The Wall Street Walk when Blockholders Compete for Flows*

Amil Dasgupta
LSE and CEPR

Giorgia Piacentino
LSE

First version: May 2011; This version: March 2012

Abstract

An important recent theoretical literature argues that the threat of exit can be an effective form of governance when the blockholder is a principal. However, delegated portfolio managers hold a significant fraction of equity blocks. How do agency frictions arising from such delegation affect the ability of blockholders to govern via the threat of exit? Fund managers are often subject to short-term flow-performance relationships and differ in their relative flow-sensitivities. We show that when blockholders are sufficiently flow-sensitive, exit will fail as a disciplining device. Our result generates testable implications across different classes of funds: only those funds who have relatively high powered incentives will be effective in using exit as a governance mechanism. We also show that the threat of exit can complement shareholder voice, and thus provide a potential explanation for the empirically observed variation across different types of portfolio managers' use of voice.

1 Introduction

Equity blockholders in publicly traded corporations who are dissatisfied with the actions of company management usually have the option to sell their blocks—the so-called "Wall Street Walk". A growing theoretical literature starting with Admati and Pfleiderer (2009) and Edmans (2009) argues that the Wall Street Walk can be an effective form of governance. The exit of a blockholder will typically depress the stock price, punishing management whenever executive compensation is linked to the market price of equity. Thus, faced with a credible threat of exit, management will be reluctant to misbehave. Admati and Pfleiderer argue

*We are grateful to Ulf Axelson, Elena Carletti, Alex Edmans, Oliver Hart, Xuewen Liu, Mark Lowenstein, Gustavo Manso, David Reeb, Rik Sen, Anand Srinivasan, Dimitri Vayanos, Michela Verardo, Ernst Ludvig von Thadden and seminar audiences at EUI Florence, HKUST, LSE, NUS, and UCL for helpful comments. We thank the Paul Woolley Centre at the LSE for financial support. Dasgupta thanks the Faculty of Economics at Cambridge University for its kind hospitality. Email: a.dasgupta@lse.ac.uk, g.piacentino@lse.ac.uk.

that when blockholders observe managers acting suboptimally, it is in their own best interest to exit early before information about the manager's actions becomes public. This makes exit a credible threat which thus ameliorates managerial behaviour and enhances firm value. Edmans argues that informed institutional trading enhances the informational efficiency of the firm's equity in the secondary market, enabling myopic managers to make better investment decisions and increase firm value.

The theoretical literature on exit treats the blockholder as a profit maximizing principal: she acts as an individual owner of an equity block would. In contrast to this assumption, a significant proportion of equity blocks is held by institutional investors who are delegated portfolio managers.[1] This matters because delegated portfolio managers often face short-term incentives that may drive them to behave in ways that differ from pure profit maximization. For example, the EU Corporate Governance Green Paper notes (2011):

> It appears that the way asset managers' performance is evaluated... encourages asset managers to seek short-term benefits... [M]any asset managers are selected, evaluated, and compensated based on short-term relative performance... The Commission believes that short-term incentives in asset management contracts may contribute significantly to asset managers' short-termism, which probably has an impact on shareholder apathy.

An important driver of short-termism on the part of fund managers is performance-chasing by investors. This manifests itself in the form of short-term flow-performance relationships which also exposes managers to relative performance evaluation. An influential empirical literature (e.g., Chevalier and Ellison (1997, 1999), Brown, Harlow, and Starks (1996), Agarwal, Daniel, and Naik (2009), and Dass, Massa, and Patgiri (2008)) documents that many types of money managers face such short-term flow-performance relationships. Whenever management fees rely on the amount of money under management, money managers faced with short-term flow-performance relationships will compete to retain existing clients and win new ones. Such incentives are often collectively referred to as the *career concerns* of fund managers.

In this paper we ask how career concerns of funds interact with their ability to govern via the threat of exit. Taking as a baseline the model of Admati and Pfleiderer (2009), we show

[1] Institutional money managers hold over 70% of publicly traded US equity (see for example Gillan and Starks (2007)), and a significant measure of these holdings is quite concentrated. For example, Hawley and Williams (2007) point out that, in 2005 the hundred largest US institutions owned 52% of publicly held equity. In addition, Gopalan (2008) notes that in 2001 almost 60% of NYSE-listed firms had an institutional blockholder with at least 5% equity ownership. Finally, Davis and Yoo (2003) point out that large mutual fund families, such as Fidelity, own sizeable blocks in a majority of large US corporations.

that career concerns of delegated blockholders may interfere with their ability to credibly threaten management by exit. The core intuition, which we flesh out in greater detail below, is that exit may be informative about the ability of the fund to generate value for investors. The signalling role of exit may impair its disciplinary potential. Thus, when blockholders are delegated portfolio managers who compete for investors' flows, they may be less credible in using the threat of exit to govern.

Our model features a *manager* who runs a firm and a *fund* who holds an equity block in that firm on the behalf of a set of *investors* who employ her to manage their money. There are three dates. At date 0, the manager faces a choice between a good action which preserves firm value and some perverse action that reduces the value of the firm but endows him with private benefits. Some managers enjoy no private benefits and thus never take the perverse action. These firms are free of agency problems. In other firms, the manager's choice is non-trivial. Regardless of the type of firm, the amount by which he lowers the value of the firm by taking the perverse action is private information to the manager until date 2, when all information becomes public. The fund can observe the manager's actions and can choose whether to sell the block of shares at date 1 or to hold on to it until date 2.

Funds differ in their ability as stock pickers. In particular, some funds are more likely to form blocks in firms that are free of agency problems. We refer to these funds as good funds. Bad funds are less able to do so. As a result, if at the end of the game an investor is matched with a good fund, he attains a higher continuation payoff than if he is matched with a bad one, implicitly due to better stock selection in future periods.

The investors' initial match with the fund is random and nobody knows the type of their fund at date 0. At both dates 1 and 2 investors observe the fund's portfolio value and can make inferences about her type. Based on such inferences, at each of these dates investors can choose to retain the fund or replace her with a randomly selected fund. If investors choose to retain the fund at both dates 1 and 2, their expected continuation value depends on their endogenous belief about the type of the fund based on all information received.

The fund cares about investors' perception of her ability. This is because, for each period that she is employed, she receives an uncontingent payment w. In addition to this, she also receives a fraction α of any liquidating portfolio value (at date 1 or 2, depending on when the portfolio is liquidated), with the investors receiving the rest. The fund's payoff parameters α and w are proxies for the fund's compensation sensitivity to earned profits and investor flows respectively. While the first is obvious, the latter deserves further discussion. The fund can be retained or fired at date 1. While the profit-contingent component of compensation may either rise or fall as a result of these events, the *un*contingent component of compensation is certainly higher if the fund is retained instead of fired at date 1. It is in this sense that the size of w proxies the fund's concern for flows: it is only by retaining the current investors (i.e., preventing outflows) that the fund can earn w for another period. The relative size of α vs w, in turn, captures the relative importance of explicit (profit-related) vs implicit (flow-related) compensation. We summarize our results next.

Our main result demonstrates the negative effect of career concerns on exit as a governance mechanism. We show that when the fund is sufficiently flow sensitive (i.e., w is large relative to α), and when good funds generate sufficiently higher continuation value for investors than bad ones, it is *impossible* in equilibrium for *any* type of fund to credibly threaten the manager by exit conditional on the perverse action being taken. Thus, in sharp contrast to Admati and Pfleiderer (2009), exit cannot act as a form of governance when the blockholder is sufficiently career concerned. The intuition is as follows.

For exit to impose discipline, funds must sell in equilibrium if they observe the perverse action being taken. Since good funds are more likely to choose to hold blocks in firms without agency problems (where exit is unnecessary), funds that exit are more likely to be the bad ones. Thus, the observation of exit induces the investor to fire the fund at date 1. When observing the perverse action being taken, the fund faces the following choice: She may either hold the block, be retained by the investor and earn w for an extra period, but suffer from an $\alpha-$share of smaller profits at $t = 2$, or she may sell the block early, be fired by the investor and lose the assets-under-management fee for the second period, but realize larger profits on the actual position. When w is large and α is small, the former option is more attractive.

For this argument to be valid, it is not just necessary for investors to fire the fund conditional on an early block sale, but also to retain the fund in the absence of such a sale. Why would investors choose to pay w for an extra period when the fund cannot take any further productive actions on their behalf during $t = 2$? They would do so because by retaining the fund, they gather further information about her type. Since investors would rather be matched with a good rather than a bad fund at the end of the game, this additional information is valuable to them. Indeed, it is most valuable—and worth paying w for an extra period—precisely when good and bad funds produce sufficiently different continuation values.

To endow our results with empirical content, we then proceed to show what *can* arise in equilibrium. We show that, when good funds generate sufficiently higher continuation value for investors than bad ones: (i) when w is large relative to α, there exists an equilibrium in which no fund chooses to exit conditional on the perverse action being taken by the manager; in contrast (ii) when w is small relative to α, the fund *is* credibly able to use exit as a disciplining device.

Thus, the effectiveness of exit as a governance mechanism will be determined by variations in the contractual incentives of the delegated blockholder. Across the different classes of delegated portfolio managers, there is clear variation in the degree of profit vs flow sensitivity, proxied for in our model by the size of $\frac{\alpha}{w}$. For example, mutual funds typically receive no explicit profit-based compensation and thus would be captured in our model by having low $\frac{\alpha}{w}$. Other portfolio managers, such as, for example, hedge funds derive a significant fraction of their payoffs from explicit profit-based compensation and would show up in our model as blockholders with high $\frac{\alpha}{w}$. Thus, our results suggest that mutual funds would be less effective in using exit as a disciplining device than hedge funds.

The growing empirical literature on exit as a governance mechanism has not, to date, directly focussed on the impact of blockholder compensation. The literature nevertheless provides findings that are broadly consistent with our model. Parrino, Sias, and Starks (2003) were the first to empirically investigate the role of exit as a governance mechanism. Amongst other things, they showed that the degree to which institutions use exit may depend on their type. Using the CDA/Spectrum classification of institutions (into Bank Trusts, Insurance Companies, Independent Investment Advisors, Investment Companies and Others) they find that, for the years 1982 to 1993, bank trusts are greater users of exit than investment companies. While the aggregate nature of 13-F filings and the legal nature of the CDA/Spectrum classification warrant a degree of caution in interpreting their findings in the context of our model, it is likely that the average bank trust is less influenced by investor flows than, say, a traditional mutual fund company which would typically appear under investment companies under the CDA/Spectrum classification. Thus, this evidence is broadly consistent with our theoretical result that flow-sensitive institutions would be less effective in using exit.

In contrast to the empirical literature on exit, there is established variation on the different degrees to which different types of institutional investors use *other* governance tools—collectively referred to as "voice" —to discipline management and deliver shareholder value. A growing body of empirical papers provides evidence that hedge funds produce substantial gains to shareholders of target companies by using voice (see, for example, Becht, Franks, and Grant (2010), Brav, Jiang, Thomas, and Partnoy (2008), and Klein and Zur (2009)). In contrast, however, it is commonly observed that mutual funds do not use voice to a similar degree. For example, Kahan and Rock (2007) argue that mutual funds do not typically sponsor shareholder proposals, do not uniformly use proxy voting to improve corporate governance, and do not even seem to make significant demands to management during "behind-the-scenes" negotiations. The "silence" of mutual funds is also evident from the survey of Gillan and Starks (2007), who list the prominent roles of different institutional investors in using voice across different decades since the 1930s.

Our results linking blockholder compensation with the effectiveness of exit may also provide a basis for interpreting the empirical evidence on institutional voice. The link arises from the fact that shareholder voice is usually not legally binding on the company's management. As a result, it is sometimes asserted that the threat of exit *supports* shareholders' voice. This idea dates back at least to Hirschman (1970, p. 82), who writes: "The chances for voice to function effectively...are appreciably strengthened if voice is backed up by the threat of exit, whether it is made openly or whether the possibility of exit is merely well understood to be an element in the situation."

Motivated by Hirschman's complementarity hypothesis, in Section 7 we extend our model to incorporate active monitoring and ask whether exit and voice can be complementary to each other. We allow blockholding funds who realize that their portfolio firm cannot be disciplined via the threat of exit alone to use voice, in the form of making—at some cost to themselves—proposals for changes in business strategy that preserve firm value and deliver additional rewards to managers. We show that there exists a class of firms for which exit and voice are complementary: managers heed blockholder voice if and only if it is backed up by a credible threat of exit if voice is ignored. This, in turn, implies that it is only those blockholding funds that can credibly threaten to use exit, which will pay the cost of using voice to complement their exit-based governance with active interventions. Thus, our results suggest, in line with the empirical evidence outlined above, that hedge funds would effectively use voice while mutual funds would remain silent.[2]

Our results on voice and exit taken together find further support in two recent empirical papers. Clifford and Lindsey (2011) provide the first empirical investigation directly linking how differences in compensation among institutional shareholders affect monitoring. Looking at hand-collected data from SEC blockholder filings for a panel of 1500 S&P firms, they provide evidence that shareholder organizations receiving higher incentive pay are more likely to declare themselves as active instead of passive—filing 13-Ds instead of 13-Gs—and appear to be effective monitors, measured via improvement of operating and stock performance. Edmans, Fang, and Zur (2012) study a sample of 101 activist hedge funds and—in contrast to the rest of the literature—examine exit and voice together. They show that over half of the funds in their sample engage in either exit or voice, establishing that hedge funds are effective at both exit and voice, consistent with our findings.

At a theoretical level, our analysis relates most directly to the relatively recent literature that shows that the threat of exit is, in itself, a governance mechanism. Apart from the papers of Admati and Pfleiderer (2009) and Edmans (2009) that we have already noted above, this literature includes the work of Gopalan (2008) and Edmans and Manso (2011).

[2] Needless to say, there may well be many reasons why mutual funds are not effective users of voice, such as, for example, business ties with portfolio firms (see Davis and Kim (2007) or Dasgupta and Zachariadis (2010)). In general, the higher-powered incentives of hedge funds may induce them to spend more effort on activism.

Gopalan (2008) presents a model in which a privately informed blockholder can impact the probability of takeover through trading and therefore can influence firm governance. Edmans and Manso (2011) consider the trade-off between voice and exit and solve for the number of blockholders which maximizes firm value. In contrast to these papers, which treat the blockholder as a principal, we focus on the delegated nature of blockholding. This new literature on exit, as well as our work, builds on a large theoretical literature on the role of blockholders in corporate governance.[3] That literature typically focuses on the role and incentives of the blockholder to monitor, rather than focusing on exit itself as a governance mechanism.

Our paper also has a familial connection to the growing literature on the financial equilibrium implications of the career concerns of funds (see, for example, Dasgupta and Prat (2008), Dasgupta, Prat, and Verardo (2011b), or Guerrieri and Kondor (2011)). These papers establish a link between fund managers' career concerns and the equilibrium prices, returns, and volume of assets they trade. In contrast, we focus on the implications of funds' career concerns and the nature of corporate governance in firms in which they hold equity blocks.

The rest of the paper is organised as follows. In section 2 we introduce the underlying governance problem. Section 3 reviews Admati and Pfleiderer's core result that exit can act as a governance mechanism when the blockholder is a principal. Then, in section 4 we enrich the analysis by introducing delegated blockholding by funds. Section 5 shows that when these funds are sufficiently career concerned the threat of exit fails to improve governance. Section 6 characterizes equilibria with and without exit. In section 7 we extend our model to include the possibility of active monitoring and demonstrate the potential complementarity between voice and exit. In section 8 we discuss our results and consider variations and extensions. Section 9 concludes.

2 The Governance Problem

We consider a publicly traded all equity-financed firm with a given ownership structure. We ask how changes in the ownership structure—the presence of blockholders of different types—can influence the nature of corporate governance in that firm. The underlying model of the firm is identical to that of Admati and Pfleiderer (2009).[4]

[3] See, for example, Grossman and Hart (1980), Shleifer and Vishny (1986), Admati, Pfleiderer, and Zechner (1994), Kahn and Winton (1998), Maug (1998), Mello and Repullo (2004), Burkart, Gromb, and Panunzi (1997), Bolton and von Thadden (1998), Faure-Grimaud and Gromb (2004), Tirole (2001), and Noe (2002).

[4] To be precise, we focus on Admati and Pfleiderer's Model B. This is the version of the model in which they show exit to be most effective as a governance mechanism. In other variants of their model, they show that—even when the blockholder is a principal—exit has potentially less desirable effects. We wish to take as

The firm exists over three dates ($t = 0, 1, 2$). It is run by a manager and is characterized by a moral hazard problem. The manager may take an action (action 1) which is undesirable from the point of view of shareholders but generates private benefits β for him. We refer to this as the "perverse action," as in Admati and Pfleiderer. If the manager does not take action 1, we write that he takes action 0.

