in prices is measured instead.

I define stale pricing as in Lo and MacKinlay (1990). Suppose the true return of the portfolio, $r_{t,}$ follows a one factor stochastic model with μ as the true mean. Denote π as the probability of the security not traded in a period. The observed return in period t becomes $r_t^o = \Sigma_{k=0}^{\infty} M_t(k)\, r_{t-k}$, where $M_t(k)$ is a Bernoulli process for whether security i is traded in period t and t-k-1, but has not traded in continuous k periods from t-k to t-1. It equals one with a probability of $(1-\pi)\,\pi^k$. It can be shown that the mean of observed returns is unbiased, $E(r^o) = \mu$, but a spurious autocovariance in observed returns is generated: $Cov(r_t^o, r_{t+n}^o) = -\mu^2 \pi^n$. Rearranging the terms, we can get $\pi = [-Cov(r_t^o, r_{t+n}^o) / \mu^2]^{1/n}$. Stale pricing is therefore defined as

$$S = -Cov(r_t^o, r_{t+1}^o) / \mu^2; \text{ if } Cov(r_t^o, r_{t+1}^o) < 0 ;$$
$$= 0. \text{ if } Cov(r_t^o, r_{t+1}^o) > 0 . \qquad (2)$$

It is easy to see that the larger π is, the staler is the price.[18]

[18] For a detailed step-by-step derivation, please refer to Lo and Mackinlay (1991).

Volatility of abnormal flow

Both timing and late trading are associated with large abnormal fund flows unrelated with past performance. They increase flow volatilities but do not impact the flow-return covariance[19]. I decompose fund flows into four components: industry-wide flows, style-wide flows, fund-specific long-term flows, and the rest, which most likely, comes from opportunistic trading. Fund by fund, I regress Eq. (1d) with flows from January 2001 to August 2003. The standard deviation of the residuals measures the volatility of abnormal flows,

$$AFV_i = std\ (residual\ flow_i). \qquad (3)$$

3.4. Summary Statistics and Uni-variate Analysis

Table 1 panel A summarizes fund characteristics as of January 2001. The sample includes 10,220 funds*classes overseeing $5 trillion of assets, among which $1.75 trillion are managed by the firms that are involved in scandals. In term of the number of funds that each family oversees, the indicted firms manage significantly more funds* class on average compared to firms that are not indicted (149 vs 112 with a t-stats of 3.23). This pattern is not surprising, because small fund families are less likely to be involved in the scandal.[20] The average size of a fund in the two groups is however no difference. Funds in the indicted group are on average younger than those in the non-indicted group (15 vs. 17 with a t-stat of –2.59). 36% of the funds charge rear loads and 64.8% charge 12b-1 fees. Funds in the indicted group charges higher loads on average than the non-indicted group. The weighted average expense ratio is 0.81% for the full sample, but 0.76% for non-indicted group and 0.94% for the indicted group. The difference is significant at

[19] Decompose the flow into two parts: long-term flow correlated with returns *(lf)* and timing flow uncorrelated with returns *(tf). Var(flow) = Var(lf + tf) = var(lf) + var(tf); Cov(flow, r) = cov(lf + tf, r) = cov(lf,r).* It means that the timing flow affects the volatility of flows but not the flow sensitivity to returns.

[20] In an early version of this paper, where all funds are included in the sample, I find that the size of total assets of the family is the most significant variable in explaining indictments.

1% level. This finding is consistent with the Tufano and Sevick (1997) and Del Guercio, Dann, and partch (2003) that a high expense ratio signals bad governance.

Panel B and C in the table 1 summarize and compare the fund performance and growth of assets. Fund performance is evaluated relative to the market benchmark and the style benchmarks with monthly return data from January 2001 to August 2003. Growth of assets is measured by net flows as a percentage of total net assets. During this period funds in the non-indicted group have an average Jensen's alpha of 2.41% while those in the non-indicted group 2.07%. Even more striking, funds that are identified as abused in the litigations have an alpha of 0.46% only. Those differences are significant at 1% level. On the other hand, the monthly average growth of assets is higher for funds in the indicted group than those in the non-indicted group (2.42% vs 1.51% and t-stat of 7.93). This higher rate is purely driven by the funds that are managed by the indicted firms but not revealed to be abused. Funds revealed to be timed or late traded have significantly slower growth rates of assets compared to non-indicted group (0.18% vs. 2.42% and t-stat of – 4.32). The performance pattern is consistent with findings in Greene & Hodges (2002), Chalmers, Edelen & Kadlec (2001), and Zitzewitz (2003a,b) that daily timing and late trading hurt fund performance. The pattern of assets growth within the indicted group is consistent with the story that management cooperates with arbitragers to time on some funds in exchange of sales of more assets management service in others. (Refer to Section 2 and Appendix A.2).

Panel A of table 2 presents characteristics of management companies. One third of the firms has been charged at least once by the SEC in the past 8 years. The charges include insider trading, self-dealing, illegal fees etc. The average turnover of portfolio managers is 20% over the sample period. Most of the firms have long business histories with an average age of 67. Firms in

the scandal group are relatively younger, significant at 1% level, with an average age of 49 compared to 74 for the non-indicted firms. The portion of firms that are affiliates of conglomerate financial service is smaller in the indicted group than in the non-indicted group (0.1 vs. 0.4 with a t-stat of –3.33). Other characteristics of the management firms are not significantly different between the two groups.

Panel B of table 2 presents board characteristics. 79% of the families have a unitary board structure[21], i.e., the same board oversees all the funds in the family. 17% of the boards have an independent chairman and 14% have an independent nomination committee. There are, on average, 8.6 members on each board and 75% of them are independent[22]. The total compensation paid to the board is $550,443 on average and $68,269 to each independent member[23]. Both figures are significantly higher in firms involved in scandals. The average participation rate of the deferred compensation payment program is lower than one third. Members on average are older than 62 with little experience in portfolio investments.

Using ICDI objective code, I categorize funds into eight different investment styles. They are Small cap, Global equity, Balanced, Sector, Other equity, Government securities, Fixed-income, and Money market[24]. Panel C of Table 2 presents the distribution of fund styles. Small cap and global funds account about one fifth of total funds. There is no significant difference in the distribution of fund styles between the firms involved in scandals and those not, except for

[21] For fund families with more than one board, I weight the observations for each board by TNA.
[22] Tufano and Sevick (1997) find 8.6 and 71% for open-end funds' boards in 1992.
[23] Tufano and Sevick (1997) find $52,714 for open-end funds in 1992. Dann, Del Guercio, and Partch (2002) find a median of $84,191 for closed-end funds in 1996. According to a survey by CFO Magazine (Feb. 1996), average corporate board directors received approximately $54,000 in 1994. Directors on boards of mutual funds are paid much more than directors on boards in the corporate sector.
[24] The objective codes of funds included in Small Cap are "AG", Global, "GE" & "IE", Balance, "BL", Sector, "UT"&"SF", Other equity, "LG", "GI", "TR", & "IN", Government security, "GS"&" MG", Fixed-income, "BQ", "BY", "GB", "MQ", "MS", & "GM", Money market and others, "MF", "MT", "MY", "PM", "SP".

other equity funds (excluding growth, small cap, and global) and money market funds where abuse is not likely to occur.

3.5. Estimated flow sensitivity, stale pricing, and volatility of abnormal flows

Flow sensitivity as the measure of market monitoring is the most important variable in the paper. Table 3 provides detailed descriptions of its estimation and cross sectional properties. Panel A presents distributions of the t-statistics of the estimated sensitivity. The null hypothesis is that there is no significant monitoring conducted by investors, hence the t-statistics of the estimated sensitivity follows a normal distribution. The number presented in the table is the percentage of funds fall into each corresponding range of t-values. The first column presents t-values ranges and the second the null distribution. The rest six columns are for the six measures of sensitivity. They are slope and convexity coefficients estimated from Eq. (1d) with return horizons vary from three months to one year. All six distributions are very different from the null. 40%~50% of the funds have estimated slope significant at 1% level. The distribution of the estimated convexity is less dramatic but still have 4% ~ 20% falling into 1% significance level. These results reject the null hypothesis and show that there are significant monitoring actions from investors.

Panel B compares the sensitivities across sub-samples. The mean of the estimated slope for the full sample is 0.24 and convexity -0.05 when the return horizon is three months, i.e., each 1% of increase in the return will increase net flow by 0.24% while the next 1% increase in return will increase the flow by only 0.19% (0.24% subtract 5%). The slope and convexity with three months return horizon are significantly lower in the indicted group than the non-indicted group. Panel C summarizes another six measures of flow sensitivity. The first three are the correlations

between net flows and total fund returns accumulated over the past 3, 6, or 12 months, and the latter three are the slope coefficients between net flows and returns excess of the style average. Flow sensitivity to excess returns at all horizons is lower in the indicted group than those in the non-indicted group. The significant level is 1%. The correlation measure of sensitivity is lower in the indicted funds than non-indicted funds only when the return horizon is three months. Panel D presents the correlations among the 12 measures of flow sensitivity. The correlations among all linear measures of sensitivity are very high (up to 0.72), while the correlation between slope and convexity measures is negative (down to –0.63).

Rows 2 to 4 in table 4 summarize the sample (sub-samples) means of the residual flow volatility and they are surprisingly lower in the indicted group. Stale pricing on the other hand is higher in the indicted groups (row 5). This is consistent with the conjecture that not all the trading violations can be discovered and indicted. In rows 7 to 9, the funds are partitioned by whether its stale pricing is higher or lower than the sample average. The residual flows are more volatile in funds whose stale pricing is higher than the sample average. For example when the chasing behavior with a horizon of 3 months is controlled for, the standard deviation of the residual flows is 0.12 for funds whose stale pricing is above mean and 0.09 for those below mean. The t- statistics for the difference is 5.61. The pattern is the same when chasing behaviors at other horizons is controlled for. The relation between stale pricing and volatility of the residual flows implies that these two measures do capture, to some extent, actual actions of timing and late-trading.

4. Multi-variate analysis procedure and results

The univariate analysis in the earlier section has shown that fund governance differs in indicted funds from non-indicted ones. This section explores the detailed relations between various governance mechanisms and management fiduciary failure through multi-variate analyses. The most important finding is that market monitoring, measured by flow sensitivity, has a negative relation with fiduciary failure measured by indictment, stale pricing, and volatility of abnormal flows.

4.1. Predicting indictments

I use logit models to analyze the relation between fund governance and the likelihood of funds being indicted. The observations are at fund level. 300 funds are identified as abused funds. The dependent variable takes one if the fund is indicted in the scandal. The explanatory variables include all three sets of governance measures and fund characteristics. The independent variables are studentized and the elasticity instead of coefficients is estimated. Table 5 presents regression results. The slope measure of flow sensitivity at various return horizons is negatively associated with the likelihood of indictments. Each one standard deviation increase in the slope can reduce the likelihood of indictment by 28 ~ 44% (elasticity, (dy/y)/x). The convexity measure of flow sensitivity at return horizons of 6 and 12 months is also negative associated with the likelihood of indictment. The elasticity is around –30% and -52% respectively and significant at 1% level. These results suggest that effective market monitoring deters funds from hurting the long-term investors.

