The Wall Street Stampede: Exit as Governance with Interacting Blockholders

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Keywords: institutional investors, competition for flow, exit governance, correlated trading

JEL Classifications: G23, G34

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1 Introduction

In March 2007, Chapman Capital, an activist hedge fund, acquired a 6.5% stake in FSI International, a Minnesota-based producer of semiconductor inputs. Chapman filed a 13D[1] intending to replace management and merge FSI with a larger company, complaining that its CEO was paying himself generously while the company made repeated losses. FSI countered that they were a cyclical business in an industry downturn and were already making several operational changes. They claimed that Chapman did not represent other shareholders' preferences and was taking a "...typical activist hedge-fund approach, to try to come in and discredit management."[2] The debate raged for months. Eventually, however, Chapman gave up on fostering change at FSI and sold its full stake in the open market in the first quarter of 2008 at a significant loss. FSI remained independent with its management in place until 2012, at which time it merged with a larger company, as originally suggested by Chapman.

In January 2008, there were seven institutional investors (other than Chapman) who each held roughly a million (or more) shares.[3] During the first quarter of 2008, as Chapman exited, two of these blockholders – both mutual funds – significantly reduced their holdings: TCW sold 318,713 shares (∼30% of their holdings) while Heartland Advisors sold 176,584 (∼10% of theirs). In contrast, the Wisconsin Investment Board, a public pension fund, held its position constant, while Renaissance Technologies, a hedge fund, increased its holdings by 94,000 shares (∼10% of their stake).[4]

Chapman's exit from FSI in 2008 can be viewed as an example of the "Wall Street Walk" – when a blockholder concludes that managers will not make value-maximizing choices, she may sell out to avoid (further) longer-term losses.[5] Such informed sales will, however, lower the share price of the company, punishing managers, raising the cost of bad choices ex ante,

[1] Section 13(d) of the US 1934 Exchange Act requires investors to file with the SEC upon acquiring 5% of a public company if they have an interest in influencing its management or operations.

[2] Benno Sand, FSI's executive vice president for business development and investor relations, quoted in the Star Tribune, 21 June 2007.

[3] All other institutional blocks were approximately half the size of the smallest of these seven.

[4] Of the remaining three, two mutual funds, Dimensional and Perritt, also reduced their holdings, while Needham, with both mutual and hedge funds, held its position constant.

[5] While Chapman sold at a loss, by selling when it did it avoided much larger further losses. The FSI stock price declined by approximately 87% in the year following Chapman's exit, and took around two years to return to March 2008 price levels.

a mechanism known as governance via exit (Admati and Pfleiderer (2009), Edmans (2009)). The McCahery, Sautner, and Starks (2016) survey of institutional investors suggests that they commonly use exit to govern.

The FSI-Chapman anecdote reminds us that blockholders do not exist in isolation: when one exits, others may (or may not) join. The degree to which blockholder exits are correlated is clearly relevant to the exit governance mechanism. If exits are correlated, the share price impact is likely to be higher, strengthening the ex ante threat of exit. Institutional investors are aware of this: according to McCahery, Sautner, and Starks (2016), the single most important consideration in institutional exit decisions (72% of respondents) is the decision by *others* to exit.

More intriguingly, the FSI-Chapman anecdote illustrates that those blockholders who exited with Chapman were very different from those who didn't. Mutual funds were the biggest sellers in the quarter in which Chapman exited. As a result of their open-ended structure, these investors are subject to investor redemptions. In contrast, a large public pension fund (whose investors cannot easily leave) and a hedge fund (whose investors are sophisticated and may have agreed to lock-up provisions) retained or even increased their holdings.

The co-existence of multiple institutional blockholders with differing organizational and incentive structures is widespread. Using data from 1999 to 2017, Dasgupta, Fos, and Sautner (2020) report that the average US firm had over 11 institutional blockholders with 1% or more of shares. They also document significant heterogenenity in blockholdings. Focussing on mutual funds (as regulated, retail orientated, open-ended institutions) and hedge funds (as unregulated institutions with sophisticated, sometimes locked-in, investors), they find that the average firm had 2.5 mutual fund blockholders and 2.6 hedge fund blockholders at the 1% or higher level. Thus, potential interactions across several, heterogeneous, institutional blockholders is of key relevance to corporate governance. We study such interactions in this paper. How do institutional incentives affect the manner in which different blockholders react to each others' exit and, in turn, the strength of the exit governance mechanism? What characteristics of institutional investors strengthen or weaken the threat of exit in a multi-blockholder setting?

We take a two-pronged approach to address these questions. First, we develop a model of how governance via exit operates in the presence of multiple institutional blockholders with differing incentives. While institutional incentives are multi-faceted, inspired by the FSI-Chapman anecdote, we focus on one pervasive source of heterogeneity: Some institutional investors (e.g., mutual funds) are (relatively more) open-ended and thus more exposed to short-term investor redemption than others (e.g., hedge funds, endowments, pensions funds). Exposure to redemption risk has been widely demonstrated to have undesirable consequences in asset pricing following the seminal work of Shleifer and Vishny (1997) on the limits of arbitrage. In contrast, we show that in corporate governance such exposure can be a *positive* force. The key insight is to recognize that institutional blockholders who are exposed to short-term redemptions do not wish to disappoint their clients. As a result, when such blockholders perceive that an informed blockholder has sold out, they worry that unless they follow suit they will be revealed to be poorly informed and suffer outflows. This increases their incentives to exit when the engaged blockholder exits, ramping up the quantity sold, and enhancing the ex ante power of the engaged blockholder in the eyes of corporate managers, improving governance. We then present large-sample empirical evidence to illustrate the mechanism in our model. In particular, we show that when activist hedge funds exited target firms between 1994 and 2011, open-ended mutual funds sold out significantly more than other institutions.

Our model takes the Admati and Pfleiderer (2009) framework as a starting point and enriches it in three ways. First, since we are interested in how blockholders react to each other's exit, we allow for multiple blockholders who move sequentially. Second, since we focus on the incentives of heterogeneous institutional investors, we allow for some blockholders to be exposed to redemption risk while others are not. Finally, since the *amount* of selling support provided by other blockholders to an engaged, informed blockholder is central to our story, we create an explicit role for the *quantity* of selling by introducing a (microfounded) downward-sloping demand curve.

In our model, a corporate manager chooses between a good action (that generates high eventual cash flows) and a bad one (that generates low cash flows) that endows him with private benefits. An informed blockholder observes the manager's choices and decides whether to retain or exit. As in Admati and Pfleiderer (2009), the possibility of liquidity shocks creates noise in the secondary market, and thus when this blockholder observes that the manager chooses the bad action, it is in her best interest to exit. A second blockholder observes the informed blockholder's choice (or infers it from price movements) and decides how to react. This blockholder is imperfectly informed, and the quality of her information depends on her own (unknown) type. Further, this second blockholder's incentives can differ. She may either be motivated purely by portfolio value maximization – i.e., she does not worry about short-term redemptions – in which case we call her "value motivated." Or she may be subject to the possibility of investor redemptions – in which case, she wants to ensure that she is not revealed to have received incorrect information because that risks outflows – and we refer to her as "flow motivated."

In equilibrium, value motivated blockholders do not react to the exit of the informed blockholder. If the value motivated blockholder is well informed, she exits if and only if her own information indicates that the manager has chosen the bad action. If the value motivated blockholder is poorly informed she *never* exits, because she does not wish to pay the roll down the downward-sloping demand curve implied by her sales. In sharp contrast, as long as the informed blockholder is not subject to frequent liquidity shocks, flow motivated blockholders react maximally to the exit of the informed blockholder: *regardless* of their own private information, such blockholders exit whenever the informed blockholder exits. In other words, flow motivated blockholders herd behind the informed blockholder.

The governance implications of such behavior are nuanced. On the one hand, the fact that flow motivated blockholders herd behind the informed blockholder enhances the price drop associated with the informed blockholder's exit, increasin punishments for suboptimal choices. On the other, the fact that such blockholders ignore their own information when making exit decisions introduces *endogenous* noise, sometimes punishing the manager severely even when he has made *optimal* choices. We characterize, via two results, how governance ranks across equilibria with value motivated vs flow motivated blockholders. First, we show that the only instance in which governance works better *without* flow motivated blockholders is if value motivated blockholders are very well informed. Otherwise, governance is unambiguously better with flow motivated blockholders. Second, we show that if information acquisition is a choice, it is unlikely that value motivated blockholders will choose to become well informed in the presence of a large informed blockholder. Thus, overall, our analysis suggests that flow motivated blockholders are beneficial for governance via exit in conjunction with an informed blockholder.

We now turn to the empirical component of our analysis. Our model delivers two interconnected sets of results: (i) how blockholders react to each other's exits; and (ii) the implications of such interactions for governance. The second set of predictions are not readily amenable to empirical examination as they rely on unobservables such as the information quality of value motivated blockholders. In contrast, trading choices and the identity of blockholders can be inferred from holdings data. In our empirical analysis, we therefore focus on the first set of predictions, thus examining whether the *underlying foundations* for our governance results are evident in the data. In particular, we examine trading by institutional investors in the aftermath of exits by activist hedge funds. Given the immersive involvement of activist funds in their target firms, we treat such funds as informed blockholders. We identify how and when such informed blockholders exit and trace the reactions of other institutional investors via quarterly 13F filings.

We treat open-ended *mutual funds* (identified by their presence in the Morningstar Open End Mutual Funds database) as our proxy for flow motivated blockholders. In contracting with their clients, such retail funds are subject to significant restrictions imposed by the Investment Companies Act of 1970, leading over 97% of them to use assets under management contracts as their exclusive form of compensation (Elton, Gruber, and Blake (2003)). This creates clear incentives for them to act in ways that maximize investor capital inflow.

Other asset managers, such as pension funds, hedge funds, banks and insurance companies, typically have compensation structures with varying degrees of sophistication that enable relatively better alignment of the interests of investors and their funds, thus potentially inducing funds to act more as portfolio value maximizers. While there is clearly heterogeneity amongst non-mutual funds, *on average*, such institutions will be less flow motivated than mutual funds.

Our empirical analysis is conducted on a set of 260,678 firm-quarter observations between 1994 and 2013, covering 7,994 companies, targeted by 175 hedge fund families, resulting in 2,739 engagement campaigns. The results of our empirical analysis suggest that the mechanism identified in our theoretical framework is at play in the real world. Controlling for unobserved firm-level heterogeneity and general economic conditions, we find that following exits by activist funds, flow motivated mutual funds sell out of the target firm significantly more than other institutional investors. Such differences in trading behavior are exacerbated when (i) the activist fund exited at a loss and (ii) when the market's immediate reaction suggested that the activist exit was unlikely to be due to liquidity needs. We argue in Section 5 that both these findings are in line with our model's predictions.

1.1 Related literature

Our paper builds on the literature on blockholder monitoring (surveyed by Edmans and Holderness (2017)) and the role of institutional investors in particular (surveyed by Dasgupta, Fos, and Sautner (2020)). We classify our discussion of more specific links to the literature into three components.

Exit models. Edmans and Manso (2011) consider the possibility of multiple blockholders who govern via exit. In their model, competition in trading by multiple blockhoders leads to improved information aggregation (as in Kyle models with multiple insiders), improving governance. Their focus is different from ours. Edmans and Manso (2011) are interested in whether multi-blockholder structures per se can be beneficial. Accordingly, their blockholders are homogeneous and there is no role for incentives and heterogeneity, which are key ingredients in our analysis. Further, their analysis is static and does not permit blockholders to react to each other's exit. Dasgupta and Piacentino (2015) focus on how flow motivations affect governance via exit. They show that such incentives weaken exit in a single-blockholder context: flow motivated blockholders are reluctant to execute on a threat of exit as this would reveal negative information about their ex ante stock selection ability. In contrast, we show that, in a *multiple* blockholder context, the *interaction* of flow motivated blockholders with engaged blockholders *strengthens* the exit governance mechanism. Song (2017) also considers the role of flow motivations in a multiple blockholder setting, but focuses on how such motivations influence the use of voice by non-flow motivated blockholders.

Herding models. In our paper flow motivated investors bolster the exit governance mechanism by herding out of firms when engaged blockholders exit. Herding arises in our model because these investors care about their ex post reputation with their clients. Reputational herding was first analyzed by Scharfstein and Stein (1990). In contrast to that paper, prices are endogenously determined in ours, incorporating the effect of herding. Further, these endogenously determined prices enter into the manager's payoff function, thus affecting managerial choices and firm value, which in turn feeds back into prices. The existence of this feedback loop – missing from the traditional herding literature – implies that herding can be beneficial despite the induced loss in information aggregation. Khanna and Sonti (2004) also combine herding with a (different form of) price feedback loop. In their paper, herding can push prices higher and induce a positive change in the firm's investment, through feedback from prices into corporate investment. As a result herding can be beneficial. In formalizing the benefits of herding, our paper is closely connected in spirit to Khanna and Mathews (2011). They consider whether herding can improve investment decisions in settings in which (i) early movers choose the precision of their information and (ii) subsequently rely on the information revealed by all decisions in order to make decisions. They show that as long as such future decisions are sufficiently important, early movers will acquire more precise information when they know that late movers will herd and reveal no information. In a different context not involving governance considerations, Altı, Kaniel, and Yoeli (2012) tell a distinct story of trend chasing not involving reputational concerns. In their model, funds are uncertain about the quality of their information, and wait for public news to confirm their information before trading in that direction.

Governance role of active mutual funds. Our paper is thematically linked to empirical papers seeking to examine the role of mutual funds in corporate governance. Iliev and Lowry (2015) document that mutual funds may exert influence via voice by showing that a substantial fraction of mutual funds are active voters, not purely reliant on proxy voting advice. Our results demonstrate that mutual funds may also contribute to governance via correlated exit strategies. Further, some recent papers provide evidence that active mutual funds provide support in governance via voice to activist hedge funds include Kedia, Starks, and Wang (2021) and Brav, Jiang, and Li (2018).[6] Finally, our work complements Giannetti and Yu (2020), who empirically examine the governance benefits of short-horizon investors. Identifying short-horizon investors as those empirically classified to be "transient" by Bushee (2001), they find that firms with more such investors respond better than peers to reductions in import tariffs (an exogenous shock), and argue that this is due to the disciplining effect of the fear of aggressive sales by short-term investors. By establishing the ex ante governance benefits of herd sales, we provide a conceptual foundation for their findings. Further, our micro foundation via flow sensitivity provides guidance on *why* some investors may sell aggressively in response to bad news. Finally, while they focus empirically on firm-level outcomes, we focus instead on the actual trades of different institutional owners.

2 A Conceptual Framework

Consider an economy with four dates $t = 0, 1, 2$ and 3. There is a single firm, with a continuum of outstanding shares, normalized to measure 1. The firm generates a single cash flow, $v \in \{\underline{v}, \overline{v}\}$, at $t = 3$ where the realized value of v depends on managerial actions. Denote the (endogenously determined) share price of the firm at $t = 1, 2, 3$ by P_t. All information is public at $t = 3$ and thus $P_3 = v$.

The actors in the model are a corporate manager, an informed blockholder who makes choices at $t = 1$, a second blockholder who makes choices at $t = 2$, and a continuum of myopic risk averse traders who operate at $t = 1$ and 2. There is no discounting.

At $t = 0$ the manager (M) chooses an action $a_M \in \{\underline{v}, \overline{v}\}$ where $\overline{v} > \underline{v} > 0$. M derives a stochastic private benefit β from choosing $\underline{v}$, where β is distributed on $[0, \infty)$ with CDF F. The realized value of β is privately observed by M. M's action uniquely determines the cash flows produced by the firm, i.e., $v = a_M$. As is standard in exit models, M is incentivized by a

[6] A growing parallel strand of the literature features an active debate about the role of passive, i.e., *index*, mutual funds in corporate governance (see Dasgupta, Fos, and Sautner (2020, sec. 5.4.4) for a discussion of these papers). This strand is less related to our work as index funds can play no role in governance via exit.

linear combination of short-term prices and final cash flows. In particular, M's payoff is given by $\omega_1 P_1 + \omega_2 P_2 + \omega_3 v + I(a_M = \underline{v})\beta$, where $I(\cdot)$ is the indicator function and $\omega_{1,2,3} > 0$. We define $\Delta v \equiv \overline{v} - \underline{v}$.

At $t = 1$ an informed blockholder (IB), who enters the model owning $\alpha_1 \in (0,1)$ fraction of equity, observes the manager's action. Conditional on the signal the IB chooses whether to retain $a_1 = r$ or exit $a_1 = e$. The IB's ex post payoff is given by

$$\pi_1 = \begin{cases} \alpha_1 v, & if\, a_1 = r, \\ \alpha_1 P_1, & if\, a_1 = e. \end{cases}$$

Further, with probability $\delta_1 \in (0,1)$ the IB is subject to a privately observed liquidity shock and must choose $a_1 = e$.

At $t = 2$ there is a second blockholder (2B), who enters the model owning $\alpha_2 \in (0, 1 - \alpha_1)$, observes a_1,[7] as well as a private signal about M's action, $s_2 \in \{\underline{v}, \overline{v}\}$. Conditional on the signal 2B chooses whether to retain $a_2 = r$ or exit $a_2 = e$. 2B's signal is imperfect and depends on her skill. In particular, 2B can be of two types $\tau \in \{g, b\}$, where $\gamma_2 = Pr(\tau = g)$; the precision of the signal is given by:

$$\sigma_{2,\tau^*} = \mathbb{P}\left[s_i = v^* \mid v = v^*, \tau = \tau^*\right],$$

where $\tau^* \in \{g, b\}$ with $1 \geq \sigma_{2,g} > \sigma_{2,b} \geq \frac{1}{2}$. We denote the average precision of 2B's information by $\sigma_2 \equiv \gamma_2 \sigma_{2,g} + (1 - \gamma_2)\sigma_{2,b}$. Like IB, 2B is subject to liquidity shocks: with probability $\delta_2 \in (0,1)$ 2B is subject to a privately observed liquidity shock and must choose $a_2 = e$.

