

The Wall Street Stampede: Exit as Governance with Interacting Blockholders

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Dragana Cvijanovic

University of Warwick

Amil Dasgupta

London School of Economics, CEPR and ECGI

Konstantinos Zachariadis

Queen Mary University of London

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Abstract

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Keywords: institutional investors, competition for flow, governance via exit

JEL Classifications: G23, G34

*Dragana Cvijanovic**

Associate Professor of Finance
University of Warwick, Warwick Business School
Gibbet Hill Rd
Coventry, CV4 7AL, United Kingdom
e-mail: Dragana.Cvijanovic@wbs.ac.uk

Amil Dasgupta

Professor of Finance
London School of Economics, Department of Finance
Houghton Street
London, WC2A 2AE, United Kingdom
phone: +44 207 955 7458
e-mail: a.dasgupta@lse.ac.uk

Konstantinos Zachariadis

Associate Professor
Queen Mary University of London, School of Economics and Finance
Mile End Road
London E1 4NS, United Kingdom
phone: +44 207 882 8698
e-mail: k.e.zachariadis@qmul.ac.uk

*Corresponding Author

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Dragana Cvijanovic[†] Amil Dasgupta[‡] Konstantinos Zachariadis[§]

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Abstract

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[†]University of North Carolina, Chapel Hill

[‡]London School of Economics, CEPR, and ECGI

[§]Queen Mary University of London

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 13D¹ 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 on 14 March 2008 at a loss of around 70%. 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, other than Chapman there were seven institutional investors 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 an engaged 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 to some extent when the blockholder exits,

¹Section 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.

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

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

⁴Of 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.

⁵While 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.

punishing managers, raising the cost of bad choices ex ante, 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 – the majority of corporate owners today – 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.

As Edmans and Holderness (2017) highlight, institutional blockholders are heterogeneous: their organizational structures and incentive mechanisms vary widely. 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 blockholders who are exposed to short-term redemptions do not wish to disappoint their investors. As a result, when such blockholders perceive that an informed blockholder has sold out in discontent, 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. We then present large-sample empirical evidence to illustrate how the mechanism in our model plays out in the real world. In particular, we show that between 1994 and 2011, when activist hedge funds exited following failed campaigns, 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 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 the model, a corporate manager chooses between a good action (which generates high eventual cash flows) and a bad one (which generates low cash flows but 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. 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 a “value maximizer.” 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 – and we refer to her as a “flow maximizer.”

In equilibrium, value maximizers make choices in a manner that is *independent* of the actions of the informed blockholder: if the value maximizer is sufficiently well informed, she exits if and only if her own information indicates that the manager has chosen the bad action; If the value maximizer 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 too many liquidity shocks, flow maximizers' choices are *fully dependent* on the actions of the informed blockholder: flow maximizers exit if and only if the informed blockholder exits.

The governance implications of such contrast in the behavior of value maximizing and flow maximizing blockholders are nuanced. On the one hand, the fact that flow maximizing blockholders stampede out after the informed blockholder enhances the price drop associated with the informed blockholder's exit, enhancing punishments for suboptimal choices. On the other, the fact that flow maximizing blockholders ignore their own information when making exit decisions introduces noise, sometimes punishing the manager severely even when he has made optimal choices. We characterize, via two results, how governance ranks across equilibria with profit maximizing vs flow maximizing blockholders. First, we show that the only instance in which governance works better *without* flow motivated blockholders is if the value maximizing blockholder is extremely well informed, when – intuitively – the situation is like having *two* fully informed blockholders. Otherwise, governance is better with flow motivated blockholders. Second, we show that if information acquisition is a choice, it is unlikely that a value maximizing blockholder 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.

With the model in hand, we turn to examining whether a mechanism like this is in evidence

in the real world. In particular, imagine a corporate manager who is considering whether to take an action opposed by an engaged blockholder in his company. The manager understands that if he chooses a course of action that the blockholder considers to be suboptimal, it will be in the blockholder's best interest to exit. However, the blockholder owns only a limited stake (say, 5-6%) in the company. What the manager may be interested to know is how other blockholders will react to the exit of the engaged blockholder: What happens in firms in which an engaged blockholder exits unsuccessfully from a campaign?

In our empirical analysis, we examine the aftermath of exits by activist hedge funds from target firms following failed activism campaigns. Using detailed hedge fund activism data from 1994-2011, we are able to identify how and when engaged blockholders exit, in the light of their stated engagement goals. We trace out the trading behaviour of other blockholders 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 flat 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 heterogeneity amongst them, *on average*, such institutions, which we denote *non-mutual funds* will be less flow motivated (and more value motivated) than mutual funds. Thus, we treat all asset managers that report in the 13F filings, and who are not previously identified as mutual funds in the Morningstar database, as our proxy for value motivated non-mutual funds.

Our empirical investigation is then conducted on a set of 260,678 firm-quarter observations over 1994-2011 time period, 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 in play in the real world. Controlling for unobserved firm-level heterogeneity and general economic conditions, we find that following an exit in discontent by the informed activist, flow motivated mutual funds sell out of the target firm significantly more than non-mutual funds. Our empirical findings are robust to several definitions of exit in discontent and are robust to the inclusion of contemporaneous and lagged firm-level characteristics to proxy for evolving corporate governance.

1.1 Related literature

Our paper is related to the large literature on governance by blockholders (see Edmans and Holderness (2017) for a survey). Like us, Edmans and Manso (2011) also consider the possibility of multiple blockholders in firm who govern via exit. In their model, competition in trading by multiple blockholders 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. Like us, Dasgupta and Piacentino (2015) focus on the incentives of institutional blockholders to compete for investor flow. 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. In Song's model, flow motivated blockholders are reluctant to intervene (i.e., use voice) because interventions will signal poor stock selection ability, for reasons similar to those in Dasgupta and Piacentino (2015). Knowing this, non-flow motivated blockholders will realize that they must use voice themselves, because there is no point free riding on their flow motivated counterparts.

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. In emphasizing the benefits of herding, our paper is 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.

At an applied level, our paper is thematically linked to the recent literature on how institutional investors interact with activist hedge funds. Brav, Dasgupta, and Mathews (2016) argue that reputational concerns can help to alleviate free-riding in the use of (costly) voice in coordinated engagements.⁶ Recent empirical papers that provide evidence of how active funds provide support in governance via voice to activist hedge funds include Kedia, Starks, and Wang (2016) and Brav, Jiang, and Li (2018), while Appel, Gormley, and Keim (2016) focus on the role played by passive funds. In contrast to all of these, we study how institutional investors interact with activist hedge funds in governing via exit.

Our work is thematically related to the recent empirical study of Giannetti and Yu (2017) which examines the governance benefits of short-horizon investors. Identifying short-horizon investors as those empirically classified to be “transient” by Bushee (2001), they find that

⁶In Brav, Dasgupta, and Mathews (2016), wolf pack members sell out simultaneously with the activist if – after entry – they discover management to be too intransigent, in order to avoid an exogenous cost of staying invested. Their theoretical mechanism is entirely different: Brav et al do not model the manager's action choice and thus do not consider governance via the threat of exit. Further, exit occurs at fully revealing prices in Brav et al and pack exits have no price impact and thus could play no governance role. Empirically, too, the two papers capture different phenomena: we find that there is limited overlap with the set of those who enter following the activist and those who exit in the aftermath of the activist's exit. In one third of failed campaigns, there is zero overlap. In the remaining two thirds, the overlap is less than 50%.

firms with more such investors respond better than peers to reductions in import tariffs. Gianetti and Yu interpret this to be the disciplining effect of the fear of aggressive sales by short-term investors. Our paper complements theirs in several ways. Theoretically, by establishing the ex ante governance benefits of stampede sales, we provide a conceptual foundation for Gianetti and Yu’s empirical findings. Further, our micro foundation via flow sensitivity provides guidance on *why* some investors may sell aggressively in response to bad news while simultaneously shedding light on *which* type of investors are likely to be aggressive sellers. At an empirical level, while Gianetti and Yu focus on firm-level outcomes, guided by our model we focus instead on the actual trades of different institutional owners.

Finally, our paper has a thematic connection to the strand of the banking literature that emphasizes the benefits of financial fragility (Calomiris and Kahn (1991), Diamond and Rajan (2001)). In such models, exposing financial intermediaries to an extreme form of redemption risk, via demandable deposit contracts, can mitigate hold-up problems and enhance welfare. In a different context and via a different mechanism, we show that exposure to redemption risk can also have benefits in the context of (equity) blockholder monitoring.

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, $v \in \{\underline{v}, \bar{v}\}$, 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 .

At $t = 0$ the manager (M) chooses an action $a_M \in \{\underline{v}, \bar{v}\}$ where $\bar{v} > \underline{v} > 0$, and choosing \underline{v} delivers the manager a private benefit of β chosen according to the distribution function F in $[0, \infty)$, which is privately observed by the manager. M’s action uniquely determines the cash flows produced by the firm, i.e., $v = a_M$. 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 finite $\omega_{1,2,3} > 0$. Define $\Delta v \equiv \bar{v} - \underline{v}$.

At $t = 1$ an informed blockholder (IB), who enters the model owning $\alpha_1 \in (0, 1)$ fraction of equity, observes a perfect signal $s_1 \in \{\underline{v}, \bar{v}\}$ of the manager's action. The observation of managerial actions by a blockholder is a standard assumption in exit models. Conditional on the signal the IB chooses whether to retain $a_1 = r$ or exit $a_1 = e$. The IB's payoff is given by

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

Further, with probability $\delta_1 \in (0, 1)$ the IB receives 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 $s_2 \in \{\underline{v}, \bar{v}\}$. Conditional on the signal the 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 $\tau \in \{g, b\}$ and the precision of the signal is given by:

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

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 receives 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 investor as being of two broad classes:

1. 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

⁷Note that it would be trivial to replace this by observing P_1 only in the current version of the model, as the PM fund is the only potential trader at $t = 1$.

value maximizers (VM). If 2B is a VM, then her payoff is given by:

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

VM institutions can be thought to be asset managers whose clients are sophisticated and set investment mandates — which include incentive payments, self-investment requirements, and lock-up provisions — appropriately to align incentives. A natural example of such investors are sophisticated and (relatively) unregulated hedge funds, which are incentivized by complex contracts involving AUM fees, carries interest, high watermarks etc, who self-invest significantly, and who often have lockup provisions. A discussion of the investment mandates of hedge funds can be found in Fung and Hsieh (1999). Agarwal, Daniel, and Naik (2009) argue that a conservative lower bound on the degree to which hedge fund managers self invest amounts to over 7% of assets under management.