Consistent with the hypotheses about the impact of fund size, table 5 shows positive coefficients (around 2.9) on the linear term and negative ones (around –1.5) on the quadratic

terms of log(TNA). All are significant at 1% level. The likelihood of indictment is also negatively associated with the loads charged by funds. Institutional funds and retail funds are more likely to be abused by timers and late traders with elasticity 1.34 ~ 1.86. The comparison group is the funds of fund. There is also positive and significant elasticity on the fund's management fee (0.36, t stat. 2.01). This is consistent with the conventional thought that high management fee implies bad governance.

For firm characteristics, the likelihood of indictment is negatively associated with the SEC's charge records. Firms caught with fraud before become more careful. A financial conglomerate has less need to outsource its services and has more channels for selling shares, e.g., premium income from insurance and 401(K) plans, while in funds sponsored by commercial banks flows compete with deposits. Consistent with outsourcing hypothesis, management companies as subsidiaries of large financial service groups are less likely to be involved in the scandal with elasticity around -70%. The trading violations are more likely to occur when the underlying assets of the fund are illiquid, hard-to-value, or traded in different time zones. Due to this nature, small cap funds, global funds and sector funds are more likely to be involved in the scandals.

4.2. "Fair-value" pricing

Since the practice of "fair-value" pricing is not observable, stale pricing is used to measure how much the fund ignores its vulnerability of being arbitraged. The stale pricing measure introduced by Lo and MacKinley (1991) censors the left tail (below zero) to zero. However, we know that non-trading induces negative autocovariance in returns and thin-trading positive one. Both autocovariance, positive and negative, can be used to predict price movement.

This section uses the absolute measure of the stale pricing rather than the censored one in the analysis. Table 6 presents the relation between stale pricing and fund governance at the fund level with fund styles controlled for. Both the slope and convexity measures of flow sensitivity with return horizons of 6 and 12 months are negatively associated with stale pricing and the coefficients are significant at 1% level. These results imply that market monitoring encourages "fair-value" pricing practices.

Share prices are staler in retail funds than funds of fund. The coefficient is around 0.19 and t-stat is higher than three. Stale pricing is positively associated with charges of front and rear loads. The coefficients are around 2 and 4 and significant at 5% and 1% respectively. This finding is consistent with Chordia (1996) that funds holding illiquid assets want to deter redemption of shares by charging a high rear road. The table also shows that there is less stale pricing in larger funds and younger funds. Sector funds, government securities and fixed-income funds have much staler (1% significance level) pricing than money market funds where the most liquid assets are held.

4.3. Governance and opportunistic trading

Volatilities of abnormal flows measure the amount of flows due to opportunistic trading. Table 7 presents the relation between fund governance and the volatility of abnormal flows. Both the slope and convexity measures of flow sensitivity with return horizons of 3 and 6 months are negatively (coefficients is –4 ~ -6) and significantly (t stats >2.44) associated with the volatility of abnormal flows, implying that active market monitoring deter management from cooperating with arbitragers or encourages management to prevent arbitrage trading.

The SEC charge record has a positive relation with the flow volatility, with coefficient around 2 and t-stats larger than 2.26. This finding is interesting because the SEC charge record is shown negatively associated with indictment in section 4.1. It is very likely that funds previously caught in fraud are more likely to be approached by arbitrager, and at the same time, become more experienced in hiding actions.

4.4. Other measures of flow sensitivity

The strongest evidence from section 4.1 to 4.3 is that flow sensitivity to returns plays an important role in monitoring funds. Table 8 summarizes relation between fund behavior and another six measures of flow sensitivity. Three of them are the slope estimated from regression (1c) with returns excess of style average. The other three are correlation in Eq. *(1b).* Each block in table 8 is from a separate regression which explaining the fund behavior with flow sensitivity and other governance variables. For each regression, only the coefficients on the flow sensitivity, tstats, and r-squares are reported. The flow-return correlations with various return horizons are negatively, significant at 1% level, associated with all measures of fiduciary failure. Economically, an increase by one standard deviation of the correlation can reduce the likelihood of indictment by 22% –29% (in elasticity), stale pricing by 0.013 to 0.02, and flow volatility by 0.93% to 1.18%.

However, flow sensitivity measured with respect to excess returns shows little significance in explaining fund behavior. The same is for flow sensitivity with respect to Jensen's alpha. The lack of robustness with respect to these measures is actually consistent with findings in the existing literature. Del Guercio and Tkac (2002) and Evans (2004) show that mutual fund flows have a strong relation with the unadjusted raw return but are weakly or not

related with the Jensen's alpha or the tracking error. Investors respond to raw returns instead of relative ones in monitoring fund management.

4.5. Analysis at the family level and with matched fund-sample

The previous four tables present the relation between governance and fund behavior at the fund level. Table 9 presents the results at the family level, where both the logit and multi-logit models are applied. The flow sensitivity at family level is a weighted average of sensitivity of funds within the family with TNAs as weights. The correlation between flows and returns over the past 6 months is used as explanatory variable. When there are multiple boards in a family, a weighted average of board characteristics is obtained. The same is done to get the loads, 12b-1 fees, etc at the family level. Consistent with findings at the fund level, flow sensitivity is negatively associated with the probability of involvement in the scandal at the family level. A one standard deviation increase in the flow sensitivity reduces the scandal likelihood by 67% and significant at 10% level. Firms with longer business histories or belong to large financial conglomerates are less likely to be involved in the scandal (elasticity –0.79, t =-1.99, and elasticity –3.64 and -2.64 respectively). These findings are consistent with the reputation effect and the outsourcing hypothesis. The 3rd and 4th columns in the table 9 present the results of multilogit analysis. The differentiation of timing and late trading is based on the legality difference of these two practices. Late-trading, clearly an illegal activity, is governed by the strongest legal enforcement, therefore, rely less on the firm governance. Fund governance is particularly important for practices in the gray area. Consistently, the multi-logit regression shows that the determinants of the timing practice are the same as those of indictments. Late trading, however, is not explained by any of the governance variables.

Late trading and timing exploit stale pricing in fund shares and stale pricing is prevalent in funds invested in small-cap or international equities, whose underlying securities are traded less frequently or listed on exchanges in different time zones. These funds are most likely to be abused. One robust check is to examine which funds are abused among those abusable ones. The logit and multi-logit models are conducted in the sub-samples of small cap and global funds. The flow sensitivity is negatively correlated with the likelihood of indictments within these sub-samples.

A matched sample approach is also used. The litigation files name 300 funds in particular, a match sample is constructed for this group based on the fund's style, size (TNA) and age. The relation between fund behavior and governance are examined within this matched sample. The flow sensitivity takes slope and convexity measures with three months return horizon. The slope measure of sensitivity is found to be negatively and significantly associated with indictments. The convexity measure of sensitivity is negatively and significantly associated with the volatility of abnormal flows.

5. The board of directors

Previous sections focus on the examination whether market monitoring, fund characteristics, and managerial incentives can explain fiduciary failures in mutual fund management. This section discusses the relation between board characteristics and fund behavior. The main findings are that the unitary board structure and incentive payment of the board (participation rate of the deferred payment program) are signs of effective board and that highly compensated boards are ineffective in monitoring management.

5.1. Board structure and board composition

Uzun, Szewczyk, and Varma (2004) find that larger size, lower independence, and higher grayness of the board are associated with a higher likelihood of corporate fraud. This study finds this result not robust in fund industry. Table 5 shows that there is little evidence that board composition explain the likelihood of trading scandals. Instead, board structure and compensation make differences. The unitary board structure reduces the probability of scandals with an elasticity of 0.81%. Higher compensation the board or board members is linked with a higher likelihood of funds being involved in scandals. An increase by one standard deviation in payment to the board is associated with 50% increase in the likelihood of indictment. The presence of an independent nomination committee and the average age of directors are both positively associated with the likelihood of indictment with t-stats higher than two.

In table 6, the unitary board structure and the participation rate of the deferred payment program are both shown to be negatively associated with the extent of stale pricing and significant at 1% level. Other board characteristics carry little significance in explaining stale pricing. In table 7, the presence of an independent nomination committee is positively associated with the flow volatility, again a sign of ineffective board.

At the family level, table 9 shows that board composition carries little explanation power for the firm scandal, but the unitary board has a negative association with the likelihood of scandal and the board compensation, a positive one. Both are significant at 1% level. In the matched sample analysis, presence of an independent nomination committee, high board compensation, and the age of the firms are all positively associated with the likelihood of firms being indicted.

5.2. Board compensation

There are many factors influencing boards' compensation: the assets they overseen, the number of funds, complexity of investment styles and performance of funds. The first adjusted compensation is the excess compensation net of those influences[25]. Table 11A shows that each additional fund overseen brings about $2,258 to the board or $196 to each member. A $1billion increase in assets overseen brings $840 to the board or $23 to each member. The number of different ICDI objective code proxy for the complexity of monitoring. The board compensation is increased by $19,390 or $2,345 to each member when one more investment style is introduced. Boards' compensation is also positively related with funds' past performance. A one percent increase in Jensen's alpha of past year can increase board compensation by $24,585 or $3,207 to each member. The second adjustment of compensation is to scale it by total expenses net of 12b-1 fees of the fund family. This compensation ratio measures the profit sharing between the board and the management.

Table 11B presents the results from multi-logit analysis, in which the indictment likelihood is predicted with the adjusted board compensation. The flow sensitivity stays negative and significant in those regressions. Excess compensation to the board and individual independent directors is positively related with indictments of timing activities. Compensation ratio is positively associated with indictments of late trading activities. Regression results from logit analysis of indictments are similar to those of timing indictment. With those findings, we cannot reject hypotheses of collusive behavior or profit sharing between the board and the management. Findings on the board compensation are consistent with Tufano and Sevick

[25] I regress board compensation on those factors, then define the residuals from the regression as excess compensation. This modification is done for average compensation of each member as well as total compensation to the board.

(1997)'s claim that excessive paid boards are ineffective monitors for shareholders in mutual funds.

5.3. Substitution effects

Market monitoring, measured by the fund's flow sensitivity to returns, is effective in reducing stale pricing, abnormal flows, and trading violations. These findings are consistent with Fama and Jensen (1983)'s argument that investors' ability to withdraw money from fund is an effective governance mechanism. Fama and Jensen (1983) also argue that boards of mutual funds are irrelevant because of investors' monitoring. It implies a substitution effect between the external and internal monitoring: boards should be more effective when market monitoring is weak.

To test this hypothesis, let's first try to understand what causes the cross-sectional differences in investors' monitoring decision. Many factors can have important influences, e.g., the fund's reputation, types of distribution channel, and costs of exercising the exit or entering the fund. Flow sensitivity is regressed against those factors and the results are presented in appendix A.4. Flow sensitivities are higher in funds with top performance and good reputations.