The value of the firm at $t = 2$ is affected by the manager's action choice at $t = 0$— $a \in \{0, 1\}$. If he chooses $a = 0$ the value of the firm is v. If he chooses $a = 1$, the value of the firm is $v - \tilde{\delta}$, where $\tilde{\delta}$ is distributed on $\left[0, \bar{\delta}\right]$ with a continuous density $f(\cdot)$. The manager observes the realisation of $\tilde{\delta}$ at $t = 0$ and then chooses his action. The value of v is common knowledge throughout, but realisation of $\tilde{\delta}$ is private information available only to the manager at $t = 0, 1$. All information becomes public at $t = 2$.

We assume, following Admati and Pfleiderer, that the manager's contractual payoff depends on the market prices at $t = 1$ and $t = 2$. If he takes action 0, his payoff is $\omega_1 P_1 + \omega_2 P_2$, where $\omega_1 > 0$ and $\omega_2 > 0$ represent the sensitivities of managerial compensation to market prices P_1 and P_2 at times 1 and 2. If the manager instead takes action 1, his payoff is $\omega_1 P_1 + \omega_2 P_2 + \beta$, where $\beta \geq 0$ is fixed and common knowledge.

The firm is publicly traded, and the prices P_1 and P_2 are set by a risk-neutral market maker on the basis of all available public information. The firm's equity is the only risky asset in the economy. The only other available asset is a risk-free asset with unit gross rate of return and that is in infinitely elastic supply.

The firm is owned by many small passive direct shareholders as well as by a large blockholder. The identity of the blockholder will change across different variants of our model. In the baseline case, which is identical to Admati and Pfleiderer's, the blockholder is a principal, and we think of her as a large private blockholding investor. In the core of our paper, motivated by the large degree of blockholding by institutional asset managers in Anglo-Saxon financial systems, we think of the blockholder as a fund who acts on behalf of a continuum of identical investors.

In all variants, the blockholder is able to observe the action chosen by the manager at $t = 0$, and is able to sell her stake in the firm at $t = 1$ in response. Because the blockholder's potential sales are based on her observation of the manager's action, which in turn affects firm value, the price at the interim date ($t = 1$) will be affected by the trading decision of the blockholder. This, in turn, will affect the payoffs of the manager, generating the core corporate governance mechanism. If the blockholder can credibly threaten to exit when the manager takes action 1, thus lowering the firm's traded price at $t = 1$, the resulting reduction

a starting point the version of their model that gives exit its best chance as a governance mechanism and still show (see Proposition 1 below) that agency frictions arising from the delegation of portfolio management can reduce its effectiveness.

in payoff to the manager can induce him to take the perverse action less often, thus reducing the agency costs and increasing the value of the firm.

It is useful at the outset to outline the incidence of the perverse action in the absence of a blockholder. In such a setting, since small shareholders are passive (implicitly, they have neither the skill nor the incentive to acquire private information about the manager's actions) the price of the firm at $t = 1$ is insensitive to the manager's choice of action. Accordingly, the manager compares his rents from taking the perverse action $\beta + \omega_1 P_1 + \omega_2(v - \delta)$ with that of taking the non-perverse action $\omega_1 P_1 + \omega_2 v$; he takes the perverse action if and only if $\tilde{\delta} \leq \frac{\beta}{\omega_2} =: \delta_{No-L}$.

In what follows, we consider whether the presence of different types of blockholders can reduce the incidence of the manager's perverse action. We begin with the important benchmark case in which the blockholder acts as a principal. This is the case considered by Admati and Pfleiderer.

3 The Blockholder as Principal: Governance via Exit

Admati and Pfleiderer (2009) show that when the blockholder acts as a principal, the threat of exit can act as a disciplining device. We sketch their result here.

An equilibrium of the game is *disciplining* if the blockholder can credibly commit to sell her holdings at $t = 1$ if the manager takes the perverse action. Since, taking the perverse action in a disciplining equilibrium reduces the contractual payoff to the manager via a lower interim price P_1, the incidence of the perverse action is strictly lower in a disciplining equilibrium than in the equilibrium in the absence of a blockholder. Admati and Pfleiderer show that there exists a unique equilibrium and it is always disciplining. Their equilibrium is characterised by a cutoff $\delta_L < \delta_{No-L}$ such that the manager takes the perverse action if and only if $\tilde{\delta} < \delta_L$ and the large blockholder sells her shares if the manager takes that action.

The intuition for the result is as follows. Admati and Pfleiderer's blockholder may face a liquidity shock at $t = 1$ with probability $\theta \in (0, 1)$ which forces her to liquidate her position. This allows her to gain from trade when she is not hit by a liquidity shock and observes the fund taking the perverse action: the market maker does not know the large shareholder's motive to trade. When the blockholder observes that the manager has taken the perverse action at $t = 1$, she realizes that the firm's value will be lower at $t = 2$ when all information becomes public. If she has not been hit by the liquidity shock she has the choice to hold her block until $t = 2$, and realize these gains or sell at $t = 1$. Of course, her sale at $t = 1$ will lower the price of the block, because her trade may reflect her private information. However, because the market assigns positive probability to the sale being driven by the blockholder's liquidity shock rather than by private information, the loss in value from the early sale will be smaller than the loss from holding until $t = 2$. Thus, the blockholder will exit, lowering P_1. Knowing this, the manager will hesitate to take the perverse action.

We now turn to the case where the blockholder is not a principal, but an agent: In the remainder of the paper, the blockholder is a delegated portfolio manager who holds shares on behalf of many (identical) small investors.

4 The Blockholder as Agent: A Model

We consider now the case where the blockholder is a delegated portfolio manager such as a mutual fund, hedge fund, pension fund, etc. We assume that these delegated blockholders act on behalf of a large number of small investors who would have no access to blockholding other than via delegation. We do not analyse interactions amongst investors at this stage. Instead, we treat all investors symmetrically. As a result, in what follows, we shall often refer to this collection of investors simply as "the investor" (I). We refer to the delegated blockholder as the fund (F). The delegated blockholder, like the principal blockholder of the previous section, can observe the manager's actions at $t = 0$, and can choose whether to exit at $t = 1$ or hold until $t = 2$.

As discussed in the introduction, an important strand of the empirical literature has documented that investors chase performance across funds of different ability, generating career (or reputational) concerns for these funds. We consider how the career concerns of funds may impact their effectiveness in monitoring via the threat of exit. In order to incorporate career concerns, we augment the model by adding some crucial, but minimal, ingredients.

First, we assume a degree of heterogeneity across funds, which affects their relative desirability as agents from the perspective of investors: Blockholding funds differ in their stock-picking ability, i.e., in how good they are in selecting firms in which to hold blocks. We introduce a class of firms for which $\beta = 0$. In such firms, there is no agency problem, and so the manager always chooses $a = 0$. There are two types of funds: good ($\tau^{\mathrm{F}} =$ g) and bad ($\tau^{\mathrm{F}} =$b), with $\Pr(\tau^{\mathrm{F}} =\mathrm{g}) = \gamma_{\mathrm{F}}$. Blocks held by good funds are free of agency problems with probability $\gamma_{\mathrm{M}}^{G} \leq 1$. Blocks held by bad funds are free of agency problems with probability $\gamma_{\mathrm{M}}^{B} \in \left(0, \gamma_{\mathrm{M}}^{G}\right)$.[5] As is standard in experts models, we assume that funds do not know their own type. Because of their better stock picking ability, during an unmodelled final period (period 2+) a good fund if matched to the investor generates a continuation payoff to the investor

[5]We thus define the ability of funds as the precision of their ex ante information (before they form blocks). A different formulation, in which funds are distinguished by their ex post ability to spot problems in firms in which they have already established blocks, is discussed in Section 8.1.

of $\pi^{\mathrm{I}}_{\mathrm{g}}$. If, instead, the investor ends up matched to a bad fund, his payoff is $\pi^{\mathrm{I}}_{\mathrm{b}} < \pi^{\mathrm{I}}_{\mathrm{g}}$.[6] The fund that is employed by the investor during this final period, receives a payoff of $\pi^{\mathrm{F}} \geq 0$. In the formal analysis below, in order to achieve the most parsimonious characterization, we set $\gamma^{G}_{\mathrm{M}} = 1$, and denote γ^{B}_{M} by γ_{M}. This simplification does not change the qualitative features of the analysis, as we show in Section 10.2.

Second, we introduce a hiring and replacement process between investors and funds which induces career concerns for funds. The set up is as follows. The investor does not know the type of the fund at $t = 0$ and he is randomly matched to one. Both at $t = 1$ and $t = 2$ he can update his inference about the type of the fund that he is randomly matched to: at $t = 1$ he observes the price of the fund's portfolio (which depends on whether the fund sold or not) and at $t = 2$ he observes the realisation of $\tilde{\delta}$. At either $t = 1$ or $t = 2$, the investor may either retain or fire his fund. The fund who is fired at t dies immediately and cannot be rehired.[7] The investor can only hire a new fund at $t = 2$.[8] If he hires a new fund, the match is random, and thus the investor's continuation value in the final period is $\bar{\pi}^{\mathrm{I}} := \gamma_{\mathrm{F}}\pi^{\mathrm{I}}_{\mathrm{g}} + (1 - \gamma_{\mathrm{F}})\,\pi^{\mathrm{I}}_{\mathrm{b}}$. If, on the other hand he chooses to retain his fund at both $t = 1$ and $t = 2$, then his continuation value depends on his endogenous beliefs about the type of the fund to whom he was matched at $t = 0$. The investor's beliefs are equilibrium quantities and are computed below in the relevant contexts. Thus, both at $t = 1$ and at $t = 2$, the investor makes a rational decision in equilibrium to retain or fire his current fund on the basis of information observed up to that point.

Third, we introduce rents from employment for funds: The reason funds care about investor's perception of their ability is that, for each period that they are employed, they

[6] For concreteness, consider a final single period 2+ in which the fund employed by the investor chooses a block in one firm selected from a set of firms some of which have agency problems ($\beta > 0$) while others don't ($\beta = 0$). If the selected firm is free of agency problems, the expected value is v', but if it is not the expected value will be lowered to $v' - \delta'$ due to agency rent extraction. The good type of fund, if employed by the investor, will choose a block in a firm free from agency problems with higher probability than a bad type of fund, and can thus generate higher returns for investors in the future. This generates a difference in continuation values across matches with different types of funds.

More generally, such a continuation value will be endogenously generated (in equilibrium) of an infinitely repeated version of our game. Such an extended formulation would come at a significant algebraic cost, which would distract from our core message.

[7] Implicitly, there is a sufficiently significant reputational loss from being fired. Alternatively, it could be that funds are simply indistinguishable from each other by an investor who is not in a current employment relationship with them—thus a fired fund cannot be identified to be rehired.

[8] This is without loss of generality, because there are no productive investments between $t = 1$ and $t = 2$, so a fund hired by the investor at $t = 1$ cannot take any actions to affect the investor's payoff. By the same token, since a new fund if hired at $t = 1$ takes no action, observing δ at $t = 2$ conveys no information about the type of this newly hired fund. Thus, the investor would have no incentive to hire a new fund until $t = 2$.

receive a fixed payment w. In addition to this, the fund also receives a fraction $\alpha \in (0,1)$ of any liquidating portfolio value (at $t=1$ or at $t=2$, depending on when the portfolio is liquidated), with the investor receiving the rest. The investor's payoff is complementary to the fund's in the sense that he pays a fixed sum to the fund in each period he employs the fund and gets a fraction $(1-\alpha)$ of the liquidating portfolio.

It is worth pointing out here that the fund's payoff parameters α and w represent, respectively, the fund's compensation sensitivity to earned profits and investor flows. The fund can be retained or fired at $t=1$. While the profit-contingent component of compensation may either rise or fall, depending on the sequence of events, the profit-uncontingent component of compensation is certainly higher if the fund is retained instead of fired at $t=1$. It is in this sense that the size of w captures the fund's concern for flows: it is only by retaining the current investors (i.e., preventing outflows) that the fund can earn w for another period. The relative size of α vs w, in turn, captures the relative importance of explicit (profit-related) and implicit (flow-related) compensation. Funds with higher $\frac{\alpha}{w}$ ratios can be thought to have higher powered incentives than those with low $\frac{\alpha}{w}$ ratios.

Finally, to match the liquidity shock of Admati and Pfleiderer (2009) in our revised context, we assume that the investor has a probability $\theta \in (0,1)$ of being impatient—of receiving a shock that forces him to liquidate his holding at $t=1$. When a block liquidation occurs at $t=1$, the market cannot tell whether it is the investor or the fund who initiated the sale. However, needless to say, the investor knows the source of the liquidation.[9]

4.1 Some useful notation

It is useful to introduce some notation at this stage. The objects for which we define notation here are equilibrium quantities, and thus will derive economic meaning only in our formal analysis below.

We define the following:

$$\tilde{a} := s_{\mathrm{M}}(\tilde{\delta}) = \begin{cases} 0 & \text{if } a = 0 \\ 1 & \text{if } a = 1, \end{cases} \tag{1}$$

which represents the manager's strategy: he takes an action after having observed the realisation of $\tilde{\delta}$.

Since the investor infers the fund's action from the value of the portfolio he observes at

[9] It would be possible, without changing the qualitative results, to replace this liquidity shock by some other form of inefficiency (e.g., noise traders) in the interim date market. In this case, the fund would still be able to "hide" behind the noise when trading at $t=1$, while investors upon seeing a sale by their fund would still know that the fund *chose* to exit.

$t=1$, we write the investor's information set to include $a_{\mathrm{F}} \in \{\mathrm{s}, \mathrm{ns}\}$ and we define

$$\mathbb{E}_s := \mathbb{E}\left(\tilde{a}\tilde{\delta} |\ a^{\mathrm{F}} = \mathrm{s}\right) \tag{2}$$

as the ex ante expected change in firm's value when the investor observes the fund selling the shares ($a^{\mathrm{F}} = \mathrm{s}$) and

$$\mathbb{E}_{ns} := \mathbb{E}\left(\tilde{a}\tilde{\delta} |\ a^{\mathrm{F}} = \mathrm{ns}\right) \tag{3}$$

the ex ante expected change in firm's value when he observes the fund not selling ($a^{\mathrm{F}} = \mathrm{ns}$), where $a^{\mathrm{F}} \in \{\mathrm{s}, \mathrm{ns}\}$.

At $t = 1$ the investor updates his expectation of his continuation payoff (for period 2+) using the information available to him:

$$\mathbb{E}\left(\tilde{\pi}^{\mathrm{I}} | a^{\mathrm{F}}\right), \tag{4}$$

where $a^{\mathrm{F}} \in \{\mathrm{s}, \mathrm{ns}\}$ and which will depend on equilibrium quantities and will be computed in each relevant section. If the investor fires the fund at $t = 1$ he is randomly matched to a new fund and his continuation payoff is

$$\bar{\pi}^{\mathrm{I}} := \mathbb{E}(\tilde{\pi}^{\mathrm{I}}) = \gamma_{\mathrm{F}} \pi^{\mathrm{I}}_{\mathrm{g}} + (1 - \gamma_{\mathrm{F}}) \pi^{\mathrm{I}}_{\mathrm{b}}. \tag{5}$$

We denote by $a^{\mathrm{I}} \in \{\mathrm{f}, \mathrm{r}\}$ the action of the investor at time 1 where he either fires (f) or retains (r) the fund.

Finally, denote the collection of deep model parameters with the exception of $\alpha, w, \pi^{\mathrm{I}}_{\mathrm{g}}$ and $\pi^{\mathrm{I}}_{\mathrm{b}}$ by Θ. Thus our game is defined by payoff parameters $\left\{\Theta, \alpha, w, \pi^{\mathrm{I}}_{\mathrm{g}}, \pi^{\mathrm{I}}_{\mathrm{b}}\right\}$.

5 The Failure of Governance via Exit

We show that, with delegated blockholding, exit may no longer act as an effective disciplining device. In particular, we ask: Is it feasible for delegated blockholders to credibly threaten managers with exit conditional on a perverse action being taken? We answer this question as follows:

Proposition 1 *For $\frac{\alpha}{w}$ small enough and for $\pi^I_g - \pi^I_b$ large enough, there is never an equilibrium in which any type of fund sells if and only if she observes $a = 1$.*

In other words, this proposition highlights two conditions under which the beneficial effect of the threat of exit identified by Admati and Pfleiderer does not survive when the blockholder is an agent. First, the blockholder must be principally motivated by flows rather than by profits. Second, investors must be sufficiently interested in retaining only good funds, which in turn generates career concerns for delegated blockholders.

Our argument will proceed as follows. We first establish conditions under which, if the fund adopts a strategy of selling the block at $t = 1$ if and only if she observes that the manager has taken the perverse action, then the investor chooses to retain the fund if and only if the fund has not sold at $t = 1$. We then establish conditions under which, such a retention strategy on the part of the investor induces the fund *not* to sell at $t = 1$ even if she has observed the manager taking the perverse action. This, then, establishes a set of conditions under which it is impossible for the fund to sell (in equilibrium) at $t = 1$ if and only if she observes the perverse action. We first establish the formal proof and then provide an intuitive discussion of the ingredients delivering our main result.