2. The other class of institutional investor is made up of asset managers whose interests are not necessarily perfectly aligned with their principals due to their organizational structure and limitations on incentive contracting. As a result of such limitations, these institutional 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 flow maximizers (FM) or equivalently as flow motivated investors. If 2B is a 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 $\tilde{\gamma}_3 \sim U[0, 1]$ of being the good type. $\tilde{\gamma}_3$ is realized at $t = 3$. In other words, FM's expected future earnings are

$$Pr [Pr (\tau = g \mid v, a_2) > \tilde{\gamma}_3] w = Pr (\tau = g \mid v, a_2) w.$$

Thus, the FM maximizes

$$Pr (\tau = g \mid v, a_2).$$

FM institutions can be thought to be asset managers who (for whatever reason) are organized in an open ended manner and where the pressures created by open ending cannot be corrected by sufficient incentive contracting due to regulatory constraints. A natural example of such investors are retail mutual funds. The contracts between retail mutual funds and their investors are significantly restricted by provisions in the Investment Companies Act of 1970 leading over 97% of them to use flat 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.⁸

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

At $t = 1, 2$ there is a continuum of myopic risk-averse traders with mean-variance preferences. Each of these traders observes the market-clearing quantity traded and make rational inferences. Each trader has endowment W and can either invest in the stock or in the risk-free asset (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:

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

where I_t is the (common) information set of each trader at date t .

2.1 Preliminaries

2.1.1 Strategies and Notation

The strategies of the players are designated as follows: IB’s strategy is $\Sigma_1 : a_M \rightarrow \{e, r\}$; 2B’s strategy is $\Sigma_2 : s_2 \rightarrow \{e, r\}$; and M’s strategy is designated $\Sigma_M : \beta \rightarrow \{\underline{v}, \bar{v}\}$. Let

⁸We do not take a view on why mutual funds are open ended (see Stein (2002)), but rather examine the consequences of the existence of such open ended blockholders. Also, it is worth noting that managerial self-investment in funds, which would act as a natural incentive mechanism against perverse incentives created by open ending is essentially missing from mutual funds (Khorana, Servaes, and Wedge (2007)).

h_t denote the history of trades up to and including t . Let $\alpha_t \equiv \alpha(h_t; \Sigma_1, \Sigma_2, \Sigma_M)$ denote the total (cumulative) quantity sold conditional on history h_t . Let $q_t \equiv q(h_t; \Sigma_1, \Sigma_2, \Sigma_M) = Pr(v = \bar{v} | h_t; \Sigma_1, \Sigma_2, \Sigma_M)$ denote the conditional probability that M chose action \bar{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:

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

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

$$P_t = E(v|h_t) - (1/\int_i \frac{1}{\lambda_i} di) \alpha_t \text{Var}(v|h_t)$$

Defining $\frac{1}{\lambda} \equiv \int_i \frac{1}{\lambda_i} di$, we have

$$P_t = E(v|h_t) - \lambda \alpha_t \text{Var}(v|h_t).$$

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 $v = \bar{v}$; 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 $\Sigma_M = \{\underline{v} \text{ if and only if } \beta > \hat{\beta}\}$ 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 are in the Appendix. In our model, the price is the expected asset cash flows given the observed history, $E(v|h_t)$, less

a risk premium $\lambda\alpha_t Var(v|h_t)$. The risk premium is higher if the asset is (conditionally) more risky (i.e., if $Var(v|h_t)$ 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 unrealistic possibility. Further, while expected cash flows $E(v|h_t) = \Delta v q_t + \underline{v}$ is linear in q_t , the conditional probability that M chooses \bar{v} , the conditional variance of cash flows $Var(v|h_t) = \Delta v^2 q_t(1 - q_t)$ is nonmonotone. 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 \bar{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 $a_M = \bar{v}$ then his payoff will be $\omega_1 P_1^B + \omega_2 P_2^B + \omega_3 \bar{v}$ 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 $a_M \in \{\underline{v}, \bar{v}\}$. Then, the manager chooses the low action if and only if $(\omega_1 + \omega_2 + \omega_3)\bar{v}$ is lower than $(\omega_1 + \omega_2 + \omega_3)\underline{v} + \beta$ or, equivalently, $\beta \geq \bar{\beta} \equiv (\omega_1 + \omega_2 + \omega_3)\Delta v < \infty$.

2.2 Equilibrium

We now characterize equilibrium outcomes of our game, classifying by whether 2B is a VM or a FM.

2.2.1 The value maximizing case

We first solve for the equilibrium for the case in which 2B is a VM. We can state:

Proposition 1. *There exist $\frac{1}{2} < \underline{\sigma} < \bar{\sigma} < 1$ and $\beta_{VM}^u, \beta_{VM}^{\sigma_2} \in (\underline{\beta}, \bar{\beta})$ such that:*

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

The intuition is as follows. Since IB observes M's choices and since by Lemma 1, part (i), prices at $t = 1$ are always strictly above \underline{v} , it is clearly in IB's best interest to exit if and only if M has chosen the low action. 2B also has valuable information about M's actions, but her information is imperfect. Thus 2B faces a tradeoff. When she observes $s_2 = \underline{v}$, she would ideally sell (because her information is correct on average) but when 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 ($\sigma_2 > \bar{\sigma}$), it is worth paying the roll down the demand curve, and she chooses to exit if and only if her information indicates that M choose 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 $\beta > \beta_{VM}^u$

when 2B is poorly informed and for $\beta > \beta_{VM}^{\sigma^2}$ 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).

2.2.2 The flow maximizing case

We now solve for the equilibrium for the case in which 2B is a 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 $s_2 = \bar{v}$. 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 $\delta_1 < \bar{F}(\bar{\beta})/F(\bar{\beta})$, there exists $\beta_{FM} \in (\underline{\beta}, \bar{\beta})$ such that:*

1. *IB chooses $a_1 = e$ if and only if $a_M = \underline{v}$.*
2. *2B chooses $a_2 = e$ if and only if IB's action is $a_1 = e$.*
3. *M chooses \underline{v} if and only if $\beta > \beta_{FM}$.*

The intuition is as follows. IB's behavior is identical to the previous case. As before, 2B also has valuable information about M's actions, but her information is imperfect. Thus, again, 2B faces a tradeoff. However, since 2B is now a flow maximizer, the tradeoff is different. To appreciate the tradeoff, imagine that 2B has observed signals $s_2 = \bar{v}$. 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 her information is informative: the future cash flow will be \underline{v} . A flow maximizing 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 $s_2 = \bar{v}$), her clients can make no inferences about her, since the equilibrium strategy 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 (a) it is sufficiently likely that the realized outcome will be \underline{v} , which also (b) 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.

2.3 When is governance via exit strongest?

We are now in a position to compare governance under the VM and FM cases.

Proposition 3. *There exist $\sigma^* \in [\bar{\sigma}, 1)$ such that for all $\sigma_2 > \sigma^*$ we have:*

$$\beta_{VM}^u < \beta_{FM} < \beta_{VM}^{\sigma_2}.$$

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. The proposition above demonstrates that governance is best under in the VM case but only if 2B is highly informed; In case 2B is not well informed, governance is better under the FM case.

The comparison between governance across equilibria of our model is subtle, because it involves a feedback loop: The way in which 2B trades affects prices (and thus the rewards and punishments that M faces for his choices), which in turn affects M's behaviour, which then feeds back into prices. 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. In the FM case, 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 equally when he has chosen $a_M = \bar{v}$ 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 a 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 punished with high probability also by 2B's exit, whereas when he chooses $a_M = \bar{v}$ and IB is forced to exit due to a liquidity shock, unless 2B also faces a liquidity shock M's punishment will be ameliorated with high probability 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 a FM. If however, 2B is *not* well informed, then 2B's reluctance to pay for the roll down the demand curve when selling (see the discussion following Proposition 1) will mean that 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 $\sigma_2 < \underline{\sigma}$.

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.

2.4 Endogenous information acquisition

Proposition 3 suggests that governance via exit is better in the VM case than in the FM case if and only if 2B is sufficiently well informed. Since the quality of information is to a large extent a choice made by blockholders, the empirical implication of this result relies on whether VM blockholders in firms with an activist IB are likely to be well informed or not. With a view to this, we now model in a simple manner the information acquisition choice of 2B in the VM case. Note that, 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 relatively uninformed VM 2B, i.e., with $\sigma_2 < \underline{\sigma}$, keeping the rest of the model unchanged. 2B now additionally has a choice at the beginning of the game: By expending (effort) cost $c_I > 0$, she can become perfectly informed, i.e., have $\sigma_2 = 1$. Her information choice is observed by all.

Proposition 4. *For each $c_I > 0$ there exists $\bar{\alpha}_1 < 1$ such that if $\alpha_1 > \bar{\alpha}_1$, 2B chooses not to pay c_I to become informed.*

Whether 2B chooses to become informed or not makes no difference to the strategy of IB,

who is already fully informed. Thus, as before, IB will choose to exit if and only if $a_M = \underline{v}$. This also means that, conditional on observing $a_1 = r$, it will be common knowledge that $v = \bar{v}$, and information will make no difference to 2B. Thus, the attractiveness of paying for better information ex ante depends on potential gains from this additional information conditional on her (equilibrium) continuation choices given $a_1 = e$. By Proposition 1, if 2B has not paid to acquire information, she will choose $a_2 = r$ and thus receive continuation payoff $E(v|a_1 = e)$. However, if she has paid to acquire information, so that $\sigma_2 = 1 > \bar{\sigma}$, she will now act according to that information, selling when her information correctly indicates that $a_M = \underline{v}$. In this case, she gains because she liquidates at price $P_2(e, e; \beta_{VM}^{\sigma_2=1})$ instead of holding on to her position for a payoff of \underline{v} . Thus, her incremental expected payoff is indeed positive. But the incremental payoff also diminishes in the size of IB's sold stake α_1 , because $P_2(e, e; \beta_{VM}^{\sigma_2=1})$ 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. Accordingly, for a given cost of information c_1 , there exist α_1 large enough to make it unattractive ex ante to acquire additional information.