We think of 2B as being an institutional investor who manages the capital of clients. In turn, we think of institutional investors as being of two broad classes.

One class of institutional investor consists of asset managers whose interests are perfectly aligned with their (risk neutral) clients. They maximize portfolio value (as their clients would, had they been in control), and we refer to such institutional investors as being *value*

[7]The model is qualitatively unchanged if—instead of observing a_1—2B observed P_1, since IB is the only trader at $t = 1$.

motivated (VM). If 2B is VM, then her ex post payoff is given by:

$$\pi_2 = \begin{cases} \alpha_2 v, & if\, a_2 = r, \\ \alpha_2 P_2, & if\, a_2 = e, \end{cases}$$

VM institutions can be thought to be asset managers whose clients are sophisticated and set investment mandates—including, e.g., incentive payments, self-investment requirements, and lock-up provisions—to align incentives. A natural example of such investors are sophisticated and (relatively) unregulated hedge funds.

The other class of institutional investor is made up of asset managers whose interests are not perfectly aligned with their principals due to their organizational structure and limitations on incentive contracting. As a result of such limitations, these institutions are subject to investor redemption pressure, and act in ways that maximize their chances of having their investment mandates renewed, i.e., to retain or attract investor flow in order to earn fees. We refer to such investors as being *flow motivated* (FM). If 2B is FM, imagine that she earns fee $w > 0$ if rehired by clients at the end of the game. In making their rehiring decisions, clients compare the institution to the available alternative, which is a new fund with a probability $\gamma_3 \sim U[0, 1]$ of being the good type. γ_3 is realized at $t = 3$. In other words, 2B's expected future earnings are

$$\mathbb{P}\left[\mathbb{P}\left(\tau = g \mid v, a_2\right) > \gamma_3\right] w = \mathbb{P}\left(\tau = g \mid v, a_2\right) w.$$

Thus, the FM 2B maximizes

$$\mathbb{P}\left(\tau = g \mid v, a_2\right).$$

A natural example of such investors are retail mutual funds. The contracts between retail mutual funds and their investors are restricted by provisions in the Investment Companies Act of 1970 leading over 97% of them to use assets under management contracts as their exclusive form of compensation (Elton, Gruber, and Blake (2003)). This creates clear incentives for them to act in ways that maximize investor capital inflow, and indeed, there is extensive empirical evidence (Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997)) that mutual funds *do* compete for investor flow.

We assume, that the signal s_2 is independent of s_1 conditional on v, and these signals, the private benefit, β, and the type, τ, are mutually independent.

At $t = 1, 2$ there is a continuum of myopic risk-averse traders with mean-variance preferences. Each trader (i) observes the history of trades up and including date t, denoted by h_t, and makes rational inferences; (ii) has endowment W and can either invest in the stock or in the risk-free asset (with zero rate of return). By holding $x_{i,t}$ units of the stock at price p_t trader i with "risk aversion" λ_i obtains utility

$$x_{i,t}\mathbb{E}(v|h_t) - \frac{1}{2}\lambda_i x_{i,t}^2 \mathrm{Var}(v|h_t) + W - p_t x_{i,t}.$$

2.1 Preliminaries

2.1.1 Strategies and Notation

The strategies of the players are designated as follows: IB's strategy is $\Sigma_1 : a_M \to \{e, r\}$; 2B's strategy is $\Sigma_2 : s_2 \to \{e, r\}$; and M's strategy is designated $\Sigma_M : \beta \to \{\underline{v}, \overline{v}\}$. Let $\alpha_t \equiv \alpha(h_t)$ denote the total (cumulative) quantity sold conditional on history h_t. Let $q_t \equiv q(h_t) = \mathbb{P}(v = \overline{v}|h_t)$ denote the conditional probability that M chose action $\overline{v}$ given history h_t.

2.1.2 Characterizing prices

Consider the short-lived traders. The first order condition of trader i at any date t implies:

$$x_{i,t} = \frac{\mathbb{E}(v|h_t) - P_t}{\lambda_i \mathrm{Var}(v|h_t)}$$

so, market clearing at each t: $\int_i x_{i,t} di = \alpha_t$, gives

$$P_t = \mathbb{E}(v|h_t) - \lambda \alpha_t \mathrm{Var}(v|h_t),$$

where $\lambda \equiv 1/\int_i \frac{1}{\lambda_i} di$. Throughout the remainder of our analysis we impose the following assumption:

Assumption 1. $\lambda < 1/\Delta v$.

This assumption ensures that prices are well behaved in the model. Lemma 1 below shows that under Assumption 1 prices (i) do not fall below $\underline{v}$, (ii) are increasing in the conditional probability of $v = \overline{v}$; and (iii) are higher when managers make better choices.

Lemma 1. *If* $\lambda < 1/\Delta v$,

(i) $P_t > \underline{v}$ *for all* t, h_t.

(ii) P_t *is increasing in* q_t.

(iii) If there exists $\hat{\beta}$ *such that* $\Sigma_M = \left\{\underline{v} \text{ if and only if } \beta > \hat{\beta}\right\}$ *and* q_t *is increasing in* $\hat{\beta}$, *then* P_t *is increasing in* $\hat{\beta}$.

The proof of this result—as well as that of all subsequent results—is in Section A of the Appendix. In our model, the price is the expected asset cash flows given the observed history, $\mathbb{E}(v|h_t)$, less a risk premium $\lambda\alpha_t\text{Var}(v|h_t)$. The risk premium is higher if the asset is (conditionally) more risky (i.e., if $\text{Var}(v|h_t)$ is higher), if more of it must be held by risk averse traders (i.e., if α_t is higher), and if aggregate risk aversion (λ) is higher. For high levels of λ, the market clearing price could fall below the lowest possible cash flow $\underline{v}$. Part (i) of Lemma 1 establishes an upper bound on λ sufficient to rule out this possibility. Further, while expected cash flows $\mathbb{E}(v|h_t) = \Delta v q_t + \underline{v}$ is linear in the conditional probability that M chooses $\overline{v}$ q_t, the conditional variance of cash flows $\text{Var}(v|h_t) = \Delta v^2 q_t(1-q_t)$ is non-monotone. For high levels of λ, the price could be non-monotone in q_t. However, part (ii) of Lemma 1 shows that under the same condition as in part (i), the price is always increasing in q_t. Part (iii) of Lemma 1 is useful for subsequent analysis. It establishes that if M chooses $\overline{v}$ if and only if his private benefit is smaller than some threshold $\hat{\beta}$ then—under the same condition as in parts (i) and (ii)—the price is increasing in $\hat{\beta}$.

2.1.3 Governance Benchmarks

Before moving on to our main analysis we state two governance benchmarks.

No governance. Suppose there is no governance via exit—because, for whatever reason, shareholders cannot respond to managerial actions—and thus the prices at $t = 1, 2$ are unaffected by the manager's action. Denote these prices P_1^B and P_2^B. In that case, the choice facing the manager is as follows. If he chooses $a_M = \overline{v}$ then his payoff will be $\omega_1 P_1^B + \omega_2 P_2^B + \omega_3 \overline{v}$ whereas if he chooses $a_M = \underline{v}$ his payoff will be $\omega_1 P_1^B + \omega_2 P_2^B + \omega_3 \underline{v} + \beta$. Thus the manager will choose $a_M = \underline{v}$ if and only if $\beta \geq \underline{\beta} \equiv \omega_3 \Delta v > 0$.

Perfect governance. Suppose there is perfect governance in that prices perfectly reflect the informational content of managerial choices, i.e., $P_1 = P_2 = a_M$, where $a_M \in \{\underline{v}, \overline{v}\}$. Then, the manager chooses the low action if and only if $(\omega_1 + \omega_2 + \omega_3)\overline{v}$ is lower than $(\omega_1 + \omega_2 + \omega_3)\underline{v} + \beta$ or, equivalently, $\beta \geq \overline{\beta} \equiv (\omega_1 + \omega_2 + \omega_3)\Delta v \in \left(\underline{\beta}, \infty\right)$.

3 Trading in equilibrium

3.1 The value maximizing case

We first solve for the equilibrium for the case in which 2B is VM.

Proposition 1. *There exist $\frac{1}{2} < \underline{\sigma} < \overline{\sigma} < 1$ and $\beta^u_{VM}, \beta^{\sigma_2}_{VM} \in \left(\underline{\beta}, \overline{\beta}\right)$ such that:*

1. *IB chooses $a_1 = e$ if and only if $a_M = \underline{v}$.*
2. *For $\sigma_2 > \overline{\sigma}$*
   - *(a) If $a_1 = e$, 2B chooses $a_2 = e$ if and only if $s_2 = \underline{v}$;*
   - *(b) If $a_1 = r$, 2B chooses $a_2 = r$ for all s_2.*
   - *(c) M chooses $\underline{v}$ if and only if $\beta > \beta^{\sigma_2}_{VM}$.*
3. *For $\sigma_2 < \underline{\sigma}$*
   - *(a) If $a_1 = e$, 2B chooses $a_2 = r$ for all s_2;*
   - *(b) If $a_1 = r$, 2B chooses $a_2 = r$ for all s_2.*
   - *(c) M chooses $\underline{v}$ if and only if $\beta > \beta^{u}_{VM}$.*

IB observes M's choices and by Lemma 1, part (i), prices at $t = 1$ are always strictly above $\underline{v}$. Thus it is clearly in IB's best interest to exit if and only if M has chosen the low action. If

$a_1 = r$, then—since IB is perfectly informed (and retention rules out liquidity shocks)—this immediately reveals that $a_M = \overline{v}$. Thus all uncertainty is resolved and $P_t = \overline{v}$ for $t = 1, 2, 3$, rendering 2B's choices inconsequential for managerial incentives. In turn, 2B is indifferent across all trades and it is (weakly) a best response to set $a_2 = r$.

If $a_1 = e$, however, there is residual uncertainty, because IB may have exited for informational or liquidity reasons. Now, 2B's private information becomes relevant. 2B has valuable information about M's actions, but her information is imperfect. She faces a tradeoff. When she observes $s_2 = \underline{v}$, she would ideally sell (because her information is correct on average) but then she lowers prices, i.e., she faces a "roll down the demand curve" due to the risk premium component of exit prices. If her information is of sufficiently high quality ($\sigma_2 > \overline{\sigma}$), it is worth paying the roll down the demand curve, and she chooses to exit if and only if her information indicates that M chooses the low action. If her information is sufficiently imprecise ($\sigma_2 < \underline{\sigma}$), then it is too costly to pay the roll down the demand curve and 2B simply retains. Thus, from M's perspective, the expected punishment for choosing $a_M = \underline{v}$ depends on the quality of 2B's information. Accordingly, M follows a conditional strategy, choosing $a_M = \underline{v}$ for $\beta > \beta^u_{VM}$ when 2B is poorly informed and for $\beta > \beta^{\sigma_2}_{VM}$ when 2B is well informed. The former threshold does not depend on the precise quality of 2B's information (since 2B follows an information-uncontingent strategy when poorly informed) but the latter does.

3.2 The flow maximizing case

We now solve for the equilibrium for the case in which 2B is FM. In the analysis that follows, we always fix off-equilibrium beliefs to be as follows: off-equilibrium exit by 2B is assumed to arise from having observed $s_2 = \underline{v}$, whereas off-equilibrium retention is assumed to arise from having observed $s_2 = \overline{v}$. These beliefs are robust in the sense that they would be the *on*-equilibrium beliefs if with a small probability 2B was "naive" and always acted according to her signal. We can state:

Proposition 2. *As long as* $\delta_1 < \underline{\delta}_1 \equiv \overline{F}\left(\overline{\beta}\right)/F\left(\overline{\beta}\right)$*, there exists* $\beta_{FM}^{\delta_1} \in \left(\underline{\beta}, \overline{\beta}\right)$ *such that:*

1. *IB chooses* $a_1 = e$ *if and only if* $a_M = \underline{v}$*.*

2. *If* $a_1 = e$*, 2B chooses* $a_2 = e$ *for all* s_2*.*

3. *If* $a_1 = r$*, 2B chooses* $a_2 = r$ *for all* s_2*.*

4. *M chooses* $\underline{v}$ *if and only if* $\beta > \beta_{FM}^{\delta_1}$*.*

IB's behavior is identical to the previous case. As before, when $a_1 = r$, it is revealed that $v = \overline{v}$, but when $a_1 = e$ residual uncertainty remains. 2B has valuable information about M's actions, but her information is imperfect. Imagine that 2B has observed signals $s_2 = \overline{v}$. When IB exits, 2B knows that this could be either because IB was subject to a liquidity shock in which case IB's action is uninformative about the future firm cash flow v. However, if IB was not subject to a liquidity shock, then exit is informative: the future cash flow will be $\underline{v}$. A flow motivated 2B is interested in maximizing her clients' ex post inferences about her. She has two choices. If she follows the equilibrium strategy and exits (even though she has received signal $s_2 = \overline{v}$), her clients can make no inferences about her, since equilibrium trading is uninformative. If she deviates and retains, she will be revealed to be correctly informed if both (i) IB was subject to a liquidity shock and (ii) her own signal is correct. In this case, she will improve her standing in the eyes of her clients. But, if either (i) or (ii) fails, then she will be revealed to be incorrectly informed, and her standing in the eyes of her clients will decline. Intuitively, when δ_1 is small, IB's exit convinces 2B that it is sufficiently likely that the realized outcome will be $\underline{v}$, which also simultaneously makes her doubt the quality of her own information thus making a negation of (ii) more likely. Thus, it is better for 2B to "jam" her private signal by acting in a manner that hides it from her clients.

By a similar argument, if δ_1 is large, then the likelihood of (i) above becomes high, and thus observing a signal that disagrees with IB's actions makes it less likely that (ii) will fail. For such parameters, it is better not to "jam" private signals, but rather to follow them, as the following results establishes:

Proposition 3. *As long as* $\delta_1 > \overline{\delta}_1 \equiv \overline{F}\left(\underline{\beta}\right)/F\left(\underline{\beta}\right)$, *there exists* $\beta_{FM}^{\delta_1} \in \left(\underline{\beta}, \overline{\beta}\right)$ *such that:*

1. *IB chooses* $a_1 = e$ *if and only if* $a_M = \underline{v}$.

2. *If* $a_1 = e$, *2B chooses* $a_2 = e$ *if and only if* $s_2 = \underline{v}$;

3. *If* $a_1 = r$, *2B chooses* $a_2 = r$ *for all* s_2.

4. *M chooses* $\underline{v}$ *if and only if* $\beta > \beta_{FM}^{\delta_1}$.

Note that since $\overline{\beta} > \underline{\beta}$ and $\overline{F}/F$ is a decreasing function, we have that $\overline{\delta}_1 > \underline{\delta}_1$.

4 Governance in equilibrium

We now compare governance with VM vs FM blockholders. In order to make our comparison meaningful and driven by (endogenous) incentives instead of (exogenous) variations in information quality, we hold the precision of information for 2B constant across VM and FM blockholders in all our comparisons.

Proposition 4. *There exists* $\delta_1^* \in \left(\overline{\delta}_1, 1\right)$ *and* $\sigma^* \in [\overline{\sigma}, 1)$, *such that for* $\delta_1 \in (0, \underline{\delta}_1) \cup (\delta_1^*, 1)$ *and* $\sigma_2 \in \left(\frac{1}{2}, \underline{\sigma}\right) \cup (\sigma^*, 1)$, *we have:*

$$\beta_{VM}^{u} < \beta_{FM}^{\delta_1} \leq \beta_{VM}^{\sigma_2},$$

where $\underline{\sigma}$ *and* $\overline{\sigma}$ *are defined in Proposition 1 while* $\underline{\delta}_1$ *and* $\overline{\delta}_1$ *are defined in Propositions 2 and 3, respectively.*

The comparison between governance across equilibria of our model is subtle because it involves a feedback loop: 2B's trading affects prices (and thus the rewards and punishments that M faces for his choices), which in turn affects M's decisions, which then feeds back into prices. Adding further complexity, VM and FM blockholders' trades respond differentially to model parameters. For VM blockholders the key parameter is the quality of private information σ_2 (see Proposition 1): for a given trade by the IB, VM blockholders care only about the degree to which they are informed over and above information already priced in. In contrast, FM blockholders care only indirectly about profits, being instead incentivized by whether they are perceived (ex post) to be well informed. Thus, for them, it is key that IB's trade will turn out to be ex post "correct." Hence, the key parameter driving the trade of FM blockholders is δ_1, the likelihood that the IB experienced a liquidity shock and thus traded in an uninformative manner (see Propositions 2 and 3).

Nevertheless, we can provide a parsimonious comparison of governance. Good governance is achieved by lowering the probability that M chooses $a_M = \underline{v}$, i.e., by raising the threshold level of private benefits β above which the undesirable action is chosen. Proposition 4 demonstrates that governance *can* be better in the VM case *but only if* 2B is highly informed; In case 2B is not well informed, governance is *unambiguously* better with FM blockholders.

Intuitively, the comparison across the FM and VM cases may be thought of as follows. M behaves best when he is punished (via blockholder exit) whenever he chooses $a_M = \underline{v}$ and is rewarded (via blockholder retention) otherwise.