Proof: Consider any putative equilibrium in which the fund's strategy is as follows:

$$s_{\mathrm{F}}(a) = \begin{cases} \mathrm{ns} & \text{if } a = 0 \\ \mathrm{s} & \text{if } a = 1. \end{cases} \tag{6}$$

We first outline the manager's best response to the fund's behaviour.

To determine the manager's strategy we compare his expected utility from taking the perverse action with that from not taking the perverse action, once he observes the realization of $\tilde{\delta}$ at $t = 0$.

If he takes the perverse action, he knows that the fund will sell his shares at $t = 1$ so $P_1 = v - \mathbb{E}_s$ and $P_2 = v - \delta$. Thus his expected utility is

$$\beta + \omega_1 P_1 + \omega_2 P_2 = \beta + \omega_1(v - \mathbb{E}_s) + \omega_2(v - \delta). \tag{7}$$

If he does not take the perverse action, he knows that the fund will sell his shares at $t = 1$ only for liquidity reasons—which occurs with probability θ—and that $P_2 = v$. Thus his expected utility is

$$\omega_1 P_1 + \omega_2 P_2 = \omega_1\{v - \theta\mathbb{E}_s - (1-\theta)\mathbb{E}_{ns}\} + \omega_2 v. \tag{8}$$

Hence, the manager's strategy is

$$s_{\mathrm{M}}(\delta) = \begin{cases} 1 & \text{if } \beta - \omega_1(1-\theta)(\mathbb{E}_s - \mathbb{E}_{ns}) - \omega_2\delta \geq 0 \\ 0 & \text{otherwise.} \end{cases} \tag{9}$$

Since $\beta - \omega_1(1-\theta)(\mathbb{E}_s - \mathbb{E}_{ns}) - \omega_2\delta$ is decreasing in δ, the manager's best response will be characterised by a cutoff point δ_{sep}, such that the he takes the perverse action for any $\delta \leq \delta_{\text{sep}}$, where the cutoff is equal to the fixed point of the following equation:

$$\delta_{\text{sep}} = \frac{\beta - \omega_1(1-\theta)(\mathbb{E}_s(\delta_{\text{sep}}) - \mathbb{E}_{ns}(\delta_{\text{sep}}))}{\omega_2}. \tag{10}$$

We can thus write the strategy of the manager as follows:

$$s_{\mathrm{M}}(\delta) = \begin{cases} 1 & \text{if } \delta \leq \delta_{\mathrm{sep}} \\ 0 & \text{otherwise.} \end{cases} \tag{11}$$

The cutoff point δ_{sep} is unique if $\mathbb{E}_s(\delta_{\mathrm{sep}}) - \mathbb{E}_{ns}(\delta_{\mathrm{sep}})$ is increasing in δ_{sep}. To establish this, we compute $\mathbb{E}_s$ and $\mathbb{E}_{ns}$ as functions of δ_{sep}.

When the fund sells her shares, the market does not know whether it is for liquidity or speculative reasons and hence

$$\mathbb{E}_s(\delta_{\mathrm{sep}}) = \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\mathrm{sep}})\mathbb{P}(\tilde{\delta} \leq \delta_{\mathrm{sep}})}{\theta + (1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta} \leq \delta_{\mathrm{sep}})}. \tag{12}$$

Computations for equations (12) are shown in the appendix.

If the fund does not sell, the market infers that the manager has not taken the perverse action and that the value of the firm is v. Hence,

$$\mathbb{E}_{ns}(\delta_{\mathrm{sep}}) = 0. \tag{13}$$

It is now easy to see that $\mathbb{E}_s(\delta_{\mathrm{sep}}) - \mathbb{E}_{ns}(\delta_{\mathrm{sep}})$ is increasing in δ_{sep} establishing the uniqueness of δ_{sep}. The proof of this result is detailed in the appendix. We now proceed to compute the best response of the patient investor—the investor who at $t = 1$ has not been hit by a liquidity shock and has not liquidated his position.

The investor's decision at $t = 1$ relies on what inference he expects to make at $t = 2$. At $t = 2$, there are three mutually exclusive and exhaustive events:

$$\mathrm{E}_1 = \{\delta \leq \delta_{\mathrm{sep}}\} \cap \{a = 0\} \tag{14}$$

$$\mathrm{E}_2 = \{\delta > \delta_{\mathrm{sep}}\} \cap \{a = 0\} \tag{15}$$

$$\mathrm{E}_3 = \{a = 1\} \tag{16}$$

The investor also infers the action of the fund from the portfolio value. Thus, the investor's $t = 2$ information set consists of six possible paired events, which are the elements of

$$\{\mathrm{E}_1, \mathrm{E}_2, \mathrm{E}_3\} \times \{\mathrm{s}, \mathrm{ns}\}.$$

Each of these events conveys different information to the investor and may affect his retention vs firing decision at $t = 2$. We first consider the events that can arise on the putative equilibrium path. These are $\left(\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns}\right)$, $\left(\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns}\right)$, and $\left(\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{s}\right)$. For each of these cases, the investor can compute the probability that he is matched with a good fund using Bayes Rule as follows:

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g} | \mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns}) = \frac{\gamma_{\mathrm{F}}}{\gamma_{\mathrm{F}} + (1-\gamma_{\mathrm{F}})\gamma_{\mathrm{M}}} > \gamma_{\mathrm{F}} \tag{17a}$$

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g} | \mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns}) = \gamma_{\mathrm{F}}, \tag{17b}$$

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g} | \mathrm{E}_3, a^{\mathrm{F}} = \mathrm{s}) = 0. \tag{17c}$$

Clearly, the investor retains at $t = 2$ in the events $\left(\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns}\right)$ and $\left(\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns}\right)$ and replaces at $t = 2$ in the event $\left(\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{s}\right)$. For the other three events—$\left(\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{s}\right)$, $\left(\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{s}\right)$, and $\left(\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns}\right)$—it is impossible to assign posteriors based on Bayes Rule, and, since we are proving an impossibility result, we make no assumption whatsoever on the investor's behaviour in these cases. It is easy to see that our arguments below will be unaffected by the specific posterior chosen by the investor under these off-(putative)-equilibrium events.[10]

Having thus computed the investor's decision rule at $t = 2$, we proceed to compute his strategy at $t = 1$. In order to make his $t = 1$ decision, he first observes the fund's portfolio and infers her action, then computes the probability of ending up in one of the three events conditional on the action he observes. Finally, he computes his continuation payoff in each event conditional on his retention vs firing decision at $t = 2$ as specified above.

If he observes $a^{\mathrm{F}} = \mathrm{ns}$, he must compute the following quantities: $\mathbb{P}\left(\mathrm{E}_1 \middle| a^{\mathrm{F}} = \mathrm{ns}\right)$, $\mathbb{P}(\mathrm{E}_2 | a^{\mathrm{F}} = \mathrm{ns})$, and $\mathbb{P}(\mathrm{E}_3 \middle| a^{\mathrm{F}} = \mathrm{ns})$. It is easy to see that:

$$\mathbb{P}\left(\mathrm{E}_1 \middle| a^{\mathrm{F}} = \mathrm{ns}\right) = \frac{\mathbb{P}\left(\tilde{\delta} \leq \delta_{\mathrm{sep}}\right)(\gamma_{\mathrm{F}} + (1-\gamma_{\mathrm{F}})\gamma_{\mathrm{M}})}{1 - (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \leq \delta_{\mathrm{sep}}\right)} \tag{18a}$$

$$\mathbb{P}(\mathrm{E}_2 | a^{\mathrm{F}} = \mathrm{ns}) = \frac{1 - \mathbb{P}\left(\tilde{\delta} \leq \delta_{\mathrm{sep}}\right)}{1 - (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \leq \delta_{\mathrm{sep}}\right)} \tag{18b}$$

$$\mathbb{P}(\mathrm{E}_3 | a^{\mathrm{F}} = \mathrm{ns}) = 0. \tag{18c}$$

In this putative equilibrium if the investor observes the fund not selling, it must be that the manager has taken action $a = 0$, hence E_3 will never realise. We have already shown above that, conditional on events E_1 and E_2, the investor will choose to retain at $t = 2$. Thus, if the investor observes $a^{\mathrm{F}} = \mathrm{ns}$ and retains the fund at $t = 1$, his expected payoff is:

$$(1-\alpha)\mathbb{E}\left(P_2 \mid a^{\mathrm{F}} = \mathrm{ns}\right) - 2w + \mathbb{E}\left(\tilde{\pi}^{\mathrm{I}} \mid a^{\mathrm{F}} = \mathrm{ns}\right),$$

[10] In particular, since the investor assigns probability zero at $t = 1$ to each of these continuation events, his $t = 1$ decision (which is what determines the behaviour of the fund) is unaffected by any assumptions about his behaviour under these events.

where

$$\mathbb{E}\left(\tilde{\pi}^{\mathrm{I}}|a^{\mathrm{F}}=\mathrm{ns}\right)=$$
$$\mathbb{P}\left(\mathrm{E}_1\middle|a^{\mathrm{F}}=\mathrm{ns}\right)\left[\mathbb{P}(\tau^{\mathrm{F}}=\mathrm{g}|\mathrm{E}_1,a^{\mathrm{F}}=\mathrm{ns})\pi^{\mathrm{I}}_{\mathrm{g}}+(1-\mathbb{P}(\tau^{\mathrm{F}}=\mathrm{g}|\mathrm{E}_1,a^{\mathrm{F}}=\mathrm{ns}))\pi^{\mathrm{I}}_{\mathrm{b}}\right]$$
$$+\,\mathbb{P}(\mathrm{E}_2|a^{\mathrm{F}}=\mathrm{ns})\left[\mathbb{P}(\tau^{\mathrm{F}}=\mathrm{g}|\mathrm{E}_2,a^{\mathrm{F}}=\mathrm{ns})\pi^{\mathrm{I}}_{\mathrm{g}}+(1-\mathbb{P}(\tau^{\mathrm{F}}=\mathrm{g}|\mathrm{E}_2,a^{\mathrm{F}}=\mathrm{ns}))\pi^{\mathrm{I}}_{\mathrm{b}}\right]. \quad (19)$$

Simplifying, we have that if the investor observes $a^{\mathrm{F}}=\mathrm{ns}$ and retains the fund at $t=1$, his expected payoff is:

$$(1-\alpha)v-2w+\bar{\pi}^{\mathrm{I}}+\frac{\mathbb{P}(\tilde{\delta}\le\delta_{\mathrm{sep}})\gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\le\delta_{\mathrm{sep}})}(\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}}). \quad (20)$$

Instead, if the investor observes $a^{\mathrm{F}}=\mathrm{ns}$ and fires the fund, his expected payoff is:

$$(1-\alpha)P_1-w+\mathbb{E}\left(\tilde{\pi}^{I}_{\mathrm{F}}\right)=(1-\alpha)(v-\mathbb{E}_s(\delta_{\mathrm{sep}}))-w+\bar{\pi}^{\mathrm{I}}, \quad (21)$$

because he gets his share of the liquidating portfolio, he pays the fixed wage and receives the unconditional expected continuation payoff by being randomly matched to a fund at $t=2$.

Hence, the investor will choose to retain the fund conditional on no sale if

$$(1-\alpha)v-2w+\bar{\pi}^{\mathrm{I}}+\frac{\mathbb{P}(\tilde{\delta}\le\delta_{\mathrm{sep}})\gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\le\delta_{\mathrm{sep}})}(\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}})\ge$$
$$(1-\alpha)(v-\mathbb{E}_s(\delta_{\mathrm{sep}}))-w+\bar{\pi}^{\mathrm{I}} \quad (22)$$

i.e.

$$(1-\alpha)\mathbb{E}_s(\delta_{\mathrm{sep}})+\frac{\mathbb{P}(\tilde{\delta}\le\delta_{\mathrm{sep}})\gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\le\delta_{\mathrm{sep}})}(\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}})\ge w \quad (23)$$

It is clear that, for a given $\{\alpha,w,\Theta\}$, as long as $\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}}$ is large enough, inequality (23) holds. It is also clear that the lower bound on $\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}}$ is increasing in α, since $\mathbb{E}_s(\delta_{\mathrm{sep}})>0$. Let us denote the relevant lower bound on $\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}}$ as a function of α by $B_{\Delta\pi}(\alpha;w,\Theta)$.

If, instead, the investor observes that the fund sold at $t=1$, if he fires the fund he gets:

$$(1-\alpha)P_1-w+\mathbb{E}(\tilde{\pi}^{\mathrm{I}})=(1-\alpha)\left(v-\mathbb{E}_s(\delta_{\mathrm{sep}})\right)-w+\bar{\pi}^{\mathrm{I}}. \quad (24)$$

If instead he retains the fund, he needs to compute his expected continuation value. For this we note:

$$\mathbb{P}\left(\mathrm{E}_1\middle|a^{\mathrm{F}}=\mathrm{s}\right)=0 \quad (25)$$
$$\mathbb{P}\left(\mathrm{E}_2\middle|a^{\mathrm{F}}=\mathrm{s}\right)=0 \quad (26)$$
$$\mathbb{P}(\mathrm{E}_3|a^{\mathrm{F}}=\mathrm{s})=1, \quad (27)$$

and we have already shown that

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{s}) = 0.$$

He knows, therefore, that in the only potential event that can arise at $t = 2$, he will wish to replace the fund. Thus, his expected payoff from retention is:

$$(1-\alpha)P_1 - 2w + \bar{\pi}^{\mathrm{I}} = (1-\alpha)(v - \mathbb{E}_s(\delta_{\mathrm{sep}})) - 2w + \bar{\pi}^{\mathrm{I}}. \tag{28}$$

Thus, it is clear that the investor will fire at $t = 1$ if he observes a sale.

Thus, as long as $\pi_{\mathrm{g}}^{\mathrm{I}} - \pi_{\mathrm{b}}^{\mathrm{I}}$ is large enough, the investor retains the fund if and only if she chose not to sell at $t = 1$. We now show that, when α is small, the investor's behaviour leads the fund to deviate from her proposed equilibrium strategy.

Suppose the fund observes $a = 0$. If she chooses to hold, she is retained by the investor and thus gets

$$2w + \alpha\mathbb{E}\left(P_2 \mid a = 0\right) + \mathbb{P}(\text{retained in } t = 2)\pi^{\mathrm{F}} = 2w + \alpha v + \pi^{\mathrm{F}}.$$

If she chooses to sell she instead gets

$$w + \alpha P_1 = w + \alpha(v - \mathbb{E}_s(\delta_{\mathrm{sep}})).$$

It is clear that she will always choose to hold.

Suppose the fund observes $a = 1$. If she sells, given the investor's strategy above, she is fired and receives

$$w + \alpha P_1 = w + \alpha(v - \mathbb{E}_s(\delta_{\mathrm{sep}})).$$

If, instead, she chooses not to sell she will be retained at $t = 1$, but may or may not be fired at $t = 2$, depending on the investor's beliefs at the time. Upon observing $a = 1$, the fund realizes that the investor will observe event $(\mathrm{E}_3, \mathrm{ns})$ at $t = 2$. As noted above, we are agnostic about the investor's beliefs upon observing such off-equilibrium events. Thus, the argument here must hold for *all possible* beliefs $\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns})$. From the fund's perspective, the *lowest possible* payoff from not selling arises if the investor fires for sure (which arises if $\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns}) < \gamma_{\mathrm{F}}$). For all other possible off-equilibrium beliefs, the fund must assign at least positive probability to receiving, in addition to the payoffs at $t = 1$ and $t = 2$, a continuation payoff of $\pi_{\mathrm{F}} > 0$ at $t = 2+$. Thus, a *lower bound* on the fund's payoff from not selling is:

$$2w + \mathbb{E}\left(P_2|a = 1\right) = 2w + \alpha\left(v - \mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\mathrm{sep}})\right).$$

Thus, a *necessary* condition for the the fund to adopt strategy

$$s_{\mathrm{F}}(a) = \begin{cases} \mathrm{ns} & \text{if } a = 0 \\ \mathrm{s} & \text{if } a = 1, \end{cases} \tag{29}$$

is that

$$w + \alpha(v - \mathbb{E}_s(\delta_{\text{sep}})) \geq 2w + \alpha\left(v - \mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\text{sep}})\right), \tag{30}$$

which we can rewrite as:

$$\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\text{sep}})\left[1 - \frac{(1-\gamma_{\text{F}})(1-\gamma_{\text{M}})\mathbb{P}(\tilde{\delta} \leq \delta_{\text{sep}})}{\theta + (1-\theta)(1-\gamma_{\text{F}})(1-\gamma_{\text{M}})\mathbb{P}(\tilde{\delta} \leq \delta_{\text{sep}})}\right] \geq \frac{w}{\alpha}. \tag{31}$$

It is clear that fixing Θ, as $\frac{w}{\alpha}$ increases, inequality (31) is harder to satisfy. Let's define $B_{\frac{\alpha}{w}}(\Theta)$ as the smallest $\frac{\alpha}{w}$ satisfying inequality (31). Define $\underline{\alpha}(w, \Theta) = wB_{\frac{\alpha}{w}}(\Theta)$ as the lowest α that satisfies inequality (31). Let

(i) $\frac{\alpha}{w} < \frac{\underline{\alpha}(w,\Theta)}{w}$,

(ii) $\pi_{\text{g}}^{\text{I}} - \pi_{\text{b}}^{\text{I}} > B_{\Delta\pi}(\underline{\alpha}(w, \Theta), w, \Theta)$.