Propositions 3 and 4 have significant 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.

2.5 Discussion of modeling choices

Before moving on to the empirical analysis, we briefly discuss some of our modeling choices.

2.5.1 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.

2.5.2 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

$$\kappa\pi_2 + (1 - \kappa) Pr(\tau = g \mid v, a_2),$$

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

2.5.3 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: $Pr(\tau = g \mid v, a_2)$. Second, since (by Lemma 1) $P_2 \in (\underline{v}, \bar{v})$, 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

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

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

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 $F(\beta_{\text{FM}})$. Thus, 2B's exits are unprofitable in the FM case only with probability $\delta_1 (1 - F(\beta_{\text{FM}}))$. When δ_1 is small, follower exits will rarely be unprofitable.

3 An Empirical Investigation

The conceptual framework introduced in Section 2 demonstrated how the presence of flow motivated institutional blockholders can enhance governance via the threat of exit. The key force driving this result is that such flow maximizing blockholders sell out of the firm whenever an informed blockholder exits, thus reinforcing her exit and increasing the potential punishment on the corporate manager. We now examine the real world salience of this mechanism, by investigating if this key force is at play in the data. To do so we would ideally need to identify instances in which a corporate manager does not take the action viewed to be optimal by an informed blockholder, who then exits in discontent, and trace the relative degree to which flow motivated blockholders sell out of the firm in comparison to other blockholders. This requires:

1. Identifying firms with informed blockholders who have a view about the actions that managers should undertake;
2. Identifying instances in which the firm manager does not undertake the action viewed to be optimal by such informed blockholders and thus informed blockholder exits in discontent (having failed to achieve her goals); and

3. Finding suitable proxies for (relatively) flow-maximizing vs (relatively) value-maximizing blockholders in such firms and tracing their trading behavior following the informed blockholder's exit.

While this is no easy task, the availability of extensive data on engagements by so-called activist hedge funds provides a way forward.

Brav, Jiang, Partnoy, and Thomas (2008) document the emergence of activist hedge funds as a class of blockholders who specialize in intervention and are often effective in increasing the value of firms they target. These blockholders manifestly have “a view” about the optimal course of action for company management. Further, given the intensity of their involvement in target firms, they are also likely to be better informed than others about the degree to which target firm managers are adopting their recommendations. Hence, an activist hedge fund leading a campaign against a target firm is a reasonable proxy for an informed blockholder with a view, thus enabling step (1) above.

Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, Kim, et al. (2010) (henceforth referred to as Brav et al) combine the regulatory filings by activist hedge funds with extensive news searches using Factiva to build up a rich dataset on activist campaigns, classifying them into successes and failures wherever possible and also documenting when and how the activist fund exited. This rich dataset thus lets us identify instances in which activist funds concluded that target firm managers would not undertake the recommended course of action and thus exited in discontent, thus enabling step (2) above.

Finally, the availability of institutional portfolio holdings via quarterly 13F filings provides a way to trace the behavior of other institutional blockholders. We treat open ended mutual funds (identified by their presence in the Morningstar Open End Mutual Funds database, as described below) as our proxy for flow motivated blockholders. As noted in Section 2, 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 flat 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. Beyond mutual funds, asset management mandates can be richer, enabling greater

protection against investor redemptions and reducing flow motivations. For example, some institutions (e.g., hedge funds) may impose lock-up provisions and feature significant self-investment by their managers. Other types of institutions such as public pension funds may benefit from implicit lock-ups because, e.g., state employees would need to switch jobs to change providers. Thus, *on average*, non-mutual funds will be less flow motivated (and more value motivated) than mutual funds. Accordingly, we address step (3) above by comparing the behavior of retail mutual funds in the aftermath of activist fund exits to that of other institutional investors.

3.0.1 Are activist engagements good empirical fits for the model?

While the significant advantages of the Brav et al 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 (\bar{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?

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 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, Franks, Grant, and Wagner (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 discovery that the manager simply cannot be persuaded to choose \bar{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 \bar{v} , which we label $t = 0$.

It is worth adding at this point that it is not our intention to argue 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.

3.1 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.

3.1.1 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 Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, Kim, et al. (2010). 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 a wealth of information about the filing date, ownership and its changes, cost of purchase, and the stated purpose of the filing. Brav et al then combine the 13D filings data with data obtained through news searches using Factiva, employing the hedge fund and target company names as key words. They gather information that is not available in the 13Ds, such as the target's

management response and the development and resolution of the events.

The resulting activist campaign sample consists of 2,739 distinct campaigns involving 2,016 unique targets and 175 hedge fund families. For our analysis we retain only the first activist campaign in which a firm was targeted, so that there is a one-to-one correspondence between a campaign and a firm. As shown in Table 1 (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,⁹ and 8.58% of campaigns had an unspecified/missing classification in the data.¹⁰

[Insert Table 1 here]

The data also contain information on how and when the activist fund exited. We denote as the date of exit (below referred to as the *event quarter date*) the date when the activist fund: 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] 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] c) the date on 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.). In Panel B we break down the campaigns with a specific goal by their respective outcomes, as stated in the activist 13D filings. 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. Campaigns were still ongoing at the time of data collection in 1.03% of cases, and in 11.08% of campaigns there

⁹Brav et al 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".

¹⁰According to Brav et al, a campaign's objective is *specific* if the informed activist acquired a stake in the target company with a specific 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 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 wants 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).

was insufficient information about the outcome (the activist could have withdrawn, or the campaign was still ongoing). Finally, in 0.19% of campaigns the outcome variable (as coded in the data) is not applicable and in 0.66% is unspecified/missing.

How did the activist funds exit? Panel C provides detailed information on the type and representativeness of each exit mode. The most common mode of exit, in 39.21% of cases, is via sale in the open market. 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 exit (liquidation, selling back to the target, or target being taken by another hedge fund) are less frequent. In almost 15% of campaigns, the mode of exit was not known at the time of data extraction.

Panel B also provides more detail on how open market sales vary across different campaign outcomes. 71.74% of campaigns in which the activist withdrew ended in a sale in the open market, while 37.18% of campaigns that the activist considered as failure to achieve their stated goals ended in a sale in the open market. Among campaigns that concluded as success (settlement), in 37.18% (32.43% respectively) of cases the activist decided to sell in the open market.

3.1.2 Institutional Holdings Data

We trace the trading behaviour of other blockholders via quarterly 13F filings. In the U.S. any institutional investor who manages U\$100 million or more is required to disclose their stock holdings by filing Form 13F to the US 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 (flow motivated) retail *mutual funds* all funds that appear in the Morningstar Open End Mutual Funds database over the 1994–2013 time period. For each mutual fund, the Morningstar database contains information about the funds' total assets under management (AUM), their individual stock holdings, type of fund (e.g. index, fund of funds, socially responsible investor etc.). Since our empirical analysis is conducted at the (mutual) fund-family level, we aggregate the Morningstar data at the fund-family level.

Finally, we name match and merge the Morningstar fund-family data with the 13F Thomson Reuters institutional ownership data. This procedure is described in detail in the Appendix.

For the purposes of our analysis, we classify all fund-families from the Morningstar database as (flow-motivated) *mutual funds*. Fund-families that are present in the 13F data, but not in Morningstar are then conversely classified as (value motivated) *non-mutual funds*.

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, for example 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.

[Insert Table 2 here]

We merge the pre-matched 13F-Morningstar holdings 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 between 1994 and 2011 (Table 2). 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. The average size of the institutional holdings per firm is \$1.95 billion, which represents 42.32% of the firm stock ownership. Mutual funds hold on average 16% of a firm's stock, while non-mutual funds hold an average of 18.35%. In terms of 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 (see for example Gantchev, Gredil, and

Jotikasthira (2017)).

The top 3 largest *mutual fund* managers in our sample in terms of the average holdings size are Fidelity, Vanguard and State Street, and the top 3 largest *non-mutual fund* managers in our sample in terms of the average holdings size are Barclays, Capital World Investors and Capital Research Global (Panel C).

3.2 Empirical Methodology and Results

The key result presented in our conceptual framework in Section 2 suggests that flow motivated mutual funds can enhance governance by selling following informed activist's exit in discontent, thus reinforcing the effect of an activist's exit on the company's management. As we can see in Figure 1, the average holdings (as a fraction of shares outstanding) by value-motivated non-mutual funds tend to be higher in the two quarters after the activist campaign, in the case of both failed and successful campaigns. On the other hand, as Figure 2 depicts, average holdings (as a fraction of shares outstanding) by flow motivated mutual funds tend to be lower in the two quarters after a failed activist campaign. Moreover, following a successful campaign, we do not see a decrease in mutual fund holdings, if anything, they are slightly increased.

[Insert Figure 1 here]

[Insert Figure 2 here]

We explore this evidence more formally by estimating the following differences-in-differences (DiD) specification:

$$\begin{aligned} \frac{Holdings_{i,j,t}}{SharesOut_{i,t}} &= \alpha + \beta_1 \frac{InstShares_{i,t}}{SharesOut_{i,t}} + \beta_2 PostActivism_{i,t} * Failure_i + \beta_3 PostActivism_{i,t} \\ &+ Controls_{i,t} + \gamma_i + \delta_t + \varepsilon_{i,t}. \end{aligned} \quad (1)$$

Here $Holdings_{i,j,t}$ represents the (amount of) holdings of stock i at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, where, as mentioned, we exclude indexers from both types. We normalize the change in holdings by the

total number of shares outstanding of firm i at time t . We control for the institutional ownership, as a fraction of shares outstanding at time t : $InstShares_{i,t}/SharesOut_{i,t}$.