For small δ_1, the FM 2B exits whenever IB exits. This means that M is strongly penalized—because 2B's exit lowers prices further following IB's exit—when he chooses $a_M = \underline{v}$. This is good for governance. But, a downside is that M is also punished just as much when he has chosen $a_M = \overline{v}$ if IB is forced to sell due to a liquidity shock: since 2B does not use her signal in equilibrium, valuable information is lost. This information loss is averted if 2B is VM and very well informed. In that case, when M chooses $a_M = \underline{v}$, he is punished for sure by IB's exit and likely also punished by 2B's exit; whereas when he chooses $a_M = \overline{v}$ and IB is forced to exit due to a liquidity shock, unless 2B also faces a liquidity shock, M's accidental punishment will likely be ameliorated by 2B's retention. Thus, in the case of a sufficiently well informed 2B, governance will be better than in the case in which 2B is FM. If, however, 2B is *not* well informed, then the VM 2B will not sell at all. Thus, when it comes to punishing M for $a_M = \underline{v}$, it is as if IB acts alone. This reduction of punishment for poor choices weakens governance, which is superior in the FM case than in the VM case for $\sigma_2 < \underline{\sigma}$.

In contrast, for large δ_1, with well-informed 2B, trading choices and thus governance are identical across the VM and FM cases. In contrast, a poorly informed VM 2B never punishes

M for choosing $a_M = \underline{v}$, while a poorly informed FM 2B follows an informative trading strategy for large δ_1. Hence, again, governance is superior in the FM case.

Since governance comparisons across the VM and FM cases rely crucially on the degree to which 2B is informed, we now turn to endogenizing information quality.

4.1 Endogenous information acquisition

Proposition 4 suggests that governance can be better in the VM case but only if 2B is highly informed; in case 2B is not well informed, governance is better with FM blockholders. Since the quality of information is to some extent a choice made by blockholders, the applied implication of this result relies on whether VM 2B in firms with an IB are likely to be well informed or not. We now model the information acquisition choice of 2B in the VM case. Since the behavior of 2B in the FM case is independent of the quality of her information, it is sufficient to model information acquisition only for the VM case.

We start with a poorly informed VM 2B, with $\sigma_2 < \underline{\sigma}$, keeping the rest of the model unchanged. 2B now has a choice at the beginning of the game: Suppose that, by expending some cost, she can become perfectly informed, i.e., have $\sigma_2 = 1$. Her information acquisition choice is observed by all. We show that:

Proposition 5. *The willingness of a VM 2B to pay to acquire information is monotonically decreasing in the size of IB's stake,* α_1.

2B's ex ante decision to pay to become informed relies on potential gains from being informed at the point of trade. There are two potential trading histories after which 2B must trade: $a_1 = r$ or $a_1 = e$. Since IB observes a_M, conditional on observing $a_1 = r$, it will be common knowledge that $v = \overline{v}$, and the quality of 2B's information is irrelevant. Thus, the benefits of information derives entirely from how it benefits 2B's trade conditional on $a_1 = e$. If 2B is uninformed, by Proposition 1 she will choose $a_2 = r$ and thus receive continuation payoff $E(v|a_1 = e)$. If 2B has paid to acquire information, so that $\sigma_2 = 1 > \overline{\sigma}$, by Proposition 1 she will sell when her information indicates that $a_M = \underline{v}$. In this case, she gains because she liquidates at some market clearing price $P_2 > \underline{v}$ (by Lemma 1) instead of holding on to her position for a payoff of $\underline{v}$. Thus, her incremental payoff from paying for information is positive. But this incremental payoff diminishes in the size of IB's sold stake α_1, because the market clearing price decreases towards $\underline{v}$ as the traded quantity becomes larger. Effectively, the larger is α_1, the bigger the roll down the demand curve when 2B has an opportunity to trade. Thus, 2B's willingness to pay for information will decrease.

Our results to date have implications for the potential preferences of informed blockholders such as activist hedge funds with regard to their fellow blockholders in target firms. In particular, consider an activist who is contemplating establishing a position in a firm in which other blockholders are value maximizers. This activist faces a trade-off: to gain direct influence over target management (via "voice") the activist would like to increase α_1, but higher α_1 worsens (indirectly) governance via exit, by making it less likely that her fellow blockholders will choose to become informed and thus provide (implicit) support for the activist's governance via the threat of exit. This trade-off does not exist in firms in which fellow blockholders are flow motivated institutional investors.

4.2 Discussion of modeling choices

In constructing our model we have made a number of choices. In the Online Appendix, we provide a discussion of these choices. We discuss the assumed exogeneity of the order of trading in the model (and show that it does not matter); we show that our results hold even if 2B blockholders are simultaneously value- and flow-motivated; and we trace the origins of the FM 2B's trading choices to flow-performance relationships.

5 An Empirical Investigation

Our model delivers two interconnected sets of results. First, in Propositions 1, 2, and 3, we characterize how VM and FM blockholders trade in response to an informed blockholder's exit. Second, in Proposition 4, we delineate how such trading choices affect managerial incentives and thus the quality of governance. While our governance result—that the flow motivations of blockholders may aid governance via exit—is of key economic interest, it is not readily amenable to empirical examination. Apart from the usual difficulties of empirically examining governance via the *threat* of exit as discussed by Bharath, Jayaraman, and Nagar

(2013), the characterization in Proposition 4 relies on unobservables such as the information quality of VM blockholders. In contrast, trading choices and the identity of the blockholders are observable. Thus, in this section, we empirically examine the trades of FM and VM blockholders, in order to examine whether the *underlying foundations* for our governance effects are evident in the data.

To identify exits by informed blockholders, we use data from Brav, Jiang, Partnoy, and Thomas (2008) (BJPT) and Brav, Jiang, and Kim (2010) (BJK). BJPT and BJK combine regulatory filings by activist hedge funds with news searches to build up a rich dataset on activist campaigns, documenting when and how the activist fund exited. Given the intensity of activist hedge funds' involvement in target firms, they are likely to be well informed. Quarterly 13F filings allow us to trace the behavior of other institutional blockholders. We identify open-ended mutual funds (via their presence in the Morningstar Open End Mutual Funds database, as described below) as our proxy for FM blockholders. As noted in Section 2, the majority of mutual funds are purely flow-motivated. This renders them (by definition) more flow motivated than the *average* non-mutual fund institutional investor, including those that impose explicit lock-up provisions, e.g., hedge funds, or those that benefit from implicit lockups, e.g., state pension funds whose investors need to switch jobs to change providers.

Table 1: Summary from Propositions 1, 2, and 3, on how FM (Top row) and VM (Bottom row) blockholders respond to the observed exit of the IB.

		Left	Right
		$\delta_1 < \underline{\delta}_1$	$\delta_1 > \overline{\delta}_1$
Top	FM	Always sell	Sell if and only if $s_2 = \underline{v}$
Bottom	VM	If $\sigma_2 > \overline{\sigma}$, sell if and only if $s_2 = \underline{v}$. If $\sigma_2 < \underline{\sigma}$ never sell.	If $\sigma_2 > \overline{\sigma}$, sell if and only if $s_2 = \underline{v}$. If $\sigma_2 < \underline{\sigma}$ never sell.

Table 1 summarizes the conclusions of Propositions 1, 2, and 3 regarding how FM and VM blockholders respond to the observed exit of the IB. When $\delta_1 > \overline{\delta}_1$, the exit choices of FM and VM blockholders are identical when VM blockholders are well informed; but when VM blockholders are poorly informed, they never sell, so that FM blockholders overall sell more often when $\delta_1 > \overline{\delta}_1$. Such differences are exacerbated when $\delta_1 < \underline{\delta}_1$, because FM blockholders *always* sell. Thus, unconditionally on δ_1, i.e., comparing the Top row with the Bottom row across the Left and Right columns, combined with our identifying assumption that mutual funds are relatively flow motivated, delivers our first empirical prediction:

EP1. *Conditional on the exit of an activist fund, mutual funds sell more relative to other institutional investors.*

As the discussion above suggests, if we were to condition on $\delta_1 < \underline{\delta}_1$, i.e., compare across the Top and Bottom rows for *only* the Left column, the differences in selling between FM and VM blockholders is exacerbated. While δ_1 is not directly observable, a natural empirical proxy for δ_1 is the immediate price reaction to an informed blockholder's exit. If the market believes that δ_1 is small, the immediate price impact of an informed blockholder's exit should be larger. Using the price reaction to an informed blockholder's exit as a proxy for δ_1 along with our identifying assumption of mutual funds as flow motivated blockholders delivers our second empirical prediction:

EP2. *The difference between mutual funds and other institutional investors' reaction to the exit of an activist fund is higher when the immediate price impact of the activist blockholder's exit is larger.*

Are activist engagements good empirical counterparts for the model?

While the richness of the BJK data make activist campaigns attractive for our purposes, the discerning reader may worry that the publicity inherent in activist campaigns limits their fit to exit models. In exit models, the informed blockholder has private information about the manager's choice of action. In an activist campaign, activists declare their preferred action ($\overline{v}$) in the 13D filing. At the outset of campaigns it is also often publicly known (e.g., Chapman Capital vs FSI) that target management do not wish to undertake that action. To what extent then does the activist have private information about the manager's actions at the point of exit?

Activist campaigns typically take time and involve a degree of persuasion (via the use of voice—both public and behind the scenes) of target management. In campaigns such as Chapman vs FSI, the activist may continue to try to persuade or pressurize management even if they are initially unwilling, in the hope that they may change their mind. If such persuasion works, the campaign succeeds (and typically ends with a public announcement, e.g., Becht et al. (2017)). If persuasion fails, there will be a point when the activist realizes that target managers will simply *not* choose their preferred action and concludes that the campaign will fail. Further—in contrast to the case where persuasion succeeds—the activist has no incentive to make his conclusion public. Hence, the activist's private information is effectively the conclusion that the manager simply cannot be persuaded to choose $\overline{v}$, and thus—by implication—chooses $\underline{v}$. Interpreted in the context of activism campaigns, our model abstracts from the full dynamics of the interaction (voice) between activists and management, and effectively starts at the point when the activist reaches some conclusion as to whether the manager will choose $\overline{v}$, which we label $t = 0$. Theoretical analysis of the interaction between voice and exit by an activist shareholder is provided by Levit (2019).

It is noteworthy that we do not claim that activist hedge funds principally govern via the threat of exit. In our view—implicit in the discussion in the previous paragraph—they use *voice* to persuade management. But simultaneously management will be aware that once an activist realizes that his campaign will fail, he may exit to prevent further losses, an implicit threat that supports voice (Hirschman (1970)). Our analysis suggests that such exits may induce flow-motivated blockholders to also sell, enhancing the price impact, and bolstering the implicit threat of exit. We now turn to a more detailed description of our data.

5.1 Data

We merge activist hedge fund campaign data with information on institutional holdings in target companies from the Thomson Reuters 13F database as well as with the Morningstar Open-end Mutual Fund portfolio holdings dataset.

5.1.1 Activist Campaign Data

We use data on informed activist campaigns based on an updated sample (1994-2011) provided by Alon Brav using the same data collection procedure and estimation methods as in BJPT and BJK. The activist campaign dataset is primarily based on Schedule 13D filings.

Under Section 13(d) of the 1934 Exchange Act, investors must file with the SEC within 10 days of acquiring more than 5% of any class of securities of a publicly traded company if they have an interest in influencing the management or the operations of the company. Schedule 13D filings provide information about the filing date, ownership and its changes, cost of purchase, and the stated purpose of the filer. BJK then combine the 13D filings data with data obtained through news searches using Factiva, gathering additional information such as the target management's response and the development and resolution of the events.

The resulting sample consists of 2,739 distinct campaigns involving 2,016 unique targets and 175 hedge fund families. We retain only the first campaign in which a firm was targeted, generating a one-to-one correspondence between campaigns and firms. As shown in Table 2 (Panel A), 38.88% of hedge fund campaigns involved a specific engagement objective by the informed blockholder in targeting the company, 52.54% of campaigns were run without a specific objective,[8] and 8.58% of campaigns had an unspecified/missing classfication in the data.

[Insert Table 2 here]

In Panel B we classify campaigns with a specific goal by their outcomes and find that there is significant heterogeneity. In 43.47% of campaigns, hedge funds reported that the outcome of their engagement was successful, and in 20.47% they settled with the target company. Activists reported a failed campaign in 14.55% of campaigns while they withdrew in 8.54% of campaigns. Around 1% of campaigns were still ongoing at the time of data collection and around11% of campaigns had insufficient information about the outcome.

The data contain information on how and when campaigns were terminated. We denote as the date of termination (below referred to as the *event quarter date*) the date when the activist fund: either a) reduces its stake in the target company below 5% (as indicated by the filing date of the last 13D/A that indicates ownership fell below 5%), or if a) is not available, then b) divests (this can also include the date when the target was acquired by another company or liquidated); or if neither a) nor b) are available, then c) the date on

[8] BJK denote campaigns as non-specific if the 13D filings and news searches on campaign objective provide generic statements such as "improving the company or improving shareholder value". For more information see Section 6.

which the campaign reaches a resolution (e.g. the target firm is sold, or the company agrees to comply with the hedge fund demands, or the hedge fund decides to quit, etc.).

Panel C provides information on the manner of campaign termination. The most common form of termination, in 39.21% of cases, is via sale in the open market, i.e., via "exit" in the sense of the model in Section 2. At the time of data extraction, 30.08% of activists still held on to their stakes in target companies, 8% of campaigns ended in the target being merged with another company, and 4.67% ended with the target company being sold to a third party. Other types of termination (liquidation, selling back to the target, or target being taken by another hedge fund) are less frequent. In almost 15% of campaigns, the manner of termination was not known at the time of data extraction. In our empirical analysis we use only sales in the open market, i.e., exits, to match our theoretical setup.

Finally, Panel B also provides detail regarding outcomes in campaigns that terminated via exits. 72.53% of campaigns in which the activist withdrew and 37.42% of campaigns that the activist considered as failure ended in exits. Among campaigns that concluded as success (settlement), in 24.19% (33.03% respectively) of cases the activist exited. Hence, there is also significant heterogeneity in outcomes within campaigns that terminated in exits.

5.1.2 Institutional Holdings Data

We trace the trading behavior of other blockholders via quarterly 13F filings. In the U.S. any institutional investor who manages $100 million or more must disclose their stock holdings by filing Form 13F to the SEC. We use the S34 dataset (13F filings) compiled by Thomson Reuters and combine it with the Morningstar Open End Mutual Funds database. We identify as *mutual funds* all funds that appear in the Morningstar Open End Mutual Funds database over the 1994–2013 time period. We note that our data on Open End Mutual Funds extends beyond the activist campaign data, which ends in 2011, to allow us to trace mutual fund trades *following* activist exits. For each mutual fund, the Morningstar database contains information about the fund's total assets under management (AUM), its individual stock holdings, type (e.g. index, fund of funds, socially responsible, etc.). Since our empirical analysis is conducted at the (mutual) fund-family level, we aggregate the Morningstar data at that level. Finally, we name-match and merge the Morningstar fund-family data with the 13F ownership data. This procedure is described in detail in Section C of the Appendix. We eliminate all fund families that are principally indexers as they cannot exit.[9] Finally, fund-families that are present in the 13F data, but not in Morningstar are then conversely classified as *non-mutual funds*.

[Insert Table 3 here]

We merge the pre-matched 13F-Morningstar data with the activist campaign data. We also add the firm level characteristics available from Compustat and limit our sample to companies with non-missing total assets. The resulting dataset contains 260,678 firm-quarter observations on 7,994 companies (Table 3). As shown in Panel A, the average number of shares outstanding in our sample is 235 million, and the corresponding average market capitalization stands at $8.06 billion. Institutional holdings represent on average 42.32% of the firm's stock ownership. Mutual funds hold on average 16.02% of a firm's stock, while non-mutual funds hold 18.35%. As for the company characteristics, the average firm size in terms of total assets in our sample is $9 billion, with an average leverage ratio of 26%, and average market-to-book ratio of 2.56. The distributions of these variables are in line with the existing studies on institutional ownership (e.g., Gantchev, Gredil, and Jotikasthira (2019)).

In Panel C of Table 3, we list the top three largest mutual fund managers in our sample in terms of the average holdings size, Fidelity comes up top; similarly, we list the top three largest *non-mutual fund* managers, where Barclays Bank Plc is top. We also include their classification as an indexer (1) or not (0). Out of the ten only Vanguard Group is classified as an indexer and so is excluded from our ensuing analysis.

5.2 Empirical Methodology and Results

We begin by examining EP1. First, we present some suggestive evidence.

[Insert Figure 1 here]

[9] A discussion of how we identify and eliminate indexers is provided in Section D of the Appendix.

Figure 1 shows the average holdings (as a fraction of shares outstanding) in four quarters before and after the activist exited by selling in the open market, for (a) mutual funds and (b) non-mutual funds. It is clear that mutual funds sell more than other institutional investors following activist exits. Next, we examine these effects formally by estimating the following differences-in-differences (DiD) specification:

$$\begin{aligned} \frac{Holdings_{i,t}}{SharesOut_{i,t}} &= \alpha + \beta_1 PostActivism_{i,t} \times MutualFund_{i,t} + \beta_2 PostActivism_{i,t} \\ &+ \beta_3 MutualFund_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t}, \text{ if } SoM_i = 1, \end{aligned} \quad (1)$$

The variable $Holdings_{i,t}$ represents the (amount of) holdings of institutions in firm i at time (i.e., quarter) t; we normalize holdings by the total number of shares outstanding in firm i at time t, $SharesOut_{i,t}$. Holdings refer to institutions that are mutual funds if $MutualFund_{i,t} = 1$ and non-mutual funds if $MutualFund_{i,t} = 0$. The variable $PostActivism_{i,t}$ is equal to 1 if in firm i the event quarter is less than or equal to quarter t and zero otherwise (where the event is the campaign termination date as described above). The variable SoM_i is 1 if the exit event occurred (i.e., the campaign terminated via a sale in the open market) and zero otherwise. All our specifications include firm and quarter fixed effects, and heteroscedasticity-adjusted standard errors. While the trading behavior of institutional investors can be driven by several observable and unobservable common factors, our difference-in-difference specifications help us isolate *differences* in the trading behavior of mutual funds and other institutional investors around activist exits.