Since $B_{\Delta\pi}(\underline{\alpha}(w, \Theta), w, \Theta)$ is increasing in α, for α and $\pi_{\text{g}}^{\text{I}} - \pi_{\text{b}}^{\text{I}}$ satisfying (i) and (ii) it is clear that inequality (23) holds and (31) does not, giving a contradiction. This concludes the formal argument.■

We now proceed to discuss the intuition behind our result.

For exit to impose discipline, funds must sell in equilibrium if they observe the perverse action being taken. We show that the career concerns of funds—their desire to be retained by clients—endogenously prevents them from acting in this manner. Since good funds only invest in companies with no agency problems, the only funds that can be seen to exit must be the bad ones. But then exit reveals that the fund is of the bad type, which will induce the investor to fire the fund—keeping a fund on an extra period is expensive to investors because in each period that they do so, they pay an uncontingent assets-under-management fee w for employing the fund. When observing the perverse action being taken, the bad fund therefore faces the choice between two options: She may either hold the block, be retained by the investor and earn w for an extra period, but suffer from an $\alpha-$share of smaller profits at $t = 2$ or she may sell the block early, be fired by the investor and lose the assets-under-management fee for the second period, but realize larger profits on the actual position. When w is large and α is small, the former option is more attractive. This is the first of two conditions identified in Proposition 1.

However, notice that for the argument above to be valid, it is not just necessary for the investor to fire the fund conditional on an early block sale, but also to retain the fund in the absence of such a sale. Why would the investor choose to pay w for an extra period when the fund cannot take any further productive actions on his behalf during $t = 2$? He would do so because by retaining the fund, he gathers further information about her type. Since in the continuation game the investor would rather be matched with a good than a bad fund, this additional information about the type is valuable to the investor. Indeed, it is most valuable—and worth paying w for an extra period—precisely when good and bad funds produce significantly different continuation values for the investor, i.e., when $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ is large enough. This is the second condition identified in Proposition 1.

It is also worth commenting on the applied relevance of these two conditions. The second condition (a lower bound on $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$) identifies circumstances under which investors endogenously retain funds if and only if they have not sold at $t = 1$. When funds sell at $t = 1$ their portfolio value is lower than it would have been at $t = 1$ had they not sold. Thus, the second condition guarantees that investors retain funds with relatively high $t = 1$ portfolio values and replace those with low $t = 1$ portfolio values. In other words, investors chase short-term performance. Short-term performance chasing by investors appears to be a robust feature of the data, and holds *across* very different classes of delegated portfolio managers. For example, flow performance relationships have been identified both for mutual funds (e.g. Chevalier and Ellison (1997)) and for hedge funds (e.g. Agarwal, Daniel, and Naik (2009)). In contrast, the first condition (a lower bound on $\frac{\alpha}{w}$) *separates* different types of funds. For example, at one end of the spectrum, US mutual funds receive typically purely uncontingent fees, perhaps as a consequence of regulatory restrictions, and thus have relatively low-powered incentives.[11] In contrast, at the other end of the spectrum, hedge funds receive a significant component of their compensation from contingent fees explicitly linked to portfolio value, and have higher-powered incentives.

Finally, from a theoretical perspective, it is worth noting that while the two conditions in Proposition 1 are *jointly* sufficient for our result—absent restrictions on the set of parameters (Θ, w, α)—they are *individually* necessary. It is clear that, if $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ is large enough to guarantee that investors will retain the fund if and only if she does not sell but α is large relative to w, the fund will still prefer (despite the presence of career concerns) to sell upon observing $a = 1$. Similarly, even if α was sufficiently small relative to w, if $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ is small, then—depending on the parameters (Θ, w, α)—it is possible that the fund would *always* be replaced at $t = 1$, and therefore may as well maximize her portfolio value by selling early whenever $a = 1$.

To conclude this section, we provide a variation of our main result. We have shown that sufficient career concerns on the part of delegated blockholders preclude the existence of equilibria in which blockholders can punish funds *non*-stochastically when they take the perverse action. The careful reader may wonder if it is possible, despite the career concerns of delegated blockholders, to have equilibria in which, if the manager takes the perverse action,

[11] The Investment Companies Act of 1940 features a clause often referred to as the "fulcrum fee rule" which requires that mutual fund's performance fees are symmetric in gains and losses. As a result, the vast majority of US mutual funds charges fees that are uncontingent (see, for example, Elton, Gruber, and Blake (2003)).

the delegated blockholder punishes him with *arbitrarily* high probability $\mu < 1$. While threats involving mixed strategies are, in our view, of limited applied relevance, we nevertheless show that even such stochastic punishment fails in the presence of sufficient career concerns. In particular, we show that:

Proposition 2 *There exists $\hat{\mu} \in (0,1)$ such that for any $\mu \geq \hat{\mu}$ there are bounds $B_{\Delta\pi}(\mu)$ and $B_{\frac{\alpha}{w}}(\mu)$ such that if $\pi_g^I - \pi_b^I > B_{\Delta\pi}(\mu)$ and $\frac{\alpha}{w} < B_{\frac{\alpha}{w}}(\mu)$, it cannot be an equilibrium for the fund to choose to sell with probability μ if and only if she observes $a = 1$ because, upon observing $a = 1$, the fund will strictly prefer not to sell.*

This and all subsequent proofs are provided in the appendix. Taken together, Propositions 1 and 2 show that exit cannot act as an effective disciplining device when delegated blockholders are principally concerned about retention. Needless to say, while Propositions 1 and 2 establish impossibility results, in order to have empirical content, we need to delineate what happens in equilibrium. In the next section, we address this question.

6 Who Exits in Equilibrium and Who Does Not

In this section, we construct equilibria with minimal and maximal amounts of exit. We begin with the case of minimal exit. For an important class of institutional investors, our result shows that exit can be an entirely ineffective disciplining device in equilibrium.

Proposition 3 *For $\frac{\alpha}{w}$ small enough and $\pi_g^I - \pi_b^I$ large enough, there is an equilibrium in which*

(i) The patient investor fires a fund if she sells at $t = 1$ and retains her otherwise;

(ii) No fund sells at $t = 1$ regardless of the action chosen by the manager.

The proposition identifies two conditions under which there is an equilibrium with no exit. The conditions are qualitatively similar to those of Proposition 1. First, the fund must be sufficiently more interested in flows than in profits. Second, the investor must care sufficiently more about being matched with a good than a bad fund. A voluntary sale at $t = 1$ is an off-equilibrium event which leads to the replacement of the fund. In contrast, the lack of a voluntary sale leads to retention, because by retaining the fund the investor gains further information about her type—which is most valuable exactly when $\pi_{\mathrm{g}}^{\mathrm{I}} - \pi_{\mathrm{b}}^{\mathrm{I}}$ is high. Since the investor is willing to pay w for an extra period if the fund does not sell at $t = 1$, a sufficiently flow motivated fund does not sell even upon observing the perverse action because she is willing to sacrifice profits for flows.

We then move on to consider the polar opposite case, where exit occurs whenever the manager takes the perverse action. Needless to say, exit cannot arise in equilibrium if both the conditions identified in Proposition 1 are satisfied. However, as we have noted above, the two conditions are jointly sufficient but are individually necessary. Thus, there is a degree of freedom in relaxing these conditions in order to construct equilibria with exit. Since our main applied motivation in this section is to theoretically delineate the prevalence of exit across different classes of delegated portfolio managers, we feel that it is appropriate to motivate our choice on the basis of what is ex ante empirically plausible. Given the empirical relevance of short-term performance chasing by investors across different types of delegated portfolio managers (see the discussion in section 5), we therefore maintain the assumption that guarantees that investors retain only those funds who have performed relatively better in the recent past. Fixing this assumption, we show that, if $\frac{\alpha}{w}$ is large, exit can function effectively as a disciplining device. In particular, we show that:

Proposition 4 *For $\frac{\alpha}{w}$ and $\pi_g^I - \pi_b^I$ large enough, there is an equilibrium in which*

(i) The patient investor fires a fund if she sells at $t = 1$ and retains her otherwise.

(ii) The fund sells at $t = 1$ whenever the manager chooses $a = 1$.

Propositions 3 and 4 generate clear empirical implications. In Proposition 3, we have shown that for $\frac{\alpha}{w}$ *small* enough, a delegated blockholder will never be effective in using exit to discipline management. In Proposition 4, we have show that for $\frac{\alpha}{w}$ *large* enough, there will be equilibria in which delegated blockholders can credibly threaten management with exit. Thus, the effectiveness of exit as a governance mechanism will be determined by variations in the contractual incentives of the delegated blockholder.[12]

As we have argued above, variations in $\frac{\alpha}{w}$ can be thought to be a proxy for variations in the degree to which funds have high-powered incentives. Across the different classes of delegated portfolio managers, there is clear variation in the power of explicit incentives. As mentioned above, mutual funds typically receive no explicit profit-based compensation. Thus, such funds would be proxied for by low $\frac{\alpha}{w}$. Other portfolio managers, such as hedge funds, for example, derive a significant fraction of their payoffs from explicit profit-based compensation. For these investment vehicles, $\frac{\alpha}{w}$ is likely to be much higher. Thus, our results taken together suggest that mutual funds would be less effective in using exit as a disciplining device than hedge funds. This is a testable implication of our model. While we are aware of no direct

[12] A critique of our results may argue that variation in the contractual parameters is not necessarily relevant for exit because, if $\pi_{\mathrm{g}}^{\mathrm{I}} - \pi_{\mathrm{b}}^{\mathrm{I}}$ is small, then even low $\frac{\alpha}{w}$ funds (i.e., mutual funds) will use exit. However, we note that this critique requires that $\pi_{\mathrm{g}}^{\mathrm{I}} - \pi_{\mathrm{b}}^{\mathrm{I}}$ is small for *low* $\frac{\alpha}{w}$ funds, i.e., for mutual funds, which implies that mutual fund investors do not chase performance. Empirical evidence seems to point to the contrary.

empirical examination of this prediction, as we have pointed out in the introduction, this result is broadly consistent with some existing empirical evidence.

7 Exit, Voice, and Compensation

We have argued that institutions that are relatively flow motivated such as mutual funds will be less effective in their use of exit as a governance device than relatively profit motivated ones such as hedge funds. To date, we have not considered the possibility of active monitoring (the use of "voice") by delegated blockholders. However, Hirschman (1970) argued that exit and voice are potentially complementary governance mechanisms: the existence of the threat of exit makes blockholder voice worth listening to. Do our results on the effects of funds' compensation on the different use of exit correspond to different ability and willingness to use voice? We consider this question next.

Recall our baseline model with a fund who has $\frac{\alpha}{w}$ high enough to satisfy the conditions of Proposition 4. For firms in which $\delta \geq \delta_{\text{sep}}$ the existence of the threat of exit, by itself, prevents perverse behaviour by the manager at no cost to the fund (since the threat of exit is not executed for these firms in equilibrium). However, for firms with $\delta < \delta_{\text{sep}}$, the perverse action cannot be prevented by the threat of exit, and the fund must engage in costly exit in equilibrium. Consider the following modification of the model. Imagine that, at $t = 0$, the fund learns whether the type of the firm is such that the threat of exit alone will discipline the manager, i.e., the fund learns whether $\delta < \delta_{\text{sep}}$ before the manager makes his action choice.[13] Where exit is insufficient alone, could the fund be tempted to use voice to discipline management?

We model voice as follows. When the fund learns that exit alone is insufficient, she can make a proposal for a series of operational and financial remedies (e.g. changes in business strategy) to the firm. Formulating the proposal comes at cost e to the fund. The proposal may be accepted or rejected by the manager. If accepted, the resulting change in business strategy leads the manager to relinquish the perverse action (i.e., choose $a = 0$) and yields him benefits, $R \in (0, \beta - \omega_2\delta_{\text{sep}})$, over and above his normal compensation from choosing $a = 0$. The cost e is sunk regardless of whether the manager accepts or rejects the proposal. Our formulation for voice can be interpreted in the following way: The change in business strategy generates a reduction in the effort cost for the manager for choosing $a = 0$, which – in our baseline model of agency problems drawn from Admati and Pfleiderer (2009)—translates

[13] Note that knowing whether $\delta < \delta_{\text{sep}}$ makes no difference to the arguments of Proposition 4, since this information is inferred in equilibrium. Also note that we are enabling the fund to observe whether $\delta < \delta_{\text{sep}}$ rather than infer it via some pre-choice declaration of the manager. Such additional pre-game communication adds unnecessary complexity to this section.

into an increase in benefits of choosing $a = 0$. Our formulation for voice is consistent with the description of active monitoring by hedge funds given by Brav, Jiang, Thomas, and Partnoy (2008). They argue that hedge funds target undervalued firms and propose an array of strategic, operational, and financial remedies.

To keep things simple we assume that the voice pre-game described here is unobservable to the investors and the market. We show the following result:

Proposition 5 *For e small enough, there exists an equilibrium in which for $\delta \in \left(\delta_{sep} - \frac{R}{\omega_2}, \delta_{sep}\right)$:*

1. *A fund with sufficiently high $\frac{\alpha}{w}$, who can credibly threaten to exit when the perverse action is chosen, will successfully use voice to prevent the perverse action (and thus avoid exit).*

2. *A fund with sufficiently low $\frac{\alpha}{w}$, who cannot credibly threaten to exit when the perverse action is chosen, will not use voice.*

The proof is in the appendix. In words, there exists a class of firms for which exit and voice are complementary in generating good governance, because delegated blockholders will use voice if and only if they can credibly threaten to exit. The intuition is as follows. The manager's payoff from ignoring voice depends on whether the fund exits or not if voice is ignored, and is higher when the fund does not exit than when she does. This reduces the reward required to induce the manager to take $a = 0$ when the fund uses voice. Indeed, for $R \in (0, \beta - \omega_2 \delta_{\text{sep}})$ blockholder voice will never induce the manager to choose $a = 0$ over $a = 1$ if he knows that the fund will not exit. This is not true when he instead rationally anticipates that the fund will exit if voice is ignored. This implies that for sufficiently low cost e, sufficiently profit motivated funds will use voice backed by the threat of exit. The use of voice reduces the range of δ for which the manager takes the perverse action from $\delta < \delta_{\text{sep}}$ to $\delta < \delta_{\text{sep}} - \frac{R}{\omega_2}$, thereby making voice an additional corporate governance instrument. In contrast, highly flow motivated institutions, being unable to credibly threaten to exit, never induce the manager to take $a = 0$ through voice if $R \in (0, \beta - \omega_2 \delta_{\text{sep}})$ and thus rationally refrain from paying the costs of using voice.

As noted in the introduction, our finding provides one potential explanation – based on the interaction of voice and exit—for the empirical regularity that hedge funds use voice and produce significant gains for shareholders in target companies (Brav, Jiang, Thomas, and Partnoy (2008), Becht, Franks, and Grant (2010)), while mutual funds choose to remain silent and do not deliver similar gains (Karpoff (2001), Barber (2007), and Kahan and Rock (2007)).

8 Discussion

In this section, we discuss some of our modelling assumptions and conclusions. We begin by discussing the nature of the inferences made by investors who observe early liquidation of blocks by their funds.

8.1 Could exit be a good signal of managerial ability?

Our core observation (Proposition 1) relies on the fact that investors who observe that their fund sold conclude that she will not generate high returns for them in the future. This is because the need to execute on a threat to exit suggests that this fund was a poor stock picker (formed a block in a firm with agency problems) and thus is less likely to generate high future returns for investors. Needless to say, implicit in this conclusion is a modelling choice: observable evidence of governance via exit is a negative signal, because fund managers who hold blocks are distinguished by their ability to spot the potential for agency problems ex ante. While it is quite standard in the literature to think of fund managers differing in stock picking ability, it is conceivable to construct alternative models in which funds differ, instead, in their ability to spot perverse behaviour ex post. In such models, it is possible for exit to be a *positive* signal, because—since there is no question of ex ante information—exit simply signals to investors that the exiting fund knows that management is acting suboptimally. Are our results robust to such a modification?

We would argue that—as in our baseline model—the career concerns of delegated blockholders would again interfere with the ability of exit to effectively discipline management. If exit is a good signal of ability, career concerned blockholders would exit excessively, i.e., they would exit not because the manager had taken a perverse action but because they wished to attract or retain flows. Any incentive mechanism that breaks the precise link between the action choice of the manager and the exit of the blockholder would make exit less effective as a form of voice. To formalize this intuition, we develop a simple model in the appendix (see section 10.3) in which funds are distinguished by the quality of their information about the internal working of firms in which they hold blocks. Firms are heterogeneous in the degree to which they suffer from agency problems, with differences arising from the extent of private benefits that the management can extract by effort avoidance. We show that when blockholders are career concerned, excessive exit will arise—and thus limit the disciplinary ability of exit—exactly for those firms in which the moral hazard problem is most severe. It is for these firms that exit will endogenously be viewed as a positive signal of ability on the part of the delegated blockholder. Consequently, for these firms, a career concerned blockholder will exit too often, breaking the link between managerial misbehaviour and punishment by blockholders.

