The Effect of Speculative Monitoring on Shareholder Activism

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Abstract

This paper investigates how informed trading in financial markets affects the incentive of a large shareholder to monitor a company. The shareholder engages in costly monitoring activities to the extent that she can profitably trade on her private information about these activities. By making stock prices more informative about these activities, informed trading increases the shareholder's incentive to undertake such value-enhancing activities in case she has to liquidate her stake before their effect is publicly observed. This reduces the size of the stake that the shareholder has to acquire to commit to her desired level of monitoring. At the same time, a more informative stock price reduces the value of the shareholder's private information and hence her benefit from monitoring. If acquiring a large stake is excessively costly to the shareholder, the former effect dominates and an increase in informed trading, which reduces market liquidity, can lead to an increase in monitoring efforts. In this case, there is a complementarity between shareholder activism and informed trading, and multiple equilibria with different levels of ownership concentration and monitoring may coexist.

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1 Introduction

Large shareholders have long been recognized as playing an important role in mitigating the agency problems that arise from the separation of ownership and control. By ensuring that managers act in the owners' interest, large shareholders—also known as blockholders—can have a significant impact on firm value (e.g., Holderness 2003). The literature has identified two main mechanisms through which shareholders can exert governance (Hirschman 1970). The first, known as "voice" or "active monitoring," is direct intervention in a firm's operations (e.g., through suggesting a strategic change via a public shareholder proposal, replacing the board of directors, or supporting a takeover bid). The second mechanism, known as "exit" or "speculative monitoring," disciplines management through the sale of shares. If shareholders disapprove of managerial actions, they can punish a manager by selling their stake in the firm, thereby pushing down the firm's stock price and lowering the manager's compensation. In this paper, we investigate how the two forms of monitoring interact. We examine how speculative monitoring influences the formation of share blocks and how it affects blockholders' incentive to undertake value-enhancing interventions.

Active monitoring is costly to shareholders. They have to gather costly information about the firm and take costly measures to change the firm's course of action. These costs have to be borne by the monitor alone. The benefits of monitoring, however, accrue to all shareholders. An activist investor thus faces a free-rider problem when deciding on whether or not to monitor a firm. The extent of free riding depends on the size of the investor's stake in the firm: the more shares she holds, the stronger is her incentive to take costly but value-enhancing actions. The activist profits from her monitoring activities in two ways. First, the fact that her monitoring decision is her private information allows her to make a trading profit at the expense of uninformed liquidity traders. Second, if the price at which she acquires her initial stake does not fully reflect the increase in firm value due to monitoring—for example, because liquidity trades provide camouflage for her orders (e.g., Kyle and Vila 1991)—, she

also makes a profit on her initial stake. This seems to suggest that the presence of other informed traders ("speculative monitors"), which reduce market liquidity, should diminish the activist's incentive to engage in costly monitoring. Our analysis shows that this is not always the case. Indeed, if the activist investor is likely to face liquidity needs that force her to liquidate her stake before the effect of her activity is publicly observed, an increase in price informativeness may lead to more frequent interventions.

The intuition behind this result is as follows. As argued above, the activist's incentive to monitor the firm increases in the size of her stake. A larger stake thus allows the activist to commit to more interventions. Such a commitment can be desirable if a higher monitoring intensity increases the activist's informational advantage over other market participants, thereby improving her expected trading profit (Maug 1998). Clearly, the size of the stake necessary to commit to a certain level of monitoring depends on market liquidity: the more liquid the market is, the higher is the price at which the activist can expect to sell her stake in case she receives adverse information about the firm, and hence the weaker is her incentive to engage in costly intervention. Liquidity thus plays a dual role. In addition to affecting the prices at which the activist can buy or sell shares, liquidity also influences the number of shares the activist needs to acquire to commit to a certain monitoring intensity and hence to gain a certain informational advantage over other market participants. If acquiring a large stake in the firm is excessively costly to the activist (e.g., because of the high level of idiosyncratic risk associated with a concentrated portfolio) or if the activist faces portfolio constraints that restrict the size of her stake, an increase in liquidity therefore has an ambiguous effect on the activist's level of monitoring. On the one hand, it makes trading on private information that the activist acquires through her monitoring activities more valuable, thereby increasing the activist's incentive to monitor the firm. On the other hand, an increase in liquidity lowers the level of monitoring that the activist can credibly commit to. The presence of other traders who are informed about the outcome of the activist's monitoring efforts, which reduces market liquidity, can thus lead to an increase in active monitoring.