The main coefficient of interest is the estimate of β_1 on the interaction term $PostActivism_{i,t} \times MutualFund_{i,t}$. Based on EP1 we expect that β_1 will be negative, i.e., mutual funds sell more (or buy less) than other institutions after an activist exit.

In our model, we focus on exits which may have governance impact by affecting prices, i.e., before information becomes public at $t = 3$. Thus, exits occur either when the manager chooses the value destroying action (which may show up in the data as either a campaign failure or perhaps as a withdrawal if the activist fund "gave up") or if the fund experiences a liquidity event (which may manifest in the data as a withdrawal). Of course, in reality, funds may simply sell in the open market (i.e., “exit” in an empirical sense) to take profits after the public success of an activist campaign. Such exits have no governance impact, and are of limited interest to us. Further, in such exits, there is no reason for mutual funds or other institutional investors to be influenced by the activist investors sale. Thus, in a refinement of our empirical strategy, we focus on the former type of exit by examining exits *at a loss* for the activist, because an exit at a loss is unlikely to be the result of profit-taking after a successful campaign. Figure 2 presents a refinement for Figure 1 to such exits at a loss.

[Insert Figure 2 here]

As in Figure 1, it is clear that mutual funds sell more than other institutional investors following activist exits at a loss. In order to differentiate this from the effect in Figure 1, we estimate:

$$\begin{aligned} \frac{Holdings_{i,t}}{SharesOut_{i,t}} &= \alpha + \beta_1 PostActivism_{i,t} \times MutualFund_{i,t} + \beta_2 PostActivism_{i,t} \\ &+ \beta_3 MutualFund_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t}, \text{ if } SoM_i \times EaL_i = 1. \end{aligned} \quad (2)$$

The variable EaL_i is 1 if the stock price of the target firm was lower at the time of the event quarter relative to when the activist entered the firm and zero otherwise.

For both specifications above, in some regressions we include $Controls_{i,t}$: firm size, market-to-book ratio and leverage, to capture observable time-varying firm characteristics that might be driving our results.[10] Further, in some regressions we consider ±4 quarters (as in the figures) around the event date, to assess the granularity of the effect across time.

Table 5 shows the results of estimating specifications (1) and (2). In particular, in columns 1–4 we conduct our analysis for all campaign terminations that involved sales in the open market (i.e. for $SoM_i = 1$) . Column 1 shows results of estimating specification (1), while column 2 restricts attention to ±4 quarters; and columns 3–4 are the respective specifications with controls $Controls_{i,t}$. In columns 5–8 we repeat the same structure, for exits at a *loss* (i.e., for $SoM_i \times EaL_i = 1$), starting from specification (2), and proceeding with event windows

[10] Controlling for a rich set of time-varying firm characteristics is important since it is reasonable to assume that an informed activist with a specific goal in mind will want to change those as part of her involvement. All firm level controls are winsorized at 0.01 percentile.

and controls as before.

Consistent with the model and EP1, the estimated coefficient β_1 is negative and significant across all columns 1–8, suggesting that following an activist's exit, mutual funds sell more relative to non-mutual funds. Moreover, estimates of β_1 in columns 5–8 are at least 2× in magnitude relative to those in columns 1–4, confirming our intuition that in using $EaL_i = 1$—i.e., conditioning on "exits at a loss"—is a clearer proxy for the effect we model.

[Insert Table 5 here]

We now proceed to examine EP2. To do so we estimate the following difference-in-difference-in-difference (DiDiD) specification:

$$\begin{aligned}
\frac{Holdings_{i,j,t}}{SharesOut_{i,t}} &= \alpha + \beta_1 PostActivism_{i,t} \times MutualFund_{i,t} \times PriceImpact_{i,T} + \\
&+ \beta_2 PostActivism_{i,t} \times PriceImpact_{i,T} + \beta_3 MutualFund_{i,t} \times PriceImpact_{i,T} \\
&+ \beta_4 PostActivism_{i,t} \times MutualFund_{i,t} + \beta_5 PostActivism_{i,t} + \beta_6 MutualFund_{i,t} \\
&+ \beta_7 PriceImpact_{i,T} + \gamma_i + \delta_t + \varepsilon_{i,t}, \begin{cases} \text{if } SoM_i = 1, & \text{(a)} \\ \text{if } SoM_i \times EaL_i = 1, & \text{(b)} \end{cases}
\end{aligned} \tag{3}$$

where

$$PriceImpact_{i,T} \equiv \max\left\{1 - \frac{\text{Price(event date in firm } i+T)}{\text{Price(event date in firm } i-T)}, 0\right\},$$

for $T > 0$ in days. $PriceImpact_{i,T}$ captures the magnitude of the price reaction to the exit of the activist as measured by the net return between T before and T days after the event (i.e., an event window analysis). The max operator ensures that we only take into account negative price-reactions in line with the model.

Our main point of interest in (3) is the estimate of β_1 on the interaction term $PostActivism_{i,t} \times MutualFund_{i,t} \times PriceImpact_{i,T}$. It is the effect of the (negative) price reaction to the exit of the activist blockholder comparing across both pre vs post the event quarter and mutual vs non-mutual funds. EP2 suggests that β_1 should be negative.

Table 6 reports the results for estimating (3) (a)–(b), where in Panel A, B we consider

$T = 1, 3$, respectively. In both panels the structure is the same as Table 5, i.e., column 1 is an estimation of (3) (a), column 2 is column 1 with controls, and so on. Moreover, all specifications include the same set of control variables, fixed effects structure, and standard errors treatment as before.[11] Consistent with EP2, the estimated coefficient β_1 is negative and significant across columns (1)–(4) (all exits), suggesting that a larger share price drop following an activist's exit exacerbates the degree to which mutual funds sell relative to non-mutual funds. The estimated coefficient is still negative in columns (5)–(8) (exits at a loss) but we lose statistical significance due to the small sample size and the highly saturated nature of the triple-difference.

[Insert Table 6 here]

6 Conclusion

Many publicly traded corporations today have multiple small blockholders. In such firms governance via exit is affected by how blockholders react to each others' exit. Institutional investors, who hold the majority of such equity blocks, are heterogeneous in their incentives. In this paper, we examine how such incentives affect the manner in which institutional blockholders react to each others' exit and thus, in turn, the effectiveness of the exit governance mechanism. Our theoretical framework shows that open-ended institutional investors, who are subject to investor redemption risk, will be sensitive to an informed blockholder's exit, giving rise to correlated exits and strengthening governance. Thus, exposure to redemption risk, universally a negative force in asset pricing, can play a positive role in corporate governance. Using data on engagement campaigns by activist hedge funds we then present large-sample evidence consistent with our theoretical mechanism.

[11] Note that we do not have an estimate for β_7 because variable $PriceImpact_{i,T}$ is collinear with the firm fixed effects γ_i.

References

Admati, A. R., and P. Pfleiderer, 2009, "The "Wall Street Walk" and Shareholder Activism: Exit as a Form of Voice," *Review of Financial Studies*, 22, 2645–2685.

Altı, A., R. Kaniel, and U. Yoeli, 2012, "Why Do Institutional Investors Chase Return Trends?," *Journal of Financial Intermediation*, 21, 694–721.

Becht, M., et al., 2017, "Returns to Hedge Fund Activism: An International Study," *Review of Financial Studies*, 30, 2933–2971.

Bharath, S. T., S. Jayaraman, and V. Nagar, 2013, "Exit as Governance: An Empirical Analysis," *Journal of Finance*, 68, 2515–2547.

Brav, A., W. Jiang, and H. Kim, 2010, "Hedge Fund Activism: A Review," *Foundations and Trends in Finance*, 4, 185–246.

Brav, A., W. Jiang, and T. Li, 2018, "Picking Friends Before Picking (Proxy) Fights: How Mutual Fund Voting Shapes Proxy Contests," *Columbia Business School Research Paper*.

Brav, A., W. Jiang, F. Partnoy, and R. Thomas, 2008, "Hedge Fund Activism, Corporate Governance, and Firm Performance," *Journal of Finance*, 63, 1729–1775.

Brown, K. C., W. V. Harlow, and L. T. Starks, 1996, "Of Tournaments and Temptations: An Analysis of Managerial Incentives in the Mutual Fund Industry," *Journal of Finance*, 51, 85–110.

Bushee, B. J., 2001, "Do Institutional Investors Prefer Near-Term Earnings Over Long-Run Value?," *Contemporary Accounting Research*, 18, 207–246.

Bushee, B. J., and C. F. Noe, 2000, "Corporate Disclosure Practices, Institutional Investors, and Stock Return Volatility," *Journal of Accounting Research*, 38, 171–202.

Chevalier, J., and G. Ellison, 1997, "Risk Taking by Mutual Funds as a Response to Incentives," *Journal of Political Economy*, 105, 1167–1200.

Dasgupta, A., V. Fos, and Z. Sautner, 2020, "Institutional Investors and Corporate Governance," *European Corporate Governance Institute (ECGI) – Finance Working Paper No. 700/2020. Available at SSRN:* `https://ssrn.com/abstract=3682800`.

Dasgupta, A., and G. Piacentino, 2015, "The Wall Street Walk When Blockholders Compete for Flows," *Journal of Finance*, 70, 2853–2896.

Edmans, A., 2009, "Blockholder Trading, Market Efficiency, and Managerial Myopia," *Journal of Finance*, 64, 2481–2513.

Edmans, A., and C. G. Holderness, 2017, "Blockholders: A Survey of Theory and Evidence," *Handbook of the Economics of Corporate Governance*, 1, 541–636.

Edmans, A., and G. Manso, 2011, "Governance Through Trading and Intervention: A Theory of Multiple Blockholders," *Review of Financial Studies*, 24, 2395–2428.

Elton, E. J., M. J. Gruber, and C. R. Blake, 2003, "Incentive Fees and Mutual Funds," *Journal of Finance*, 58, 779–804.

Gantchev, N., O. Gredil, and C. Jotikasthira, 2019, "Governance Under the Gun: Spillover Effects of Hedge Fund Activism," *Review of Finance*, 23, 1031–1068.

Giannetti, M., and X. Yu, 2020, "Adapting to Radical Change: The Benefits of Short-Horizon Investors," *forthcoming at Management Science.*

Hirschman, A. O., 1970, *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States* . , vol. 25, Harvard university press.

Iliev, P., and M. Lowry, 2015, "Are Mutual Funds Active Voters?," *The Review of Financial Studies*, 28, 446–485.

Kedia, S., L. T. Starks, and X. Wang, 2021, "Institutional Investors and Hedge Fund Activism," *Review of Corporate Finance Studies*, 10, 1–43.

Khanna, N., and R. D. Mathews, 2011, "Can Herding Improve Investment Decisions?," *RAND Journal of Economics*, 42, 150–174.

Khanna, N., and R. Sonti, 2004, "Value Creating Stock Manipulation: Feedback Effect of Stock Prices on Firm Value," *Journal of Financial Markets*, 7, 237–270.

Khorana, A., H. Servaes, and L. Wedge, 2007, "Portfolio Manager Ownership and Fund Performance," *Journal of Financial Economics*, 85, 179–204.

Levit, D., 2019, "Soft Shareholder Activism," *Review of Financial Studies*, 32, 2775–2808.

Lim, J., B. A. Sensoy, and M. S. Weisbach, 2016, "Indirect Incentives of Hedge Fund Managers," *Journal of Finance*, 71, 871–918.

McCahery, J. A., Z. Sautner, and L. T. Starks, 2016, "Behind the Scenes: The Corporate Governance Preferences of Institutional Investors," *Journal of Finance*, 71, 2905–2932.

Scharfstein, D. S., and J. C. Stein, 1990, "Herd Behavior and Investment," *American Economic Review*, 80, 465–479.

Shleifer, A., and R. W. Vishny, 1997, "The Limits of Arbitrage," *Journal of Finance*, 52, 35–55.

Song, F., 2017, "Blockholder Short-Term Incentives, Structures, and Governance," *European Corporate Governance Institute (ECGI) – Finance Working Paper No. 513/2017. Available at SSRN: https://ssrn.com/abstract=2516643*.

Appendix

A. Proofs

Proof of Lemma 1: We observe that:

$$\begin{aligned} P_t &\equiv \mathbb{E}\left[v \mid h_t\right] - \lambda \alpha_t \mathrm{Var}\left[v \mid h_t\right] \\ &= \Delta v q_t - \lambda \alpha_t \Delta v^2 q_t (1-q_t) + \underline{v}. \end{aligned}$$

i) We have

$$P_t \geq \underline{v} \iff \Delta v q_t - \lambda \alpha_t \Delta v^2 q_t (1-q_t) \geq 0,$$

First note that the existence of liquidity shocks guarantees that $q_t > 0$ for all h_t. If $\alpha_t = 0$ the inequality above holds immediately. If $\alpha_t > 0$ but $q_t = 1$, again the inequality holds immediately. For $\alpha_t > 0$ and $q_t \in (0,1)$, $P_t \geq \underline{v}$ is equivalent to

$$\lambda < \frac{1}{\alpha_t}\frac{1}{\Delta v}\frac{1}{1-q_t}. \tag{4}$$

Since $\alpha_t \leq \alpha_1 + \alpha_2 < 1$ and $q_t \in (0,1)$, the above inequality is guaranteed by $\lambda < \frac{1}{\Delta v}$.

ii) To see this take the q_t derivative of P_t:

$$\frac{\partial P_t}{\partial q_t} = \Delta v \left(1 - \lambda \alpha_t \Delta v (1 - 2q_t)\right).$$

For $q_t \geq \frac{1}{2}$ it is immediate that $\frac{\partial P_t}{\partial q_t} > 0$. For $q_t \in \left(0, \frac{1}{2}\right)$, $\frac{\partial P_t}{\partial q_t} > 0$ is equivalent to

$$\lambda < \frac{1}{\alpha_t}\frac{1}{\Delta v}\frac{1}{1-2q_t}.$$

Again, since $\alpha_t \leq \alpha_1 + \alpha_2 < 1$ and $2q_t \in (0,1)$, the above inequality is guaranteed by $\lambda < \frac{1}{\Delta v}$.

iii) Since

$$\frac{\partial P_t}{\partial \hat{\beta}} = \frac{\partial q_t}{\partial \hat{\beta}} \Delta v \left(1 - \lambda \alpha_t \Delta v (1 - 2q_t)\right),$$

$\frac{\partial P_t}{\partial \hat{\beta}} > 0$ follows from the observations in the proof of statement (ii) above and the fact that, by hypothesis, $\frac{\partial q_t}{\partial \hat{\beta}} > 0$. ■

Proof of Proposition 1:

Prices at $t = 1$: There are two possible histories r and e. If $a_1 = r$, then since IB observes a_M the $t = 1$ price will be $P_1(r) = \overline{v}$. If $a_1 = e$, inferences are imperfect due the existence of the liquidity shock. Denote $M's$ strategy by the threshold $\hat{\beta} \in \left\{\beta^u_{VM}, \beta^{\sigma_2}_{VM}\right\}$. Further, making the dependence of q_t on the manager's strategy explicit, and defining $\overline{F} \equiv 1 - F$, if $a_1 = e$ we have:

$$q_1(e;\hat{\beta}) = \frac{\delta_1 F(\hat{\beta})}{\delta_1 F(\hat{\beta}) + \overline{F}(\hat{\beta})}.$$

Thus, if $a_1 = e$, the price in $t = 1$ is

$$P_1(e;\hat{\beta}) \quad \equiv \quad \Delta v q_1(e;\hat{\beta}) + \underline{v} - \lambda \alpha_1 \Delta v^2 q_1(e;\hat{\beta})(1 - q_1(e;\hat{\beta})). \tag{5}$$

Claim 1. $P_1(e;\hat{\beta})$ is increasing in $\hat{\beta}$.

Proof of Claim 1: Since F is increasing and $\overline{F}$ is decreasing, $q_1(\hat{\beta})$ is increasing in $\hat{\beta}$. The claim now follows from Lemma 1, part (iii). ■

IB's strategy: If IB observes $s_1 = \overline{v}$, retaining pays $\alpha_1 \overline{v}$, whereas selling pays $\alpha_1 P_1(a_1 = e) < \alpha_1 \overline{v}$. Thus, she holds. If IB observes $s_1 = \underline{v}$ then retaining pays $\alpha_1 \underline{v}$, while selling pays $\alpha_1 P_1(a_1 = e) > \alpha_1 \underline{v}$ (by Lemma 1, part i). Thus, she sells.