While the core economic content of our results are robust to this alternative formulation of managerial ability, we should note that the two alternative models of exit may differ in their empirical plausibility. If exit was viewed as a positive signal about ability (as in the alternative formulation), then exit should be associated with short-term inflows (or the lack of exit with outflows). Since exit lowers share prices, and thus indirectly the portfolio value of the fund (the sale of a block is likely to have a first-order effect on the value of even a large fund), the alternative model would require short-term investor flows to be *negatively* related to short-term performance at least over some range. The empirical literature presents persuasive evidence for the existence of an increasing short-term flow-performance relationship. In contrast to the alternative, our baseline mechanism is consistent with an *increasing* short-term flow-performance relationship. Indeed, such a flow performance relationship is (endogenously) instrumental in our baseline model: It is exactly when investors observe low performance at $t = 1$ that they fire the fund (i.e., withdraw their funds).

8.2 Non-linear compensation for money managers

In our baseline analysis we have assumed that, in addition to the essentially universal uncontingent assets under management fee, the fund receives an α-share of realized portfolio value. In reality, funds often receive compensation that takes the form of a "2 and 20" contract: a 2% uncontingent assets under management fee plus 20% of realized *profits* (i.e., max(profits, 0)). It is worth noting that our core results would not change if we introduced such non-linear payoffs for funds.

Our results only rely on the relative value of the portfolio values from early vs late liquidation if the manager took the perverse action. At no stage does our analysis require that the explicit compensation of the fund be negative. Thus, conditional on $a = 1$, if p_E represents the portfolio value from early liquidation, and p_L represents the portfolio value from late liquidation, our analysis uses only the fact that $p_E > p_L$. Suppose the block was initially established at some (unmodelled) price p_0. Then $p_E > p_L$ implies that $\max(p_E - p_0, 0) \geq \max(p_L - p_0, 0)$, with strict inequality unless $p_0 \geq p_E > p_L$. Except in this perverse latter case, our qualitative analysis remains unchanged: the fund's career concerns push her in the direction of not exiting, while her profit motivations push her to do the opposite. Thus, more career concerned funds will not exit, while less career concerned funds will. In the perverse case in which $p_0 \geq p_E > p_L$, profit motivations no longer affect the choice to exit, and the only remaining motivation remains the fund's career concerns. In this case, no fund would choose to exit, *regardless* of the relative sizes of α and w.

8.3 Is delegation rational?

The empirical relevance of Proposition 3 relies on the existence of investors who would choose to invest in delegated funds with low α and high w in spite of their inability to use exit as a disciplining mechanism. There are two separate components to this question. First, since funds with high α and low w (e.g. hedge funds) generate higher value through exit than funds with low α and high w, it is clear that investors would prefer to invest in hedge funds rather than in mutual funds. It is clear that there are a variety of frictions that lead to the segmentation of markets with regard to delegated portfolio management. Investment in hedge funds requires, for example, that the investors pass significant net-worth thresholds which make hedge funds inaccessible for large groups of retail investors. However, despite the evident existence of such a class of investors, it is also also relevant to ask whether those investors who can only access mutual funds would prefer to do so (despite the payment of fees and the perverse behaviour identified in Proposition 3) rather than invest in the storage asset.[14] To answer this question we compute the ex ante expected utility for the investor at time 0:

$$\begin{aligned} U^{\mathrm{I}}(\delta_{\mathrm{pool}}) = (1-\alpha)\left[v - \theta\mathbb{E}_s(\delta_{\mathrm{pool}}) - (1-\theta)\mathbb{E}_{ns}(\delta_{\mathrm{pool}})\right] - w(2-\theta) \\ + (1-\theta)\left[\bar{\pi} + \gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}})\right] \geq 1 \end{aligned}$$

The first term refers to the investors share of the liquidated portfolio value, the second term refers to the payment of the uncontingent fee, and the final term arises from the additional value obtained by each investor from learning about the fund from delegation. We can rewrite this as follows:

$$\begin{aligned} U^{\mathrm{I}}(\delta_{\mathrm{pool}}) = (1-\alpha)\Big[v - (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta} \leq \delta_{\mathrm{pool}})\mathbb{E}(\tilde{\delta} \mid \tilde{\delta} \leq \delta_{\mathrm{pool}})\Big] - w(2-\theta) \\ + (1-\theta)\left[\bar{\pi} + \gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}})\right] \geq 1. \quad (32) \end{aligned}$$

Fixing $(\alpha, w, \Theta, \pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}})$ to satisfy the conditions of Proposition 3, it is clear that if v is large enough this inequality is satisfied.[15]

[14] One could think of the storage asset as some benchmark portfolio, so that the returns from investing in active management with blockholding are viewed as being *relative* to such an alternative.

[15] An alternative comparison that we could have done is the delegation with pooling vs non-delegated blockholding by a coalition of investors. Here too, since good funds can invest in firms with no agency problems (and do not need to exit) and bad funds will invest in some firm with agency problems, there will be conditions that guarantee the optimality of delegation. However, we would argue that this condition is not economically meaningful as small investors do not meaningfully have the ability to participate directly in blockholding.

9 Conclusions

Blockholders are often seen as a solution to problems arising from the separation of ownership and control in publicly traded corporation. In order for the various elements of blockholder activism to be successful, it may be helpful for blockholders to be able to credibly threaten management by exit. Admati and Pfleiderer (2009) show that the threat of exit can be an effective form of corporate governance when the blockholder is a profit-maximizing principal. Motivated by the prevalence of equity blocks that are held by delegated portfolio managers, we analyze whether agency frictions arising from delegated portfolio management—career concerns—may affect the ability of blockholders to govern through exit.

We show that career concerned block holders cannot use the threat of exit effectively as a governance device. Our results imply that delegated portfolio managers with high-powered contracts (e.g. hedge funds) will use exit effectively, while those with low-powered contracts (e.g. mutual funds) will fail to do so. This is a novel prediction testable in the cross-section of funds. While no systematic attempt has been made to empirically connect money-manager compensation with the effectiveness of exit, some existing empirical results are consistent with our theoretical prediction. In contrast, a significant empirical literature connects the type of asset manager to the effectiveness of blockholder voice. We provide theoretical support for this literature by demonstrating the potential complementarity between exit and voice: The threat of exit determines the effectiveness of voice, implying that only immediately profit-motivated funds will succeed in disciplining management with voice and exit; flow motivated funds are unsuccessful in using either mechanism.

Our analysis examines the interplay of two distinct agency problems: between the managers and equity holders of firms on the one hand, and between delegating investors and their portfolio managers on the other. Both of these problems are ubiquitous. Our results suggest that the two agency problems interact in crucial ways: the existence of the latter may undermine traditional solutions to the former. Needless to say, our analysis represents only a benchmark first step, and much remains to be done. It may be interesting, for example, to examine how the career concerns of delegated portfolio managers interact with Edmans's (2009) elegant formulation of governance via exit. Edmans shows how blockholder trading can impound information into prices giving rise to better governance. In a different context, Dasgupta and Prat (2006, 2008) have examined the link between career concerns of money managers and price-informativeness of assets they trade. The exploration of such interactions is an interesting direction for future research.

10 Appendix

10.1 Omitted Proofs and Derivations

Derivation of equation 12: We show that expected change of the firm when the fund sells is

$$\mathbb{E}\left(\tilde{a}\tilde{\delta}|\ a^{\mathrm{F}}=\mathrm{s}\right)=\mathbb{E}_s(\delta_{\mathrm{sep}})=\frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_{\mathrm{sep}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})}{\theta+(1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})},\tag{33}$$

where

$$\tilde{a}:=s_{\mathrm{M}}(\tilde{\delta})=\begin{cases}0 & \text{if } a=0\\ 1 & \text{if } a=1.\end{cases}\tag{34}$$

We call $\tilde{e}\in\{e,ne\}$ a random variable that is equal to e if the fund picks a stock in a firm with no agency problem and to ne when fund picked a stock in a firm with agency problem and has only access to exit as a disciplining device. We also introduce another random variable $\tilde{l}=\{ls,nls\}$ that indicates whether the fund has been hit by a liquidity shock.

Let's fix the strategy of the fund: she sells if she observes the perverse action or if she is hit by a liquidity shock, and does not sell otherwise. Recall that only the bad fund can observe $a=1$ because the good fund invested in firms with no agency probelms. Hence,

$$s_{\mathrm{F}}(a,\tau^{\mathrm{F}},\tilde{l})=\begin{cases}\mathrm{s} & \text{if } a=1 \text{ and } \tau^{\mathrm{F}}=b \text{ or if } \tilde{l}=ls,\\ \mathrm{ns} & \text{otherwise.}\end{cases}\tag{35}$$

The manager's strategy, which is a best response to the fund's strategy, is

$$s_{\mathrm{M}}(\delta,\tilde{e},\tau^{\mathrm{F}})=\begin{cases}1 & \text{if } \delta\leq\delta_{\mathrm{sep}} \text{ and } \tilde{e}=ne \text{ and } \tau^{\mathrm{F}}=b\\ 0 & \text{otherwise.}\end{cases}\tag{36}$$

Then,

$$\begin{aligned}\mathbb{E}\left(\tilde{a}\tilde{\delta}|a^{\mathrm{F}}=\mathrm{s}\right)&=\mathbb{E}\left[\mathbf{1}_{\{s_{\mathrm{M}}(\tilde{\delta},\tilde{e},\tau^{\mathrm{F}})=1\}}\tilde{\delta}\,|,a^{\mathrm{F}}=\mathrm{s}\right]=\\
&=\frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\mathbf{1}_{\{s_{\mathrm{M}}(\tilde{\delta},\tilde{e},\tau^{\mathrm{F}})=1\}}\mathbf{1}_{\{a^{\mathrm{F}}=\mathrm{s}\}}\tilde{\delta}\right]\\
&=\frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\mathbf{1}_{\left\{\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\}\cap\{\tilde{e}=ne\}\cap\{\tau^{\mathrm{F}}=b\}\right\}\cap\left\{\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\}\cap\{\tau^{\mathrm{F}}=b\}\cup\{\tilde{l}=ls\}\right\}}\tilde{\delta}\right]\\
&=\frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\mathbf{1}_{\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\}}\mathbf{1}_{\{\tau^{\mathrm{F}}=b\}}\mathbf{1}_{\{\tilde{e}=ne\}\cap\{\tilde{l}=ls\}}\tilde{\delta}\right]\\
&=\frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\mathbf{1}_{\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\}}\mathbf{1}_{\{\tau^{\mathrm{F}}=b\}}\mathbf{1}_{\{\tilde{e}=ne\}}\tilde{\delta}\right]\end{aligned}$$

Given independence, we have that

$$\begin{aligned}
\mathbb{E}\left(\tilde{a}\tilde{\delta}|\ a^{\mathrm{F}}=\mathrm{s}\right) &= \frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{P}\left[\tilde{e}=ne\right]\mathbb{P}\left[\tau^{\mathrm{F}}\ =b\right]\mathbb{E}\left[\ \mathbf{1}_{\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\ \}}\tilde{\delta}\right] \\
&= \frac{(1-\gamma_{\mathrm{M}})(1-\gamma_{\mathrm{F}})\mathbb{E}\left[\ \mathbf{1}_{\tilde{\delta}\geq\delta_{\mathrm{sep}}}\ \tilde{\delta}\right]}{\theta+(1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})} \\
&= \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_{\mathrm{sep}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})}{\theta+(1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})}.
\end{aligned}$$

Proof of the uniqueness of the manager's cutoff in the putative disciplining equilibrium: If $\delta_{\mathrm{sep}} < \bar{\delta}$ is a cutoff, then $\beta-\omega_1(1-\theta)(\mathbb{E}_s(\delta_{\mathrm{sep}})-\mathbb{E}_{ns}(\delta_{\mathrm{sep}}))-\omega_2\delta_{\mathrm{sep}}=0$ where

$$\mathbb{E}_s(\delta_{\mathrm{sep}}) = \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_{\mathrm{sep}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})}{\theta+(1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})} \tag{37}$$

and

$$\mathbb{E}_{ns}(\delta_{\mathrm{sep}}) = 0. \tag{38}$$

The cutoff will be unique if $\mathbb{E}_s(\delta_{\mathrm{sep}})-\mathbb{E}_{ns}(\delta_{\mathrm{sep}})$ is increasing in δ_{sep} ; this difference is simply equal to $\mathbb{E}_s(\delta_{\mathrm{sep}})$ which it is easy to see that is increasing in δ_{sep}. In fact,

$$\mathbb{E}_s(\delta_{\mathrm{sep}})-\mathbb{E}_{ns}(\delta_{\mathrm{sep}}) = \mathbb{E}_s(\delta_{\mathrm{sep}}) = \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_{\mathrm{sep}})}{\frac{\theta}{\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})}+(1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})}, \tag{39}$$

is increasing in δ_{sep} since both $\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_{\mathrm{sep}})$ and $\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})$ are increasing in δ_{sep}.

Proof of Proposition 2: The structure of the proof is similar to that of Proposition 1. We sketch the proof here, highlighting only the points of departure from that argument. Consider any putative equilibrium in which the fund's strategy is to sell with probability μ if $a=1$ and not to sell otherwise. The manager's expected utility from $a=0$ remains unchanged (see 8) whereas his utility from $a=1$ changes from (7) to

$$\beta+\omega_1\left\{v-\theta\mathbb{E}_s-(1-\theta)[\mu\mathbb{E}_s+(1-\mu)\mathbb{E}_{ns}]\right\}+\omega_2(v-\delta). \tag{40}$$

As before the manager's strategy will be characterized by a threshold δ_μ which is now implicitly defined by:

$$\delta_\mu = \frac{\beta-\omega_1(1-\theta)\ \mu\ (\mathbb{E}_s(\delta_\mu)-\mathbb{E}_{ns}(\delta_\mu))}{\omega_2}, \tag{41}$$

where

$$\mathbb{E}_s(\delta_\mu) = \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_\mu)\mathbb{P}(\tilde{\delta}\leq\delta_\mu)(\theta+(1-\theta)\mu)}{\theta+\mu(1-\theta)(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta}\leq\delta_\mu)} \tag{42}$$

and

$$\mathbb{E}_{ns}(\delta_\mu) = \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_\mu)\mathbb{P}(\tilde{\delta} \leq \delta_\mu)(1-\mu)}{1-\mu(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta} \leq \delta_\mu)}. \tag{43}$$

The threshold δ_μ is uniquely defined as long as $\mathbb{E}_s(\delta_\mu) - \mathbb{E}_{ns}(\delta_\mu)$ is increasing in δ_μ. This is true as long as μ is not too small as the following lemma shows:

Lemma 6 *There exists a $\hat{\mu} \in (0,1)$ such that for $\mu \geq \hat{\mu}$, $\mathbb{E}_s(\delta_\mu) - \mathbb{E}_{ns}(\delta_\mu)$ is increasing in δ_μ.*

Proof of Lemma: Let $A = (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})$, $E(\delta_\mu) = \mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_\mu)$, and $P(\delta_\mu) = \mathbb{P}(\tilde{\delta} \leq \delta_\mu)$. Note that E and P are both increasing functions of δ_μ. Then,

$$\mathbb{E}_s(\delta_\mu) = \frac{AE(\delta_\mu)(\theta + (1-\theta)\mu)}{\frac{\theta}{P(\delta_\mu)} + \mu(1-\theta)A},$$

which is clearly monotone increasing in δ_μ. Denoting the denominator by D,

$$\frac{\partial}{\partial \delta_\mu}\mathbb{E}_s(\delta_\mu) = \frac{A(\theta + (1-\theta)\mu)}{D^2}\left(\left(\frac{\theta}{P(\delta_\mu)} + \mu(1-\theta)A\right)E' + E(\delta_\mu)\frac{\theta}{P(\delta_\mu)^2}P'\right),$$

which is clearly bounded below by a strictly positive number for all μ. In addition,

$$\mathbb{E}_{ns}(\delta_\mu) = \frac{AE(\delta_\mu)(1-\mu)}{\frac{1}{P(\delta_\mu)} - \mu A},$$

which is clearly also monotone increasing. Again,denoting the denominator by D:

$$\frac{\partial}{\partial \delta_\mu}\mathbb{E}_{ns}(\delta_\mu) = \frac{A(1-\mu)}{D^2}\left(\left(\frac{1}{P(\delta_\mu)} - \mu A\right)E' + E(\delta_\mu)\frac{1}{P(\delta_\mu)^2}P'\right).$$

This implies that $\frac{\partial}{\partial \delta_\mu}\mathbb{E}_{ns}(\delta_\mu)$ converges continuously to 0 as $\mu \to 1$. Thus, there exists a $\hat{\mu} \in (0,1)$ such that for $\mu \geq \hat{\mu}$, $\mathbb{E}_s(\delta_\mu) - \mathbb{E}_{ns}(\delta_\mu)$ is increasing in δ_μ. This concludes the proof of the lemma. $\square$

Consider first the best response of the patient investor at $t = 2$. Define the events E_1, E_2, and E_3 as before, so that at $t = 2$ the investor observes elements of the cross product $\{\mathrm{E}_1, \mathrm{E}_2, \mathrm{E}_3\} \times \{\mathrm{s}, \mathrm{ns}\}$. In contrast to the proof of Proposition 1, now events $(\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns})$, $(\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns})$, $(\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns})$, and $(\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{s})$ can arise in equilibrium, and the posterior attached at $t = 2$ for each of these events is as follows:

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns}) = \frac{\gamma_{\mathrm{F}}}{\gamma_{\mathrm{F}} + (1-\gamma_{\mathrm{F}})\gamma_{\mathrm{M}}} > \gamma_{\mathrm{F}} \tag{44}$$

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns}) = \gamma_{\mathrm{F}}, \tag{45}$$

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns}) = 0 \tag{46}$$

$$\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{s}) = 0. \tag{47}$$

This implies that the investor retains at $t = 2$ in the first two events and replaces at $t = 2$ in the last two events. As before, we make no assumption about the investor's behaviour in the other two events.