The first difference in (1) is between the value of holdings (as defined above) pre and post the event quarter, that is, the exit of the activist blockholder.¹¹ Accordingly, indicator variable $PostActivism_{i,t}$ takes the value 1:

a) in Tables 4 and 5 for all quarters subsequent or equal to the event quarter, and 0 otherwise, that is:

$$PostActivism_{i,t} = \begin{cases} 1 & , \text{if (in firm } i \text{ the event quarter)} \leq t, \\ 0 & , \text{otherwise.} \end{cases}$$

b) in Tables 6 and 7 in the event quarter and the two subsequent quarters, and 0 in the two quarters immediately preceding the event quarter, that is:

$$PostActivism_{i,t} = \begin{cases} 1 & , \text{if (in firm } i \text{ the event quarter)} \leq t \leq (\text{in firm } i \text{ the event quarter)} + 2, \\ 0 & , \text{if (in firm } i \text{ the event quarter)} - 2 \leq t < (\text{in firm } i \text{ the event quarter}). \end{cases}$$

The second difference in (1) is between failed campaigns (the treatment group) and successful campaigns (the control group). We define the corresponding dummy variables below. $Failure_i$ measures whether the activist hedge fund exited firm i by selling in the open market—a necessary ingredient of the exit governance mechanism—upon having deemed its campaign to have failed. We introduce two definitions of failure. The first measure of failure simply inherits the definition in the Brav et al data. The second measure is closer to our conceptual framework. We posit that it is a stronger signal of a failed campaign, where the activist blockholder has exited in discontent if, at exit, prices are lower than those at entry. Accordingly, the second measure of failure additionally requires that the blockholder's sale occurred at a loss (relative to his initial position).

Regarding success, we also employ two different definitions. First, we define success as a

¹¹As described above, the event quarter date is the date of divestment, or the date when the activist hedge fund holdings in firm i drop to below 5%, or the date on 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.).

campaign that Brav et al deem to be a “success” or a “settlement.” Second, more broadly, we define success as anything that is not a failure (according to the definitions above). Thus, two measures of failure, crossed with two measures of success, generate four potential ways to define the dummy variable $Failure_i$, that is:

a) $Failure1 = 1$ if the Outcome of the campaign was Fail, the activist sold in the open market, and the campaign had declared specific goals,

$Failure1 = 0$ if the Outcome of the campaign was Succeed or Settle;

b) $Failure2 = 1$ if the Outcome of the campaign was Fail, the activist sold in the open market at a loss (i.e., there was a price drop between the activist’s entry and exit dates), and the campaign had declared specific goals,

$Failure2 = 0$ if the Outcome of the campaign was Succeed or Settle;

c) $Failure3 = 1$ if the Outcome of the campaign was Fail, the activist sold in the open market, and the campaign had declared specific goals,

$Failure3 = 0$ if the Outcome of the campaign was anything else (thus constituting a broad definition of success);

d) $Failure4 = 1$ if the Outcome of the campaign was Fail, 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 the campaign had declared specific goals,

$Failure4 = 0$ if the Outcome of the campaign was anything else.

In Table 3, we show how many instances of failed campaigns we have in our final dataset, depending on the definition of failure used. According to the first definition of failure ($Failure1$), 0.31% (7.68% out of the observations where this variable is defined) of firm-quarter observations are classified as having been subject (at least once) to a failed activist campaign. 0.20% (5.09% out of the observations where this variable is defined) of all firm-quarter observations are classified as a failed campaign that involved activist hedge fund selling at a loss ($Failure2$). For, $Failure1$ and $Failure2$, our control group are campaigns that were declared “success” or “settlement”. Next, we broaden the definition of success. $Failure3$ ($Failure4$) is then similar in spirit to $Failure1$ ($Failure2$), with a broader control group. While according to $Failure1$ ($Failure2$), 3.77% (3.77%) campaigns were deemed a success, according to a

broader definition of success, as in *Failure3* (*Failure4*), 99.69% (99.80%) of campaigns were classified as successful. Finally, if we restrict attention to only targeted firms (as we do for our regressions) for measures *Failure3* and *Failure4*, these later figures fall to 10.38% and 10.49%, respectively, amongst the whole sample observations.

[Insert Table 3 here]

In specification (1) the coefficient of interest is β_2 , which is an estimate of the average difference in firm-*i* holdings of type-*j* institutional investors before and after the firm-*i* event quarter and between failed and successful campaigns. In particular our (null) hypothesis is:

H0: β_2 is negative and significant for (flow-maximizing) mutual funds and non-negative and/or non-significant for (value-maximizing) non-mutual funds.

We present results with and without a set of additional controls $Controls_{i,t}$, such as firm size, market-to-book ratio and leverage to capture time-varying firm characteristics that might be driving our results. 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. All our specifications include firm-*i* and time/quarter-*t* fixed effects, and cluster standard errors in the year dimension. By including time fixed effects and also clustering in the time dimension we are, if anything, being conservative in the treatment of standard errors. We have chosen to cluster along the year dimension, as it gives a fairly large number of observations per cluster, thus satisfying the requirements of the clustering techniques. When using *Failure3* and *Failure4* to define a failed campaign (treatment group), we limit our sample to firms that were targeted at least once, in order to control for selection effects of targeted firms.

[Insert Table 4 here]

The results of estimating (1) are shown in Table 4 and Table 5, without and with additional controls, respectively. As we can see, the coefficient β_2 on the $PostActivism_{i,t} * Failure_i$

interaction term is negative and statistically significant for mutual fund holdings (columns 2, 4, 6 and 8), and mostly positive and significant for non-mutual fund holdings (columns 1, 3, 5, 7). An estimated coefficient on the interaction term (reported in column 8) of -3.715 suggests that aggregate mutual fund holdings at the firm level were 3.715% lower following a failed activist campaign, relative to their holdings prior to the exit event and to those after a successful campaign, controlling for time-invariant firm characteristics and firm-invariant quarter characteristics. The differences between the coefficients from mutual funds and non-mutual funds, as measured by the z -test, are significant in all four cases at the 95% level. In most specifications, the estimated coefficient β_3 on $PostActivism_{i,t}$ is positive and significant, suggesting that successful campaigns were followed by increases in holdings by both mutual and non-mutual funds. Finally, the sum of the estimated coefficients $\beta_2 + \beta_3$ is positive for non-mutual funds and negative for mutual funds suggesting that after failed campaigns the former bought and the latter sold.

[Insert Table 5 here]

In Table 5 we show results that include time-varying firm level controls. The results remain broadly unchanged. The coefficient β_2 on the $PostActivism_{i,t} * Failure_i$ interaction term is negative and generally statistically significant for mutual fund holdings (columns 2, 4, 6 and 8), and mostly positive in case of non-mutual fund holdings (columns 1, 3, 5, 7). An estimated coefficient (reported in column 8) of -3.821, suggests that aggregate mutual fund holdings at the firm level were 3.821% lower following a failed activist campaign, relative to their holdings prior to the exit event and to those after a successful campaign, controlling for time-varying firm characteristics, as well as unobserved firm-level and quarter-level heterogeneity. The differences between the coefficients from mutual funds and non-mutual funds, as measured by the z -test, are significant at 95% level. In all specifications, the estimated coefficient on $PostActivism_{i,t}$ is positive and significant, suggesting that successful campaigns were followed by increases in holdings by both mutual and non-mutual funds. Finally, the sum of the estimated coefficients $\beta_2 + \beta_3$ is positive for non-mutual funds and negative for mutual funds suggesting that indeed after a failed campaign the former if anything bought and the latter sold.

[Insert Table 6 here]

The results of estimating (1) on a window of ± 2 quarters relative to the event quarter are shown in Tables 6 and 7, with and without time-varying firm controls respectively. These results solidify the conclusions drawn from Figures 1 & 2. In particular, as we can see from Table 6, the coefficient on the $PostActivism_{i,t} * Failure_i$ interaction term is mostly negative and statistically significant for mutual fund holdings (columns 2, 4, 6 and 8), and mostly positive and insignificant for non-mutual fund holdings (columns 1, 3, 5, 7). An estimated coefficient on the interaction term (reported in column 8) of -2.714, suggests that aggregate mutual fund holdings at the firm level were 2.71% lower in the first two quarters following a failed activist campaign, relative to their holdings in the two quarters prior to the exit event and to those after a successful campaign, controlling for unobserved firm-level and quarter-level heterogeneity. The differences between the coefficients from mutual funds and non-mutual funds, as measured by the z -test, are significant at 95% level. In all specifications, the estimated coefficient on $PostActivism_{i,t}$ is positive and significant, suggesting that successful campaigns were followed by increases in holdings by both mutual and non-mutual funds. Finally, the sum of the estimated coefficients $\beta_2 + \beta_3$ is positive for non-mutual funds and negative for mutual funds suggesting that indeed after a failed campaign the former if anything bought and the latter sold. The results remain qualitatively unchanged in Table 7, where we estimate (1) on a window of ± 2 quarters relative to the event quarter and include time-varying firm level controls..

[Insert Table 7 here]

Finally, in the Appendix, we repeat our analysis by using lagged measures of institutional ownership and firm-level controls. We do so to alleviate any concerns regarding correlation of contemporaneous ownership/controls with a campaign's outcome. Results are shown in Table A1 and Table A2 (for all quarters prior/after the event quarter), and in Table A3 and Table A4 (for a window of ± 2 quarters relative to the event quarter). They remain qualitatively unchanged.

4 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.

Appendix

Main Tables and Figures

Table 1: **Summary Statistics – Activist Campaigns**

This table shows the summary statistics for the hedge fund activist campaigns obtained from Brav, Jiang, Partnoy, and Thomas (2008) and Brav, Jiang, Kim, et al. (2010). The activist sample consists of 2,739 distinct campaigns involving 2,016 unique targets and 175 hedge fund families between 1994 and 2012. 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 open market	% 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 exit	N	%
Still holding*	824	30.08%
Sale in the open market	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 2: **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 mutual fund and non-mutual fund ranking based on their average market value over 1994–2012.

Panel A

	mean	p50	sd	min	max	<i>N</i>
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	18,200,000.00	260,678
Institutional Shares (MM\$) per Firm	1,950.00	112.00	8,870.00	0.00	407,000	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 ranking			
Manager	Index	Avg Market Value (\$billion)	
1 FIDELITY MANAGEMENT & RESEARCH	0	403	
2 VANGUARD GROUP	1	331	
3 STATE STR CORP	0	328	
4 CAPITAL RESEARCH & MANAGEMENT	0	238	
5 AXA FINANCIAL, INC.	0	171	

Non-Mutual Funds ranking			
Manager	Index	Avg Market Value (\$billion)	
1 BARCLAYS BANK PLC	0	316	
2 CAPITAL WORLD INVESTORS	0	259	
3 CAPITAL RESEARCH GBL INVESTORS	0	216	
4 BLACKROCK, INC.	0	175	
5 MELLON BANK CORPORATION	0	163	

Table 3: **Failed campaigns**

In this table we show the summary characteristics for the final merged firm-quarter sample. We present relative frequencies of each definition of failed campaign. Failure1 = 1 if the Outcome of the campaign was Fail, the activist sold in the open market, and the campaign had declared specific goals, and Failure1 = 0 if the Outcome of the campaign was Succeed or Settle; Failure2 = 1 if the Outcome of the campaign was Fail, 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 the campaign had declared specific goals, and Failure2 = 0 if the Outcome of the campaign was Succeed or Settle; Failure3 = 1 if the Outcome of the campaign was Fail, the activist sold in the open market, and the campaign had declared specific goals, and Failure3 = 0 if the Outcome of the campaign was anything else (thus constituting a broad definition of success); while Failure4 = 1 if the Outcome of the campaign was Fail, 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 the campaign had declared specific goals, and Failure4 = 0 if the Outcome of the campaign was anything else.