This is especially the case when the activist is likely to face a liquidity shock that forces her to sell her stake in the firm. The reason is that informed traders reduce market liquidity by selling shares only in those states of the world in which they receive negative information about the firm's prospects, that is, when the activist's monitoring efforts failed to improve firm value and the activist hence sells her stake for informational reasons rather than liquidity reasons. Put differently, informed trading leads to a state-contingent reduction in liquidity that allows the activist to commit to more monitoring without making it more costly for her to satisfy her liquidity needs. This argument indicates that it is not (only) the average level of liquidity that determines the activist's monitoring policy, as the previous literature has argued (e.g., Maug 1998), but rather the extent of informed and uninformed trading. Our analysis demonstrates that whereas an increase in market liquidity due to an increase in uninformed trading unambiguously encourages shareholder activism, an increase in liquidity due to a decrease in informed trading may discourage it.

By endogenizing the amount of informed trading, we show that there exists a feedback loop between shareholder activism and market liquidity. To the extent that interventions increase the volatility of a firm's cash flow, the intensity of active monitoring not only reflects the level of market liquidity but also affects it. The reason is that a more volatile cash flow makes private information about it more valuable to investors, implying that a more aggressive monitoring policy will attract more informed trading. This argument highlights a potential complementarity between active monitoring and speculative monitoring: informed trading can foster shareholder activism, which in turn makes trading on private information more profitable. This complementarity introduces the possibility of multiple equilibria with different ownership concentrations and levels of activism. Indeed, our analysis demonstrates that an equilibrium with a blockholder who actively monitors the firm and an equilibrium without a blockholder (and no monitoring) may coexist.

The above discussion shows that speculative monitoring may benefit an activist investor who cannot acquire a large enough stake in the firm to commit to her desired level of monitor-

ing. There are many reasons why an investor may face such a restriction. For example, many mutual funds have position limits that restrict the size of the position that they can hold in any single stock because of risk considerations. Rather than imposing such an exogenous constraint, we focus on a restriction that arises endogenously from the activist's incentive to disguise a block sale motivated by negative private information as one motivated by liquidity needs. The larger the activist's stake in the firm, the stronger is her incentive to forego her profit from anonymously trading with uninformed liquidity traders and to instead sell her entire stake in case of bad news. Although such a trading strategy is ex post optimal for large enough block sizes, it is not optimal from an ex ante perspective because it prevents the activist from exploiting her private information about her monitoring activity and hence lowers her expected trading profit. Thus, in addition to the commitment problem regarding the activist's monitoring incentives discussed above, the activist faces a commitment problem with respect to her trading strategy in the secondary market. By acquiring a large stake in the firm to alleviate the former, the activist exacerbates the latter: a large block biases her decision towards choosing "exit" over "voice," thereby lowering her chances to profitably trade on her private information. The activist's profit motive, which is the very reason why she acquires a block in the first place, thus restricts the size of her stake.

Our analysis is related to the literature on shareholder activism. A number of theoretical papers have studied the role of large shareholders in corporate governance.[1] These papers tend to focus on a single (type of) shareholder who can improve firm value by directly intervening in the firm's operations (Shleifer and Vishny 1986; Kyle and Vila 1991; Admati, Pfleiderer, and Zechner 1994; Burkart, Gromb, and Panunzi 1997; Bolton and von Thadden 1998; Kahn and Winton 1998; Maug 1998; Noe 2002; Brav, Dasgupta, and Mathews 2015), by improving price informativeness (Dow and Gorton 1997; Admati and Pfleiderer 2009; Edmans 2009; Goldman and Strobl 2013; Edmans, Levit, and Reilly 2015), or both (Edmans and Manso 2011; Levit 2014; Dasgupta and Piacentino 2015; Fos and Kahn 2015). In con-

[1] See Edmans (2014) for an excellent survey of this literature.

trast to our analysis, these papers do not consider the interaction between different types of shareholders: they do not explore how a blockholder's incentive to engage in intervention is affected by the presence of other informed investors.

In this respect, our approach is closer to that of Aghion, Bolton, and Tirole (2004) and Faure-Grimaud and Gromb (2004), who also study the link between active monitoring by a blockholder with a demand for liquidity and speculative monitoring. Aghion, Bolton, and Tirole (2004) take a mechanism design approach and study the optimal design of the active monitor's exit option in the presence of an informed speculator. Our approach differs from theirs in that it does not rely on a designated monitor who has a contractual relationship with the firm. Faure-Grimaud and Gromb (2004) also consider a blockholder's incentive to engage in costly monitoring when the stock price conveys information about her activities. In their model, an increase in price informativeness unambiguously leads to a higher monitoring effort. The reason is that the blockholder does not compete with other informed traders in the secondary market. This is in contrast to our model, which shows that an increase in informed trading may reduce the level of monitoring by the activist investor because of the increased competition in the secondary market. The two papers also differ from ours in that they both take the so-called "Founding Father" approach and assume that the firm's ownership concentration is decided (once and for all) by the initial owners. In contrast, our analysis focuses on an investor's incentive to acquire a block in the secondary market.