A simple correlation test between the flow sensitivity and board characteristics shows weak substitution effect. To be more rigorous, I define a dummy variable, which equals one if the sensitivity is lower than the sample average. This dummy variable is found to be strongly associated with indictments (correlation = 0.20). I then try to explain the indictment with this dummy variable and a subset of board characteristics: the size of the board, the independence ratio and the dummy of independent chairman. Table 12 presents the regression results. In funds with low flow sensitivities, the size of the board has a positive (coefficient = 0.25) and

significant (t =1.83) relation with the likelihood of indictments, and the independent ratio, a negative one (coefficient = -3.70, t = -2.08). Funds with weak external monitoring, but with boards of smaller size or higher independence are less likely to be involved in the scandal. This finding supports the substitution hypothesis. However, the relation between the interactive variables and stale pricing gives the opposite results. The interaction variables explain little about the volatility of abnormal flows.

6. Other robust checks

6.1. Redemption and new sales

I construct sensitivities for redemptions and purchases (new sales from the fund's point of view) in a similar approach of constructing the net flow sensitivity. Redemption sensitivities and new-sales sensitivities are negatively correlated. The net flow sensitivity is positively correlated with new-sales sensitivities. Table 12 presents the relation between indictments and these three sensitivities. Redeeming sensitivities are negatively (-1.19) but weakly (p=0.13) associated with the likelihood of indictments. New-sale sensitivities are positively associated with likelihood of indictments. Only the net flow sensitivity survives when three measures compete in the regression.

6.2. 401 (k) plans

Employers usually allow limited selection of funds for the employees to put their 401(K) money. The frequency of the account turnover is also subject to certain rules. These limitations reduce the sensitivity of fund flows even if the investors want to watch the funds closely. I am in search of relevant data to conduct a robust check in funds with high assets ratio of 401(k) plans

or other defined contribution plans. In addition, the robust check goes through in the sub-sample of funds who charge a high ratio of loads.

6.3. Board of funds vs. board of advisors

Mutual funds assets are managed by fund advisors or sub-advisors, which are legal identities separated from funds. The advisors and sub-advisors have boards of directors if they are publicly traded firms, which are a small portion of the universe. Private ones may or may not have boards of directors. These boards care about advisors' involvement in the trading practices because their misbehavior can damage the reputation of firms and hurt the interest of shareholders or partners of these firms in a long run.

This paper spends little attention to the board of advisory firms. It focuses on boards of funds that carry the fiduciary duty of protecting the interest of funds' shareholders. A mutual fund board of directors is responsible for reviewing any contracts or sub-contracts between funds and agents that provide services. The governance of the advisory firms would have been at scrutiny of the board of the fund if the fund board is an effective monitor. Therefore, omission of boards of the advisory firms is not likely to drive the results in this paper.

6.4. Performance, indictment and ex post

Since performance is the final interest of investors, it is a natural question why not to use performance as the dependent variable. However, performance is a very noisy measure. It largely depends on the model used in evaluation, which carries no relation with governance at all. Second, performance depends on the ability of portfolio managers, but it is not clear that the rent created by portfolio managers should go to investors rather than the managers themselves.

Fiduciary failure on the other hand has two advantages as measure of fund behavior. First it is an equivalent of governance failure. Second, it captures the idea that how much performance stays with investors for given ability of portfolio managers. Appendix A.5 regresses fund performance on fund characteristics and behaviors variables used in this paper. From the table, we can see that flow sensitivity is positively related with fund performance but indictments don't necessarily imply a poor performance. Finally, both stale pricing and volatility of abnormal flows are negatively associated with fund performance. These results confirm that stale pricing and abnormal volatility are good measures of fiduciary failure.

7. Caveats and implications

An endogenous problem is embedded in the study of firms' governance. The management chooses the board and the board monitors management. In this paper, the explanatory variables are mostly observed at the beginning of the sample period and the dependent variables at the end of the sample period. Some variables are constructed with the data during the sample period. This design is to avoid possibility of reversal causality. However, it is better to interpret the relation found in the paper as association rather than causality.

I find that the board in mutual funds neither fulfills the responsibilities specified by the Investment Act of 1940, nor behaves similarly as in corporations. Some of the findings are even opposite to conventional thoughts. For example, there is a positive relation between the independence ratio of the board and the likelihood of timing activities, stale pricing, and flow volatilities. This "abnormality" is consistent with asymmetric information argument. When the number of independent members increases, both the independence and asymmetric information of the board increase. After some threshold, the loss due to asymmetric information may actually

outweigh the gain from the discipline effect. The previous literature focuses on the discipline effect but ignores the asymmetric information. More research should be done on this issue. The positive relation between board independence and indictment likelihood not only contradicts the result in the literature of corporations' boards, but also doubts the effectiveness of the current regulation policy that pursues higher and higher independence of the board.

I am not aware of any academic research on the free ride problem among multiple boards. The conventional thought is that multiple boards are more efficient by sharing responsibilities while the directors in the unitary board are too busy to be effective[26]. This paper finds that the unitary board structure actually prevents the illegal maneuvers much better. Multiple boards are possible to free ride on each other. Any one board in the structure is likely to wait for the other boards to take actions when something in management become suspicious.

Investors' ability to monitor funds makes significant difference in fund behavior. Factors that cause the cross-sectional difference in this ability are particularly interesting, for example, the incentive brokerage firms. Christofferson, Evans, and Musto (2005) show that investors are less likely to withdraw money from underperforming funds, if the shares are purchased through an in-house brokerage. More research is in need along this line.

The incentive of the board of directors is another ignored issue in the literature. Directors are assumed to have the right incentive, ethics or reputation effect, to carry out their fiduciary responsibilities. This paper shows that incentive compensation is also in need. Boards whose directors invest in the funds they oversee are much better monitors than boards who are over compensated in total amount[27]. Findings in this paper suggest some collusive and profit sharing

[26] Fich and Shivdasani (2005) show that directors of boards in corporations, who hold smaller number of positions, are better monitors.
[27] There are two working papers studying the incentive compensation to outside directors, Perry (2000) and Cremers, Driessen, Maehout, and Weinbaum (2005).

behavior between the board and the management. More research is called upon to explore their interactions.

Findings in this paper provide signs for long-term investors to watch out to protect own interest. For example, a good reputation provides a positive managerial incentive. Firms with well established names restrain themselves from illegal maneuvers, and firms with violation records do not necessarily become more cautious.

8. Conclusion

Consistent with Fama and Jensen (1983), I find that investors' ability to withdraw from or add resources to funds is an effective market monitoring mechanism. Funds with higher flow sensitivity to returns are less likely to be involved in trading violations. Good reputation is also an effective governance mechanism. Funds with longer histories are less likely to be involved in the illegal maneuvers. Board composition plays a limited role in monitoring fund management. However, board structure and board compensation are important. The unitary board structure is more effective in monitoring funds than the multi-boards structure does. Boards in indicted firms are more highly compensated compared to those in non-indicted firms. There is some evidence of the substitution effect between the internal and external monitoring: boards make differences in funds with weak market monitoring.

This study gives mixed evidence of whether an effective board requires a higher independence ratio or an independent chairman, but does suggest the importance of market monitoring and the incentive of the board of directors.

Appendix

A.1. The name list of fund families whose funds are involved in the trading scandal.

A firm is included only if the funds it manages are implicated. Hedge fund, brokerage firm, and other investment banking services are excluded. Some of those allegations are at the state level and some are informal. AG in the table presents attorney general.

Fund implicated	Practice under Investigation	Regulator involved	Initial news date	Parent firms
Alliance Berstein	Market timing	Internal Probe	9/30/2003	Alliance Capital
Nations Fund	Market timing + Late trading	NY state AG	9/3/2003	Bank of American
One Group funds	Market timing	NY state AG	9/3/2003	Banc One
Columbia Funds	Trading Practice	SEC	1/15/2004	FleetBoston Financial
Federated	Market timing + Late trading	SEC/ NASD /NY state AG	10/22/2003	Federated Investors
Franklin Templeton	Market timing	California AG	9/3/2003	Franklin Resources
Fed Alger	Late trading	NY state AG, NY Supreme Court	10/3/2003	private
Fremont	Market timing	SEC	11/24/2003	Private
Heartland Advisor	Trading Practice + Pricing violation	SEC	12/11/2003	private
Invesco/AIM	Market timing	SEC/ NY State AG/ Colorada AG	12/2/2003	Amvescap PLC
Janus Funds	Market timing	NY State AG	9/3/2003	Janus Capital group
Loomis Sayles &Co	Market timing	Internal Probe	11/13/2003	CDC assets management
MFS	Market timing	SEC	12/9/2003	Sun Life Financial
PBHG Funds	market timing	SEC/ NY State AG	11/13/2003	Old muutal PLC
Pimco /PEA Capital	Market timing	California AG	2/13/2004	Allianz group
Putnam Investment	Market timing	SEC/ Mass State Regulators	9/19/2003	Marsh&McLennan
Scudder Investment	Market timing	SEC	1/23/2004	Deutache Bank AG
Strong Capital	Market timing	NY State AG / WI. State Regulators	9/3/2003	Private
RS Investment	Market Timing	SEC / NY State AG	3/3/2003	privare
Excelsior	Market Timing +late trading	Maryland AG	11/14/2003	Charles Schwab
ING Investment	Market Timing + late trading	NY state AG	3/11/2004	ING group
Evergreen	Market Timing	Mass. AG	8/4/2004	Wachovia
Seligman	Trading practices +Market Timing	NY state AG	1/7/2004	private
American Funds	Marekt timing	California AG	12/29/2003	Capital Group
Prudential Securities	Marekt timing + late trading	SEC/ NASD/ NY state AG /Mass. State Regulators	11/4/2003	Prudential securities

Sources: Money Management Executive Compilation, January 31, 2004,
Wall Street Journal, "Fund Scandal Scorecard" April , 27th 2004,
The SEC press releases from September 2003 to December 2004.
Morningstar fund investigation update, June 28th 2005.

A.2. An example of how the late trading and timing are conducted

Bank of America, as described in the SEC (2003) enforcement release, owns a mutual fund management subsidiary (Nations Fund) and a broker-dealer subsidiary. Canary Capital Partners LLC, a hedge fund in New Jersey, places an order with the dealer after 4:00pm. This order is forwarded to the fund and executed at the NAV of that day. A false audit record is created showing that Canary's order is received before 4:00pm. The next day, Canary reverses the transaction making profits from the price change. In exchange for this favor, Canary agrees to invest in securities sponsored by Bank of America on a long-term basis and pay an annual "wrap fee" 0.5%-1%. Funds affiliated with Bank of America and Bank One allow Canary's in-and-out trades up to a certain amount, typically, 1% of the funds' assets.

Canary also times mutual funds by entering arrangements with the Security Trust Company (STC). The STC operates as an electronic trading service provider to institutional clients. It hides canary's orders in large flows and evades funds' limits and fees on short-term transactions.