Failure1	Freq.	Percent	Failure2	Freq.	Percent
0	9,837	3.77%	0	9,837	3.77%
1	818	0.31%	1	528	0.20%
Unknown	250,023	95.91%	Unknown	250,313	96.02%
Total	260,678	100.00%	Total	260,678	100.00%

Failure3	Freq.	Percent	Failure4	Freq.	Percent
0	259,860	99.69%	0	260,150	99.80%
1	818	0.31%	1	528	0.20%
Total	260,678	100.00%	Total	260,678	100.00%

Failure3 & Firm Targeted	Freq.	Percent	Failure4 & Firm Targeted	Freq.	Percent
0	27,060	10.38%	0	27,350	10.49%
1	818	0.31%	1	528	0.20%
Total	27,878	10.69%	Total	27,878	10.69%

Table 4: **DiD of Holdings**

This table shows results of estimating equation (1). The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measure the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t}}{SharesOut_{i,t}}$. 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/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _t	0.416*** [32.763]	0.335*** [49.346]	0.417*** [32.148]	0.334*** [49.748]	0.404*** [52.896]	0.343*** [53.293]	0.404*** [52.929]	0.343*** [53.279]
PostActivism x Failure1	3.136*** [5.088]	-0.402 [-0.594]						
PostActivism	1.174*** [3.227]	1.295*** [3.908]	1.208*** [3.406]	1.264*** [3.636]	1.541*** [5.990]	1.347*** [6.022]	1.561*** [5.971]	1.368*** [6.058]
PostActivism x Failure2			3.695*** [4.140]	-2.459** [-2.482]				
PostActivism x Failure3					2.241*** [3.515]	-1.538** [-2.173]		
PostActivism x Failure4							2.719*** [2.960]	-3.715*** [-3.847]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	10,174	10,174	9,893	9,893	26,472	26,472	26,472	26,472
R-squared	0.782	0.782	0.779	0.782	0.796	0.786	0.796	0.786

Table 5: **DiD of Holdings; Additional Controls**

This table shows results of estimating equation (1). The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measures the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t}}{SharesOut_{i,t}}$. All specifications include firm and quarter fixed effects, and all control variables are winsorized at the 1% and 99% levels. Standard errors are adjusted for heteroskedasticity and clustered at the fiscal year level, and t-statistics are reported below the coefficients in parentheses. Coefficients with ***, **, * are significant at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _t	0.402*** [34.380]	0.310*** [37.194]	0.404*** [33.608]	0.309*** [37.846]	0.391*** [56.334]	0.322*** [52.453]	0.391*** [56.452]	0.322*** [52.595]
PostActivism x Failure1	3.147*** [5.010]	-0.559 [-0.805]						
PostActivism	1.150*** [3.118]	1.389*** [4.690]	1.179*** [3.285]	1.355*** [4.324]	1.503*** [5.886]	1.362*** [6.268]	1.522*** [5.858]	1.383*** [6.294]
PostActivism x Failure2			3.750*** [4.063]	-2.663** [-2.590]				
PostActivism x Failure3					2.230*** [3.556]	-1.608** [-2.298]		
PostActivism x Failure4							2.711*** [2.983]	-3.821*** [-3.891]
Leverage _t	-0.121 [-0.128]	-2.419** [-2.648]	-0.151 [-0.161]	-2.539** [-2.812]	-1.940** [-2.408]	-3.204*** [-6.525]	-1.933** [-2.414]	-3.254*** [-6.661]
M/B _t	0.633*** [5.558]	0.276*** [3.198]	0.632*** [5.570]	0.271*** [3.199]	0.489*** [7.091]	0.373*** [4.234]	0.490*** [7.083]	0.371*** [4.228]
log(Total Assets) _t	1.009*** [3.656]	2.025*** [10.253]	0.942*** [3.207]	2.043*** [10.781]	0.879*** [7.244]	1.542*** [12.909]	0.879*** [7.200]	1.541*** [12.853]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	10,174	10,174	9,893	9,893	26,472	26,472	26,472	26,472
R-squared	10,174	10,174	9,893	9,893	26,472	26,472	26,472	26,472

Table 6: DiD of Holdings; Event Window Analysis

This table shows results of estimating equation (1) on a on a window of ± 2 quarters relative to the event quarter. The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measure the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t}}{SharesOut_{i,t}}$. 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 with ***, **, * are significant at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _t	0.384*** [6.947]	0.265*** [7.678]	0.363*** [6.656]	0.252*** [6.872]	0.391*** [11.695]	0.290*** [14.342]	0.392*** [11.755]	0.290*** [14.277]
PostActivism x Failure1	1.192 [1.203]	-0.414 [-0.807]						
PostActivism	0.621 [1.011]	-0.079 [-0.164]	0.518 [0.839]	-0.060 [-0.121]	0.812* [1.870]	0.523* [2.048]	0.816* [1.897]	0.553** [2.185]
PostActivism x Failure2			1.635 [1.164]	-2.509*** [-3.651]				
PostActivism x Failure3					1.201 [1.128]	-0.535 [-0.927]		
PostActivism x Failure4							2.005 [1.392]	-2.714*** [-3.879]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	935	935	888	888	2,655	2,655	2,655	2,655
R-squared	0.937	0.915	0.936	0.914	0.922	0.922	0.922	0.922

Table 7: DiD of Holdings; Event Window Analysis; Additional Controls

This table shows results of estimating equation (1) on a on a window of ± 2 quarters relative to the event quarter. The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measures the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t}}{SharesOut_{i,t}}$. All specifications include firm and quarter fixed effects, and all control variables are winsorized at the 1% and 99% levels. Standard errors are adjusted for heteroskedasticity and clustered at the fiscal year level, and t-statistics are reported below the coefficients in parentheses. Coefficients with ***, **, * are significant at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _t	0.383*** [6.735]	0.246*** [6.770]	0.360*** [6.518]	0.230*** [6.188]	0.391*** [11.467]	0.283*** [13.975]	0.392*** [11.518]	0.282*** [13.903]
PostActivism x Failure1	1.189 [1.188]	-0.378 [-0.639]						
PostActivism	0.624 [0.986]	-0.084 [-0.173]	0.531 [0.833]	-0.051 [-0.100]	0.827* [1.929]	0.526* [2.057]	0.832* [1.954]	0.557** [2.196]
PostActivism x Failure2			1.638 [1.166]	-2.541*** [-3.959]				
PostActivism x Failure3					1.202 [1.132]	-0.497 [-0.802]		
PostActivism x Failure4							2.009 [1.401]	-2.705*** [-3.851]
Leverage _t	0.924 [0.173]	-0.098 [-0.016]	-0.364 [-0.071]	-0.470 [-0.075]	1.087 [0.195]	-0.278 [-0.074]	1.116 [0.200]	-0.314 [-0.084]
M/B _t	0.726 [1.529]	-0.211 [-0.349]	0.659 [1.391]	-0.217 [-0.366]	0.231 [0.919]	0.374* [2.064]	0.230 [0.916]	0.375* [2.072]
log(Total Assets) _t	0.664 [0.432]	3.162** [2.571]	0.785 [0.477]	3.501** [2.645]	0.228 [0.512]	1.633* [1.972]	0.218 [0.485]	1.633* [1.969]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	935	935	888	888	2,655	2,655	2,655	2,655
R-squared	0.937	0.916	0.937	0.915	0.922	0.922	0.922	0.923

Figure 1: Mutual Fund Holdings Relative to End of Campaign

This figure shows average mutual fund holdings, as a percentage of a firm's shares outstanding, in a window of two quarters before and two quarters after an activist campaign. Bars in blue depict failed campaigns (where the definition of Failure corresponds to Failure1), and bars in red show successful campaigns. 95% confidence intervals are also depicted in green.