Our paper also contributes to the literature that studies the potential trade-off between liquidity and control. A number of papers have argued that liquidity deters active monitoring by reducing the large shareholder's cost of selling her stake in response to adverse information about the firm (e.g., Coffee 1991; Bhide 1993). In a seminal paper, Maug (1998) overturns this argument by showing that, once the shareholder's incentive to acquire a block is taken into account, liquidity encourages intervention because it facilitates the acquisition of additional shares and hence increases the shareholder's marginal benefit from intervening. Collin-Dufresne and Fos (2015) reach a similar conclusion. They find that liquidity fosters

shareholder activism by facilitating the accumulation of large blocks. In contrast, Back, Li, and Ljungqvist (2015) show that when the blockholder acquires her stake through an optimal IPO mechanism and trades in a dynamic Kyle (1985) model, liquidity typically hinders intervention. Our analysis complements these studies by showing that it is not (only) the level of liquidity that matters: an increase in liquidity may lead to more or less monitoring depending on whether this change is caused by a decrease in informed trading or an increase in uninformed trading.

2 The Model

We consider an economy with an all-equity financed firm whose shares are traded by four types of agents: (i) an *activist investor* who can, at a cost, improve the firm's cash flow by monitoring the manager, (ii) a *speculator* who can produce information about the value of the firm and can profit from trading on that information, (iii) *liquidity traders* who trade the firm's shares for reasons exogenous to the model, and (iv) a *market maker* who sets prices and acts as counterpart to all trades. All agents are risk neutral. The model takes place over times 0, 1, and 2. At time 0, the activist acquires a block of α shares of the firm and decides whether or not to monitor the manager. At time 1, the firm's shares are traded on the open market. At time 2, the firm generates a terminal cash flow of v per share. Besides the firm's shares, market participants can also invest in a riskless bond. The bond is in perfectly elastic supply and its interest rate is normalized to zero.

The firm's cash flow depends on the activist investor's monitoring activity. Absent any monitoring by the activist, the payoff is $v = v_\ell$. Monitoring improves the firm's management and increases the payoff to $v = v_h > v_\ell$.[2] Without loss of generality, we normalize v_h to one and v_ℓ to zero. For most of our analysis, we assume that the improvement in firm value

[2]Monitoring can include various activities, ranging from voting to rescind takeover defenses to refocusing the firm's business strategy.

through monitoring is independent of the activist's stake α.[3] Thus, in the terminology of Admati, Pfleiderer, and Zechner (1994), the activist's monitoring technology is "allocation-neutral."[4] Monitoring is costly to the activist investor. We assume that the activist's utility cost of monitoring, denoted by c, is drawn from a uniform distribution over the interval $[0, \bar{c}]$, where $\bar{c} > 1$. The activist's monitoring cost and her monitoring decision are her private information; they are not observable to other market participants before the firm's cash flow is realized at time 2.

At time 1, the activist can trade the firm's shares on the open market. Based on her private information about v (due to her monitoring activity), the activist submits a market order for x_A shares of the firm's stock to the market maker.[5] The activist's trading activity is, however, impeded by the fact that, with probability $\lambda \in (0, 1)$, she suffers a liquidity shock (denoted by $\ell = 1$). If this is the case, the activist is forced to reduce her holdings of the firm's shares to zero, independent of her monitoring decision. Depending on its underlying cause, the occurrence of a liquidity shock may or may not be observable to other market participants. For example, in case of an institutional investor, the outflow of funds associated with a poor past performance may make the liquidation of certain positions to some degree predictable. To capture this observation in our model, we assume that the activist's liquidity needs are known to the market maker with probability $\delta \in (0, 1)$.

There is a single speculator in the economy who can collect information on the value of the firm (and thus the activist's monitoring activity) before the stock market opens at time 1. By incurring a cost κ, the speculator observes an informative signal $s = v$ with probability $\theta \in (0, 1)$. With probability $1 - \theta$, she does not receive any useful information about the firm's payoff (denoted by $s = \emptyset$). The signal realization is independent of all other random variables. Based on her information, the speculator then submits a market order for x_S shares

[3] In Section 5, we argue that if the activist has to acquire a sufficiently large stake to influence the firm's operations, an equilibrium with monitoring may not exist.

[4] According to Admati, Pfleiderer, and Zechner (1994), a monitoring technology is allocation-neutral if its effectiveness does not directly depend on the allocation of shares.