Sources: The SEC litigation release 8288, 2003.
The Complaint, State of New York v. Canary Capital Partners, LLC et al. (N. Y., Sup. Ct., September 3, 2003). http://www. Oag.state.ny.us/press/2003/sep/canary_complaint.pdf.

A.3. Definitions of variables

Variable	Definition
	Panel A: Market monitoring variables
Flow sensitivity -slope	The coefficient, γ_1, between a fund's net flow and it past returns and estimated from this regression: $Fund\ Flow_{i,t} = a_i + b_i * Industry\ flow_t + c_i * Style\ flow_t + \gamma_{1i} * Fund\ returns_{i,t-k:t-1} + \gamma_{2i} * Fund\ returns_{i,t-k:t-1}^2 + \varepsilon_{i,t}$ $K=3,6,12$, i. e., $\gamma_{1i} = cov(flow_{i,t}, r_{i,t-1:t-k}) / var(r_{i,t-1:t-k})$;
Flow sensitivity -convexity	The coefficient, γ_2, between a fund's net flow and it past returns squared and estimated from this regression: $Fund\ Flow_{i,t} = a_i + b_i * Industry\ flow_t + c_i * Style\ flow_t + \gamma_{1i} * Fund\ returns_{i,t-k:t-1} + \gamma_{2i} * Fund\ returns_{i,t-k:t-1}^2 + \varepsilon_{i,t}$ $K=3,6,12$, i. e., $\gamma_{2i} = cov(flow_{i,t}, r_{i,t-1:t-k}^2) / var(r_{i,t-1:t-k}^2)$;
Dummy for low sensitivity	Equals one, if sensitivity of flow is below sample average, otherwise, zero.
401(k) holding	The percentage of fund assets that is from 401(k) plans.
	Panel B: Fund behavior variables
Indictment dummy	Equals 1, if the fund/family is indicted/investigated by the SEC for trading practices.
Indictment legal ranking	Equals 1, if the fund is indicted/ investigated for timing, 2, late trading; 0, otherwise.
Settlement ranking	Equals 1, if the settlement for the litigation is equal or below than $ 10 million, 2 if the settlement is higher than $10 million, otherwise, 0.
Volatility of abnormal flows	Standard deviation of the residual flows from Eq. (1d), calculated as in Eq.(3). $Fund\ flow_{i,t} = a_i + b_i * industry\ flow_{i,t} + c_i * Style\ flow_{i,t} + \gamma_{1i} * Fund\ returns_{i,t-k:t-1} + \gamma_{2i} * Fund\ return_{i,t-k:t-1}^2 + \varepsilon_{i,t}$ $K=6$; $AFV_i = std(e_{i,t})$.
Stale pricing	Probability of non-trading, inferred from the autocovariance of returns, equation (3).
Performance	Alpha estimated with CAPM or Four-Factor with returns Jan. 2001-Aug. 2003.
	Panel C: Managerial characteristics
Ownership	A classification based on the major ownership of the fund management company. It includes four categories: (1) a subsidiary of a commercial bank; (2) a subsidiary of a large asset management company; (3) a subsidiary of a large financial services group; (4) a fund management company privately owned by partners or employees.
SEC charge record	Equals 1, if the firm, parent-, affiliated firm or employee was charged for fraud or violation by the SEC for during the past 8 years.
Age of the firm	Log (2001-Year when the firm or parent-firm was established).
Total Assets	Sum (TNA of all the funds in the family at January 2001).
Manager Turnover	At the family level, it the total number of portfolio manager changes divided by the total number of portfolio managers*year in the fund family. For each fund, it is the number of portfolio manager changes divided by the number of managers*year during 2000-2003.
	Panel D: Board characteristics
Unitary board	Equals 1, if the same board looks over all the funds in the family, otherwise 0.
Independent chairman	Equals 1, if the chairman of the board is independent, i.e., he/she is not an officer, employee, or 5% shareholder of the firm, affiliated firm, or underwriter of the fund.
Independent Nomination Committee	Equals 1, if the board has an independent committee for nominating candidates for board membership.
Size of the board	The total number of the directors sitting on the board.
Ratio of independence	Number of independent directors divided by total number of directors.
Ratio of the board grayness	Number of gray directors divided by number of independent directors. An independent director is defined to be gray, if he/she was once an interested person of the firm or he/she currently also sit on the board of an affiliated firm.
Compensation to the board	Two measures: (1) total payment to the board; (2) average payment to each board member;
Excess compensation to the board	Residuals after excluding compensation that can be explained by common factors. See regression details in table 11A.
Compensation/expense	Total compensation of the board divided by the total expenses of the funds overseen.
Participation rate of the deferred payment program	The number of independent directors who participate in the deferred payment Program divided by total number of independent directors. Through such a program, part or all of participating member's payment is invested in the funds overseen.

Age of the board members	The average age of independent board members.
Professional relevance	Average score of professional relevance of independent members. The score is taken as (-1) marketing, sales; (0) administrative, or background unrelated to top management or investment; (1) management, CEO, CFO, partners, entrepreneurs; (2) portfolio investment, investment research, regulation, attorney.
Turnover of the board members	Equals 1, if the there's a board member replacement between year 2000 to 2001.
Panel E: Fund characteristics	
Age of the fund	Log(Year 2001- the year in which the fund is organized+1).
Size of fund	Size of TNA of the fund, measured in $ million.
12 b1 fees	Fees paid by investors for service provided by financial advisors on the sales side, as a percentage of TNA.
Front load	Sales charges applied at the initial purchase time, measured in the percentage of purchase.
Rear load	Charges applied at redemption as a percentage of TNA.
Income distributed	The total income distributed over the calendar year as a percentage of TNA.
Capital gain distributed	The total capital gain distributed over the calendar year as a percentage of TNA.
Expense	Total fund operating expenses, as a percentage of TNA.
Fund style	Eight styles of funds are identified by their objective code. They are: growth, income, balance, government, money market, global, sector, and others.
Retail fund	Equal 1, if the fund is identified as a retail fund, otherwise 0.
Institutional fund	Equal 1, if the fund is identified as an institutional fund, otherwise 0.

A.4: The determinants of the flow sensitivity to past performance

The dependent variables are the flow sensitivity measures estimated from equation (1d). *Fund Flow* $_{i,t}$ = a_i+b_i* *Industry flow*$_t$ +c_i* *Style flow*$_t$ +γ_{1i}**Fund returns* $_{i,t-k:t-1}$+γ_{2i}**Fund returns*$_{i,t-k:t-1}^2$ + $\varepsilon_{i,t}$ *K=3,6,12*. The independent variables are fund characteristics and investor characteristics. The benchmark group for fund classes is 'fund of fund". Coefficients and robust t-statistics are presented.

Panel A: Y = Flow sensitivity: Slope and Convexity estimated from equation (1d)

	Slope (γ_1)			Convexity (γ_2)		
	K=3	K=6	K=12	K=3	K=6	K=12
Constant	0.104	0.222	0.367	-2.87	-4.42	-3.33
	(1.10)	(1.92)	(1.54)	(-1.32)	(-3.39)	(-1.47)
Retail fund	0.046	-0.023	0.071	-0.80	0.69	-0.73
	(1.32)	(-0.61)	(0.94)	(-1.14)	(1.48)	(-1.28)
Institutional	-0.031	-0.013	-0.020	-0.40	-0.20	-0.04
Fund	(-1.36)	(-0.47)	(-0.34)	(-0.72)	(-0.56)	(-0.08)
Rear load	0.718	-0.901	-1.469	23.83	21.17	12.95
	(0.90)	(-0.95)	(-0.68)	(1.08)	(1.62)	(0.66)
Log(tna)	-0.006	-0.004	-0.004	-0.15	-0.07	-0.27
	(-0.62)	(-0.40)	(-0.20)	(-0.87)	(-0.57)	(-1.94)
Log(age)	-0.027	-0.013	-0.036	**1.38**	**0.56**	**0.70**
	(-1.34)	(-0.55)	(-0.74)	**(2.73)**	**(1.87)**	**(1.78)**
Turnover	0.008	-0.012	-0.024	**0.61**	**0.39**	**0.47**
	(0.83)	(-1.09)	(-1.16)	**(2.89)**	**(2.67)**	**(2.95)**
12b-1 Fees	2.348	4.124	18.575	-36.37	-42.73	-52.59
	(0.46)	(0.69)	(1.47)	(-0.31)	(-0.55)	(-0.47)
Management Fees (2002)	0.084	0.002	-0.057	**-2.63**	-0.09	1.54
	(1.40)	(0.03)	(-0.46)	**(-1.96)**	(-0.13)	(1.59)
S&P ranking	0.014	0.020	0.014	-0.27	-0.07	-0.14
	(1.06)	(1.25)	(0.46)	(-0.86)	(-0.37)	(-0.50)
Performance 2000-2002	**0.003**	0.0001	0.003	0.02	**0.04**	**0.04**
	(1.70)	(0.05)	(0.85)	(0.57)	**(2.14)**	**(1.64)**
Style of funds	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
# of obs.	4825	4825	4825	4825	4825	4825
F test	7.44	9.25	8.86	2.52	6.86	5.25
R-squares	0.039	0.043	0.038	0.007	0.043	0.025

Panel B: Y= Flow sensitivity to excess returns or measured as the correlation with total returns

	Excess return			Correlation with total return		
	K=3	K=6	K=12	K=3	K=6	K=12
Constant	-0.154	-0.198	0.053	-0.116	-0.129	-0.052
	(-0.88)	(-1.31)	(0.43)	(-4.98)	(-5.43)	(-1.90)
Retail fund	0.015	0.0003	**-0.047**	**0.061**	**0.065**	**0.034**
	(0.40)	(0.01)	**(-2.17)**	**(7.89)**	**(8.25)**	**(3.75)**
Institutional	0.030	-0.002	-0.025	-0.007	-0.002	**-0.012**
Fund	(1.08)	(-0.11)	(-1.50)	(-1.25)	(-0.36)	**(-1.69)**
Rear load	**3.590**	**1.523**	0.602	**1.079**	**0.763**	0.294
	(4.00)	**(2.25)**	(1.11)	**(5.59)**	**(3.71)**	(1.27)
Log(tna)	**-0.024**	**-0.018**	-0.009	**0.009**	**0.016**	**0.018**

	(-3.04)	**(-2.77)**	(-1.53)	**(6.73)**	**(10.38)**	**(10.49)**
Log(age)	**0.111**	**0.143**	**0.077**	**0.021**	0.003	-0.001
	(4.66)	**(7.24)**	**(4.94)**	**(4.26)**	(0.65)	(-0.19)
Turnover	**-0.045**	**-0.036**	**-0.018**	**0.006**	**0.004**	0.003
	(-2.79)	**(-2.74)**	**(-1.74)**	**(3.24)**	**(2.40)**	(1.11)
12b-1 Fees	-5.631	**-7.647**	-3.428	**5.758**	**7.887**	**12.790**
	(-1.13)	**(-2.01)**	(-1.15)	**(5.88)**	**(7.64)**	**(10.95)**
Management Fees (2002)	0.017	**0.123**	**0.093**	-0.007	**0.039**	0.019
	(0.33)	**(3.35)**	**(3.06)**	(-0.51)	**(2.87)**	(1.28)
S&P ranking	**0.052**	**0.025**	-0.005	**0.010**	**0.008**	0.005
	(3.04)	**(1.79)**	(-0.51)	**(3.08)**	**(2.36)**	(1.26)
Performance 2000-2002	-0.004	0.002	**0.005**	**0.005**	**0.005**	**0.006**
	(-1.62)	(1.51)	**(3.94)**	**(9.21)**	**(9.17)**	**(9.74)**
Style of funds	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
# of obs.	6853	6867	6866	6892	6892	6892
F test	7.81	9.31	15.5	46.55	57.15	74.63
R-squares	0.058	0.037	0.043	0.099	0.118	0.154

A.5. Performance, indictments, and variables that measure the arbitrage activities

I regress fund performance on indictment-related variables. The flow sensitivity is the correlation between flows and accumulative return over past three months. Coefficients and robust t statistics are in parentheses. Performance on average is lower in the indicted funds. However, its negative relation with indictments is not statistically significant. Performance is significantly lower in funds with more arbitrage activities.