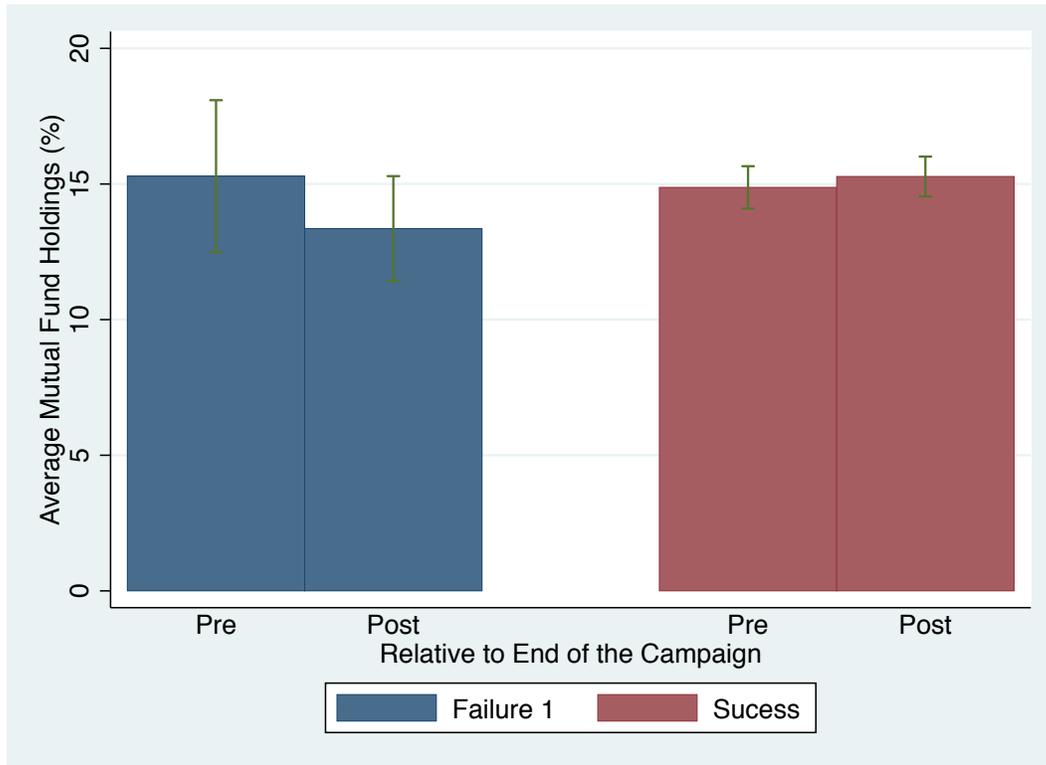
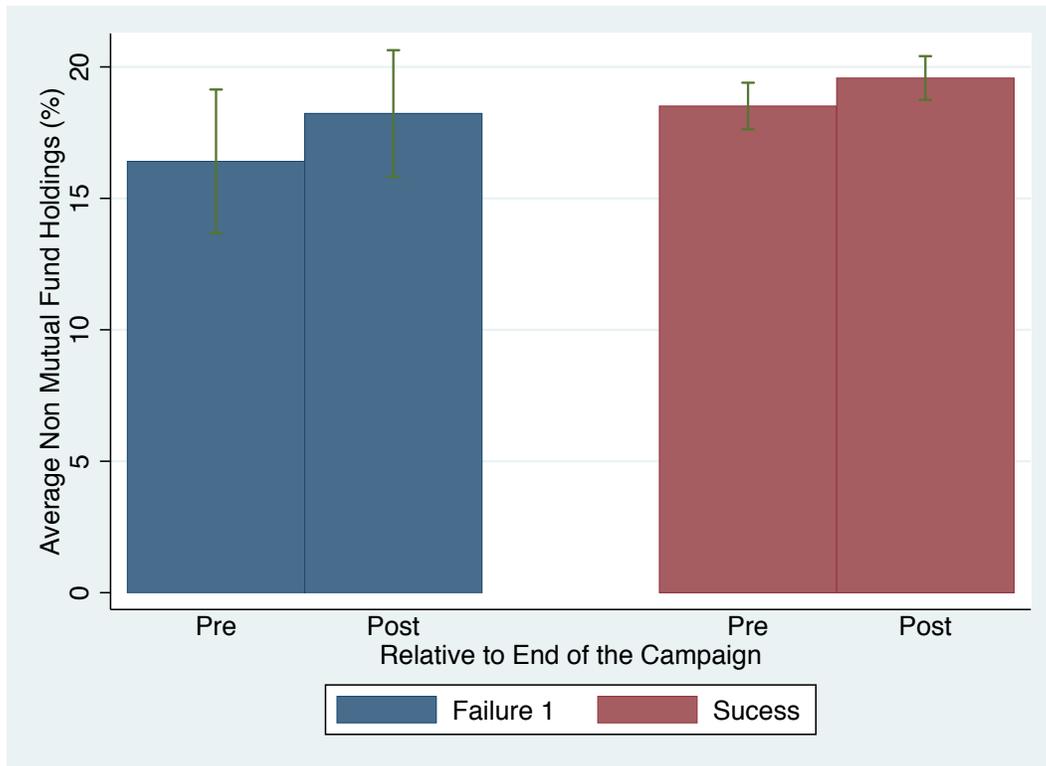


Figure 2: Non-Mutual Fund Holdings Relative to End of Campaign

This figure shows average non-mutual fund holdings, as a percentage of a firm's shares outstanding, in a window of two quarters before and two quarters after an activist campaign. Bars in blue depict failed campaigns (where the definition of Failure corresponds to Failure1), and bars in red show successful campaigns. 95% confidence intervals are also depicted in green.



Proofs

Proof of Lemma 1: We observe that:

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

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

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

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 :

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

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

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

$\frac{\partial P_t}{\partial \hat{\beta}} > 0$ 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 $P_1(r) = \bar{v}$. If $a_1 = e$, inferences are imperfect due the existence of the liquidity shock. Denote M 's strategy by the threshold $\hat{\beta} \in \{\beta_{VM}^u, \beta_{VM}^{\sigma_2}\}$. Further, making the dependence of q_t on the manager's strategy explicit, and defining $\bar{F} \equiv 1 - F$, if $a_1 = e$ we have:

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

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

$$P_1(e; \hat{\beta}) \equiv \Delta v q_1(e; \hat{\beta}) + \underline{v} - \lambda \alpha_1 \Delta v^2 q_1(e; \hat{\beta})(1 - q_1(e; \hat{\beta})). \quad (3)$$

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

Proof of Claim 1: Since F is increasing and \bar{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 $s_1 = \bar{v}$, retaining pays $\alpha_1 \bar{v}$, whereas selling pays $\alpha_1 P_1(a_1 = e) < \alpha_1 \bar{v}$. 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 $\sigma_2 > \bar{\sigma}$: There are four possible histories: $(r, r), (r, e), (e, r), (e, e)$. Since IB observes a_M , we have $P_2(r, r; \beta_{VM}^{\sigma_2}) = P_2(r, e; \beta_{VM}^{\sigma_2}) = \bar{v}$. For the history (e, r) , reusing the same notation as above:

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

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

So

$$P_2(e, r; \beta_{VM}^{\sigma_2}) \equiv \Delta v q_2(e, e; \beta_{VM}^{\sigma_2}) + \underline{v} - \lambda \alpha_1 \Delta v^2 q_2(e, e; \beta_{VM}^{\sigma_2})(1 - q_2(e, e; \beta_{VM}^{\sigma_2})). \quad (4)$$

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

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

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

So

$$P_2(e, e; \beta_{VM}^{\sigma_2}) \equiv \Delta v q_2(e, e; \beta_{VM}^{\sigma_2}) + \underline{v} - \lambda (\alpha_1 + \alpha_2) \Delta v^2 q_2(e, e; \beta_{VM}^{\sigma_2})(1 - q_2(e, e; \beta_{VM}^{\sigma_2})) \quad (5)$$

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). \square

Prices at $t = 2$ for $\sigma_2 < \underline{\sigma}$: There are four possible histories: (r, r) , (r, e) , (e, r) , (e, e) .

As before $P_2(r, r; \beta_{VM}^u) = P_1(r, e; \beta_{VM}^u) = \bar{v}$. 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:

$$P_2(e, e; \beta_{VM}^u) = \Delta v q_1(e; \beta_{VM}^u) + \underline{v} - \lambda (\alpha_1 + \alpha_2) \Delta v^2 q_1(e; \beta_{VM}^u)(1 - q_1(e; \beta_{VM}^u)). \quad (6)$$

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:

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

If $a_1 = r$, 2B knows that $v = \bar{v}$ and $P_2(r, r; \beta_{VM}^{\sigma_2}) = P_2(r, e; \beta_{VM}^{\sigma_2}) = \bar{v}$, and thus will

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

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

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 $s_2 = \bar{v}$.

Second, consider 2B with $s_2 = \underline{v}$. The payoff from retaining is $\mathbb{E}[v | a_1 = e, s_2 = \underline{v}]$, 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 $\sigma_2 \rightarrow 1$ we have $\mathbb{E}[v | a_1 = e, s_2 = \underline{v}] \rightarrow \underline{v}$. 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:

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

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

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

2B will choose r .

Second, consider 2B with $s_2 = \underline{v}$. The payoff from retaining is $\mathbb{E}[v | a_1 = e, s_2 = \underline{v}]$, while the payoff from exiting is $P_2(e, e; \beta_{VM}^u)$. Note that for $\sigma_2 \rightarrow 1/2$ we have that $\mathbb{E}[v | a_1 = e, s_2 = \underline{v}] \rightarrow \mathbb{E}[v | a_1 = e] > P_2(e, e; \beta_{VM}^u)$. 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 $a_M = \bar{v}$ if and only if $\beta \leq \beta^*$, for some $\beta^* \in (\underline{\beta}, \bar{\beta})$. Then, $P_1(e; \beta^*)$ is given by (3) replacing $\hat{\beta}$ by β^* , $P_2(e, r; \beta^*)$ is given by (4) replacing $\beta_{VM}^{\sigma_2}$ by β^* , and $P_2(e, e; \beta^*)$ is given by (5) replacing $\beta_{VM}^{\sigma_2}$ by β^* , while $P_1(r; \beta^*) = P_2(r, r; \beta^*) = P_2(r, e; \beta^*) = \bar{v}$. It also follows that, by Claims 1 and 2, $P_1(e; \beta^*)$, $P_2(e, r; \beta^*)$ and $P_2(e, e; \beta^*)$ are increasing in β^* .

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

$$(1 - \delta_1)(\omega_1 + \omega_2)\bar{v} + \delta_1\omega_1P_1(e; \beta^*) \\ + \delta_1\omega_2((1 - \delta_2)\sigma_2P_2(e, r; \beta^*) + (1 - \delta_2)(1 - \sigma_2)P_2(e, e; \beta^*) + \delta_2P_2(e, e; \beta^*)) + \omega_3\bar{v}.$$

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

$$\omega_1P_1(e; \beta^*) + \omega_2((1 - \delta_2)\sigma_2P_2(e, e; \beta^*) + (1 - \delta_2)(1 - \sigma_2)P_2(e, r; \beta^*) + \delta_2P_2(e, e; \beta^*)) + \omega_3\underline{v} + \beta.$$

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

$$\beta \geq RHS_{VM}^i(\beta^*) \equiv \omega_3\Delta v + (1 - \delta_1)(\omega_1 + \omega_2)\bar{v} - (1 - \delta_1)\omega_1P_1(e; \beta^*) \\ + P_2(e, r; \beta^*)\omega_2(\delta_1(1 - \delta_2)\sigma_2 - (1 - \delta_2)(1 - \sigma_2)) \\ + P_2(e, e; \beta^*)\omega_2(\delta_1((1 - \delta_2)(1 - \sigma_2) + \delta_2) - (1 - \delta_2)\sigma_2 - \delta_2). \quad (7)$$

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

$$RHS_{VM}^i(0) = [(\omega_1 + \omega_2)(1 - \delta_1) + \omega_3]\Delta v > 0,$$

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

$$RHS_{VM}^i(+\infty) = \omega_3 \Delta v < \infty.$$

Hence, a fixed point exists. Since the left hand side of the fixed point equation is increasing, to show uniqueness suffices to show that $RHS_{VM}^i(\beta^*)$ 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 $RHS(\beta^*)$, the coefficient on $P_1(e; \beta^*)$ is clearly negative.
3. Note that:

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

where

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

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

4. It is easy to check that $\lim_{\sigma_2 \rightarrow 1} \frac{\partial P_2(e, e; \beta^*)}{\partial \beta^*} > 0$.
5. As $\sigma_2 \rightarrow 1$, (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 $\bar{\sigma} \equiv \max(\sigma_h, \sigma^*)$ and label the unique fixed point as $\beta_{VM}^{\bar{\sigma}}$.