Prices at $t = 2$ for $\sigma_2 > \overline{\sigma}$: There are four possible histories: $(r,r), (r,e), (e,r), (e,e)$. Since IB observes a_M, we have $P_2\left(r,r;\beta^{\sigma_2}_{VM}\right) = P_2\left(r,e;\beta^{\sigma_2}_{VM}\right) = \overline{v}$. For the history (e,r), reusing the same notation as above:

$$q_2(e,r;\beta^{\sigma_2}_{VM}) \equiv \mathbb{P}[a_M = \overline{v} \mid a_1 = e, a_2 = r] = \frac{\delta_1 \widehat{\delta}_{2,h} F(\beta^{\sigma_2}_{VM})}{\delta_1 \widehat{\delta}_{2,h} F(\beta^{\sigma_2}_{VM}) + \widehat{\delta}_{2,l} \overline{F}(\beta^{\sigma_2}_{VM})},$$

where $\widehat{\delta}_{2,h} \equiv \mathbb{P}[a_2 = r | a_M = \overline{v}] = (1 - \delta_2)\sigma_2$ and $\widehat{\delta}_{2,l} \equiv \mathbb{P}[a_2 = r | a_M = \underline{v}] = (1 - \delta_2)(1 - \sigma_2)$. So

$$P_2(e,r;\beta^{\sigma_2}_{VM}) \quad \equiv \quad \Delta v q_2(e,e;\beta^{\sigma_2}_{VM}) + \underline{v} - \lambda \alpha_1 \Delta v^2 q_2(e,e;\beta^{\sigma_2}_{VM})(1 - q_2(e,e;\beta^{\sigma_2}_{VM})). \tag{6}$$

For the history of (e, e), reusing the same notation as above:

$$q_2(e, e; \beta_{VM}^{\sigma_2}) \equiv \mathbb{P}[a_M = \overline{v} \mid a_1 = e, a_2 = e] = \frac{\delta_1 \delta_{2,h} F(\beta_{VM}^{\sigma_2})}{\delta_1 \delta_{2,h} F(\beta_{VM}^{\sigma_2}) + \delta_{2,l} \overline{F}(\beta_{VM}^{\sigma_2})},$$

where $\delta_{2,h} \equiv \mathbb{P}[a_2 = e | a_M = \overline{v}] = \delta_2 \sigma_2 + (1 - \sigma_2)$ and $\delta_{2,l} \equiv \mathbb{P}[a_2 = e | a_M = \underline{v}] = \delta_2(1 - \sigma_2) + \sigma_2$. So

$$P_2(e, e; \beta_{VM}^{\sigma_2}) \equiv \Delta v q_2(e, e; \beta_{VM}^{\sigma_2}) + \underline{v} - \lambda (\alpha_1 + \alpha_2) \Delta v^2 q_2(e, e; \beta_{VM}^{\sigma_2})(1 - q_2(e, e; \beta_{VM}^{\sigma_2})). \quad (7)$$

Claim 2. $P_2(e, r; \beta_{VM}^{\sigma_2})$ and $P_2(e, e; \beta_{VM}^{\sigma_2})$ are increasing in $\beta_{VM}^{\sigma_2}$.

Proof of Claim 2: Again, this follows immediately from the fact that $q_2(e, r; \beta_{VM}^{\sigma_2})$ and $q_2(e, e; \beta_{VM}^{\sigma_2})$ are increasing in $\beta_{VM}^{\sigma_2}$ and Lemma 1, part (iii). ■

Prices at $t = 2$ for $\sigma_2 < \underline{\sigma}$: There are four possible histories: $(r, r), (r, e), (e, r), (e, e)$. As before $P_2(r, r; \beta_{VM}^u) = P_1(r, e; \beta_{VM}^u) = \overline{v}$. Since 2B retains regardless of s_2, retention is uninformative so that $P_2(e, r; \beta_{VM}^u) = P_1(e; \beta_{VM}^u)$, any exit by 2B must be due to a liquidity shock and hence also uninformative, and thus:

$$P_2(e, e; \beta_{VM}^u) = \Delta v q_1(e; \beta_{VM}^u) + \underline{v} - \lambda (\alpha_1 + \alpha_2) \Delta v^2 q_1(e; \beta_{VM}^u)(1 - q_1(e; \beta_{VM}^u)). \quad (8)$$

By Claim 1, $P_1(e; \beta_{VM}^u), P_2(e, r; \beta_{VM}^u), P_2(e, e; \beta_{VM}^u)$ are increasing in β_{VM}^u.

2B's strategy: Suppose that 2B faces prices:

$$P_2\left(r, r; \beta_{VM}^{\sigma_2}\right), P_2\left(r, e; \beta_{VM}^{\sigma_2}\right), P_2(e, r; \beta_{VM}^{\sigma_2}), P_2(e, e; \beta_{VM}^{\sigma_2}).$$

If $a_1 = r$, 2B knows that $v = \overline{v}$ and $P_2\left(r, r; \beta_{VM}^{\sigma_2}\right) = P_2\left(r, e; \beta_{VM}^{\sigma_2}\right) = \overline{v}$, and thus will be indifferent between retaining and exiting. Consider now what happens if $a_1 = e$. First, consider 2B with $s_2 = \overline{v}$. The payoff from retaining is $\mathbb{E}[v \mid a_1 = e, s_2 = \overline{v}]$, while the payoff from exiting is $P_2(e, e; \beta_{VM}^{\sigma_2})$. We have that

$$P_2(e, e; \beta_{VM}^{\sigma_2}) < \mathbb{E}[v \mid a_1 = e, a_2 = e] \leq \mathbb{E}[v \mid a_1 = e, s_2 = \overline{v}].$$

The first inequality follows from the existence of the risk premium term for $\lambda > 0$, while the second from the fact that a high signal s_2 weakly increases the expectation relative to the information inferred from the fund exiting. Hence, 2B will choose r if $s_2 = \overline{v}$.

Second, consider 2B with $s_2 = \underline{v}$. The payoff from retaining is $\mathbb{E}[v \mid a_1 = e, s_2 = \underline{v}]$, while the payoff from exiting is $P_2(e, e; \beta_{VM}^{\sigma_2})$. By Lemma 1, part (i) $P_2(e, e; \beta_{VM}^{\sigma_2}) > \underline{v}$ whereas for $\sigma_2 \to 1$ we have $\mathbb{E}[v \mid a_1 = e, s_2 = \underline{v}] \to \underline{v}$. Hence, there exists $\sigma_h < 1$ such that for all $\sigma_2 > \sigma_h$ the payoff from exiting is higher than that from retaining.

Suppose that 2B faces prices:

$$P_2\left(r, r; \beta_{VM}^{u}\right), P_2\left(r, e; \beta_{VM}^{u}\right), P_2(e, r; \beta_{VM}^{u}), P_2(e, e; \beta_{VM}^{u}).$$

If $a_1 = r$, 2B knows that $v = \overline{v}$ and $P_2\left(r, r; \beta_{VM}^{u}\right) = P_2\left(r, e; \beta_{VM}^{u}\right) = \overline{v}$, and thus will be indifferent between retaining and exiting. Consider now what happens if $a_1 = e$. First, consider 2B with $s_2 = \overline{v}$. The payoff from retaining is $\mathbb{E}[v \mid a_1 = e, s_2 = \overline{v}]$, while the payoff from exiting is: $P_2(e, e; \beta_{VM}^{u})$. Since

$$P_2(e, e; \beta_{VM}^{u}) < \mathbb{E}[v \mid a_1 = e, a_2 = e] \leq \mathbb{E}[v \mid a_1 = e, s_2 = \overline{v}],$$

2B will choose r.

Second, consider 2B with $s_2 = \underline{v}$. The payoff from retaining is $\mathbb{E}[v \mid a_1 = e, s_2 = \underline{v}]$, while the payoff from exiting is $P_2(e, e; \beta_{VM}^{u})$. Note that for $\sigma_2 \to 1/2$ we have that $\mathbb{E}[v \mid a_1 = e, s_2 = \underline{v}] \to \mathbb{E}[v \mid a_1 = e] > P_2(e, e; \beta_{VM}^{u})$. The limit follows from the fact that for $\sigma_2 = 1/2$ 2B's signal is uninformative, while the inequality follows from existence of the risk premium term for $\lambda > 0$. Hence, there exists $\underline{\sigma} > 1/2$ such that for all $\sigma_2 < \underline{\sigma}$ the payoff from retaining is higher than that from exiting.

M's strategy: Suppose that IB chooses $a_1 = e$ if and only if $a_M = \underline{v}$ while 2B chooses $a_2 = e$ if and only if $s_2 = \underline{v}$. We guess and verify that M chooses $a_M = \overline{v}$ if and only if $\beta \leq \beta^*$, for some $\beta^* \in \left(\underline{\beta}, \overline{\beta}\right)$. Then, $P_1\left(e; \beta^*\right)$ is given by (5) replacing $\hat{\beta}$ by β^*, $P_2(e, r; \beta^*)$ is given by (6) replacing $\beta_{VM}^{\sigma_2}$by β^*, and $P_2(e, e; \beta^*)$ is given by (7) replacing $\beta_{VM}^{\sigma_2}$ by β^*, while $P_1\left(r; \beta^*\right) = P_2\left(r, r; \beta^*\right) = P_2\left(r, e; \beta^*\right) = \overline{v}$. It also follows that, by Claims 1 and 2,

$P_1(e;\beta^*)$, $P_2(e,r;\beta^*)$ and $P_2(e,r;\beta^*)$ are increasing in β^*.

Suppose M chooses $a_M = \overline{v}$. M's payoff is then

$$\begin{aligned} & (1-\delta_1)(\omega_1+\omega_2)\overline{v} + \delta_1\omega_1 P_1(e;\beta^*) \\ + \quad & \delta_1\omega_2\left((1-\delta_2)\sigma_2 P_2(e,r;\beta^*) + (1-\delta_2)(1-\sigma_2)P_2(e,e;\beta^*) + \delta_2 P_2(e,e;\beta^*)\right)) + \omega_3\overline{v}. \end{aligned}$$

If instead that M chooses $a_M = \underline{v}$, the payoff is

$$\omega_1 P_1(e;\beta^*) + \omega_2\left((1-\delta_2)\sigma_2 P_2(e,e;\beta^*) + (1-\delta_2)(1-\sigma_2)P_2(e,r;\beta^*) + \delta_2 P_2(e,e;\beta^*)\right) + \omega_3\underline{v} + \beta.$$

Thus, M will choose $a_M = \underline{v}$ if and only if

$$\begin{aligned} \beta \geq RHS^{\sigma_2}_{VM}(\beta^*) \quad \equiv \quad & \omega_3\Delta v + (1-\delta_1)(\omega_1+\omega_2)\overline{v} - (1-\delta_1)\omega_1 P_1(e;\beta^*) \\ + \quad & P_2(e,r;\beta^*)\omega_2\left(\delta_1(1-\delta_2)\sigma_2 - (1-\delta_2)(1-\sigma_2)\right) \\ + \quad & P_2(e,e;\beta^*)\omega_2\left(\delta_1\left((1-\delta_2)(1-\sigma_2)+\delta_2\right) - (1-\delta_2)\sigma_2 - \delta_2\right). \end{aligned} \tag{9}$$

M's policy β^* is defined via the fixed point equation $\beta^* = RHS^{\sigma_2}_{VM}(\beta^*)$. At $\beta^* = 0$ all prices are $\underline{v}$ so that:

$$RHS^{\sigma_2}_{VM}(0) = \left[(\omega_1+\omega_2)(1-\delta_1) + \omega_3\right]\Delta v > 0,$$

while as $\beta^* \to \infty$ all prices converge to $\overline{v}$, so that

$$RHS^{\sigma_2}_{VM}(+\infty) = \omega_3\Delta v < \infty.$$

Hence, a fixed point exists. Since the left hand side of the fixed point equation is increasing, to show uniqueness suffices to show that $RHS^{\sigma_2}_{VM}(\beta^*)$ is decreasing. In order to do this, we make the following observations.

1. $P_1(e;\beta^*), P_2(e,r;\beta^*), P_2(e,e;\beta^*)$ are each increasing in β^*.

2. In the expression for $RHS^{\sigma_2}_{VM}(\beta^*)$ (see 9), the coefficient on $P_1(e;\beta^*)$ is clearly negative.

3. Note that:

$$\frac{\partial P_2(e,r;\beta^*)}{\partial \beta^*} = \Delta v \frac{\partial q_2(e,r;\beta^*)}{\partial \beta^*}\left[1 - \alpha_1 \lambda \Delta v \left(1 - 2q_2(e,r;\beta_{VM}^{\sigma_2})\right)\right],$$

where

$$\frac{\partial q_2(e,r;\beta^*)}{\partial \beta^*} = \frac{\partial}{\partial \beta^*}\frac{1}{1+\frac{1}{\delta_1}\frac{1-\sigma_2}{\sigma_2}\frac{\overline{F}(\beta^*)}{F(\beta^*)}} = -\frac{\frac{1}{\delta_1}\frac{1-\sigma_2}{\sigma_2}\frac{\partial}{\partial \beta^*}\frac{\overline{F}(\beta^*)}{F(\beta^*)}}{\left[1+\frac{1}{\delta_1}\frac{1-\sigma_2}{\sigma_2}\frac{\overline{F}(\beta^*)}{F(\beta^*)}\right]^2}.$$

Since $\lim_{\sigma_2\to 1}\frac{\partial q_2(e,r;\beta^*)}{\partial \beta^*} = 0$, we have that $\lim_{\sigma_2\to 1}\frac{\partial P_2(e,r;\beta^*)}{\partial \beta^*} = 0$.

4. It is easy to check that $\lim_{\sigma_2\to 1}\frac{\partial P_2(e,e;\beta^*)}{\partial \beta^*} > 0$.

5. As $\sigma_2 \to 1$, (i) the coefficient on $P_2(e,e;\beta^*)$ converges to

$$\delta_1(1-\delta_2) + \delta_1\delta_2 - (1-\delta_2) - \delta_2 = \delta_1\delta_2 - 1 < 0.$$

Observations (1)-(5) imply that there exists a $\sigma^* < 1$ such that for $\sigma > \sigma^*$, $RHS(\beta^*)$ is decreasing. Now, set $\overline{\sigma} \equiv \max(\sigma_h, \sigma^*)$ and label the unique fixed point as $\beta_{VM}^{\sigma_2}$.[12]

Suppose that IB chooses $a_1 = e$ if and only if $a_M = \underline{v}$ while 2B chooses $a_2 = r$ for all s_2. We again guess and verify that M chooses $a_M = \overline{v}$ if and only if $\beta \leq \beta^*$, for some $\beta^* \in (\underline{\beta}, \overline{\beta})$. Then, $P_1(e;\beta^*)$ is given by (5) replacing $\hat{\beta}$ by β^*, $P_2(e,r;\beta^*) = P_1(e;\beta^*)$, $P_2(e,e;\beta^*)$ is given by (8) replacing β_{VM}^u by β^*, while $P_1(r;\beta^*) = P_2(r,r;\beta^*) = \overline{v}$. It also follows that, by Claims 1 and 2, $P_1(e;\beta^*), P_2(e,r;\beta^*), P_2(e,e;\beta^*)$ are increasing in β^*.

Suppose M chooses $a_M = \overline{v}$. This gives payoff

$$\begin{aligned}&\omega_1\left((1-\delta_1)\overline{v} + \delta_1 P_1(e;\beta^*)\right) + \omega_2\left((1-\delta_1)\overline{v}\right.\\ +\quad &\left.\delta_1\left((1-\delta_2)P_2(e,r;\beta^*) + \delta_2 P_2(e,e;\beta^*)\right)\right) + \omega_3\overline{v}.\end{aligned}$$

[12]Recall that σ_h is the minimum σ_2 for which 2B's payoff from exiting is higher than that from retaining.

Suppose instead that M chooses $a_M = \underline{v}$. This gives payoff

$$\omega_1 P_1(a_1 = e) + \omega_2 \left((1-\delta_2)P_2(e,r;\beta^*) + \delta_2 P_2(e,r;\beta^*)\right) + \omega_3 \underline{v} + \beta.$$

Thus, M will choose $a_M = \underline{v}$ if and only if

$$\begin{aligned} \beta \geq RHS^u_{VM}(\beta^*) \;&\equiv\; \omega_3 \Delta v + \omega_1 \left(1-\delta_1\right)\left(\overline{v} - P_1(e;\beta^*)\right) \\ &+\; \omega_2 \left(1-\delta_1\right)\left(\overline{v} - \left((1-\delta_2)P_2(e,r;\beta^*) + \delta_2 P_2(e,e;\beta^*)\right)\right). \end{aligned} \tag{10}$$

M's policy β^* is defined via the fixed point equation $\beta^* = RHS^u_{VM}(\beta^*)$. Moreover:

$$RHS^u_{VM}(0) = \left[(\omega_1+\omega_2)(1-\delta_1) + \omega_3\right]\Delta v > 0 \text{ and } RHS^u_{VM}(+\infty) = \omega_3 \Delta v < \infty,$$

so a fixed point exists. In addition, the left hand side of this equation is clearly increasing, while $RHS^u_{VM}(\beta^*)$ is decreasing because prices $P_1(e;\beta^*)$, $P_2(e,r;\beta^*), P_2(e,e;\beta^*)$ are increasing in β^*. Hence, there exists unique β^* solving the above fixed point equation, which we label β^u_{VM}. ■

Proof of Proposition 2:

Prices at $t = 1$ and IB's strategy: These steps of the proof are identical to the case of Proposition 1.

Prices at $t = 2$: There are three possible histories: $(r,r), (r,e), (e,e)$. Since IB observes a_M, we have $P_2\left(r,r;\beta^{\delta_1}_{FM}\right) = P_2\left(r,e;\beta^{\delta_1}_{FM}\right) = \overline{v}$. For the history of (e,e), since 2B's choice is uninformative, reusing the same notation as above we have:

$$q_2(e,e;\beta^{\delta_1}_{FM}) = q_1\left(e;\beta^{\delta_1}_{FM}\right) = \frac{\delta_1 F(\beta^{\delta_1}_{FM})}{\delta_1 F(\beta^{\delta_1}_{FM}) + \overline{F}(\beta^{\delta_1}_{FM})}.$$

So

$$P_2(e,e;\beta^{\delta_1}_{FM}) \;\equiv\; \Delta v q_1\left(e;\beta^{\delta_1}_{FM}\right) + \underline{v} - \lambda\left(\alpha_1+\alpha_2\right)\Delta v^2 q_1\left(e;\beta^{\delta_1}_{FM}\right)\left(1 - q_1\left(e;\beta^{\delta_1}_{FM}\right)\right). \tag{11}$$

Clearly, therefore, $P_2(e,e;\beta_{FM}^{\delta_1})$ is increasing in $\beta_{FM}^{\delta_1}$.