At $t = 2$, if the patient investor observes a^{F} =ns, he computes:

$$\mathbb{P}\left(\mathrm{E}_1 \middle| a^{\mathrm{F}} = \mathrm{ns}\right) = \frac{\mathbb{P}\left(\tilde{\delta} \leq \delta_\mu\right)\left(\gamma_{\mathrm{F}} + (1-\gamma_{\mathrm{F}})\gamma_{\mathrm{M}}\right)}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \leq \delta_\mu\right)\mu} \tag{48}$$

$$\mathbb{P}(\mathrm{E}_2|a^{\mathrm{F}} = \mathrm{ns}) = \frac{1-\mathbb{P}\left(\tilde{\delta} \leq \delta_\mu\right)}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \leq \delta_\mu\right)\mu} \tag{49}$$

$$\mathbb{P}(\mathrm{E}_3|a^{\mathrm{F}} = \mathrm{ns}) = \frac{(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})(1-\mu)\mathbb{P}\left(\tilde{\delta} \leq \delta_\mu\right)}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \leq \delta_\mu\right)\mu}. \tag{50}$$

Thus, if the investor observes $a^{\mathrm{F}} = \mathrm{ns}$ and retains the fund at $t = 1$, his expected payoff can be written as:

$$(1-\alpha)(v - \mathbb{E}_{ns}(\delta_\mu)) - 2w + \bar{\pi}^{\mathrm{I}} + \frac{\mathbb{P}(\tilde{\delta} \leq \delta_\mu)\gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{E}})\mathbb{P}(\tilde{\delta} \leq \delta_\mu)\mu}(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}). \tag{51}$$

Instead, if the investor observes $a^{\mathrm{F}} = \mathrm{ns}$ and fires the fund, his expected payoff is:

$$(1-\alpha)P_1 - w + \mathbb{E}\left(\tilde{\pi}^{I}_{\mathrm{F}}\right) = (1-\alpha)(v - \mathbb{E}_s(\delta_\mu)) - w + \bar{\pi}^{\mathrm{I}}. \tag{52}$$

Hence, the investor will choose to retain the fund conditional on no sale if

$$(1-\alpha)(\mathbb{E}_s(\delta_\mu) - \mathbb{E}_{ns}(\delta_\mu)) + \frac{\mathbb{P}(\tilde{\delta} \leq \delta_\mu)\gamma_{\mathrm{F}}(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})}{1-(1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta} \leq \delta_\mu)\mu}(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}) \geq w \tag{53}$$

It is clear that, for a given $\mu \geq \hat{\mu}$ and $\{\alpha, w, \Theta\}$, as long as $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ is large enough, equation (53) holds. It is also clear that the lower bound on $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ is increasing in α, since $\mathbb{E}_s(\delta_\mu) - \mathbb{E}_{ns}(\delta_\mu) > 0$. Let us denote the relevant lower bound on $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ by $B_{\Delta\pi}(\mu)$.

If the investor observes a sale at $t = 1$, an argument identical to that in Proposition 1 establishes that it is optimal for him to fire the fund immediately.

Finally, we turn to the fund's best response. The case for when a fund observes $a = 0$ is identical to that in Proposition 1. When the fund observes $a = 1$,in the putative equilibrium with $\mu \in (0, 1)$ she must be indifferent between selling and not selling at $t = 1$. If she sells her expected payoff is:

$$\alpha P_1 + w = \alpha(v - \mathbb{E}_s(\delta_\mu)) + w \tag{54}$$

whereas if she does not sell and condition (53) holds then she is retained at $t = 1$ and gets:

$$\alpha(v - \mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_\mu)) + 2w \tag{55}$$

Therefore, it must be the case that

$$\alpha(v - \mathbb{E}_s(\delta_\mu)) + w = \alpha(v - \mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_\mu)) + 2w, \tag{56}$$

i.e.

$$\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_\mu)\left[\frac{\theta(1 - \big(1 - \gamma_{\mathrm{F}})(1 - \gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta} \leq \delta_\mu)\big)}{\theta + \mu(1-\theta)(1 - \gamma_{\mathrm{F}})(1 - \gamma_{\mathrm{M}})\mathbb{P}(\tilde{\delta} \leq \delta_\mu)}\right] = \frac{w}{\alpha}. \tag{57}$$

It is clear that fixing Θ and $\mu \geq \hat{\mu}$, we can find a $\frac{\alpha}{w}$ that satisfies equation (57). Let's define $B_{\frac{\alpha}{w}}(\mu)$ as the $\frac{\alpha}{w}$ satisfying the equality above. Let

(i) $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}} > B_{\Delta\pi}(\mu)$

(ii) $\frac{\alpha}{w} < B_{\frac{\alpha}{w}}(\mu)$.

Since $B_{\Delta\pi}(\mu)$ is increasing in α, for α and $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ satisfying (i) and (ii) it is clear that inequality (53) holds and (57) does not, giving a contradiction.[16] ■

Proof of Proposition 3: We construct a perfect Bayesian equilibrium in which the action of the bad fund who observes the perverse action is the same as the action of the fund who observes the non-perverse action.

We denote the equilibrium by a triplet $(s_{\mathrm{M}}, s_{\mathrm{F}}, s_{\mathrm{I}})$ of strategies for the three sets of players.

Let's start with the manager's strategy. The manager's expected utility if he chooses $a = 1$ is

$$\beta + \omega_1\left[v - \theta\mathbb{E}_s - (1-\theta)\mathbb{E}_{ns}\right] + \omega_2(v - \delta). \tag{58}$$

This is because he knows that at time 1 the fund is going to sell only if the investor is hit by a liquidity shock (which happens with probability θ). Similarly, the manager's expected utility if $a = 0$ is

$$\omega_1\left[v - \theta\mathbb{E}_s - (1-\theta)\mathbb{E}_{ns}\right] + \omega_2 v, \tag{59}$$

Hence, the strategic manager's strategy is:

$$s_{\mathrm{M}}(\delta) = \begin{cases} 1 & \text{if } \beta - \omega_2\delta \geq 0 \\ 0 & \text{otherwise.} \end{cases} \tag{60}$$

Since $\beta - \omega_2\delta \geq 0$ is decreasing in δ if the manager prefers to take the perverse action for a given δ, he must strictly prefer to take action for all smaller values. An equilibrium is then

[16] It is, of course, possible to violate equality (57) by picking $\frac{\alpha}{w} > B_{\frac{\alpha}{w}}(\mu)$. However, in this case $\mu = 1$, because the fund strictly prefers selling to not selling. This case has been dealt with already in Proposition 1.

characterised by a cutoff point δ_{pool}, such that the manager takes action for any $\delta \leq \delta_{\text{pool}}$. The cutoff point δ_{pool} is

$$\delta_{\text{pool}} = \frac{\beta}{\omega_2} \tag{61}$$

and is unique. Now, we can compute $\mathbb{E}_s$ and $\mathbb{E}_{ns}$ as functions of δ_{pool} as follows (we show detailed computations separately later in the appendix):

$$\mathbb{E}_s(\delta_{\text{pool}}) = \mathbb{E}_{ns}(\delta_{\text{pool}}) = (1-\gamma_{\text{F}})(1-\gamma_{\text{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\text{pool}})\mathbb{P}(\tilde{\delta} \leq \delta_{\text{pool}}). \tag{62}$$

We now proceed to compute the strategy of the patient investor.

The investor's decision at $t = 1$ relies on what inference he expects to make at $t = 2$. At $t = 2$ the investor will observe one of the following three mutually exclusive and exhaustive events:

$$\text{E}_1 = \{\delta \leq \delta_{\text{pool}}\} \cap \{a = 0\} \tag{63}$$

$$\text{E}_2 = \{\delta > \delta_{\text{pool}}\} \cap \{a = 0\} \tag{64}$$

$$\text{E}_3 = \{a = 1\} \tag{65}$$

In addition, the investor will have observed either $a^{\text{F}} = \text{s}$ or $a^{\text{F}} = \text{ns}$ at $t = 1$. Thus, the investor's information set consists of six possible paired events, which are the elements of

$$\{\text{E}_1, \text{E}_2, \text{E}_3\} \times \{\text{s}, \text{ns}\}.$$

Each of these events conveys different information to the investor and may affect his retention vs firing decision at $t = 2$. We first consider the events that can arise on the putative equilibrium path. These are $(\text{E}_1, a^{\text{F}} = \text{ns})$, $(\text{E}_2, a^{\text{F}} = \text{ns})$, and $(\text{E}_3, a^{\text{F}} = \text{ns})$. For each of these cases, the investor can compute the probability that he is matched with a good fund using Bayes Rule as follows:

$$\mathbb{P}(\tau^{\text{F}} = \text{g}|\text{E}_1, a^{\text{F}} = \text{ns}) = \frac{\gamma_{\text{F}}}{\gamma_{\text{F}} + (1-\gamma_{\text{F}})\gamma_{\text{M}}} > \gamma_{\text{F}} \tag{66}$$

$$\mathbb{P}(\tau^{\text{F}} = \text{g}|\text{E}_2, a^{\text{F}} = \text{ns}) = \gamma_{\text{F}} \tag{67}$$

$$\mathbb{P}(\tau^{\text{F}} = \text{g}|\text{E}_3, a^{\text{F}} = \text{ns}) = 0 \tag{68}$$

Clearly, the investor retains at $t = 2$ in the events $(\text{E}_1, a^{\text{F}} = \text{ns})$ and $(\text{E}_2, a^{\text{F}} = \text{ns})$ and fires at $t = 2$ in the event $(\text{E}_3, a^{\text{F}} = \text{ns})$. For the other three events, which are off-equilibrium, we assign $\mathbb{P}(\tau^{\text{F}} = \text{g}|\text{E}_i, a^{\text{F}} = \text{s}) = 0$ for all i.[17]

[17] It will be clear in the sequel that these off-equilibrium beliefs are consistent with the $t = 1$ off-equilibrium belief that $\mathbb{P}(\tau^{\text{F}} = \text{g}|a^{\text{F}} = \text{s}) = 0$.

Turning to $t=1$, if the investor observes $a^{\mathrm{F}} = \mathrm{ns}$ he computes $\mathbb{P}\left(\mathrm{E}_1 \middle| a^{\mathrm{F}} = \mathrm{ns}\right), \mathbb{P}(\mathrm{E}_2|a^{\mathrm{F}} = \mathrm{ns})$ and $\mathbb{P}(\mathrm{E}_3|a^{\mathrm{F}} = \mathrm{ns})$ as follows:

$$\mathbb{P}\left(\mathrm{E}_1 \middle| a^{\mathrm{F}} = \mathrm{ns}\right) = (\gamma_{\mathrm{F}} + (1-\gamma_{\mathrm{F}})\gamma_{\mathrm{M}})\, \mathbb{P}\left(\tilde{\delta} \le \delta_{\mathrm{pool}}\right) \tag{69}$$

$$\mathbb{P}(\mathrm{E}_2|a^{\mathrm{F}} = \mathrm{ns}) = 1 - \mathbb{P}\left(\tilde{\delta} \le \delta_{\mathrm{pool}}\right) \tag{70}$$

$$\mathbb{P}(\mathrm{E}_3|a^{\mathrm{F}} = \mathrm{ns}) = (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \le \delta_{\mathrm{pool}}\right). \tag{71}$$

In this equilibrium observing the fund not selling does not convey any information.

Hence, if the investor observes observes $a^{\mathrm{F}} = \mathrm{ns}$, by retaining the fund he gets

$$(1-\alpha)\mathbb{E}\left(P_2 \mid a^{\mathrm{F}} = \mathrm{ns}\right) - 2w + \mathbb{E}\left(\tilde{\pi}^{\mathrm{I}} \middle| a^{\mathrm{F}} = \mathrm{ns}\right) \tag{72}$$

where

$$\begin{aligned}
&\mathbb{E}\left(\tilde{\pi}^{\mathrm{I}} \middle| a^{\mathrm{F}} = \mathrm{ns}\right) = \\
&\quad \mathbb{P}\left(\mathrm{E}_1 \middle| a^{\mathrm{F}} = \mathrm{ns}\right)\left[\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns})\pi^{\mathrm{I}}_{\mathrm{g}} + (1-\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_1, a^{\mathrm{F}} = \mathrm{ns}))\pi^{\mathrm{I}}_{\mathrm{b}}\right] + \\
&\quad \mathbb{P}(\mathrm{E}_2|a^{\mathrm{F}} = \mathrm{ns})\left[\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns})\pi^{\mathrm{I}}_{\mathrm{g}} + (1-\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_2, a^{\mathrm{F}} = \mathrm{ns}))\pi^{\mathrm{I}}_{\mathrm{b}})\right] + \\
&\quad \mathbb{P}(\mathrm{E}_3|a^{\mathrm{F}} = \mathrm{ns})\left[\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns})\pi^{\mathrm{I}}_{\mathrm{g}} + (1-\mathbb{P}(\tau^{\mathrm{F}} = \mathrm{g}|\mathrm{E}_3, a^{\mathrm{F}} = \mathrm{ns}))\pi^{\mathrm{I}}_{\mathrm{b}}\right].
\end{aligned} \tag{73}$$

Simplifying we have that if the investor observes $a^{\mathrm{F}} = \mathrm{ns}$ and retains at $t=1$ his expected payoff is

$$(1-\alpha)(v - \mathbb{E}_{ns}(\delta_{\mathrm{pool}})) - 2w + \bar{\pi}^{\mathrm{I}} + \gamma_{\mathrm{F}}\ (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \le \delta_{\mathrm{pool}}\right)(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}). \tag{74}$$

If at $t=1$ he observes $a^{\mathrm{F}} = \mathrm{ns}$ and fires the fund his expected payoff is

$$(1-\alpha)P_1 - w + \mathbb{E}(\tilde{\pi}^{\mathrm{I}}) = (1-\alpha)(v - \mathbb{E}_s(\delta_{\mathrm{pool}})) - w + \bar{\pi}^{\mathrm{I}}. \tag{75}$$

The investor would rather retain the fund when she does not sell if:

$$\begin{aligned}
(1-\alpha)(v - \mathbb{E}_{ns}(\delta_{\mathrm{pool}})) - 2w + \bar{\pi}^{I} + \gamma_{\mathrm{F}}\ (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \le \delta_{\mathrm{pool}}\right)(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}) \ge \\
(1-\alpha)(v - \mathbb{E}_s(\delta_{\mathrm{pool}})) - w + \bar{\pi}^{\mathrm{I}}
\end{aligned} \tag{76}$$

i.e.,

$$\gamma_{\mathrm{F}}\ (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{P}\left(\tilde{\delta} \le \delta_{\mathrm{pool}}\right)(\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{I}_{\mathrm{b}}) \ge w \tag{77}$$

For a given Θ and w, for $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ large enough, the investor would retain the fund if she does not sell. Let us denote the relevant lower bound on $\pi^{\mathrm{I}}_{\mathrm{g}} - \pi^{\mathrm{I}}_{\mathrm{b}}$ as $B_{\Delta\pi}(w, \Theta)$ which is independent of α.