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 $a_M = \bar{v}$ if and only if $\beta \leq \beta^*$, for some $\beta^* \in (\underline{\beta}, \bar{\beta})$.

Then, $P_1(e; \beta^*)$ is given by (3) replacing $\hat{\beta}$ by β^* , $P_2(e, r; \beta^*) = P_1(e; \beta^*)$, $P_2(e, e; \beta^*)$ is given by (6) replacing β_{VM}^u by β^* , while $P_1(r; \beta^*) = P_2(r, r; \beta^*) = \bar{v}$. 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 $a_M = \bar{v}$. This gives payoff

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

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

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

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

$$\begin{aligned} \beta \geq RHS_{VM}^u(\beta^*) & \equiv \omega_3 \Delta v + \omega_1 (1 - \delta_1) (\bar{v} - P_1(e; \beta^*)) \\ & + \omega_2 (1 - \delta_1) (\bar{v} - ((1 - \delta_2) P_2(e, r; \beta^*) + \delta_2 P_2(e, e; \beta^*))). \end{aligned} \quad (8)$$

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

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

so a fixed point exists. In addition, the left hand side of this equation is clearly increasing, while $RHS_{VM}^u(\beta^*)$ 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_{VM}^u . ■

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 $P_2(r, r; \beta_{FM}) = P_2(r, e; \beta_{FM}) = \bar{v}$. For the history of (e, e) , since 2B's choice is uninformative, reusing the same notation as above we have:

$$q_2(e, e; \beta_{FM}) = q_1(e; \beta_{FM}) = \frac{\delta_1 F(\beta_{FM})}{\delta_1 F(\beta_{FM}) + \bar{F}(\beta_{FM})}.$$

So

$$P_2(e, e; \beta_{FM}) \equiv \Delta v q_1(e; \beta_{FM}) + \underline{v} - \lambda(\alpha_1 + \alpha_2) \Delta v^2 q_1(e; \beta_{FM}) (1 - q_1(e; \beta_{FM})). \quad (9)$$

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

2B's strategy: There are two cases.

Case 1: IB exits. If 2B observes $a_1 = e$ and $s_2 = \bar{v}$, 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 $s_2 = \bar{v}$ and the expected payoff will be

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

where

$$\begin{aligned} \mathbb{P}[\tau = g \mid v = \underline{v}, s_2 = \bar{v}] &= \frac{\mathbb{P}[s_2 = \bar{v} \mid v = \underline{v}, \tau = g] \mathbb{P}[\tau = g]}{\mathbb{P}[s_2 = \bar{v} \mid v = \underline{v}, \tau = g] \mathbb{P}[\tau = g] + \mathbb{P}[s_2 = \bar{v} \mid v = \underline{v}, \tau = b] \mathbb{P}[\tau = b]}, \\ &= \frac{(1 - \sigma_{2,g})\gamma_2}{(1 - \sigma_{2,g})\gamma_2 + (1 - \sigma_{2,b})(1 - \gamma_2)}, \text{ and similarly} \\ \mathbb{P}[\tau = g \mid v = \bar{v}, s_2 = \bar{v}] &= \frac{\sigma_{2,g}\hat{\gamma}_2}{\sigma_{2,g}\gamma_2 + \sigma_{2,b}(1 - \gamma_2)}. \end{aligned}$$

Substituting back to the expectation this yields:

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

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

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

So, we need the liquidity shock δ_1 to be low enough. Given, that \bar{F}/F is decreasing and $\beta < \bar{\beta}$ a sufficient condition to satisfy the above is that $\delta_1 < \bar{F}(\bar{\beta})/F(\bar{\beta})$. Hence, for δ_1 small enough, when 2B observes $a_1 = e$ and $s_2 = \bar{v}$, 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 $v = \bar{v}$. 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:

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

We have that:

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

Hence:

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

and:

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

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

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

which is always true since better types, by definition, receive better information. The incentive to retain is stronger when $s_2 = \bar{v}$, 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 $a_M = \bar{v}$ if and only if $\beta \leq \beta^*$, for some $\beta^* \in (\underline{\beta}, \bar{\beta})$. Then, $P_1(e; \beta^*)$ is given by (3) replacing $\hat{\beta}$ by β^* , $P_2(e, e; \beta^*)$ is given by (9) replacing β_{FM} by β^* , while $P_1(r; \beta^*) = P_2(r, r; \beta^*) = P_2(r, e; \beta^*) = \bar{v}$. As noted above, $P_1(e; \beta^*)$ and $P_2(e, e; \beta^*)$ are increasing in β^* .

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

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

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

$$\beta \geq RHS_{FM}(\beta^*) \equiv \omega_3 \Delta v + \omega_1 (1 - \delta_1) (\bar{v} - P_1(e; \beta^*)) + \omega_2 (1 - \delta_1) (\bar{v} - P_2(e, e; \beta^*)). \quad (10)$$

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 β_{FM} . ■

Proof of Proposition 3: The proof proceeds in two comparisons that combined delivers the proposition.

Comparison between $\beta_{VM}^{\sigma_2}$ and β_{FM} . Recall from the proof of Proposition 1 that there is a unique fixed point $\beta_{VM}^{\sigma_2}$ satisfying (7) for all $\sigma_2 > \bar{\sigma}$. Consider $\sigma_2 > \bar{\sigma}$. Observe also that as $\sigma_2 \rightarrow 1$,

$$RHS_{VM}^i(\beta^*) \rightarrow RHS_{VM}^1(\beta^*) \equiv \omega_3 \Delta v + \omega_1 (1 - \delta_1) (\bar{v} - P_1(e; \beta^*)) + \omega_2 (1 - \delta_1 \delta_2) (\bar{v} - P_2(e, e; \beta^*))$$

Now, it follows from (10) that for any given β^*

$$RHS_{VM}^1(\beta^*) > RHS_{FM}(\beta^*).$$

This is substantiated by two observations. First, for all $\delta_1 < 1$ and $\delta_2 < 1$ we have $1 - \delta_1 > 1 - \delta_1\delta_2 > 0$. 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 $\sigma_2 > \bar{\sigma}$, we have that

$$P_2^{VM, \sigma_2 > \bar{\sigma}}(e, e; \beta^*) < P_2^{FM}(e, e; \beta^*) \Rightarrow \bar{v} - P_2^{VM, \sigma_2 > \bar{\sigma}}(e, e; \beta^*) > \bar{v} - P_2^{FM}(e, e; \beta^*).$$

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

$$RHS_{VM}^i(\beta^*) > RHS_{FM}(\beta^*).$$

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 $\beta_{FM} < \beta_{VM}^{\sigma_2}$.

Comparison between β_{FM} and β_{VM}^u . Inspection of (8) and (10) suggests that for any β^*

$$RHS_{VM}^u(\beta^*) < RHS_{FM}(\beta^*).$$

This is substantiated by two observations. First, $P_2^{FM}(e, e; \beta^*) = P_2^{VM, u}(e, e; \beta^*)$ 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, $P_2^{FM}(e, e; \beta^*) < P_2^{PM, u}(e, r; \beta^*)$ 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

$$\begin{aligned} P_2^{FM}(e, e; \beta^*) &< (1 - \delta_2)P_2^{VM, u}(e, r; \beta^*) + \delta_2 P_2^{VM, u}(e, e; \beta^*) \Rightarrow \\ \bar{v} - P_2^{FM}(e, e; \beta^*) &> \bar{v} - \left((1 - \delta_2)P_2^{VM, u}(e, r; \beta^*) + \delta_2 P_2^{VM, u}(e, e; \beta^*) \right). \end{aligned}$$

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 $\beta_{FM} > \beta_{VM}^u$. ■

Proof of Proposition 4: 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 $v = \bar{v}$, 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 c_I , 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 c_I and thus is perfectly informed. Now she acts according to the equilibrium in Proposition 1 for $\sigma_2 > \bar{\sigma}$. So her expected payoff from becoming informed is:

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

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

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

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 is monotonically decreasing in α_1 . Therefore, for each $c_I > 0$ there exists an $\bar{\alpha}_1 < 1$ such that for all $\alpha_1 > \bar{\alpha}_1$ the (ex ante) cost of becoming informed is higher than the (expected) incremental benefit and hence the 2B chooses to remain uninformed. ■

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. We classify a fund-family as an indexer if: a) more than 50% of its AUM is invested in index funds; or b) more than a half (50%) of funds in a family are classified as indexers.

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 filings. 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) if *inv_long* value in Morningstar *stat_family* is similar to 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. Institutions that appear in

13F filings, but do not appear in Morningstar are then denoted as *non-mutual funds*.