	Y: Alpha	
Constant	2.86	2.88
	(7.63)	(7.66)
Dummy(abused)	*-0.60*	*-0.59*
	(-0.88)	*(-0.86)*
Flow sensitivity (correlation, K=6)	**4.02**	**4.03**
	(14.58)	**(14.63)**
Log(tna)	**-0.26**	**-0.26**
	(-9.16)	**(-9.17)**
Log(age)	**0.76**	**0.75**
	(2.97)	**(2.92)**
Portfolio Manager Turnover	**-1.23**	**-1.23**
	(-2.22)	**(-2.22)**
Expense ratio	**-0.56**	**-0.56**
	(-4.66)	**(-4.47)**
Volatility of flows (%)		***-8e-3***
		(-2.07)
Stale pricing		***1.4e-4***
		(2.29)
R-square	0.03	0.03
Obs. #	9385	9381

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Table 1: Comparison of the characteristics of the funds, their returns, performance, expenses and growth of assets between the indicted and non-indicted fund groups.

The sample includes 92 fund families and is partitioned by whether the management firm is indicted (25) or not (67). Within the funds managed by indicted firms, funds are further partitioned into abused vs. non-abused according to whether their names are revealed in the timing and late-trading litigations.

Data of fund characteristics are obtained from CRSP mutual funds database. The number of funds is observed in January 2001. Observations of other variables are averaged over the sample period, January 2001 to August 2003. The performance is Jensen's α, measured in annualized percentage. The growth of TNA of each fund is measured using the time series average monthly net flow as a percentage of TNA.

$$r_{i,t} = \alpha_i + \beta_i r_{m,t} + \varepsilon_{i,t}$$
$$Flow_{i,t} = (TNA_{i,t} - TNA_{i,t-1}(1+R_{i,t}))/TNA_{i,t-1;}$$

Panel A presents the cross sectional mean of fund characteristics and the statistics of difference between fund groups. Panel B and C present the cross sectional mean of performance and growth of the assets, standard error, and the statistics of difference between fund groups. Funds managed by the non-indicted management firms are the benchmark group.

Panel A: Fund characteristics and expenses

	Full sample	Non-Indicted group	Indicted group	t-statistics of the difference in mean
No. of fund*class	10220 (129[a])	6325 (112[a])	3895 (149[a])	**3.23**
TNA ($million)	5,041,958 (493[b])	3,293,289 (520[b])	1,748,414 (448[b])	-1.55
Age of the fund	16.6	17.1	15.3	**-2.59**
Rear load (%)	0.50 (4.1[c])	0.46 (4.2[c])	0.60 (3.8[c])	**3.08**
Expense ratio (%)	0.81	0.76	0.94	**6.76**
12b-1 fees (%)	0.18 (0.46[d])	0.15 (0.46[d])	0.23 (0.46[d])	0.37

Panel B: Performance during January 2001 to August 2003

	Obs.	mean	Std	t –diff.
Funds managed by non-indicted management firms	5996	2.41	6.84	
Funds managed by indicted management firms	3864	2.01	6.55	**-2.91**
---Non-abused funds	3727	2.07	6.44	**-2.47**
---Abused funds	154	0.46	8.73	**-2.75**

Panel C: Average monthly growth rate of total net assets during January 2001 to August 2003

	Obs.	mean	Std	t –diff.
Funds managed by non-indicted management firms	6925	1.51	4.75	
Funds managed by indicted management firms	3528	2.42	5.88	**7.93**
---Non-abused funds	3389	2.52	5.94	**8.56**
---Abused funds	135	0.18	3.53	**-4.32**

Note: a= average number of fund*class in each family;
b=average TNA of each fund;
c=average rear loads for funds that do charge rear loads;
d=average 12b-1 fees for funds that do charge 12-b1 fees.

Table 2: Comparison of the characteristics of the fund management companies and the funds' boards of directors between the indicted and non-indicted fund groups.

The sample includes 92 fund families and is partitioned by whether the fund's management company is indicted (25) or not (67). Variables are observed in January 2001, except the turnover of managers and directors which are observed during January 2001 to August 2003. Sample means, subsample means, and t statistics of the differences between the two sub-samples are presented.

	Full Sample	Non-Indicted group	Indicted Group	t-statistics of the difference in mean
Panel A: Fund management companies characteristics as in January 2001				
SEC charge record	0.38	0.35	0.48	0.99
Age of the firm	67.70	74.30	49.20	**-3.19**
Manager Turnover	0.20	0.20	0.19	-0.08
Subsidiary of commercial bank [a]	0.17 (15)	0.15	0.24	0.83
Subsidiary of Asset MGMT Company [a]	0.27 (23)	0.27	0.29	0.16
Subsidiary of financial service group [a]	0.32 (28)	0.40	0.10	**-3.33**
Indepedent Fund MGMT company [a]	0.25 (22)	0.20	0.38	1.50
Panel B: Board characteristics as in January 2001				
Unitary board structure	0.79	0.83	0.67	-1.44
Independent chairman	0.17	0.15	0.24	0.83
Independent nomination committee	0.14	0.15	0.10	-0.68
Size of the board	8.60	8.60	8.62	0.02
Ratio of board independence	0.75	0.75	0.76	0.33
Ratio of director grayness	0.03	0.02	0.05	0.65
Total compensation to the board ($)	550,433	470,079	780,017	**2.09**
Compensation per member ($)	68,269	60,704	89,883	**2.21**
Fraction of members using deferred payment program	0.27	0.25	0.33	0.7
Average age of directors	62.28	62.43	61.85	-0.41
Average profession relevance	0.66	0.68	0.6	-1.12
Director Turnover	0.65	0.68	0.57	-0.89
Panel C: Distribution of fund styles as in January 2001 (%)				
Small Cap.	9.5	9.4	9.6	-0.35
Global	12.3	12.2	12.6	-0.62
Balanced	3.5	3.4	3.7	-0.82
Sector	6.6	6.8	6.5	0.62
Other Equity	25.3	26.5	23.2	**-3.95**
Government	5.9	5.9	5.8	0.22
Fixed Income	28.8	28.4	29.3	-1.02
Money Market	7.9	7.2	9	**3.32**

Note: a = the number in parenthesis is the number of firms in this group. There are four firms whose ownership type is not identified. Classification of the fund style is based on the fund's objective code, which identifies fund's investment strategy classified by the Standard and Poor's Micropal formerly ICDI. Eights styles are identified.

1. Small cap. AG (Aggressive growth);
2. Global GE (Global equity), IE (International equity)
3. Balance BL (Balance);
4. Sector UT (Utility funds), SF (Sector funds);
5. Other equity LG (long-term growth), GI (Growth & income), TR (Total return), IN (income);
6. Government securities GS (Government security), MG (Government security Money Market);
7. Fixed income BQ (High quality B-), BY (High yield B-), GB (Global bond), MQ (High quality municipal bonds), MS (Single state municipal bonds), GM (Ginne Mae funds);
8. Money market and others MF (Tax-free money market), MT (taxable Money Market), MY (High yield Money Market), PM (Precious metal), SP (Special funds, unclassified), * (funds without a OBJ code)

Table 3: Construction of flow sensitivities as measures of market monitoring, the distribution of the statistical significance of the sensitivity estimates, and their comparison between the two sub-samples of the funds.

In time series of each fund, the flow of each fund is explained by the aggregate industry flow, the aggregate flow to the particular fund style, and the flow correlated with funds' past returns. This performance chasing behavior rewards the management with good performance. The widely documented convex relation between the flow and performance in cross-section also motivates a quadratic term of the returns into the regression. Both the slope coefficient and convexity coefficient estimated from this regression are measures of investors' monitoring through the market.

$$Fund\ Flow_{i,t} = a_i + b_i * industry\ flow_t + c_i * Style\ flow_t + \gamma_{1i} * Fund\ return_{i,t-k:t-1}{}^{i} + \gamma_{2i} * Fund\ return_{i,t-k:t-1}{}^{2} + \varepsilon_{i,t} \qquad K=3,6,12 \quad (1d)$$

This model is estimated for each fund with monthly data from January 2001 to August 2003 and the cross sectional distributions of the t-statistics of all funds' coefficients are presented in panel A. Under the null hypothesis (Ho) that there is no significant market monitoring, the significance of the coefficient estimation follows a normal distribution.

Panel B compares the cross sectional means of the coefficients across different groups. The numbers in the parenthesis in the first column are the standard errors. The numbers in the parenthesis in the other column are the t-statistics of the group difference with non-indicted group as the benchmark.

In panel C, the cross sectional mean of the other six measures of flow sensitivities are presented. The first three are correlations between the total fund returns and the subsequent flows to the fund (as in Eq. (1b)). The next three are regression coefficients between the excess return (relative to funds within the same style, calculated as in Eq. (1e)) and subsequent flows (as in Eq. (1a) and (1c)). Panel D is the correlation matrix of all 12 sensitivities as measures of market monitoring.