2B's strategy: There are two cases.

Case 1: IB exits. If 2B observes $a_1 = e$ and $s_2 = \overline{v}$, the expected payoff from exiting is γ_2, where the average reputational payoff from exiting derives from the fact that the blockholder follows a signal uncontingent strategy in equilibrium, leading to no updating. If 2B retains, this off-equilibrium action conveys that she received signal $s_2 = \overline{v}$ and the expected payoff will be

$$\mathbb{E}\left[\mathbb{P}\left[\tau = g \mid v, a_2 = r\right] \mid a_1 = e, s_2 = \overline{v}\right] = \mathbb{P}\left[\tau = g \mid v = \underline{v}, s_2 = \overline{v}\right] \mathbb{P}\left[v = \underline{v} \mid a_1 = e, s_2 = \overline{v}\right]$$
$$+ \mathbb{P}\left[\tau = g \mid v = \overline{v}, s_2 = \overline{v}\right] \mathbb{P}\left[v = \overline{v} \mid a_1 = e, s_2 = \overline{v}\right],$$

where

$$\begin{aligned}\mathbb{P}\left[\tau = g \mid v = \underline{v}, s_2 = \overline{v}\right] &= \frac{\mathbb{P}\left[s_2 = \overline{v} \mid v = \underline{v}, \tau = g\right]\mathbb{P}[\tau = g]}{\mathbb{P}\left[s_2 = \overline{v} \mid v = \underline{v}, \tau = g\right]\mathbb{P}[\tau = g] + \mathbb{P}\left[s_2 = \overline{v} \mid v = \underline{v}, \tau = b\right]\mathbb{P}[\tau = b]}, \\ &= \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)}, \text{ and similarly} \\ \mathbb{P}\left[\tau = g \mid v = \overline{v}, s_2 = \overline{v}\right] &= \frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)}.\end{aligned}$$

Substituting back to the expectation this yields:

$$\begin{aligned}&\mathbb{E}\left[\mathbb{P}\left[\tau = g \mid v, a_2 = r\right] \mid a_1 = e, s_2 = \overline{v}\right] \\ &= \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)} \frac{\left[(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)\right]\overline{F}(\beta)}{\left[(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)\right]\overline{F}(\beta) + \delta_1\left[\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)\right]F(\beta)} \\ &+ \frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)} \frac{\delta_1\left[\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)\right]F(\beta)}{\left[(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)\right]\overline{F}(\beta) + \delta_1\left[\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)\right]F(\beta)} \\ &= \frac{(1-\sigma_{2,g})\gamma_2\overline{F}(\beta) + \sigma_{2,g}\gamma_2\delta_1 F(\beta)}{\left[(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)\right]\overline{F}(\beta) + \left[\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)\right]\delta_1 F(\beta)}. \qquad (*)\end{aligned}$$

Hence, for exit to be optimal it is necessary that the expression above is lower than the gain under retention, that is

$$
\begin{aligned}
&(*) < \gamma_2 \\
\iff &(1-\sigma_{2,g}\overline{F}(\beta)(1-\gamma_2) + \sigma_{2,g}\delta_1 F(\beta)(1-\gamma_2) < (1-\sigma_{2,b})(1-\gamma_2)\overline{F}(\beta) + \sigma_{2,b}\delta_1 F(\beta)(1-\gamma_2) \\
\iff &\delta_1 F(\beta)(\sigma_{2,g}-\sigma_{2,b}) < \overline{F}(\beta)(\sigma_{2,g}-\sigma_{2,b}) \\
\iff &\delta_1 < \frac{\overline{F}(\beta)}{F(\beta)}.
\end{aligned}
$$

So, we need the liquidity shock δ_1 to be low enough. Given, that $\overline{F}/F$ is decreasing and $\beta < \overline{\beta}$ a sufficient condition to satisfy the above is that $\delta_1 < \overline{F}\left(\overline{\beta}\right)/F\left(\overline{\beta}\right)$. Hence, for δ_1 small enough, when 2B observes $a_1 = e$ and $s_2 = \overline{v}$, she chooses to exit. It is easy to check that if it observes $a_1 = e$ and $s_2 = \underline{v}$ 2B will have an even greater incentive to exit.

Case 2: IB retains. If 2B fund observes $a_1 = r$ then she knows, regardless of what signal it receives, that $v = \overline{v}$. Thus, her expected payoff γ_2, where the average reputational payoff from retaining derives from the fact that the fund follows a signal uncontingent strategy in equilibrium, leading to no updating. While, if $a_1 = r$ and say $s_2 = \underline{v}$ then if 2B exits she gets:

$$
\mathbb{E}\left[\mathbb{P}\left[\tau = g \mid v, a_2 = e\right] \mid a_1 = r, s_2 = \underline{v}\right].
$$

We have that:

$$
\mathbb{P}\left[a_1 = r \mid v = \overline{v}\right] = 1,\, \mathbb{P}\left[a_1 = r \mid v = \underline{v}\right] = 0,
$$

Hence:

$$
\mathbb{P}\left[v = \underline{v} \mid a_1 = r, s_2 = \underline{v}\right] = 0,\, \mathbb{P}\left[v = \overline{v} \mid a_1 = r, s_2 = \underline{v}\right] = 1,
$$

and:

$$\mathbb{P}\left[\tau = g \mid v = \underline{v}, s_2 = \underline{v}\right] = \frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)},$$
$$\mathbb{P}\left[\tau = g \mid v = \overline{v}, s_2 = \underline{v}\right] = \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)}.$$

Hence, for 2B to retain the reputational gain from retaining should be higher than that of exiting, that is,

$$\gamma_2 > \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)}$$
$$\iff (1-\sigma_{2,g})(\gamma_2 - 1) + (1-\sigma_{2,b})(1-\gamma_2) > 0$$
$$\iff 1-\sigma_{2,b} > 1-\sigma_{2,g}$$
$$\iff \sigma_{2,g} > \sigma_{2,b},$$

which is always true since better types, by definition, receive better information. The incentive to retain is stronger when $s_2 = \overline{v}$, and hence in this case 2B also retains.

M's strategy: Suppose that IB chooses $a_1 = e$ if and only if $a_M = \underline{v}$ while 2B chooses $a_2 = e$ if and only if $a_1 = e$. We guess and verify that M chooses $a_M = \overline{v}$ if and only if $\beta \leq \beta^*$, for some $\beta^* \in (\underline{\beta}, \overline{\beta})$. Then, $P_1(e; \beta^*)$ is given by (5) replacing $\hat{\beta}$ by β^*, $P_2(e, e; \beta^*)$ is given by (11) replacing $\beta_{FM}^{\delta_1}$ by β^*, while $P_1(r; \beta^*) = P_2(r, r; \beta^*) = P_2(r, e; \beta^*) = \overline{v}$. As noted above, $P_1(e; \beta^*)$ and $P_2(e, e; \beta^*)$ are increasing in β^*.

Suppose M chooses $a_M = \overline{v}$. This gives payoff

$$\omega_1\left((1-\delta_1)\overline{v} + \delta_1 P_1(e; \beta^*)\right) + \omega_2\left((1-\delta_1)\overline{v} + \delta_1 P_2(e, e; \beta^*)\right) + \omega_3 \overline{v}.$$

Suppose instead M chooses $a_M = \underline{v}$. This gives payoff

$$\omega_1 P_1(e; \beta^*) + \omega_2 P_2(e, e; \beta^*) + \omega_3 \underline{v} + \beta.$$

Thus, M chooses $a_M = \underline{v}$ if and only if

$$\beta \geq RHS_{FM}(\beta^*) \equiv \omega_3 \Delta v + \omega_1 (1-\delta_1)(\overline{v} - P_1(e;\beta^*)) + \omega_2 (1-\delta_1)(\overline{v} - P_2(e,e;\beta^*)) . \quad (12)$$

Thus, M's policy β^* is defined via the fixed point equation $\beta^* = RHS_{FM}(\beta^*)$. Note that

$$RHS_{FM}(0) = [(\omega_1 + \omega_2)(1-\delta_1) + \omega_3] \Delta v > 0 \text{ and } RHS_{FM}(+\infty) = \omega_3 \Delta v < \infty,$$

so a fixed point exists. In addition, the left hand side of this equation is clearly increasing, while $RHS_{FM}(\beta^*)$ is decreasing because prices $P_1(e;\beta^*)$ and $P_2(e,e;\beta^*)$ are increasing in β^*. Hence, there exists unique β^* solving the above fixed point equation, which we label $\beta_{FM}^{\delta_1}$. ■

Proof of Proposition 3. Prices at $t = 1$ and IB's strategy: These steps of the proof are identical to the case of Proposition 1.

Prices at $t = 2$: These are identical to the case for Proposition 1 with $\sigma_2 > \overline{\sigma}$, so we do not repeat them here.

2B's strategy: There are two cases.

Case 1: IB exits. Consider 2B who observes $s_2 = \overline{v}$. Equilibrium requires that 2B prefers retention to exit. Utilizing prior calculations from the proof of Proposition 2 we can compute the payoffs as follows. If 2B retains, her expected payoff will be

$$\begin{aligned}\mathbb{E}[\mathbb{P}[\tau = g \mid v, a_2 = r] \mid a_1 = e, s_2 = \overline{v}] &= \mathbb{P}[\tau = g \mid v = \underline{v}, s_2 = \overline{v}]\, \mathbb{P}[v = \underline{v} \mid a_1 = e, s_2 = \overline{v}] \\ &\quad + \mathbb{P}[\tau = g \mid v = \overline{v}, s_2 = \overline{v}]\, \mathbb{P}[v = \overline{v} \mid a_1 = e, s_2 = \overline{v}],\end{aligned}$$

where

$$\begin{aligned}\mathbb{P}[\tau = g \mid v = \underline{v}, s_2 = \overline{v}] &= \frac{\mathbb{P}[s_2 = \overline{v} \mid v = \underline{v}, \tau = g]\, \mathbb{P}[\tau = g]}{\mathbb{P}[s_2 = \overline{v} \mid v = \underline{v}, \tau = g]\, \mathbb{P}[\tau = g] + \mathbb{P}[s_2 = \overline{v} \mid v = \underline{v}, \tau = b]\, \mathbb{P}[\tau = b]}, \\ &= \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)}, \text{ and similarly} \\ \mathbb{P}[\tau = g \mid v = \overline{v}, s_2 = \overline{v}] &= \frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)}.\end{aligned}$$

If 2B exits, her expected payoff will be

$$\mathbb{E}\left[\mathbb{P}\left[\tau=g \mid v, a_2=e\right] \mid a_1=e, s_2=\overline{v}\right] = \mathbb{P}\left[\tau=g \mid v=\underline{v}, s_2=\underline{v}\right]\mathbb{P}\left[v=\underline{v} \mid a_1=e, s_2=\overline{v}\right]$$
$$+\mathbb{P}\left[\tau=g \mid v=\overline{v}, s_2=\underline{v}\right]\mathbb{P}\left[v=\overline{v} \mid a_1=e, s_2=\overline{v}\right],$$

where

$$\mathbb{P}\left[\tau=g \mid v=\overline{v}, s_2=\underline{v}\right] = \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2+(1-\sigma_{2,b})(1-\gamma_2)},$$

$$\mathbb{P}\left[\tau=g \mid v=\underline{v}, s_2=\underline{v}\right] = \frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2+\sigma_{2,b}(1-\gamma_2)}.$$

Thus equilibrium requires that:

$$\begin{aligned}
& \mathbb{P}\left[v=\overline{v} \mid a_1=e, s_2=\overline{v}\right]\frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2+\sigma_{2,b}(1-\gamma_2)} \\
+ \quad & \mathbb{P}\left[v=\underline{v} \mid a_1=e, s_2=\overline{v}\right]\frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2+(1-\sigma_{2,b})(1-\gamma_2)} \\
\geq \quad & \mathbb{P}\left[v=\overline{v} \mid a_1=e, s_2=\overline{v}\right]\frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2+(1-\sigma_{2,b})(1-\gamma_2)} \\
+ \quad & \mathbb{P}\left[v=\underline{v} \mid a_1=e, s_2=\overline{v}\right]\frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2+\sigma_{2,b}(1-\gamma_2)}
\end{aligned}$$

which is equivalent to

$$\begin{aligned}
& \left(\frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2+\sigma_{2,b}(1-\gamma_2)} - \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2+(1-\sigma_{2,b})(1-\gamma_2)}\right)\times \\
\times \quad & \left(\mathbb{P}\left[v=\overline{v} \mid a_1=e, s_2=\overline{v}\right]-\mathbb{P}\left[v=\underline{v} \mid a_1=e, s_2=\overline{v}\right]\right)\geq 0.
\end{aligned}$$

Since the first term in the product is positive, equilibrium requires that:

$$\mathbb{P}\left[v=\overline{v} \mid a_1=e, s_2=\overline{v}\right]\geq \mathbb{P}\left[v=\underline{v} \mid a_1=e, s_2=\overline{v}\right],$$

i.e., that:

$$\delta_1 \geq \frac{(1-\sigma_{2,g})\gamma_2+(1-\sigma_{2,b})(1-\gamma_2)}{\sigma_{2,g}\gamma_2+\sigma_{2,b}(1-\gamma_2)}\frac{\overline{F}(\beta)}{F(\beta)},$$

for which, given that the first fraction is less than unity and the monotonicity of $\overline{F}(\beta)/F(\beta)$, is guaranteed by $\delta_1 \geq \overline{F}\left(\underline{\beta}\right)/F\left(\underline{\beta}\right)$. The case for 2B with the low signal follows by symmetry.

Case 2: IB retains. If 2B fund observes $a_1 = r$ then she knows, regardless of what signal she receives, that $v = \overline{v}$. Her expected payoff from retention is γ_2, whereas the reputational payoff from exiting is

$$\frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)} < \gamma_2.$$

M's strategy: The steps here are identical to the case for Proposition 1 with $\sigma_2 > \overline{\sigma}$, so we do not repeat them here. ■

Proof of Proposition 4: First consider the case in which $\delta_1 \in (0, \underline{\delta}_1)$. For such δ_1, we first consider $\sigma_2 > \overline{\sigma}$ and thus compare $\beta^{\sigma_2}_{VM}$ and $\beta^{\delta_1}_{FM}$. Recall from the proof of Proposition 1 that there is a unique fixed point $\beta^{\sigma_2}_{VM}$ satisfying (9) for all $\sigma_2 > \overline{\sigma}$. Consider $\sigma_2 > \overline{\sigma}$. Observe also that as $\sigma_2 \to 1$,

$$RHS^{\sigma_2}_{VM}\left(\beta^*\right) \to RHS^{1}_{VM}\left(\beta^*\right) \equiv \omega_3 \Delta v + \omega_1\left(1-\delta_1\right)\left(\overline{v} - P_1(e;\beta^*)\right) + \omega_2\left(1-\delta_1\delta_2\right)\left(\overline{v} - P_2(e,e;\beta^*)\right)$$

Now, it follows from (12) that for any given threshold β^*

$$RHS^{1}_{VM}\left(\beta^*\right) > RHS_{FM}\left(\beta^*\right).$$

This is substantiated by two observations. First, for all $0 < \delta_1 < 1$ and $0 < \delta_2 < 1$ we have $1 - \delta_1\delta_2 > 1 - \delta_1 > 0$. Second, since there is no information in an exit by 2B in the FM case, while there is some negative information in exit by 2B in the VM case for $\sigma_2 > \overline{\sigma}$, we have that[13]

$$P^{VM,\sigma_2}_2(e,e;\beta^*) < P^{FM}_2(e,e;\beta^*) \Rightarrow \overline{v} - P^{VM,\sigma_2}_2(e,e;\beta^*) > \overline{v} - P^{FM}_2(e,e;\beta^*)$$

[13] Throughout this proof we will use a superscript on P_2 to denote the corresponding case we consider, either $\{VM, \sigma_2\}$, $\{VM, u\}$ or FM; while the arguments as before are the actions of IB and 2B, conditional on M's threshold. For example $P^{VM,\sigma_2}_2(e,e;\beta^*)$ is the $t = 2$ price when 2B is a VM with $\sigma_2 > \overline{\sigma}$, and both IB and 2B exit, given M's threshold β^*.

Thus, continuity of $RHS^{\sigma_2}_{VM}(\beta^*)$ in σ_2 implies that there exists $\sigma^* \in [\overline{\sigma}, 1)$ such that for all $\sigma_2 > \sigma^*$ we have

$$RHS^{\sigma_2}_{VM}(\beta^*) > RHS_{FM}(\beta^*),$$

where $RHS^{\sigma_2}_{VM}(\beta^*)$, $RHS_{FM}(\beta^*)$ are defined in (9), (12), respectively. Hence, since both RHSs are decreasing for all β^* and are ranked as specified above we have that for $\sigma_2 > \sigma^*$, the solutions to the fixed point equations are also ranked $\beta^{\delta_1}_{FM} < \beta^{\sigma_2}_{VM}$.