Now, let's suppose that the fund sells at $t=1$. This is an off-equilibrium action for the fund and we assign investor's beliefs to be $\mathbb{P}(\tau^{\mathrm{F}}=\mathrm{g}|a^{\mathrm{F}}=\mathrm{s})=0$[18]. Hence, he computes

$$\mathbb{P}(\mathrm{E}_1|a^{\mathrm{F}}=\mathrm{s})=\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})\gamma_{\mathrm{M}} \tag{78}$$
$$\mathbb{P}(\mathrm{E}_2|a^{\mathrm{F}}=\mathrm{s})=(1-\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})) \tag{79}$$
$$\mathbb{P}(\mathrm{E}_3|a^{\mathrm{F}}=\mathrm{s})=\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{sep}})(1-\gamma_{\mathrm{M}}). \tag{80}$$

We know from the above that in each of these events, the fund will be replaced at $t=2$.

If the investor observes $a^{\mathrm{F}}=\mathrm{s}$ and fires the fund he gets

$$(1-\alpha)P_1-w+\mathbb{E}(\tilde{\pi}^{\mathrm{I}})=(1-\alpha)(v-\mathbb{E}_s(\delta_{\mathrm{pool}}))-w+\bar{\pi}^{\mathrm{I}},$$

whereas if he retains the fund his expected payoff is:

$$(1-\alpha)\mathbb{E}\left(P_2\mid a^{\mathrm{F}}=\mathrm{s}\right)-2w+\mathbb{E}\left(\tilde{\pi}^{\mathrm{I}}\;\middle|\;a^{\mathrm{F}}=\mathrm{s}\right)=(1-\alpha)(v-\mathbb{E}_s(\delta_{\mathrm{pool}}))-2w+\bar{\pi}^{\mathrm{I}},$$

Therefore, the investor will always fire the fund. Thus, for $\pi^{\mathrm{I}}_{\mathrm{g}}-\pi^{\mathrm{I}}_{\mathrm{b}}$ large enough, the investor's strategy is

$$s_{\mathrm{I}}(a^{\mathrm{F}})=\begin{cases}\mathrm{r} & \text{if } a^{\mathrm{F}}=\mathrm{ns}\\ \mathrm{f} & \text{if } a^{\mathrm{F}}=\mathrm{s}.\end{cases} \tag{81}$$

It remains for us to show that the fund will choose not to sell regardless of whether she observes $a=0$ or $a=1$.

If the fund observes $a=0$ and chooses to hold, she is retained by the investor and thus receives

$$2w+\alpha\mathbb{E}\left(P_2\mid a=0\right)+\mathbb{P}(\text{retained in } t=2)\pi^{\mathrm{F}}=2w+\alpha v+\pi^{\mathrm{F}}$$

If, instead, she sells, she is fired by the investor and thus receives

$$w+P_1=w+\alpha\left(v-\mathbb{E}_s(\delta_{\mathrm{pool}})\right).$$

Clearly, she will choose to hold.

If, on the other hand, the fund observes $a=1$ and chooses to hold, she is retained by the investor at $t=1$ but fired at $t=2$ and thus receives

$$2w+\alpha\left(v-\mathbb{E}\left(\tilde{\delta}\mid\tilde{\delta}\leq\delta_{\mathrm{pool}}\right)\right)+\mathbb{P}(\text{retained at } t=2)\pi^{\mathrm{F}}=2w+\alpha\left(v-\mathbb{E}\left(\tilde{\delta}\mid\tilde{\delta}\leq\delta_{\mathrm{pool}}\right)\right).$$

Instead, if she chooses to sell, she is fired by the investor and thus receives

$$w+\alpha\left(v-\mathbb{E}_s\left(\delta_{\mathrm{pool}}\right)\right).$$

[18] Our selected belief is consistent with a natural perturbation of the model in which a small measure $\epsilon>0$ of funds act naively: i.e., sell whenever they observe $a=1$.

Thus the fund will prefer not to sell upon observing $a = 1$ if

$$w + \alpha(v - \mathbb{E}_s(\delta_{\text{pool}})) \leq 2w + \alpha\left(v - \mathbb{E}\left(\tilde{\delta} \mid \tilde{\delta} \leq \delta_{\text{pool}}\right)\right), \tag{82}$$

which can be rewritten as:

$$\mathbb{E}\left(\tilde{\delta} \mid \tilde{\delta} \leq \delta_{\text{pool}}\right)\left(1 - (1-\gamma_{\text{F}})(1-\gamma_{\text{M}})\mathbb{P}\left(\tilde{\delta} \leq \delta_{\text{pool}}\right)\right) \leq \frac{w}{\alpha}. \tag{83}$$

Clearly for a given Θ as $\frac{\alpha}{w}$ gets small, the inequality holds and the fund does not sell even when she observes $a = 1$. Let $B_{\frac{\alpha}{w}}(\Theta)$ be the largest $\frac{\alpha}{w}$ satisfying inequality (83). Let

1. $\pi^{\text{I}}_{\text{g}} - \pi^{\text{I}}_{\text{b}} > B_{\Delta\pi}(w, \Theta)$
2. $\frac{\alpha}{w} < B_{\frac{\alpha}{w}}(\Theta)$.

Both inequalities (77) and (83) are satisfied. This concludes the formal argument.■

Derivation of equation 62. Using the definitions provided when deriving equation 12 we show that

$$\mathbb{E}(\tilde{a}\tilde{\delta} \mid a^{\text{F}} = \text{s}) = \mathbb{E}_s(\delta_{\text{pool}}) = (1-\gamma_{\text{F}})(1-\gamma_{\text{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\text{pool}})\mathbb{P}(\tilde{\delta} \leq \delta_{\text{pool}}) \tag{84}$$

In the equilibrium with minimal exit the strategy of the fund is

$$s_{\text{F}}(\tilde{l}) = \begin{cases} \text{s} & \text{if } \tilde{l} = ls, \\ \text{ns} & \text{otherwise} \end{cases} \tag{85}$$

and the strategy of the manager is

$$s_{\text{M}}(\delta, \tilde{e}, \tau^{\text{F}}) = \begin{cases} 1 & \text{if } \delta \leq \delta_{\text{pool}} \text{ and } \tilde{e} = ne \text{ and } \tau^{\text{F}} = b \\ 0 & \text{otherwise.} \end{cases} \tag{86}$$

Then,

$$\begin{aligned}
\mathbb{E}\left(\tilde{a}\tilde{\delta}|\ a^{\mathrm{F}}=\mathrm{s}\right) &= \mathbb{E}\left[\ \mathbf{1}_{\left\{s_{\mathrm{M}}\ \left(\tilde{\delta},\tilde{e},\tau^{\mathrm{F}}\ \right)=1\right\}}\tilde{\delta}\,\middle|\,a^{\mathrm{F}}=\mathrm{s}\right]= \\
&= \frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\ \mathbf{1}_{\left\{s_{\mathrm{M}}\ \left(\tilde{\delta},\tilde{e},\tau^{\mathrm{F}}\ \right)=1\right\}}\ \mathbf{1}_{\left\{a^{\mathrm{F}}=\mathrm{s}\right\}}\tilde{\delta}\right] \\
&= \frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\ \mathbf{1}_{\left\{\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\ \}\cap\{\tilde{e}=ne\}\cap\{\tau^{\mathrm{F}}\ =b\}\right\}\cap\ \left\{\{\tilde{l}=ls\}\right\}}\tilde{\delta}\right] \\
&= \frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\ \mathbf{1}_{\left\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\ \right\}}\cdot\ \mathbf{1}_{\{\tilde{e}=ne\}}\cdot\ \mathbf{1}_{\{\tau^{\mathrm{F}}\ =b\}}\cap\{\tilde{l}=ls\}\tilde{\delta}\right] \\
&= \frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{E}\left[\ \mathbf{1}_{\left\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\ \right\}}\cdot\ \mathbf{1}_{\{\tilde{e}=ne\}}\cdot\ \mathbf{1}_{\{\tau^{\mathrm{F}}\ =b\}}\cdot\ \mathbf{1}_{\left\{\tilde{l}=ls\right\}}\tilde{\delta}\right] \\
&= \frac{1}{\mathbb{P}\left(a^{\mathrm{F}}=\mathrm{s}\right)}\mathbb{P}\left[\tilde{e}=ne\right]\mathbb{P}\left[\tau^{\mathrm{F}}\ =b\right]\mathbb{P}\left[\tilde{l}=ls\right]\mathbb{E}\left[\ \mathbf{1}_{\left\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\ \right\}}\tilde{\delta}\right] \\
&= \frac{1}{\theta}\left(1-\gamma_{\mathrm{M}}\right)\left(1-\gamma_{\mathrm{F}}\right)\theta\ \mathbb{E}\left[\ \mathbf{1}_{\left\{\tilde{\delta}\leq\delta_{\mathrm{sep}}\ \right\}}\tilde{\delta}\right] \\
&= (1-\gamma_{\mathrm{F}})(1-\gamma_{\mathrm{M}})\mathbb{E}(\tilde{\delta}|\tilde{\delta}\leq\delta_{\mathrm{pool}})\mathbb{P}(\tilde{\delta}\leq\delta_{\mathrm{pool}}).
\end{aligned}$$

Proof of Proposition 4: Referring to the proof of Proposition 1, recall that $\underline{\alpha}(w,\Theta)=wB_{\frac{\alpha}{w}}(\Theta)$ is the lowest α that satisfies inequality (31). Choose a particular $\alpha>\underline{\alpha}(w,\Theta)$ and then choose $\pi_{\mathrm{g}}^{\mathrm{I}}-\pi_{\mathrm{b}}^{\mathrm{I}}>B_{\Delta\pi}(\alpha,w,\Theta)$. Now it is clear that both (23) and (31) hold, completing the construction of the equilibrium.■

Proof of Proposition 5: Consider the high $\frac{\alpha}{w}$ fund. We consider a pre-game to the exit game analyzed in Proposition 4 above. The structure of the game is as follows. If voice is not used by the fund, then we enter the usual exit game analyzed above. If voice is used, and if the manager accepts the shareholder proposal and chooses $a=0$, the game ends with the normal contractual payment for $a=0$ to the manager augmented by the extra reward of R embodied in the fund's proposal. If the manager ignores voice and chooses $a=1$ again the usual exit game begins. Since the conditions of Proposition 4 are satisfied, we know the continuation equilibrium in the exit game: conditional on $a=1$, the fund exits and payoffs are as outlined in the baseline model. In the pre-game, the following strategies constitute an equilibrium.

The fund's strategy is as follows. If $\delta<\delta_{\mathrm{sep}}$ use voice; otherwise do not use voice. The manager knows δ and his strategy is as follows: If $\delta\in\left(\delta_{\mathrm{sep}}-\frac{R}{\omega_2},\delta_{\mathrm{sep}}\right)$ accept voice and choose $a = 0$. If $\delta < \delta_{\text{sep}} - \frac{R}{\omega_2}$ ignore voice and choose $a = 1$. If $\delta \geq \delta_{\text{sep}}$ choose $a = 0$. We check that these form an equilibrium.

Check the manager's strategy first. If $\delta \geq \delta_{\text{sep}}$ voice is not used and thus the manager is in the baseline exit game, in which we know he chooses $a = 0$ for $\delta \geq \delta_{\text{sep}}$.[19] If $\delta < \delta_{\text{sep}}$ the manager is faced with the option to accept or reject the fund's proposal. If he accepts the fund's proposal he has to choose $a = 0$ and gets

$$\omega_1 \left(\theta P_s + (1-\theta) P_{ns}\right) + \omega_2 v + R,$$

where P_s and P_{ns} are the $t = 1$ equity prices, which depend on whether the fund sells or not. Recall that with probability θ the fund will be hit by a liquidity shock and will be forced to sell, even though the manager has not taken the perverse action.

If the manager ignores the proposal and chooses $a = 1$ then he gets

$$\omega_1 P_s + \omega_2 (v - \delta) + \beta.$$

Obviously, the manager would never choose to ignore the proposal and still choose $a = 0$ since then he gets at most $\omega_1 \left(\theta P_s + (1-\theta) P_{ns}\right) + \omega_2 v$ which means that he forgoes R.

Thus, the manager will choose to accept the proposal and thus pick $a = 0$ if and only if

$$\omega_1 \left(\theta P_s + (1-\theta) P_{ns}\right) + \omega_2 v + R \geq \omega_1 P_s + \omega_2 (v - \delta) + \beta$$

$$\text{i.e. if } \delta \geq \delta_{\text{sep}} - \frac{R}{\omega_2} \tag{87}$$

This completes the check of the manager's equilibrium strategy.

We now check the fund's strategy. Since the manager chooses $a = 0$ anyway whenever $\delta \geq \delta_{\text{sep}}$, there is no use for costly voice in such cases. For $\delta < \delta_{\text{sep}}$, if no voice is used, the manager chooses $a = 1$ and the fund exits, is fired, and earns $w + \alpha P_s$. If, on the other hand voice is used, then the fund gets $2w + \alpha v - e$ if $\delta \geq \delta_{\text{sep}} - \frac{R}{\omega_2}$ and $w + \alpha P_s - e$ if $\delta < \delta_{\text{sep}} - \frac{R}{\omega_2}$. So, the fund loses by using voice in cases where $\delta < \delta_{\text{sep}} - \frac{R}{\omega_2}$ and gains by using voice in cases where $\delta \geq \delta_{\text{sep}} - \frac{R}{\omega_2}$. Since the losses are on the order of e, and the gains are not, and e can be as small as desired, there exists an e small enough that the fund always uses voice whenever $\delta < \delta_{\text{sep}}$. This completes the proof for the case of high $\frac{\alpha}{w}$.

To show that sufficiently low $\frac{\alpha}{w}$ funds will not successfully use voice for $\delta \in \left(\delta_{\text{sep}} - \frac{R}{\omega_2}, \delta_{\text{sep}}\right)$, it suffices to show that voice will not be used for $\delta < \delta_{\text{sep}}$ for $\alpha \to 0$. First, it is clear from our analysis to date that for $\alpha \to 0$ the fund will not exit conditional on $a = 1$ being chosen.[20]

[19] Implicitly, we are imposing an off-equilibrium belief that if the fund sees that $\delta \geq \delta_{\text{sep}}$ but the manager still chooses $a = 1$, she still exits.

[20] Note that the fund's information set is slightly different here, since she knows at the point of choosing whether to exit or not whether $\delta < \delta_{\text{sep}}$ or not. However, for sufficiently low α this additional information will not change the fund's exit strategy.

Now, suppose that the low $\frac{\alpha}{w}$ fund uses voice for $\delta < \delta_{\text{sep}}$. Then, if the manager accepts he gets

$$\omega_1 (\theta P_s + (1-\theta) P_{ns}) + \omega_2 v + R,$$

while if he rejects and chooses $a = 1$ (since the fund does not exit) he gets

$$\omega_1 (\theta P_s + (1-\theta) P_{ns}) + \omega_2 (v - \delta) + \beta.$$

Rejecting is better than accepting whenever $R < \beta - \omega_2 \delta$. Since by assumption $R < \beta - \omega_2 \delta_{\text{sep}}$, $R < \beta - \omega_2 \delta$ for all $\delta < \delta_{\text{sep}}$. Thus, the manager always rationally ignores fund's voice, knowing that exit will not occur if voice is ignored. Now, as $\alpha \to 0$, by using voice the fund gets $2w - e$ while by not using voice the fund gets $2w$. Thus the fund does not use voice.■

10.2 When good types can only stochastically discern managerial misbheaviour

In the baseline analysis we set $\gamma_{\text{M}}^{G} = 1$, and denoted γ_{M}^{B} by γ_{M}. The general case in which $\gamma_{\text{M}}^{G} \in (0, 1]$ and $\gamma_{\text{M}}^{B} \in \left(0, \gamma_{\text{M}}^{G}\right)$ is conceptually identical and generates the same qualitative results. The core reason is that, as in the baseline case in Section 5, the observation of exit indicates that the fund was unable to pick stocks free of agency problems and is evidence of weak ability. With $\gamma_{\text{M}}^{G} = 1$, exit at $t = 1$ implied that the fund was bad for sure. Instead, in the general case in which $\gamma_{\text{M}}^{G} \in (0, 1]$ and $\gamma_{\text{M}}^{B} \in \left(0, \gamma_{\text{M}}^{G}\right)$, exit at $t = 1$ simply implies that it is more likely that the fund is bad. It is, however, still never in the investor's interest to retain the fund at $t = 1$ conditional on an exit. This is because, conditional on exit (which, in equilibrium, implies that $a = 1$) the investor will gain no further positive information about the fund at $t = 2$. Thus, it is not worth retaining the fund and paying w for an extra period. Formally, with $\gamma_{\text{M}}^{G} \in (0, 1]$ and $\gamma_{\text{M}}^{B} \in \left(0, \gamma_{\text{M}}^{G}\right)$, (17c) will be replaced by

$$\mathbb{P}(\tau^{\text{F}} = \text{g} | \text{E}_3, a^{\text{F}} = \text{s}) = \frac{\gamma_{\text{F}} \ (1 - \gamma_{\text{M}}{}^{\text{G}})}{\gamma_{\text{F}} \ (1 - \gamma_{\text{M}}{}^{\text{G}}) + (1 - \gamma_{\text{F}})(1 - \gamma_{\text{M}}^{\text{B}})} < \gamma_{\text{F}}.$$

However, equation (18c) will remain unchanged. Thus, it remains the case that the fund is fired conditional on exit. Thus, in qualitative terms, the critical aspect—funds' incentives—which drives our main result does not change. Needless to say, the quantitative bounds are modified. For completeness, we present them here. The two bounds in the baseline analysis are generated by (23) and (31). In this more general case (23) is replaced by

$$(1-\alpha)\mathbb{E}_s(\delta_{\text{sep}}) + \frac{\mathbb{P}(\tilde{\delta} \leq \delta_{\text{sep}})\gamma_{\text{F}}(1-\gamma_{\text{F}})(\gamma_{\text{M}}^{\text{G}} - \gamma_{\text{M}}^{\text{B}})}{1 - \left[\gamma_{\text{F}} \ (1-\gamma_{\text{M}}^{\text{G}}) + (1-\gamma_{\text{F}})(1-\gamma_{\text{M}}^{\text{B}} \ )\right] \mathbb{P}(\tilde{\delta} \leq \delta_{\text{sep}} \ )} (\pi_{\text{g}}^{\text{I}} - \pi_{\text{b}}^{\text{I}}) \geq w,$$

while inequality (31) is replaced by

$$\mathbb{E}(\tilde{\delta}|\tilde{\delta} \leq \delta_{\text{sep}}) \left[1 - \frac{\left[\gamma_{\text{F}}(1-\gamma_{\text{M}}^{\text{G}}) + (1-\gamma_{\text{F}})(1-\gamma_{\text{M}}^{\text{B}}))\right] \mathbb{P}(\tilde{\delta} \leq \delta_{\text{sep}})}{\theta + (1-\theta)\left[\gamma_{\text{F}}(1-\gamma_{\text{M}}^{\text{G}}) + (1-\gamma_{\text{F}})(1-\gamma_{\text{M}}^{\text{B}})\right] \mathbb{P}(\tilde{\delta} \leq \delta_{\text{sep}})}\right] \geq \frac{w}{\alpha}.$$

10.3 A Different Formulation of Managerial Ability

The purpose of this model is to show that allowing for exit as a positive signal of ability (which can arise if blockholders differ in their ability to obtain information about the perverse actions of the manager once the block is acquired) does not eliminate our core result that the career concerns of blockholders will get in the way of discipline via exit. In particular, we show below that it is precisely for firms in which the moral hazard problem is most severe—and thus discipline is most necessary—that (i) exit will be viewed as a positive signal of ability and (ii) simultaneously, career concerned blockholders will engage in excessive exit, reducing the disciplining effect of exit.