Panel A: Distribution of the t-statistics of the coefficients

		K=3		K=6		K=12	
	Ho	Slope (γ_1)	Convexity (γ_2)	Slope (γ_1)	Convexity (γ_2)	Slope (γ_1)	Convexity (γ_2)
t>2.32	0.005	**0.28**	**0.08**	**0.30**	**0.10**	**0.25**	**0.03**
2.32>t>1.96	0.02	0.01	0.01	0.01	0.01	0.01	0.01
1.96>t>1.65	0.025	0.01	0.01	0.01	0.01	0.01	0.01
1.65>t>0	0.45	0.24	0.36	0.23	0.34	0.30	0.54
0>t>-1.65	0.45	0.21	0.44	0.22	0.41	0.25	0.40
-1.65>t>-1.96	0.025	0.01	0.01	0.01	0.01	0.01	0.00
-1.96>t>-2.32	0.02	0.01	0.01	0.01	0.01	0.01	0.00
t<-2.32	0.005	**0.22**	**0.08**	**0.20**	**0.10**	**0.15**	**0.01**

Panel B: Comparison of the cross sectional mean of the coefficients across different groups

		Full Sample	Non-Indicted	Indicted group	
		(std error)	group	Non-abused funds (t-diff)	Abused funds (t-diff)
K=3	Slope (γ_1)	0.24 (8.47)	0.48	-0.09 **(-2.21)**	-1.58 **(-2.01)**
	Convexity (γ_2)	-0.05 (1.82)	-0.05	-0.14 **(-1.82)**	-0.05 (-0.02)
K=6	Slope (γ_1)	0.86 (8.07)	1.03	0.72 (-1.29)	0.33 (-0.79)
	Convexity (γ_2)	-0.11 (2.27)	-0.15	0.06 **(2.75)**	0.08 (0.82)
K=12	Slope (γ_1)	0.84 (6.17)	0.75	1.31 **(3.11)**	1.03 (0.44)
	Convexity (γ_2)	0.04 (0.52)	0.04	0.04 (-0.02)	0.12 (0.88)

Continue with table 3:

Panel C: Other measures of flow sensitivity

		Full Sample (std error)	Non-Indicted group	Indicted group: Non-abused funds (t-diff)	Indicted group: Abused funds (t-diff)
Correlation with total returns	K=3	0.09 (0.22)	0.11	0.11 (-0.42)	0.06 **(-3.07)**
	K=6	0.11 (0.23)	0.12	0.13 (0.92)	0.12 (-0.26)
	K=12	0.12 (0.27)	0.13	0.14 (1.20)	0.12 (-0.68)
Coefficient with excess returns in linear relation	K=3	-0.11 (1.47)	-0.04	-0.14 **(-3.07)**	-0.18 **(-2.02)**
	K=6	-0.05 (1.07)	-0.04	-0.11 **(-2.69)**	-0.08 (-0.95)
	K=12	0.05 (1.03)	0.03	-0.02 **(-2.38)**	0.03 (0.09)

Panel D: Correlation between various measures of flow sensitivity

		Slope			Correlation			Excess return			Convexity		
		K=3	K=6	K=12	K=3	K=6	K=12	K=3	K=6	K=12	K=3	K=6	K=12
Slope	K=3	1											
	K=6	0.42	1										
	K=12	0.18	0.28	1									
Correlation	K=3	0.42	0.20	0.13	1								
	K=6	0.24	0.27	0.13	0.72	1							
	K=12	0.17	0.18	0.10	0.46	0.65	1						
Excess returns	K=3	0.30	0.11	0.07	0.24	0.15	0.11	1					
	K=6	0.13	0.14	0.05	0.13	0.20	0.15	0.50	1				
	K=12	0.00	0.02	0.02	0.02	0.08	0.18	0.11	0.40	1			
Convexity	K=3	-0.38	-0.12	-0.07	0.09	0.07	0.01	0.05	0.07	-0.02	1		
	K=6	-0.14	-0.63	-0.13	0.01	0.04	0.04	0.00	0.05	0.05	0.28	1	
	K=12	-0.10	-0.13	-0.66	-0.06	0.00	0.05	-0.02	0.04	0.05	0.06	0.19	1

Table 4: The volatility of residual flows and stale pricing.

This table presents the sample (sub-sample) mean of the residual flow volatility and stale pricing. The volatility is the standard deviation of the residual flows from regression $Fund\ Flow_{i,t} = a_i + b_i * industry\ flow_t + c_i * Style\ flow_t + \gamma_{1i} * Fund\ return_{i,t-k:t-1} + \gamma_{2i} * Fund\ return^2_{i,t-k:t-1} + \varepsilon_{i,t}$, $K=3,6,12$ (1d). The stale pricing is measured as in Lo and MacKinley (1990): $S = -Cov(r^o_t, r^o_{t+1}) / u^2$, *if* $Cov(r^o_t, r^o_{t+1}) < 0$, *otherwise zero* . They are estimated with observations from January 2001 to August 2003. The non-indicted group is the benchmark in computing statistical difference in the mean.

	Full Sample	Non-indicted group	Indicted group	t-diff.
Volatility of residual flows (Considering chasing of past three months returns)	0.11	0.09	0.08	-1.34
Volatility of residual flows (Considering chasing of past six months returns)	0.10	0.09	0.08	-1.19
Volatility of residual flows (Considering chasing of past 12 months returns)	0.08	0.07	0.07	-0.28
Stale pricing	0.11	0.05	0.14	1.21
		Stale pricing above mean	Stale pricing below mean	t-diff.
Volatility of residual flows (Considering chasing of past three months returns)		0.12	0.09	**5.61**
Volatility of residual flows (Considering chasing of past six months returns)		0.11	0.08	**4.77**
Volatility of residual flows (Considering chasing of past 12 months returns)		0.09	0.07	**5.15**

Table 5: Predicting indictment with fund characteristics and governance variables.

This table presents the cross sectional regression results at the fund level. The dependent variable (Y) is a dummy which equals one if the fund is identified to be abused in the litigations. 300 funds are identified as abused funds. A logit model is used to explain indictments with explanatory variables (x) including fund characteristics, flow sensitivity (marketing monitoring), past performance, management fees and governance variables, such managerial characteristics and the board of directors. Governance variables are observed in January 2001 or calculated with data between January 2001 and August 2003. The indictment occurs in Sept. 2003 and late.

The elasticity, (dY/Y)/dx instead of coefficients, are presented. The flow sensitivities, fund characteristics, and board compensations are studentized. Therefore, the elasticity represents the percentage change in probability of indictment (Y) for each standard deviation change in explanation variables (x). Below each elasticity is the robust t-statistics.

	Y: Indictment		
	K=3	K=6	K=12
Slope (γ_1)	**-0.28**	**-0.39**	**-0.44**
	(-1.70)	**(-2.97)**	**(-2.10)**
Convexity (γ_2)	0.15	**-0.30**	**-0.52**
	(1.00)	**(-2.01)**	**(-2.38)**
Log(tna)	**2.98**	**2.94**	**2.89**
	(2.87)	**(2.82)**	**(2.82)**
$Log(tna)^2$	**-1.52**	**-1.50**	**-1.48**
	(-2.20)	**(-2.16)**	**(-2.15)**
Log(age)	0.18	0.18	0.19
	(0.97)	(0.93)	(1.00)
Rear load	**-0.31**	**-0.32**	**-0.32**
	(-1.71)	**(-1.77)**	**(-1.80)**
Front load	**-0.36**	**-0.36**	**-0.36**
	(-3.08)	**(-3.13)**	**(-3.10)**
Performance(Jensen's Alpha)	-0.18	-0.19	-0.20
	(-1.20)	(-1.24)	(-1.33)
Management fee	**0.36**	**0.36**	**0.37**
	(2.01)	**(1.96)**	**(2.03)**
Institutional funds	**1.83**	**1.86**	**1.83**
	(4.26)	**(4.25)**	**(4.25)**
Retail funds	**1.35**	**1.41**	**1.34**
	(2.84)	**(2.94)**	**(2.84)**
Subsidiary of a large	**-0.69**	**-0.71**	**-0.66**
financial services group	**(-2.39)**	**(-2.41)**	**(-2.35)**
SEC charge record	**-0.96**	**-0.99**	**-1.00**
	(-2.67)	**(-2.71)**	**(-2.78)**
Manager turnover	**6.70**	**6.68**	**6.83**
	(3.01)	**(2.99)**	**(3.00)**
Unitary board	**-0.81**	**-0.88**	**-0.87**
	(-2.17)	**(-2.37)**	**(-2.34)**
Independent chairman	0.07	0.09	0.02
	(0.23)	(0.30)	(0.08)
Independent nomination	**1.37**	**1.40**	**1.45**

Committee	**(2.02)**	**(2.06)**	**(2.16)**
Size of the board	-0.07	-0.06	-0.07
	(-1.01)	(-0.93)	(-0.96)
Independence ratio	1.80	1.85	1.64
	(0.49)	(0.49)	(0.45)
Participation ratio of	0.63	0.62	0.59
the deferred payment program	(1.04)	(1.00)	(0.97)
Age of board members	**0.07**	**0.06**	**0.07**
	(2.00)	**(1.78)**	**(2.03)**
Excess Compensation to	**0.57**	**0.58**	**0.56**
board members	**(3.59)**	**(3.50)**	**(3.51)**
Small caps.	**2.47**	**2.49**	**2.55**
	(2.33)	**(2.34)**	**(2.35)**
Global funds	**1.89**	**1.91**	**1.90**
	(1.83)	**(1.83)**	**(1.79)**
Sector funds	**2.22**	**2.29**	**2.31**
	(2.02)	**(2.06)**	**(2.05)**
Other funds	1.53	1.56	1.60
	(1.51)	(1.53)	(1.53)
Fixed income funds	0.10	0.22	0.21
	(0.09)	(0.19)	(0.18)
# of obs.	4089	4089	4089
Wald test	411.19	405.09	434.64
Pseudo R-square	0.32	0.32	0.32

Table 6: Fund governance and the practice of "fair value pricing".

This table presents the cross sectional regression results at the fund level. The dependent variable (Y) is stale pricing measured by the auto-covariance of fund returns, adjusted by the expected return squared: $S = abs(Cov(r^o_t, r^o_{t+1})) / u^2$. It is calculated with monthly data between Jan. 2001 to Aug. 2003. A higher absolute value of autho-variance means a staler price. The flow sensitivities, fund characteristics, and board compensations are studentized (x). Therefore, the coefficients represent the changes in Y for each standard deviation change in x. Below coefficients are robust t-statistics.

Y= Stale pricing			
	K=3	K=6	K=12
Constant	2.15	2.18	2.15
	(5.44)	(5.53)	(5.44)
Slope (γ_1)	-0.025	**-0.075**	-0.048
	(-1.08)	**(-2.61)**	(-1.56)
Convexity (γ_2)	-0.02	**-0.07**	**-0.06**
	(-1.29)	**(-2.88)**	**(-2.13)**
Retail funds	**0.19**	**0.19**	**0.19**
	(3.35)	**(3.39)**	**(3.30)**
Institutional funds	-0.06	-0.06	-0.05
	(-1.26)	(-1.25)	(-1.17)
Front load	**2.03**	1.97	**2.04**
	(1.65)	(1.61)	**(1.66)**
Rear load	**3.88**	**3.90**	**3.80**
	(2.68)	**(2.70)**	**(2.63)**
12b-1 fees	0.50	0.50	0.49
	(1.09)	(1.10)	(1.09)
Log(tna)	**-0.06**	**-0.06**	**-0.06**
	(-5.07)	**(-5.08)**	**(-5.06)**
Log(age)	**0.07**	**0.07**	**0.08**
	(1.92)	**(1.92)**	**(1.96)**
Subsidiary of a large	-0.04	-0.04	-0.04
Financial services group	(-0.76)	(-0.78)	(-0.82)
Unitary board	**-0.14**	**-0.14**	**-0.14**
	(-2.71)	**(-2.71)**	**(-2.69)**
Ratio of gray directors	0.38	0.38	0.40
	(1.31)	(1.31)	(1.41)
Participation ratio of the	**-0.14**	**-0.14**	**-0.14**
deferred payment program	**(-2.31)**	**(-2.29)**	**(-2.34)**
Age of board members	**-0.01**	**-0.01**	**-0.01**
	(-2.10)	**(-2.17)**	**(-2.10)**
Style of funds	Controlled	Controlled	Controlled
Other board, fund characteristics	Controlled	Controlled	Controlled
# of obs.	3318	3318	3318
F-test	20.90	20.62	20.14
Adjusted R-squares	0.12	0.12	0.12

Table 7: Fund governance and the volatility of abnormal flows.