For $\delta_1 \in (0, \underline{\delta}_1)$, we next consider $\sigma_2 < \underline{\sigma}$ and thus compare β^u_{VM} and $\beta^{\delta_1}_{FM}$. Inspection of (10) and (12) implies that for any β^*

$$RHS^u_{VM}(\beta^*) < RHS_{FM}(\beta^*),$$

where $RHS^u_{VM}(\beta^*)$ is defined in (10). This is substantiated by two observations. First, $P^{FM}_2(e, e; \beta^*) = P^{VM,u}_2(e, e; \beta^*)$ because given their equilibrium behavior there is no information in the exit of 2B either in the FM case or in the VM case with $\sigma_2 < \underline{\sigma}$. Second, $P^{FM}_2(e, e; \beta^*) < P^{VM,u}_2(e, r; \beta^*)$ because although there is no information in 2B's action in either case, the risk premium lowers the price in the FM case purely due to 2B's exit. Taken, together we have

$$\begin{aligned} P^{FM}_2(e, e; \beta^*) &< (1 - \delta_2)P^{VM,u}_2(e, r; \beta^*) + \delta_2 P^{VM,u}_2(e, e; \beta^*) \quad \Rightarrow \\ \overline{v} - P^{FM}_2(e, e; \beta^*) &> \overline{v} - \left((1 - \delta_2)P^{VM,u}_2(e, r; \beta^*) + \delta_2 P^{VM,u}_2(e, e; \beta^*)\right). \end{aligned}$$

Hence, since both RHSs are decreasing for all β^* and are ranked as specified above we have that the solutions to the fixed point equations are also ranked as $\beta^{\delta_1}_{FM} > \beta^u_{VM}$.

Next consider the case in which $\delta_1 \in \left(\overline{\delta}_1, 1\right)$. For such δ_1, we again first consider the case in which $\sigma_2 > \overline{\sigma}$ and thus compare $\beta^{\sigma_2}_{VM}$ and $\beta^{\delta_1}_{FM}$. When $\sigma_2 > \overline{\sigma}$, equilibrium behavior is identical across Propositions 1 and 3, and thus prices are also identical. Hence for all $\sigma_2 > \overline{\sigma}$, we have $\beta^{\sigma_2}_{VM} = \beta^{\delta_1}_{FM}$, which is then true also for $\sigma_2 > \sigma^*$ for $\sigma^* \in [\overline{\sigma}, 1)$.

Finally, for $\delta_1 \in \left(\overline{\delta}_1, 1\right)$, consider the case in which $\sigma_2 < \underline{\sigma}$ and compare $\beta^{\delta_1}_{FM}$ and β^u_{VM}. Since the FM 2B's trading strategy for $\delta_1 > \overline{\delta}_1$ is identical to that of a VM 2B's trading strategy for $\sigma_2 > \sigma^*$, $\beta_{FM}^{\delta_1}$ is given by the solution to

$$\begin{aligned}\beta^* = RHS_{VM}^{\sigma_2}(\beta^*) \quad &\equiv \quad \omega_3 \Delta v + (1-\delta_1)(\omega_1+\omega_2)\overline{v} - (1-\delta_1)\,\omega_1 P_1(e;\beta^*) \\ &+ \quad P_2^{VM,\sigma_2}(e,r;\beta^*)\omega_2\left(\delta_1(1-\delta_2)\sigma_2 - (1-\delta_2)(1-\sigma_2)\right) \\ &+ \quad P_2^{VM,\sigma_2}(e,e;\beta^*)\omega_2\left(\delta_1\left((1-\delta_2)(1-\sigma_2)+\delta_2\right) - (1-\delta_2)\sigma_2 - \delta_2\right).\end{aligned}$$

where $P_1(e;\beta^*)$ is given by (5), $P_2^{VM,\sigma_2}(e,r;\beta^*)$ is given by (6), and $P_2^{VM,\sigma_2}(e,e;\beta^*)$ is given by (7), all with the obvious modifications. In turn, β_{VM}^u is defined by the solution to

$$\begin{aligned}\beta^* = RHS_{VM}^{u}(\beta^*) \quad &\equiv \quad \omega_3 \Delta v + \omega_1(1-\delta_1)\left(\overline{v} - P_1(e;\beta^*)\right) \\ &+ \quad \omega_2(1-\delta_1)\left(\overline{v} - \left((1-\delta_2)P_2^{VM,u}(e,r;\beta^*) + \delta_2 P_2^{VM,u}(e,e;\beta^*)\right)\right),\end{aligned}$$

where $P_2^{VM,u}(e,r;\beta^*) = P_1(e;\beta^*)$ and $P_2^{VM,u}(e,e;\beta^*)$ is given by (8), with obvious modifications. Now, it follows upon some rearrangement that

$$\begin{aligned}\frac{1}{\omega_2}\left[RHS_{VM}^{\sigma_2}(\beta^*) - RHS_{VM}^{u}(\beta^*)\right] = \quad & P_2^{VM,\sigma_2}(e,r;\beta^*)(1-\delta_2)\left((1+\delta_1)\sigma_2 - 1\right) \\ - \quad & P_2^{VM.\sigma_2}(e,e;\beta^*)\left((1-\delta_2)\left((1+\delta_1)\sigma_2-\delta_1\right) + \delta_2(1-\delta_1)\right) \\ + \quad & (1-\delta_1)\left((1-\delta_2)P_2^{VM,u}(e,r;\beta^*) + \delta_2 P_2^{VM,u}(e,e;\beta^*)\right).\end{aligned}$$

The third term is strictly positive; moreover, $P_2^{VM,\sigma_2}(e,r;\beta^*) > P_2^{VM,\sigma_2}(e,e;\beta^*)$ for all δ_1. Now, as $\delta_1 \to 1$, the coefficients on $P_2^{VM,\sigma_2}(e,r;\beta^*)$ and $P_2^{VM,\sigma_2}(e,e;\beta^*)$ both converge to $(1-\delta_2)(2\sigma_2-1) > 0$ since $\sigma_2 > 1/2$. Thus, $\lim_{\delta_1 \to 1}\left[RHS_{VM}^{\sigma_2}(\beta^*) - RHS_{VM}^{u}(\beta^*)\right] > 0$, so there exists $\delta_1^* \in \left(\overline{\delta}_1, 1\right)$ such that $\beta_{VM}^u < \beta_{FM}^{\delta_1}$ for all $\delta_1 \in (\delta_1^*, 1)$. ■

Proof of Proposition 5: First we note that 2B's information choice makes no difference to the strategies of IB. When 2B chooses her action at $t = 2$, there can be two relevant histories: $a_1 = r$ or $a_1 = e$. Given the history $a_1 = r$, it becomes common knowledge that $v = \overline{v}$, and thus 2B's information is irrelevant. Thus, whether 2B decides, ex ante, to pay to acquire information depends on her payoffs, conditional on her (prior) information decision, following history $a_1 = e$.

Given $a_1 = e$:

If 2B has not paid for information, she is still uninformed and her continuation equilibrium behavior is given by Proposition 1 for $\sigma_2 < \underline{\sigma}$. Since she always chooses $a_2 = r$, her equilibrium payoff is given by $\mathbb{E}[v \,|\, a_1 = e]$.

Suppose instead that she has paid to become perfectly informed. Now she acts according to the equilibrium in Proposition 1 for $\sigma_2 > \overline{\sigma}$. So her expected payoff from becoming informed is:

$$\mathbb{P}(v = \overline{v} \,|\, a_1 = e) \underbrace{\overline{v}}_{\text{if } a_m = \overline{v} \text{ 2B chooses } a_2 = r} + \mathbb{P}(v = \underline{v} \,|\, a_1 = e) \underbrace{P_2(e, e; \beta_{VM}^{\sigma_2 = 1})}_{\text{if } a_m = \underline{v} \text{ 2B chooses } a_2 = e}$$

By adding and subtracting $\underline{v}$ in the second term we have that 2B's continuation payoff given information acquisition is:

$$\begin{aligned} & \mathbb{P}(v = \overline{v} \,|\, a_1 = e)\overline{v} + \mathbb{P}(v = \underline{v} \,|\, a_1 = e) \left(\underline{v} + P_2(e, e; \beta_{VM}^{\sigma_2 = 1}) - \underline{v}\right) \\ = \;& \mathbb{P}(v = \overline{v} \,|\, a_1 = e)\overline{v} + \mathbb{P}(v = \underline{v} \,|\, a_1 = e)\underline{v} + \mathbb{P}(v = \underline{v} \,|\, a_1 = e) \left(P_2(e, e; \beta_{VM}^{\sigma_2 = 1}) - \underline{v}\right) \\ = \;& \underbrace{\mathbb{E}(v | \, a_1 = e)}_{\text{payoff without information}} + \underbrace{\mathbb{P}(v = \underline{v} \,|\, a_1 = e) \left(P_2(e, e; \beta_{VM}^{\sigma_2 = 1}) - \underline{v}\right)}_{\text{incremental payoff to paying } c_I}. \end{aligned}$$

Given $\lambda < 1/\Delta v$, from Assumption 1, we have that $P_2(e, e; \beta_{VM}^{\sigma_2 = 1}) > \underline{v}$, from Lemma 1 part (i), so the incremental payoff is positive. However, $P_2(e, e; \beta_{VM}^{\sigma_2 = 1})$ decreases in α_1, and thus 2B's incremental payoff—and thus 2B's willingness to pay for information—is monotonically decreasing in α_1. ■

B. Campaign objectives in BJK

According to BJK, a campaign's objective is *specific* if the informed activist acquired a stake in the target company with a view to influence: a) the management's capital structure decisions (i.e. excess cash, under-leverage, debt restructuring, recapitalization, share repurchase, dividend policy, equity issuance); or b) the company's ownership structure (i.e. through sale of the company or its main assets to a third party, by taking majority control of the company, buy-out of the company, by taking the company private); or c) the company's business strategy (i.e. by addressing the lack of business focus, by conducting business restructuring including spinning off of business segments, with a view to block a pending M&A deal involving the company or wanting to change the terms); or d) the company's corporate governance (i.e. through targeting company's takeover defenses, seeking CEO/chairman replacement, increasing board independence or fair representation, encouraging information disclosure, tackling fraud and executive compensation

C. Matching Morningstar with Thomson Reuters data

In this section we provide a brief overview of how we match the Morningstar fund level data with 13F fund-family data from Thomson Reuters. Morningstar data is available at the fund level for a collection of mutual funds over 1993–2013 time period at monthly frequency. It contains detailed information on individual stock holdings by each fund, as well as their type: index, fund-of-funds or SRI (Socially Responsible Investor). We aggregate monthly fund level data at the annual fund-family level in order to be able to match it to 13F fund-family holdings available from Thomson Reuters.

Since Morningstar data does not provide fund-family identifiers, we employ a manual name matching procedure to match the top 200 fund families from Morningstar (in terms of their average AUM over the sample period) with 13F data. We manually search online each Morningstar fund family name to identify the closest neighbour in 13F fillings. This procedure has a few hurdles, in that fund families' names can change over time (thus, we might have one version of the name in Morningstar and another version of the name in 13F). Based on the information found online we select within the group of potential 13F manager names that could be matched to a fund family in Morningstar, a final match. To identify the final match we take into consideration: (i) whether the value of variable *inv_long* in Morningstar *stat_family* is similar to the market value reported in 13F for the candidate *mgrname*; (ii) the *mgrtype* in 13F (we give priority to matches with *mgrtype=IIA/INV*). Finally, we denote as *mutual funds* all Fund-families from Morningstar that were matched to 13F data we denote as *mutual funds*m and those unmatched are then denoted as *non-mutual funds*.

D. Indexers

The presence of indexers presents a challenge. In contrast to (flow-motivated) mutual funds, and (value-motivated) non-mutual funds, indexers are passive entities designed to track the performance of a broad stock market index, e.g., the S&P 500. Their mechanical trading rules preclude participation in the exit governance mechanism and thus we need to exclude them from our analysis. We classify mutual fund families as *Indexers* if, according to Morningstar, more than 50% of the fund-families' AUM is held by index funds, or if more than 50% of funds within a fund family are classified as indexers. To identify index funds among non-mutual funds in our sample, we use the 13F data and follow Bushee (2001) and Bushee and Noe (2000). We classify a non-mutual fund as an *Indexer* if their index classification (in the two aforementioned papers) is Dedicated, and as a *Non-Indexer* if their classification is Quasi-Indexer or Transient.

E. Main Tables and Figures

Table 2: **Summary Statistics – Activist Campaigns**

This table shows the summary statistics for the hedge fund activist campaigns obtained from BJPT and BJK. The activist sample consists of 2,739 distinct campaigns involving 2,016 unique targets and 175 hedge fund families between 1994 and 2011. Panel A describes the percentage of campaigns that had a specific engagement goal. Panel B shows the respective frequencies of campaign outcomes in cases when the campaign was declared to have specific goals, and in Panel C we report relative frequencies of various exit mechanisms.

Panel A

Campaigns with specific goals	#N	%
0	1,439	52.54%
1	1,065	38.88%
Unspecified/Missing	235	8.58%
Total	2,739	100.00%

Panel B

Campaign outcome	#N	%	Sale in the open market (exit)	% per outcome
Success	463	43.47%	112	31.11%
Fail	155	14.55%	58	16.11%
Settle	218	20.47%	72	20.00%
Ongoing	11	1.03%	1	0.28%
Withdraw	91	8.54%	66	18.33%
No sufficient information	118	11.08%	49	13.61%
Not applicable	2	0.19%	1	0.28%
Unspecified/Missing	7	0.66%	1	0.28%
Total	1,065	100.00%	360	100.00%

Panel C

Type of campaign termination	#N	%
Still holding	824	30.08%
Sale in the open market (exit)	1,074	39.21%
Sold to a third party	128	4.67%
Target taken by a private HF	15	0.55%
Merger with another company	220	8.03%
Liquidated	31	1.13%
Sell back to the target	38	1.39%
Unspecified/Missing	409	14.93%
Total	2739	100.00%

Table 3: **Summary Statistics – Institutional Holdings and Firm Characteristics**

In this table we show the summary characteristics for the final merged firm-quarter sample. Panel A shows summary statistics on institutional ownership and firm characteristics. Panel B shows the top-3 mutual funds and top-3 non-mutual funds based on their average market value over 1994–2013, as well as, whether they are categorized as an index fund (1) or not (0).

Panel A

	Mean	Median	Std. dev.	Min	Max	#N
Shares outstanding in MM	235.53	25.00	3,705.87	1.00	500,000	260,678
Market Capitalisation (MM$)	8,061.85	289.50	149,536.10	0.00	18,200,000	260,678
Institutional Shares (%) per Firm	42.32	39.56	30.66	0.00	100	260,678
Non-MF holdings (%) per Firm	18.35	16.59	14.47	0.00	96	256,780
MF holdings (%) per Firm	16.02	13.08	13.69	0.00	94	244,574
Total Assets	9,045.36	428.58	79,250.70	0.00	3,771,200	260,678
Total Debt/Total Assets	0.26	0.15	4.79	0.00	1,055	260,678
M/B	2.56	1.35	46.22	0.10	9,902	260,678
Operating income after depreciation	404.36	18.32	2,216.74	0.00	88,847	260,678
Cash	372.15	23.25	2,966.72	0.00	168,897	260,678

Panel B

		Mutual Funds	
Rank	Manager	Index Fund	Avg Market Value ($billion)
1	FIDELITY MANAGEMENT & RESEARCH	0	403
2	VANGUARD GROUP	1	331
3	STATE STR CORP	0	328

		Non-Mutual Funds	
Rank	Manager	Index Fund	Avg Market Value ($billion)
1	BARCLAYS BANK PLC	0	316
2	CAPITAL WORLD INVESTORS	0	259
3	CAPITAL RESEARCH GBL INVESTORS	0	216

Table 4: **Sales in the open market (exits) and exits at a loss.**

In this table we show the summary characteristics for the final merged firm-quarter sample. We present relative frequencies of each definition of exit. Sale in the open market (SoM_i) is 1 when the activist sold in the open market and 0 otherwise. Exit at a loss ($SoM_i \times EaL_i$) is 1 when the activist sold in the open market at a loss, meaning that there was a price drop between the activist's entry and exit dates and 0 otherwise.