Consider the following model of delegated blockholding. Firms are indexed by i. In each firm i there is a manager and a blockholder. Time runs over two periods $t = 1, 2$. At $t = 1$, the manager can take action $a = 0$ or $a = 1$, where 1 is the perverse action as before. The manager's payoff is proportionate to the $t = 1$ share price. For any i, firm value v is $\bar{v}$ if $a = 0$ and $\underline{v}$ if $a = 1$, with $\bar{v} > \underline{v}$. The manager faces a moral hazard problem: if he takes action $a = 0$ he sacrifices a private benefit β, where β is distributed according to CDF $f_i(\beta)$. Only the manager knows β. The market has the prior belief $f_i(\beta)$.

For any two firms i and j, the the moral hazard problem will be greater in i than in j if f_i first order stochastically dominates f_j. We loosely refer to firms with greater moral hazard problems as firms with "high" f_i.

For any firm i, at $t = 1$, the blockholder observes the manager's action with noise. The type of the blockholder determines the precision of this information. In particular, he observes a signal ν, with type dependent precision: $\Pr(\tilde{\nu} = \underline{\nu}|\tilde{v} = \underline{v}) = \Pr(\tilde{\nu} = \bar{\nu}|\tilde{v} = \bar{v}) = \sigma_\tau$ for $\tau \in \{g, b\}$, where $\sigma_g > \sigma_b > \frac{1}{2}$. Blockholders do not know their type. The measure of type g blockholders is $\pi_g > 0$. Upon observing the signal, the blockholder has the choice to sell the block at $t = 1$ ($a_{\text{F}} = s$) or to hold until $t = 2$ ($a_{\text{F}} = ns$). At $t = 1$, there is noise in the market, so that the blockholder may be mistaken with positive probability for a noise trader who trades without information. At $t = 2$ all information becomes public. The blockholder is a delegated fund manager whose action, as well as the final firm value v, are observed by a principal, who can make Bayesian inferences $\Pr(\tau = g|a_{\text{F}}, v)$. Denote by P_s and P_{ns} the firm's equity price at $t = 1$ corresponding to the actions of the blockholder and by P_2 the full-information price at $t = 2$. The blockholder's payoff is given by

$$\alpha \left(I(a_{\text{F}} = s)P_s + I(a_{\text{F}} = ns)P_2\right) + (1-\alpha)\Pr(\tau = g|a_{\text{F}}, v),$$

where $I(\cdot)$ is the indicator function which is 1 if the argument is true and 0 otherwise. Thus, α measures the weight placed on profits by the blockholder while $1-\alpha$ measures the weight placed on career concerns.

What is the first best from the perspective of corporate governance? Since $\sigma_g > \sigma_b > \frac{1}{2}$, the information of blockholding funds is correct on average, hence the highest average discipline (which minimizes the incidence of $a = 1$ by the manager) is for the blockholder to sell if and only if $\tilde{\nu} = \underline{\nu}$. We refer to this as the first-best. We first show that if $\alpha = 1$, the first-best is an equilibrium irrespective of $f_i(\cdot)$. We then show that, for any $\alpha < 1$, for sufficiently high f_i, the first best is not an equilibrium.

Remark 7 *For $\alpha = 1$, the first-best is an equilibrium irrespective of $f_i(\cdot)$.*

Note that $P_s \in (E(\tilde{v}|\tilde{\nu} = \underline{\nu}), E(\tilde{v}|\tilde{\nu} = \bar{\nu}))$ because of the noise in the market. If the blockholder observes $\tilde{\nu} = \bar{\nu}$, then his payoff from selling—P_s—is lower than his payoff from not selling—$E(\tilde{v}|\tilde{\nu} = \bar{\nu})$—and he is better off not selling. If the blockholder observes $\tilde{\nu} = \underline{\nu}$, the opposite is true: his payoff from selling—P_s—is higher than his payoff from not selling—$E(\tilde{v}|\tilde{\nu} = \underline{\nu})$—and he is better off selling.

Remark 8 *For any $\alpha < 1$, for sufficiently high f_i, the first best is not an equilibrium, and there is excessive exit.*

Suppose the first best is an equilibrium. Consider the manager's incentives in an arbitrarily chosen firm i. If the manager chooses $a = 0$, he receives

$$(\pi_g\sigma_g + (1-\pi_g)\,\sigma_b)\,P_{ns} + (\pi_g\,(1-\sigma_g) + (1-\pi_g)\,(1-\sigma_b))\,P_s;$$

if he chooses $a = 1$ he receives

$$(\pi_g\sigma_g + (1-\pi_g)\,\sigma_b)\,P_s + (\pi_g\,(1-\sigma_g) + (1-\pi_g)\,(1-\sigma_b))\,P_{ns} + \beta.$$

Thus, he chooses $a = 0$ if and only if

$$\beta < \beta_{FB} \equiv (\pi_g\sigma_g + (1-\pi_\tau)\,\sigma_b) - (\pi_g\,(1-\sigma_g) + (1-\pi_g)\,(1-\sigma_b))\,(P_{ns} - P_s)\,.$$

Note that $\beta_{FB} > 0$ since $P_{ns} > P_s$ and $\sigma_g > \sigma_b > \frac{1}{2}$. Let $\pi_v = \Pr(a = 0) = \Pr(\tilde{v} = \bar{v}) = f_i(\beta_{FB})$. High f_i corresponds to low π_v.

Now consider a blockholder who has observed signal $\nu = \bar{\nu}$. His payoff from not selling is

$$\begin{aligned}&\alpha E(\tilde{v}|\nu = \bar{\nu}) + (1-\alpha)\,E(\Pr(\tau = g|ns, \tilde{v})|\nu = \bar{\nu}) = \\ &\alpha E(\tilde{v}|\nu = \bar{\nu}) + (1-\alpha)[\Pr(\tilde{v} = \bar{v}|\tilde{\nu} = \bar{\nu})\Pr(\tau = g|\bar{\nu}, \bar{v}) + \Pr(\tilde{v} = \underline{v}|\tilde{\nu} = \bar{\nu})\Pr(\tau = g|\bar{\nu}, \underline{v})].\end{aligned} \quad (88)$$

His payoff from selling is

$$\alpha P_s + (1-\alpha)\,E(\Pr(\tau = g|s,\tilde{v})|\tilde{\nu} = \bar{\nu}) =$$
$$\alpha P_s + (1-\alpha)\left[\Pr(\tilde{v} = \bar{v}|\tilde{\nu} = \bar{\nu})\Pr(\tau = g|\underline{\nu},\bar{v}) + \Pr(v = \underline{v}|\tilde{\nu} = \bar{\nu})\Pr(\tau = g|\underline{\nu},\underline{v})\right] \quad (89)$$

Remarks:

1. $E(\tilde{v}|\nu = \bar{\nu}) > P_s$, but as $\pi_v \to 0, E(\tilde{v}|\nu = \bar{\nu}) - P_s \to 0$.

2. $\Pr(\tau = g|\bar{\nu},\bar{v}) > \Pr(\tau = g|\underline{\nu},\bar{v})$ and $\Pr(\tau = g|\bar{\nu},\underline{v}) < \Pr(\tau = g|\underline{\nu},\underline{v})$.

3. As $\pi_v \to 0$ $\Pr(v = \bar{v}|\tilde{\nu} = \bar{\nu}) \to 0$ and $\Pr(v = \underline{v}|\tilde{\nu} = \bar{\nu}) \to 1$.

Thus, combining these three remarks, we have that, fixing α, there exists a $\underline{\pi_v} \in (0,1)$ such that if $\pi_v < \underline{\pi_v}$, the blockholder will prefer to sell instead of not sell. Thus, the first best is not an equilibrium, because there will be excessive exit.

It is clear that $\underline{\pi_v}$ is decreasing in α, so more career concerned blockholders will engage in more excessive exit.

References

Admati, A. R., P. Pfleiderer, and J. Zechner, 1994, "Large Shareholder Activism, Risk Sharing, and Financial Market Equilibrium," *Journal of Political Economy*, 102(6), 1097–1130.

Admati, A. R., and P. C. Pfleiderer, 2009, "The "Wall Street Walk" and Shareholder Activism: Exit as a Form of Voice," *Review of Financial Studies*, 22(7), 2245–2285.

Agarwal, V., N. D. Daniel, and N. Y. Naik, 2009, "Role of Managerial Incentives and Discretion in Hedge Fund Performance," *Journal of Finance*, 64(5), 2221–2256.

Barber, B. M., 2007, "Monitoring the Monitor: Evaluating CalPERS' Activism," *Journal of Investing*, pp. 66–80.

Becht, M., J. R. Franks, and J. Grant, 2010, "Hedge Fund Activism in Europe," *SSRN eLibrary, http://ssrn.com/paper=1616340.*

Bolton, P., and E.-L. von Thadden, 1998, "Blocks, Liquidity, and Corporate Control," *Journal of Finance*, 53(1), 1–25.

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

Brown, K. C., W. V. Harlow, and L. T. Starks, 1996, "Of Tournaments and Temptations: An Analysis of Managerial Incentives in the Mutual Fund Industry," *Journal of Finance*, 51(1), 85–110.

Burkart, M., D. Gromb, and F. Panunzi, 1997, "Large Shareholders, Monitoring, and the Value of the Firm," *The Quarterly Journal of Economics*, 112(3), 693–728.

Chevalier, J., and G. Ellison, 1997, "Risk Taking by Mutual Funds as a Response to Incentives," *Journal of Political Economy*, 105(6), 1167–1200.

——— , 1999, "Career Concerns of Mutual Fund Managers," *Quarterly Journal of Economics*, 114(2), 389–432.

Clifford, C. P., and L. A. Lindsey, 2011, "Blockholder Compensation, Activism, and Efficacy," *SSRN eLibrary, http://ssrn.com/paper=1644995.*

Dasgupta, A., and A. Prat, 2006, "Financial equilibrium with Career Concerns," *Theoretical Economics*, 1(1), 67–93.

Dasgupta, A., and A. Prat, 2008, "Information Aggregation in Financial Markets with Career Concerns," *Journal of Economic Theory*, 143(1), 83–113.

Dasgupta, A., A. Prat, and M. Verardo, 2011a, "Institutional Trade Persistence and Long-term Equity Returns," *Journal of Finance*, 66(2), 635–653.

——— , 2011b, "The Price Impact of Institutional Herding," *Review of Financial Studies*, 24(3), 892–925.

Dasgupta, A., and K. E. Zachariadis, 2010, "Delegated Activism and Disclosure," *SSRN eLibrary, http://ssrn.com/paper=1652148.*

Dass, N., M. Massa, and R. Patgiri, 2008, "Mutual Funds and Bubbles: The Surprising Role of Contractual Incentives," *The Review of Financial Studies*, 21(1), 51–99.

Davis, G. F., and E. H. Kim, 2007, "Business Ties and Proxy Voting by Mutual Funds," *Journal of Financial Economics*, 85(2), 552–570.

Davis, G. F., and M. Yoo, 2003, "Le Mond Toujours Plus Petite des Grandes Entreprises AmŐricaines: Partecipations Communes et Liens Dans le Conseil d'Administrations (1990-2001)," *Gerer et Comprendre*, 74, 51–62.

Edmans, A., 2009, "Blockholder Trading, Market Efficiency, and Managerial Myopia," *Journal of Finance*, 64(6), 2481–2513.

Edmans, A., V. W. Fang, and E. Zur, 2012, "The Effect of Liquidity on Governance," *SSRN eLibrary, http://ssrn.com/paper=1905224.*

Edmans, A., and G. Manso, 2011, "Governance Through Trading and Intervention: A Theory of Multiple Blockholders," *Review of Financial Studies*, 24(7), 2395–2428.

Elton, E. J., M. J. Gruber, and C. R. Blake, 2003, "Incentive Fees and Mutual Funds," *Journal of Finance*, 58(2).

European Commission, 2011, "The EU corporate governance framework," *Green Paper.*

Faure-Grimaud, A., and D. Gromb, 2004, "Public Trading and Private Incentives," *The Review of Financial Studies*, 17(4), pp. 985–1014.

Gillan, S. L., and L. T. Starks, 2007, "The Evolution of Shareholder Activism in the United States," *Journal of Applied Corporate Finance*, 19(1), 55–73.

Gopalan, R., 2008, "Institutional Stock Sales and Takeovers: The Disciplinary Role of Voting with Your Feet," *SSRN eLibrary, http://ssrn.com/paper=891515.*

Grossman, S. J., and O. D. Hart, 1980, "Takeover Bids, the Free-Rider Problem, and the Theory of the Corporation," *Bell Journal of Economics*, 11(1), 42–64.

Guerrieri, V., and P. Kondor, 2011, "Fund Managers, Career Concerns, and Asset Price Volatility," *American Economic Review, Forthcoming.*

Hawley, J. P., and A. T. Williams, 2007, "Universal Owners: Challenges and Opportunities," *Corporate Governance: An International Review*, 15, 415–420.

Hirschman, A. O., 1970, *Exit, Voice and Loyalty.* Harvard University Press.

Kahan, M., and E. B. Rock, 2007, "Hedge Funds in Corporate Governance and Corporate Control," *University of Pennsylvania Law Review*, 155, 1021.

Kahn, C., and A. Winton, 1998, "Ownership Structure, Speculation, and Shareholder Intervention," *The Journal of Finance*, 53(1), 99–129.

Karpoff, J. M., 2001, "The Impact of Shareholder Activism on Target Companies: A Survey of Empirical Findings," *SSRN eLibrary, http://ssrn.com/paper=885365.*

Klein, A., and E. Zur, 2009, "Entrepreneurial Shareholder Activism: Hedge Funds and Other Private Investors," *Journal of Finance*, 64(1), 187–229.

Maug, E., 1998, "Large Shareholders as Monitors: Is There a Trade-Off between Liquidity and Control?," *Journal of Finance*, 53(1), 65–98.

Mello, A. S., and R. Repullo, 2004, "Shareholder activism is non-monotonic in market liquidity," *Finance Research Letters*, 1(1), 2–10.

Noe, T. H., 2002, "Investor Activism and Financial Market Structure," 15(1), 289–319.

Parrino, R., R. W. Sias, and L. T. Starks, 2003, "Voting with their feet: institutional ownership changes around forced CEO turnover," *Journal of Financial Economics*, 68(1), 3–46.

Shleifer, A., and R. W. Vishny, 1986, "Large Shareholders and Corporate Control," *Journal of Political Economy*, 94(3), 461–88.

Tirole, J., 2001, "Corporate Governance," *Econometrica*, 69(1), 1–35.