This table presents the cross sectional regression at the fund level. The dependent variable (Y), volatility of abnormal flows, is obtained from Eq. (1d), $Fund\ flow_{i,t} = a_i + b_i * industry\ flow_{i,t} + c_i * Style\ flow_{i,t} + \gamma_{1i} * Fund\ returns_{i,t-k:t-1} + \gamma_{2i} * Fund\ return_{i,t-k:t-1}^2 + \varepsilon_{i,t}$ $K=6;\ AFV_i = std(e_{i,t}) * 100.$. The independent variables (x) include fund level characteristics, such as flow sensitivity, fund size, age, load, management fees, managerial characteristics, and the board of directors. The flow sensitivities, fund characteristics, and board compensations are studentized. The coefficients represent the changes in Y for each standard deviation change in x. Below coefficients are robust t-statistics.

	K=3	K=6	K=12
Constant	15.83	16.17	11.61
	(4.15)	(4.09)	(4.26)
Slope (γ_1)	**-6.53**	**-6.83**	-1.35
	(-3.28)	**(-2.44)**	(-1.00)
Convexity (γ_2)	**-4.88**	**-6.32**	-0.91
	(-3.95)	**(-2.71)**	(-0.74)
Retail funds	-0.77	-1.32	**-1.40**
	(-0.81)	(-1.29)	**(-2.61)**
Institutional funds	1.25	0.78	0.28
	(2.14)	(1.31)	(0.75)
Front load	0.20	0.23	0.26
	(0.67)	(0.74)	(1.20)
Rear load	**-0.74**	**-0.57**	**-0.45**
	(-2.31)	**(-1.82)**	**(-2.13)**
Log(tna)	**-11.31**	**-10.58**	**-8.95**
	(-7.23)	**(-6.21)**	**(-6.63)**
$Log(tna)^2$	**6.17**	**5.51**	**4.38**
	(4.92)	**(4.04)**	**(4.09)**
Log(age)	**-2.76**	**-2.15**	**-0.66**
	(-6.52)	**(-4.74)**	**(-1.91)**
Turnover	**1.01**	**0.83**	**0.78**
	(2.67)	**(2.27)**	**(2.89)**
12b1 fees	-0.06	0.13	0.93
	(-0.05)	(0.11)	(0.77)
Expenses	-0.72	-0.98	-1.07
	(-1.33)	(-1.87)	(-3.01)
Subsidiary of a large financial services group	-1.16	-0.93	-0.79
	(-1.55)	(-1.26)	(-1.59)
SEC charge record	**2.14**	**1.90**	**1.28**
	(2.77)	**(2.34)**	**(2.26)**
Manager turnover	**4.76**	2.97	**2.88**
	(1.74)	(1.02)	**(1.79)**
Unitary board	0.39	0.16	0.53
	(0.48)	(0.19)	(1.19)
Independent chairman	0.54	0.42	0.77
	(0.81)	(0.65)	(1.47)
Independent nomination committee	**2.64**	**2.57**	0.86
	(2.30)	**(1.96)**	(0.99)

Size of the board	-0.16 (-1.20)	-0.15 (-1.08)	-0.09 (-1.15)
Independence ratio	3.76 (1.00)	2.71 (0.69)	1.11 (0.39)
Ratio of gray directors	2.79 (0.69)	-2.22 (-0.67)	-3.08 (-1.32)
Participation ration of the deferred payment program	-0.25 (-0.29)	-0.62 (-0.68)	-0.40 (-0.63)
Compensation to the board	-0.14 (-0.50)	-0.04 (-0.16)	-0.08 (-0.37)
Style of the fund	Controlled	Controlled	Controlled
# of obs.	5404	5404	5404
F test	15.55	16.31	19.92
Pseudo R-square	0.21	0.17	0.16

Table 8: Other measures of market discipline and their influence on fund behaviors.

This table summarizes the relation of fund behavior with another six measures of flow sensitivity (market monitoring). The first three measures, with respect to excess returns, are the slope (γ_i) estimated from this regression: $Fund\ Flow_{i,t} = a_i + b_i * industry\ flow_t + c_i * Style\ flow_t + \gamma_i * Fund\ return_{i,t-k:t-1} + \varepsilon_{i,t}$; $K=3,6,12$ (1c). The other three measures are correlation between fund flows and past returns, CORR($Fund\ return_{i,t-k:t-1}$, $Flows_{i,t}$), $K=3,6,12$ (1b). All measures are calculated with monthly returns and flows observations from Jan. 2001 to Aug. 2003.

Each block in this table is from a separate cross sectional regression explaining fund behavior with flow sensitivity and other governance variables. For each regression, only the coefficient on the flow sensitivity, t-statistics, and R-squares are reported.

			Y = Indictment	Y = Stale pricing	Y = Volatility of abnormal flows
Excess return measure	K=3	Coefficient	**-0.36**	0.01	-1.13
		t-stats (z)	**(-2.09)**	(0.79)	(-1.60)
		R-square (Psudo)	0.27	0.04	0.17
	K=6	Coefficient	-0.18	-0.001	0.06
		t-stats (z)	(-1.29)	(-0.23)	(0.10)
		R-square (Psudo)	0.27	0.04	0.15
	K=12	Coefficient	0.16	0.01	**-1.22**
		t-stats (z)	(0.89)	(-1.10)	**(-2.40)**
		R-square (Psudo)	0.27	0.04	0.19
Correlation measure	K=3	Coefficient	**-0.29**	**-0.01**	**-0.93**
		t-stats (z)	**(-2.93)**	**(-1.94)**	**(-5.01)**
		R-square (Psudo)	0.28	0.04	0.16
	K=6	Coefficient	**-0.22**	**-0.02**	**-1.18**
		t-stats (z)	**(-2.15)**	**(-2.37)**	**(-7.39)**
		R-square (Psudo)	0.28	0.04	0.17
	K=12	Coefficient	**-0.29**	**-0.02**	**-0.84**
		t-stats (z)	**(-2.59)**	**(-2.91)**	**(-6.35)**
		R-square (Psudo)	0.28	0.04	0.18
Fund characteristics and styles			Controlled	Controlled	Controlled
Managerial characteristics and Board of directors			Controlled	Controlled	Controlled
# of observations			6434	1775	7636

Table 9: Logit and multi-logit analysis of indictment likelihood at the family level.

This table presents the results from logit and multi-logit regression at the fund family level. The dependent variable Y=1, if the firm is indicted in the 2003 mutual fund scandals. Explanatory variables (x) are fund governance observed in January 2001. Flow sensitivity to returns is measured as in Eq. (1b), CORR(*Fund return*$_{i,t-k:t-1}$, *Flows*$_{i,t}$*),* with K=6.

	Logit	Multi-logit	
	Y=1 if indicted	Y=1 if timing	Y=2 if late trading
Flow sensitivity	**-0.67**	**-1.39**	0.14
(correlation, K=6)	**(-1.72)**	**(-1.81)**	(0.24)
Log(Age)	**-0.79**	**-1.08**	-0.47
	(-1.99)	**(-1.81)**	(-0.68)
Log(TNA)	0.09	1.58	-0.59
	(0.22)	(1.52)	(-0.88)
Subsidiary of a large	-1.81	-3.01	-2.67
assets management firm	(-1.54)	(-1.39)	(-1.50)
Subsidiary of a financial	**-3.64**	**-4.95**	-3.11
services group	**(-2.64)**	**(-2.01)**	(-1.51)
Independent	-0.90	0.92	-1.37
assets management firm	(-0.87)	(0.49)	(-0.87)
SEC charge record	0.08	-1.48	0.11
	(0.10)	(-1.10)	(0.09)
Manager Turnover	-1.46	-4.68	0.57
	(-0.57)	(-0.86)	(0.14)
Rear load	-0.30	-0.73	0.30
	(-0.72)	(-0.87)	(0.44)
12 b1 fees	0.04	-0.77	0.56
	(0.09)	(-0.830	(0.80)
Unitary board	**-2.57**	**-4.01**	-1.41
	(-2.68)	**(-2.06)**	(-0.89)
Size of the board	-0.09	-0.43	0.22
	(-0.72)	(-1.53)	(1.03)
Independence ratio of	-0.41	8.63	-8.55
the board	(-0.09)	(0.84)	(-1.11)
Ratio of gray members	3.31	7.00	0.97
	(1.21)	(1.76)	(0.11)
Participation ratio of the	-1.06	-3.70	0.53
deferred payment program	(-0.99)	(-1.41)	(0.32)
Compensation to board	**1.21**	**2.60**	0.92
Member ($mil)	**(2.89)**	**(2.20)**	(1.15)
No. of obs.	77		77
LR (chi2)	35.77		57.08
Pseudo R2	0.41		0.52

Table 10: Analysis with matched samples: indictments, volatility of abnormal flows, and stale pricing

There are 300 funds specifically named in the litigations. A matched sample is selected for this indicted group, based on their style, assets size, and age. The dependent variable (Y) takes indictment (logit model), stale pricing and flow volatility respectively. The independent variables (x) take the flow sensitivities, fund characteristics, managerial characteristics and the board of directors. The slope and convexity sensitivity are measured with a horizon of three months. To avoid an excessive length, coefficients on selected variables and their statistics are presented. Coefficients on non-significant variables are not shown.