Sale in the open market (exit)	Frequency	Percent
1	33,378	12.80%
0	227,300	87.20%
Total	260,678	100.00%

Exit at a loss	Frequency	Percent
1	1,150	0.44%
0	259,528	99.56%
Total	260,678	100.00%

Table 5: **DiD of Institutional Holdings**

This table shows results of estimating specifications (1)–(2), and their extensions with controls and event-windows as described in Section 5.2. The dependent variable is $Holdings_{i,t}/SharesOutstanding_{i,t}$, which measures the (amount of) holdings of stock i, at time t, held by institutional investors, normalized the total number of shares outstanding of firm i at time t. The main independent variable is $PostActivism_{i,t} \times MutualFund_{i,t}$, which measures the difference in holdings pre and post the activist's exit for mutual funds vs non-mutual funds. Specifications in columns 1–8 differ in the exits we condition on, the length of the pre and post period we consider, and whether we include firm×quarter controls, as indicated. All specifications include firm and quarter fixed effects. Standard errors are adjusted for heteroskedasticity and clustered at the fiscal year level, and t-statistics are reported below the coefficients in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

	$Holdings_{i,t}/SharesOutstanding_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	$SoM_i = 1$	$SoM_i = 1$	$SoM_i = 1$	$SoM_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$
Window	All quarters	± 4 quarters	All quarters	± 4 quarters	All quarters	± 4 quarters	All quarters	± 4 quarters
Firm×Quarter Controls	N	N	Y	Y	N	N	Y	Y
$PostActivism_{i,t} \times MutualFund_{i,t}$	-1.929***	-0.696*	-1.940***	-0.733*	-4.143***	-4.159**	-4.163***	-4.159**
	[-9.477]	[-1.761]	[-9.926]	[-1.879]	[-3.611]	[-2.275]	[-3.882]	[-2.255]
$PostActivism_{i,t}$	2.997***	0.721	3.085***	0.752*	0.579	0.384	0.657	0.496
	[14.708]	[1.617]	[15.651]	[1.694]	[0.504]	[0.150]	[0.578]	[0.177]
$MutualFund_{i,t}$	-2.378***	-3.002***	-2.424***	-2.999***	-4.863***	-3.296**	-4.840***	-3.296**
	[-16.957]	[-10.443]	[-17.982]	[-10.582]	[-6.936]	[-2.224]	[-6.959]	[-2.208]
$Leverage_{i,t}$			-8.024***	-11.958***			-18.234***	-0.540
			[-16.914]	[-6.183]			[-6.417]	[-0.015]
$M/B_{i,t}$			1.032***	0.622***			1.114***	-1.406
			[19.871]	[4.703]			[3.537]	[-0.441]
$\log(TotalAssets)_{i,t}$			5.350***	5.536***			4.896***	-4.692
			[44.407]	[11.749]			[7.618]	[-0.429]
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	32,957	6,336	32,957	6,336	1,136	186	1,136	186
R-squared	0.557	0.673	0.592	0.682	0.436	0.814	0.483	0.815

Table 6: **DiDiD of Institutional Holdings**

This table shows results of estimating specification (3)-(a) for exits and (3)-(b) for exits at a loss, with controls and event-windows as described in Section 5.2. The dependent variable is $Holdings_{i,t}/SharesOutstanding_{i,t}$, which measures the (amount of) holdings of stock i, at time t, held by institutional investors, normalized the total number of shares outstanding of firm i at time t. The main independent variable is $PostActivism_{i,t} \times MutualFund_{i,t} \times PriceImpact_{i,T}$, which measures the effect of the (negative) price reaction to the exit of the activist blockholder comparing across both pre vs post the event quarter and mutual vs non-mutual funds. Specifications in columns 1–8 differ in the exits we condition on, the length of the pre and post period we consider, and whether we include firm×quarter controls, as indicated. Panel A considers $T = 1$ and Panel B considers $T = 3$. All specifications include firm and quarter fixed effects. Standard errors are adjusted for heteroskedasticity and clustered at the fiscal year level, and t-statistics are reported below the coefficients in parentheses. Coefficients marked with ***, **, and * are significant at the 1%, 5%, and 10% level, respectively.

Panel A

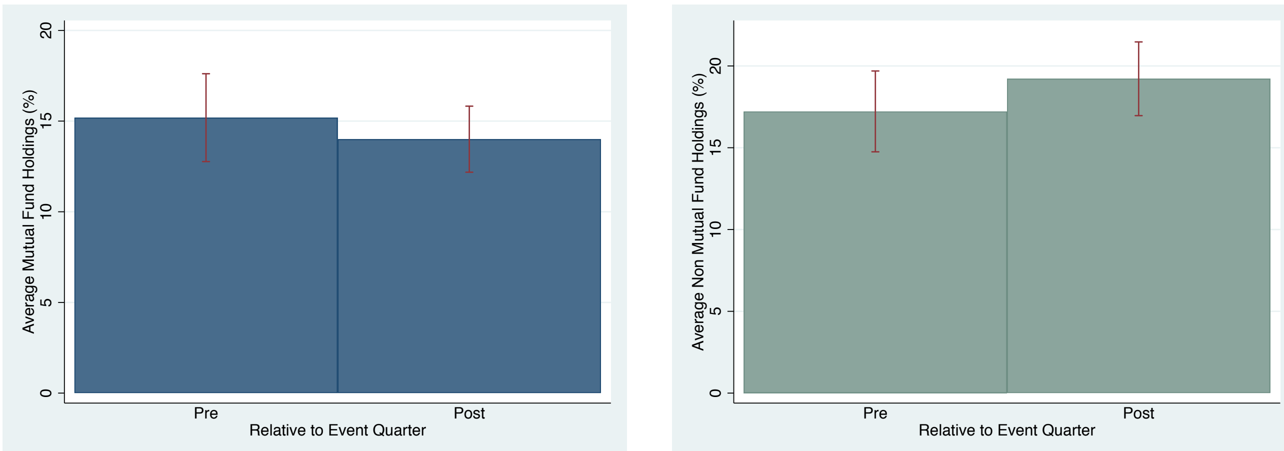
	$Holdings_{i,t}/SharesOutstanding_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	$SoM_i = 1$	$SoM_i = 1$	$SoM_i = 1$	$SoM_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$
Window	All quarters	± 4 quarters	All quarters	± 4 quarters	All quarters	± 4 quarters	All quarters	± 4 quarters
Firm×Quarter Controls	N	N	Y	Y	N	N	Y	Y
$PostActivism_{i,t} \times MutualFund_{i,t} \times PriceImpact_{i,1,1}$	-10.398***	-10.029*	-12.340***	-10.881*	-5.887	-9.018	-5.844	-9.018
	(-2.906)	(-1.716)	(-3.674)	(-1.918)	(-0.560)	(-0.492)	(-0.551)	(-0.493)
$PostActivism_{i,t} \times PriceImpact_{i,1,1}$	20.644***	11.331**	19.510***	14.491***	18.809**	27.203	16.254*	47.634**
	(7.529)	(2.520)	(7.369)	(3.340)	(2.242)	(1.351)	(1.773)	(2.305)
$MutualFund_{i,t} \times PriceImpact_{i,1,1}$	10.960***	2.530	11.503***	2.618	23.403***	-8.313	23.220***	-8.313
	(5.144)	(0.582)	(5.857)	(0.618)	(3.338)	(-0.678)	(3.200)	(-0.703)
$PostActivism_{i,t} \times MutualFund_{i,t}$	-1.993***	-0.733*	-1.975***	-0.767*	-3.874***	-1.990	-3.889***	-1.990
	(-8.811)	(-1.658)	(-9.112)	(-1.756)	(-3.055)	(-0.987)	(-3.242)	(-1.013)
$PostActivism_{i,t}$	3.030***	0.851*	3.186***	0.914*	1.399	0.119	0.716	1.257
	(13.225)	(1.696)	(14.401)	(1.831)	(1.106)	(0.036)	(0.550)	(0.354)
$M/B_{i,t}$	-2.289***	-3.062***	-2.343***	-3.054***	-5.224***	-6.303***	-5.205***	-6.303***
	(-15.137)	(-9.576)	(-16.213)	(-9.691)	(-7.229)	(-4.087)	(-7.266)	(-4.319)
$Leverage_{i,t}$			-8.777***	-11.623***			-17.389***	-106.494
			(-16.077)	(-4.767)			(-5.101)	(-1.391)
$M/B_{i,t}$			1.172***	0.629***			0.139	-10.563
			(18.899)	(4.280)			(0.163)	(-1.561)
$\log(TotalAssets)_{i,t}$			5.846***	5.696***			4.268***	-5.878
			(42.299)	(10.652)			(5.495)	(-0.471)
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	26,671	5,058	26,671	5,058	936	150	936	150
R-squared	0.558	0.673	0.595	0.682	0.495	0.846	0.527	0.857

Panel B

	$Holdings_{i,t}/SharesOutstanding_{i,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	$SoM_i = 1$	$SoM_i = 1$	$SoM_i = 1$	$SoM_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$	$SoM_i \times EaL_i = 1$
Window	All quarters	± 4 quarters	All quarters	± 4 quarters	All quarters	± 4 quarters	All quarters	± 4 quarters
Firm×Quarter Controls	N	N	Y	Y	N	N	Y	Y
$PostActivism_{i,t} \times MutualFund_{i,t} \times PriceImpact_{i,3,3}$	-11.109***	-8.749*	-11.747***	-9.220*	-8.515	-10.954	-8.181	-10.954
	(-4.595)	(-1.811)	(-5.185)	(-1.945)	(-0.765)	(-0.562)	(-0.735)	(-0.553)
$PostActivism_{i,t} \times PriceImpact_{i,3,3}$	14.053***	7.488*	13.896***	8.512**	43.211***	69.080***	34.284***	68.397***
	(5.381)	(1.896)	(7.532)	(2.204)	(4.537)	(2.842)	(3.288)	(2.948)
$MutualFund_{i,t} \times PriceImpact_{i,3,3}$	7.831***	4.140	8.385***	4.158	39.744***	4.825	39.618***	4.825
	(6.677)	(1.219)	(5.867)	(1.248)	(4.740)	(0.371)	(4.617)	(0.367)
$PostActivism_{i,t} \times MutualFund_{i,t}$	-1.863***	-0.699	-1.839***	-0.732*	-4.909***	-1.618	-4.958***	-1.618
	(-8.201)	(-1.579)	(-8.446)	(-1.672)	(-3.911)	(-0.808)	(-4.230)	(-0.808)
$PostActivism_{i,t}$	2.908***	0.815	3.069***	0.876*	0.213	-0.569	-0.041	-0.935
	(12.666)	(1.622)	(13.849)	(1.753)	(0.164)	(-0.183)	(-0.031)	(-0.268)
$M/B_{i,t}$	-2.403***	-3.079***	-2.464***	-3.071***	-5.816***	-6.461***	-5.796***	-6.461***
	(-15.762)	(-9.607)	(-16.929)	(-9.719)	(-8.388)	(-4.371)	(-8.328)	(-4.409)
$Leverage_{i,t}$			-8.815***	-11.558***			-17.427***	-92.227
			(-16.148)	(-4.732)			(-5.329)	(-1.249)
$M/B_{i,t}$			1.173***	0.600***			-0.293	-8.461
			(18.899)	(4.126)			(-0.341)	(-1.336)
$\log(TotalAssets)_{i,t}$			5.883***	5.644***			3.518***	5.292
			(42.619)	(10.593)			(4.265)	(0.459)
Firm fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Quarter fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Observations	26,584	5,040	26,584	5,040	936	150	936	150
R-squared	0.556	0.671	0.593	0.680	0.521	0.852	0.545	0.857

Figure 1: Mutual Fund and Non-Mutual Fund Holdings for Sales in the Open Market (Exits)

This figure shows average mutual fund holdings in (a) and non-mutual fund holdings in (b), as a percentage of a firm's shares outstanding, in a window of four quarters before (pre) and four quarters after (post) an activist's exit (the event quarter) via sale in the open market ($SoM_i = 1$). In both, 95% confidence intervals are also depicted in red.

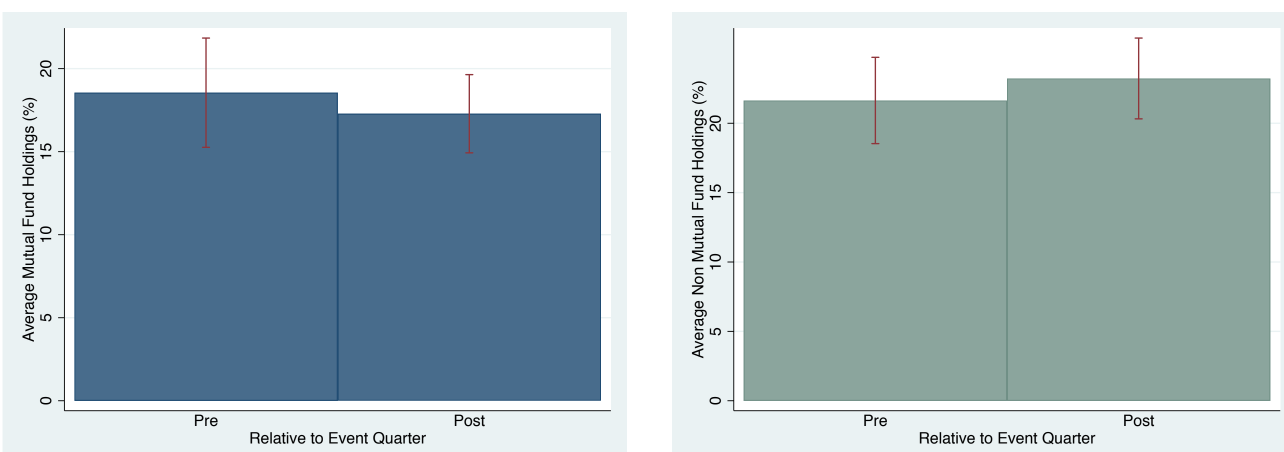


(a) Mutual Fund

(b) Non-Mutual Fund

Figure 2: Mutual Fund and Non-Mutual Fund Holdings for Exits at a Loss

This figure shows average mutual fund holdings in (a) and non-mutual fund holdings in (b), as a percentage of a firm's shares outstanding, in a window of four quarters before (pre) and four quarters after (post) an activist's exit (the event quarter) via sale at a loss in the open market ($SoM_i \times EaL_i = 1$). In both, 95% confidence intervals are also depicted in red.



(a) Mutual Fund

(b) Non-Mutual Fund

Online Appendix

Here, we briefly discuss some of our modeling choices.

OA.1 IB better informed than 2B and moves early

In our model, we specify that IB (i) is better informed than 2B and (ii) makes trading decisions before 2B. We believe this is a reasonable set of modeling choices and that the two features go hand in hand. We have in mind an engaged IB, who is likely to have more precise and more timely information about the manager's choices than other blockholders. Further, when any blockholder has information about the (irreversible) bad choices of firm managers, it is in her private interest to act on it *before* others know – this is the essence of what makes the threat of exit credible.

While we believe that our modeling choice is natural, we should note that our qualitative results are unlikely to change if the precise timings of when IB and 2B acted were relaxed, as long as the quality of IB's information is superior to that of 2B. Imagine a scenario in which the 2B may receive information ahead of IB. Since it is infeasible to prevent 2B from trading *after* IB, we can now consider the possibility that 2B can trade before or after IB. First, as our analysis already indicates, a VM 2B doesn't really care about what the IB does, so the precise timing of her choices relative to IB is not qualitatively relevant. Imagine now a FM 2B, who received positive information about the manager's actions and then chose to hold on to her position. Now, subsequent to this decision, 2B observes (or infers from prices) that the IB has exited. This 2B now is in an identical position to that of the 2B in our model. As long as she attributes sufficient probability that the IB's sale was informationally motivated (i.e., if δ_1 is not large) she will still be inclined to maximize flows by reversing her earlier decision and selling out after IB, despite her own information.

OA.2 2B is both VM and FM

In our model, we consider two potential versions of 2B: either fully VM or fully FM. Reality is less black and white. For example, a minority of mutual funds do insist on their managers investing personal wealth in the fund (Khorana, Servaes, and Wedge (2007)) and even highly sophisticated hedge funds do also care about future flows (Lim, Sensoy, and Weisbach (2016)). It may, thus, be desirable to consider mixed motivations for 2B, for example, endow her with an utility function of the form

$$\kappa\pi_2 + (1-\kappa)\,\mathbb{P}\left(\tau = g \mid v, a_2\right),$$

where $\kappa \in [0,1]$. Our analysis is qualitatively unchanged (though algebraically more tedious) by this generalization. For example, there exist $\widehat{\delta}_1$ and $\widehat{\kappa}$ such that for all $\delta_1 < \widehat{\delta}_1$ and $\kappa < \widehat{\kappa}$, 2B will behave exactly as in Proposition 2.

OA.3 Inferences by the FM 2B's clients, profitability of follower exits

In our model, the information quality of IB and 2B is ranked. Since we model 2B to represent an institutional investor managing the money of clients, such informational rankings must be understood by 2B's clients in our fully rational model. Yet, since our leading interpretation of the FM 2B is a retail mutual fund, the reader may wonder whether retail investors are sophisticated enough to understand the model's information ranking. Fortunately, the model's effective evaluation algorithm for 2B's clients can be replicated by a simplistic rule of thumb. Imagine that investors observe at $t = 3$ only whether their fund profited as a result of their $t = 2$ trade or not, rewarding profits with inflow and punishing losses with outflows. Such a rule of thumb—effectively, an increasing flow-performance relationship—is well documented for mutual funds (e.g., Brown, Harlow, and Starks (1996)). Interestingly, such a mechanical reward scheme would induce 2B to behave (qualitatively) just as in the model. To demonstrate this, we make a series of observations. First, in the model, 2B is evaluated on her actions ex post: $\mathbb{P}[\tau = g \mid v, a_2]$. Second, since (by Lemma 1) $P_2 \in (\underline{v}, \overline{v})$, correct (incorrect) actions are profitable (unprofitable) ex post. Finally, inspection of the proof of Proposition 2 shows that (off equilibrium) inferences about 2B take the form

$$\mathbb{P}[\tau = g \mid v = \underline{v}, a_2 = r] = \frac{(1-\sigma_{2,g})\gamma_2}{(1-\sigma_{2,g})\gamma_2 + (1-\sigma_{2,b})(1-\gamma_2)} < \gamma_2,$$

$$\mathbb{P}[\tau = g \mid v = \overline{v}, a_2 = e] = \frac{\sigma_{2,g}\gamma_2}{\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1-\gamma_2)} > \gamma_2,$$

i.e., 2B's potential reputation (and thus flow reward) increases in the ex post profitability of her trades. Thus, in the model it is precisely the flow-performance relationship which incentivizes 2B, when her information disagrees with that of IB, to hide (or "jam") her signal, by blindly following IB's exit, generating the key mechanism of the model.

Finally, while follower exits are blind in the FM case, it is worth noting that they are not necessarily unprofitable. The model only predicts that the profitability of leader (IB) and follower (FM 2B) exits will be *correlated*. When IB exits for informational reasons (probability $1-\delta_1$) exits will be profitable. When IB exits for liquidity reasons (probability δ_1) exits will still be profitable with probability $F(\beta_{FM}^{\delta_1})$. Thus, 2B's exits are unprofitable in the FM case only with probability $\delta_1\left(1-F(\beta_{FM}^{\delta_1})\right)$. When δ_1 is small, follower exits will rarely be unprofitable.

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