Additional Tables and Figures

Table A 1: DiD of Holdings; Lagged Values

This table shows results of estimating equation (1). The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measure the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the lagged institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t-1}}{SharesOut_{i,t-1}}$. 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 with ***, **, * are significant at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _{t-1}	0.011*** [5.384]	0.010*** [5.321]	0.011*** [5.344]	0.010*** [5.233]	0.011*** [7.878]	0.009*** [9.061]	0.011*** [7.821]	0.009*** [9.015]
PostActivism x Failure1	1.820* [1.765]	-1.584* [-1.895]						
PostActivism	0.689 [1.430]	0.955*** [3.017]	0.699 [1.460]	0.918** [2.821]	1.495*** [4.674]	1.322*** [5.953]	1.513*** [4.631]	1.345*** [6.128]
PostActivism x Failure2			1.422 [1.158]	-4.479*** [-4.359]				
PostActivism x Failure3					0.815 [0.676]	-2.771*** [-3.207]		
PostActivism x Failure4							0.402 [0.291]	-5.710*** [-5.934]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	10,094	10,094	9,819	9,819	26,258	26,258	26,258	26,258
R-squared	0.648	0.677	0.642	0.677	0.674	0.686	0.673	0.686

Table A 2: **DiD of Holdings; Additional Controls; Lagged Values**

This table shows results of estimating equation (1). The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measures the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the lagged institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t-1}}{SharesOut_{i,t-1}}$. All specifications include firm and quarter fixed effects, and all lagged control variables are winsorized at the 1% and 99% levels. Standard errors are adjusted for heteroskedasticity and clustered at the fiscal year level, and t-statistics are reported below the coefficients in parentheses. Coefficients with ***, **, * are significant at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _{t-1}	0.006*** [3.345]	0.005*** [3.136]	0.006*** [3.308]	0.005*** [3.086]	0.007*** [5.779]	0.005*** [6.683]	0.007*** [5.734]	0.005*** [6.682]
PostActivism x Failure1	2.019* [2.001]	-1.624* [-2.034]						
PostActivism	0.774 [1.496]	1.123*** [4.501]	0.775 [1.507]	1.092*** [4.118]	1.458*** [4.824]	1.312*** [6.358]	1.479*** [4.730]	1.335*** [6.485]
PostActivism x Failure2			1.851 [1.537]	-4.227*** [-4.184]				
PostActivism x Failure3					1.371 [1.173]	-2.483*** [-3.092]		
PostActivism x Failure4							1.148 [0.870]	-5.143*** [-5.428]
Leverage _{t-1}	-6.942*** [-5.057]	-7.958*** [-8.256]	-7.032*** [-5.061]	-8.084*** [-8.245]	-5.922*** [-5.365]	-6.736*** [-9.140]	-5.930*** [-5.392]	-6.790*** [-9.118]
M/B _{t-1}	1.589*** [8.801]	0.986*** [10.095]	1.583*** [8.817]	0.969*** [10.366]	1.290*** [11.618]	1.070*** [10.669]	1.289*** [11.585]	1.066*** [10.697]
log(Total Assets) _{t-1}	4.843*** [10.856]	4.997*** [18.491]	4.850*** [10.585]	5.019*** [17.870]	4.740*** [27.115]	4.800*** [26.951]	4.739*** [26.889]	4.789*** [26.822]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	9,961	9,961	9,691	9,691	25,904	25,904	25,904	25,904
R-squared	0.676	0.704	0.671	0.705	0.699	0.714	0.699	0.714

Table A 3: DiD of Holdings; Event Window Analysis; Lagged Values

This table shows results of estimating equation (1) on a on a window of ± 2 quarters relative to the event quarter. The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measure the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the lagged institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t-1}}{SharesOut_{i,t-1}}$. 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 with ***, **, * are significant at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _{t-1}	0.027*** [4.635]	0.008 [0.859]	0.028*** [4.501]	0.007 [0.751]	0.030*** [4.790]	0.020*** [3.131]	0.030*** [4.785]	0.020*** [3.135]
PostActivism x Failure1	0.850 [0.712]	-0.545 [-0.861]						
PostActivism	0.054 [0.088]	-0.471 [-0.924]	-0.018 [-0.029]	-0.443 [-0.840]	0.205 [0.447]	0.127 [0.439]	0.213 [0.463]	0.158 [0.534]
PostActivism x Failure2			0.811 [0.650]	-2.945*** [-3.777]				
PostActivism x Failure3					0.758 [0.620]	-0.964 [-1.506]		
PostActivism x Failure4							0.976 [0.703]	-3.486*** [-4.088]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	928	928	884	884	2,639	2,639	2,639	2,639
R-squared	0.921	0.904	0.923	0.905	0.899	0.907	0.899	0.907

Table A 4: DiD of Holdings; Event Window Analysis; Additional Controls; Lagged Values

This table shows results of estimating equation (1) on a on a window of ± 2 quarters relative to the event quarter. The dependent variable is $\frac{Holdings_{i,j,t}}{SharesOut_{i,t}}$, which measures the (amount of) holdings of stock i , between at time t , held by all institutions of type j , where j can be *Mutual Funds* or *Non-Mutual Funds*, normalized by the change in holdings by the total number of shares outstanding of firm i at time t . We control for the lagged institutional ownership, as a fraction of shares outstanding at time t : $\frac{InstShares_{i,t-1}}{SharesOut_{i,t-1}}$. All specifications include firm and quarter fixed effects, and all lagged control variables are winsorized at the 1% and 99% levels. Standard errors are adjusted for heteroskedasticity and clustered at the fiscal year level, and t-statistics are reported below the coefficients in parentheses. Coefficients with ***, **, * are sign. at the 1%, 5%, 10% level.

	Holdings/Shares Outstanding							
	Non-MF	MF	Non-MF	MF	Non-MF	MF	Non-MF	MF
Institutional Ownership _{t-1}	0.025*** [4.656]	0.002 [0.252]	0.026*** [4.652]	0.001 [0.237]	0.026*** [4.637]	0.016** [2.594]	0.026*** [4.622]	0.016** [2.606]
PostActivism x Failure1	0.887 [0.761]	-1.045 [-1.268]						
PostActivism	0.100 [0.160]	-0.602 [-1.183]	0.031 [0.049]	-0.535 [-1.037]	0.116 [0.233]	0.007 [0.024]	0.124 [0.248]	0.029 [0.095]
PostActivism x Failure2			0.851 [0.688]	-3.167*** [-4.068]				
PostActivism x Failure3					0.838 [0.666]	-1.282 [-1.600]		
PostActivism x Failure4							1.019 [0.734]	-3.447*** [-4.163]
Leverage _{t-1}	-1.601 [-0.433]	-2.989 [-1.117]	-1.482 [-0.403]	-2.684 [-0.990]	-6.582** [-2.416]	-5.303* [-2.079]	-6.579** [-2.410]	-5.295* [-2.061]
M/B _{t-1}	1.755*** [3.103]	-0.442 [-0.756]	1.650** [2.954]	-0.518 [-0.956]	0.832** [2.778]	0.592*** [4.836]	0.833** [2.775]	0.589*** [4.800]
log(Total Assets) _{t-1}	4.662*** [3.793]	3.775* [1.789]	4.700*** [4.077]	4.280** [2.175]	3.864*** [4.542]	3.560*** [3.681]	3.859*** [4.524]	3.575*** [3.695]
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Quarter FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	923	923	880	880	2,619	2,619	2,619	2,619
R-squared	0.923	0.906	0.925	0.906	0.901	0.909	0.901	0.909

References

- Admati, A. R., and P. Pfleiderer, 2009, "The "Wall Street Walk" and shareholder activism: Exit as a form of voice," *The Review of Financial Studies*, 22, 2645–2685.
- Agarwal, V., N. D. Daniel, and N. Y. Naik, 2009, "Role of managerial incentives and discretion in hedge fund performance," *The Journal of Finance*, 64, 2221–2256.
- Appel, I. R., T. A. Gormley, and D. B. Keim, 2016, "Standing on the shoulders of giants: The effect of passive investors on activism," Discussion paper, National Bureau of Economic Research.
- Becht, M., J. Franks, J. Grant, and H. F. Wagner, 2017, "Returns to hedge fund activism: An international study," *The Review of Financial Studies*, 30, 2933–2971.
- Brav, A., A. Dasgupta, and R. D. Mathews, 2016, "Wolf pack activism," *CEPR Discussion Paper No. DP11507*.
- Brav, A., W. Jiang, H. Kim, et al., 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," *The 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," *The 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*, pp. 171–202.
- Calomiris, C. W., and C. M. Kahn, 1991, "The role of demandable debt in structuring optimal banking arrangements," *The American Economic Review*, pp. 497–513.
- 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., and G. Piacentino, 2015, "The wall street walk when blockholders compete for flows," *The Journal of Finance*, 70, 2853–2896.
- Diamond, D. W., and R. G. Rajan, 2001, "Liquidity risk, liquidity creation, and financial fragility: A theory of banking," *Journal of political Economy*, 109, 287–327.

- Edmans, A., 2009, "Blockholder trading, market efficiency, and managerial myopia," *The Journal of Finance*, 64, 2481–2513.
- Edmans, A., and C. G. Holderness, 2017, "Blockholders: A survey of theory and evidence," *European Corporate Governance Institute (ECGI) - Finance Working Paper No. 475/2016*. Available at SSRN: <https://ssrn.com/abstract=2820976>.
- Edmans, A., and G. Manso, 2011, "Governance through trading and intervention: A theory of multiple blockholders," *The Review of Financial Studies*, 24, 2395–2428.
- Elton, E. J., M. J. Gruber, and C. R. Blake, 2003, "Marginal stockholder tax effects and ex-dividend day behavior-thirty-two years later," Available at SSRN: <https://ssrn.com/abstract=363620> or <http://dx.doi.org/10.2139/ssrn.363620>.
- Fung, W., and D. A. Hsieh, 1999, "A primer on hedge funds," *Journal of empirical finance*, 6, 309–331.
- Gantchev, N., O. Gredil, and C. Jotikasthira, 2017, "Governance under the gun: Spillover effects of hedge fund activism," *Working Paper*. Available at SSRN: <https://ssrn.com/abstract=2356544>.
- Giannetti, M., and X. Yu, 2017, "Adapting to radical change: The benefits of short-horizon investors," *CEPR Discussion Paper No. DP12021*.
- Hirschman, A. O., 1970, *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states* . , vol. 25, Harvard university press.
- Kedia, S., L. Starks, and X. Wang, 2016, "Institutional investors and hedge fund activism," Discussion paper, Working Paper.
- Khanna, N., and R. D. Mathews, 2011, "Can herding improve investment decisions?," *The RAND Journal of Economics*, 42, 150–174.
- Khorana, A., H. Servaes, and L. Wedge, 2007, "Portfolio manager ownership and fund performance," *Journal of financial economics*, 85, 179–204.
- Lim, J., B. A. Sensoy, and M. S. Weisbach, 2016, "Indirect incentives of hedge fund managers," *The 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," *The 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," *The 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>.

Stein, J. C., 2002, "Information production and capital allocation: Decentralized versus hierarchical firms," *The journal of finance*, 57, 1891–1921.

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