	Y= Indictment	Y=Stale pricing	Y=Volatility of abnormal flows
Constant		4.10	5.63
		(1.87)	(0.22)
Slope (γ_1)	**-0.48**	0.04	-3.18
	(-1.87)	(0.27)	(-0.47)
Convexity (γ_2)	1.26	-0.09	**-6.53**
	(1.56)	(-0.24)	**(-3.60)**
Retail funds	**0.92**	-0.10	0.82
	(2.04)	(-0.47)	(0.34)
Institutional funds	-0.52	0.03	-3.95
	(-1.54)	(0.13)	(-1.11)
Subsidiary of a large	**-0.89**	0.27	-0.82
financial services group	**(-3.19)**	(1.04)	(-0.27)
SEC Charge record	**-0.69**	0.18	4.22
	(-2.49)	(0.71)	(1.33)
Portfolio manager turnover	**5.83**	0.73	8.73
	(3.33)	(0.72)	(0.94)
Unitary board	-0.41	**-0.45**	2.58
	(-1.04)	**(-1.65)**	(0.85)
Independent Chairman	-0.62	0.27	-2.60
	(-1.60)	(0.90)	(-0.87)
Independent Nomination Committee	**2.05**	0.08	-1.33
	(3.65)	(0.23)	(-0.32)
Size of the board	-0.11	-0.04	**-1.13**
	(-1.29)	(-0.64)	**(-2.23)**
Independence ratio	1.55	-2.04	-18.20
	(0.46)	(-1.34)	(-1.25)
Participation ratio of the	**1.13**	-0.12	4.09
deferred payment program	**(2.34)**	(-0.33)	(0.96)
Age of board members	**0.12**	0.00	0.53
	(2.71)	(-0.04)	(1.44)
Compensation to the board	**0.74**	-0.02	1.30
	(5.20)	(-0.17)	(0.90)
Other board, fund characteristics	Controlled	Controlled	Controlled
# of obs.	504	222	562
F-test (wald test)	165.50	0.70	2.94
Adjusted R-squares (Pseudo)	0.35	0.06	0.34

Table 11: Redemption sensitivity and purchase sensitivity

Redemption (purchase or net flow) sensitivity is measured as the correlation between the redemption flows (purchase flows or net flows, as a percentage of total assets) in month t and the cumulative returns over the past k (k=3, 6, 12) months. Results with k=6 are presented in this table. With k=3 and 12, the results are robust.

The four regressions in the table predict indictment with redemption sensitivity and purchase sensitivity. Observations are at fund family level. The dependent variable is a dummy and equals one if the firm is indicted. The p values instead of t statistics are in the parentheses.

	(1)	(2)	(3)	(4)
Constant	0.73	-0.71	-0.72	-0.91
	(0.10)	(0.11)	(0.11)	(0.06)
Redemption sensitivity	**-1.19**		0.18	0.20
	(0.13)		(0.92)	(0.91)
Purchase (New sales) sensitivity		**1.31**	1.47	1.96
		(0.09)	(0.41)	(0.28)
Net flow sensitivity				**-2.78**
				(0.04)
Rear load	-10.49	-11.60	-11.76	-10.98
	(0.47)	(0.42)	(0.42)	(0.47)
No. of obs.	75	75	75	75
Chi(2)	2.72	3.38	3.39	8.04
Prob. > Chi(2)	0.25	0.18	0.33	0.07
Pseudo R2	0.03	0.04	0.04	0.10

Table11A: The determinants of board compensation.

Both the dependent and independent variables are observed in January 2001. The following regressions explain board compensation with fund characteristics.

$$Compensation = intercept + b_1 * No.\ of\ funds\ overseen + b_2 * Scale\ of\ funds\ overseen + b_3 * \#\ of\ ICDI\ objective\ code + b_4 * lag(return) + b_5 * lag(Alpha) + \varepsilon; \quad (9)$$

The No. of funds overseen proxy for the amount of monitoring efforts, Scale of funds overseen proxy for the responsibility in term of dollar amount. No. of ICDI objective code proxy for the complexity of the monitoring effort required. Finally, returns and performance measures the achievements.

	Y: Total payment to Board		Y: Compensation per member	
Intercept	-27294	-285272	11564	-3489
	(-0.20)	(-2.02)	(0.73)	(-0.20)
No. of Funds	**2258**	**2345**	**196**	**191**
	(3.56)	**(3.91)**	**(2.68)**	**(2.54)**
No. of ICDI objective code	**19390**	**30802**	**2345**	**3207**
	(1.68)	**(2.71)**	**(1.75)**	**(2.25)**
TNA ($ million)	**0.84**	**0.65**	0.023	0.013
	(1.98)	**(1.66)**	(0.47)	(0.27)
Lag(return %)		**-17135**		-751
		(-2.28)		(-0.80)
Lag(alpha %)		**24585**		**3207**
		(2.41)		**(2.25)**
R square	0.51	0.60	0.35	0.39

Table 11B: Mutli-logit analysis of indictments with excess compensation and the ratio of the payment to the board over the fund's total expenses.

Excess compensation is the residual from regressions on the determinants of board compensation measured in ($mil). The ratio of payment to the board over the fund's total expenses is measured by total compensation of the board over total expenses of the fund family, or total compensation of the board over total expenses excluding 12b-1 fees. It is a measure of profit sharing between the board and the management.

Observations are at the fund family level. The dependent variable Y=1, if timing is charged, 2, late trading, 0, otherwise. The ranking is not ordered. The explanatory variables are fund governance observed in January 2001. p-value is in the parenthesis.

Panel A: Timing Group Compared to No Violation Charged								
	(1)		(2)		(3)		(4)	
Constant	-19.26	(0.05)	-16.05	(0.10)	-14.40	(0.16)	-15.02	(0.15)
Age of the firm	**-0.03**	**(0.05)**	**-0.04**	**(0.05)**	**-0.03**	**(0.05)**	**-0.03**	**(0.05)**
Log(tna)	**1.46**	**(0.06)**	**1.59**	**(0.06)**	0.90	(0.34)	0.98	(0.30)
Subsidiary of a financial service group	-1.76	(0.16)	**-2.36**	**(0.07)**	**-1.99**	**(0.10)**	**-1.96**	**(0.10)**
SEC charge record	0.31	(0.76)	-0.31	(0.76)	0.15	(0.87)	0.14	(0.88)
Flow sensitivity (corr. k=6)	-2.58	(0.26)	**-4.75**	**(0.08)**	**-4.08**	**(0.06)**	**-4.04**	**(0.07)**
Unitary Board	**-2.22**	**(0.05)**	**-3.03**	**(0.04)**	**-2.15**	**(0.05)**	**-2.14**	**(0.05)**
Size of the board	**-0.33**	**(0.09)**	-0.38	**(0.12)**	-0.09	(0.62)	-0.09	(0.61)
Independence ratio	8.33	**(0.17)**	7.30	(0.23)	5.11	(0.31)	4.98	(0.32)
Ratio of the board grayness	4.61	(0.33)	4.49	(0.33)	2.63	(0.43)	2.66	(0.43)
Age of board members	0.03	(0.76)	-0.01	(0.95)	0.06	(0.54)	0.06	(0.56)
Exccess compensation to the board	**2.89**	**(0.05)**						
Excess compensation to board members			**34.1**	**(0.01)**				
Payment to the board /Fund expenses					-141.6	(0.63)		
Payment to the board /Fund expenses-12b1 fee							-1.00	(0.68)
Panel B: Late Trading Group Compared to No Violation Charged								
Constant	9.63	(0.37)	11.33	(0.27)	-4.98	(0.73)	-6.94	(0.65)
Age of the firm	-0.01	(0.68)	-.004	(0.74)	-0.005	(0.76)	-0.01	(0.74)
Log(tna)	-0.54	(0.52)	-0.90	(0.19)	0.97	(0.46)	1.08	(0.43)
Subsidiary of a financial service group	-1.48	(0.32)	-1.59	(0.27)	-0.91	(0.56)	-1.07	(0.51)
SEC charge record	0.81	(0.49)	1.10	(0.37)	0.43	(0.73)	0.41	(0.74)
Flow sensitivity (corr. k=6)	0.23	(0.92)	-0.32	(0.88)	-0.12	(0.96)	-0.45	(0.85)
Unitary Board	-0.91	(0.49)	-0.69	(0.61)	-0.98	(0.49)	-1.10	(0.44)
Size of the board	0.14	(0.51)	0.23	(0.20)	0.11	(0.55)	0.09	(0.62)
Independence ratio	-1.65	(0.79)	-1.92	(0.74)	-4.08	(0.56)	-4.35	(0.54)
Ratio of the board grayness	2.97	(0.68)	1.18	(0.87)	3.22	(0.64)	2.92	(0.68)
Age of board members	-0.09	(0.57)	-0.08	(0.62)	-0.09	(0.61)	-0.07	(0.70)
Exccess compensation to the board	1.48	(0.41)						
Excess compensation to board members			3.13	(0.84)				
Payment to the board /Fund expenses					**285.65**	**(0.15)**		
Payment to the board /Fund expenses-12b1 fee							**2.70**	**(0.13)**
No. of observations	77		77		77		77	
LR (chi2)	41.23	0.01	46.3	0.02	40.33	0.01	40.32	0.01
Pseudo R-square	0.38		0.42		0.37		0.38	

Table 12: Test substitution hypothesis between the market monitoring and the board.

The dependent variables are indictment, stale pricing, and flow volatility. Stale pricing and flow volatility are measured fund by fund, then weighted by TNA within the same fund family. Stale pricing is calculated as in Lo and MacKinlay (1991) using funds' return and TNA from January 2001 to August 2003. $S= -Cov(r_t^o, r_{t+1}^o) / u^2$; *if* $Cov(r_t^o, r_{t+1}^o) <0$ *; otherwise zero.* The volatility of fund flows is measured as the standard deviation of the residual flows from regression: $Fund\ flow_{i,t} = a_i + b_i * industry\ flow_{i,t} + c_i * Style\ flow_{i,t} + \gamma_{1i} * Fund\ returns_{i,t-k:t-1} + \gamma_{2i} * Fund\ return_{i,t-k:t-1}^2 + \varepsilon_{i,t}$ $K=6;\ AFV_i = std(e_{i,t})*100.$ Flow sensitivity to returns is measured by the correlation between the net flow and the accumulated returns over the past 6 months. $Flow\ sensitivity_i = cov\ (flow_{i,t}, r_{i,t-1:t-6}) / var\ (r_{i,t-1:t-6});$ Other fund governance variables are observed at the beginning of sample period. The dummy of low sensitivity equals one, if the fund's flow sensitivity is below sample average.

A logit regression is used for indictment analysis, tobit for stale pricing, and ordinary-least-square (ols) for volatility of abnormal flows.

	Y = indictments	Y= Stale pricing	Y = Volatility of abnormal flows
Constant		-7.36	-0.04
		(-0.72)	(-0.38)
Independent chairman	0.16	-3.43	-0.05
	(0.27)	(-0.97)	(-1.09)
Size of the board	-0.09	**1.59**	0.002
	(-0.98)	**(2.80)**	(0.30)
Independence ratio	1.23	-2.76	0.13
	(0.51)	(-0.21)	(0.91)
Dummy (low flow sensitivity)	-0.16	3.66	0.02
* Independent Chairman	(-0.14)	(0.67)	(0.30)
Dummy (low flow sensitivity)	**0.25**	**-1.50**	0.01
* Size of the board	**(1.84)**	**(-2.15)**	(1.27)
Dummy (low flow sensitivity)	**-3.70**	11.27	-0.14
* Independence ratio	**(-2.08)**	(1.36)	(-1.43)
No. of obs.	88	75	78
LR (chi2) / F-test	6.04	11.19	1.16
R-square (Pseudo)	0.06	0.02	0.01