[5] There are no short-sale constraints. Hence, it is not required that $\alpha + x_A \geq 0$.

of the firm's stock.

At time 1, the firm's stock is traded in a competitive market-making system similar to that of Kyle (1985). In addition to the activist investor and the speculator, there are liquidity traders who trade for reasons exogenous to the model. The aggregate demand of liquidity traders is either $x_L = +\phi$ or $x_L = -\phi$, with equal probability, and is independent of the stock price (and all other random variables in the model).[6] The activist investor, the speculator, and liquidity traders submit their orders to a risk-neutral market maker who sets the price and acts as a counterpart to all trades. The market maker observes the individual orders x_A, x_S, and x_L, but not the identity of the trader submitting each order. For expositional simplicity, we assume, however, that block sales (i.e., sales of α shares) cannot be conducted anonymously. This assumption, while not necessary to derive our results, simplifies the characterization of the stock market equilibrium by preventing the speculator from mimicking the behavior of an activist investor who was hit by a liquidity shock.[7] Bertrand competition among market makers leads to zero expected profits, so that the price P_1 equals the expected value of a share, conditional on the observed order flow.[8]

In contrast to other theories of shareholder activism, our results do not rely on the fact that the activist can acquire her initial stake α at a discount to the firm's fundamental value. To stack the deck against finding equilibria with active monitoring, we assume that the price P_0 at which the activist buys her block at time 0 fully reflects the improvements in firm value due to monitoring. This is consistent with our assumption that block transactions cannot be conducted anonymously.

[6] As in Kyle (1985), liquidity traders serve the purpose of disguising the trades of informed investors. Otherwise, prices would fully reveal investors' private information, and there would be no gains to collecting information.

[7] Alternatively, we could impose parameter restrictions ensuring that the block size chosen by the activist investor is small enough so that the speculator has no incentive to engage in block transactions. Indeed, it is straightforward to show that the restriction $\delta \leq \lambda/(1-\lambda)$ is sufficient to rule out such behavior.

[8] Discrete versions of the Kyle (1985) model, similar to ours, have been used, for example, by Dow and Gorton (1997), Maug (1998), and Faure-Grimaud and Gromb (2004).

3 Equilibrium

In this section, we solve for the equilibrium of the economy defined above. The equilibrium concept we use is that of a Perfect Bayesian Equilibrium (PBE). Formally, a PBE of our economy consists of the activist's choice of block size, monitoring policy, and trading strategy, the speculator's information collection decision and trading strategy, the market maker's pricing rule, and a system of beliefs such that: (i) the choices made by the activist and the speculator maximize their respective utility and the market maker breaks even in expectation, given the equilibrium choices of the other players and the equilibrium beliefs; (ii) the beliefs are rational given the equilibrium choices of the agents and are formed using Bayes' rule (whenever possible); and (iii) any deviation from the equilibrium strategy by any party is met by beliefs of the other parties that yield a lower expected utility for the deviating party, compared to that obtained in equilibrium.

3.1 Stock Market Equilibrium

We first solve for the equilibrium in the stock market, taking the activist's choice of block size α and monitoring strategy as well as the speculator's information acquisition decision as given. We demonstrate that, if the size of the activist's stake is below a critical level $\hat{\alpha}$, there exists a stock market equilibrium in which the activist's and the speculator's trading strategies are as follows:

(i) In case she is not hit by a liquidity shock, the activist buys ϕ shares if $v = 1$ (i.e., if she decided to monitor the firm) and sells ϕ shares if $v = 0$ (i.e., if she decided not to monitor). If she experiences a liquidity shock, the activist is forced to sell her block of

α shares. That is,

$$x_A = \begin{cases} -\alpha, & \text{if } \ell = 1, \\ +\phi, & \text{if } \ell = 0 \text{ and } v = 1, \\ -\phi, & \text{if } \ell = 0 \text{ and } v = 0. \end{cases} \tag{1}$$

(ii) The speculator buys ϕ shares if she observes a favorable signal $s = 1$, sells ϕ shares if she observes an unfavorable signal $s = 0$, and does not trade otherwise. That is,

$$x_S = \begin{cases} +\phi, & \text{if } s = 1, \\ -\phi, & \text{if } s = 0, \\ 0, & \text{if } s = \emptyset. \end{cases} \tag{2}$$

These strategies are supported by the off-equilibrium beliefs that any buy (sell) order for a quantity other than ϕ (or α in case of a sell order) stems from an informed trader knowing that $v = 1$ ($v = 0$), and that a block sale in the absence of a liquidity shock only occurs if $v = 0$.

We begin our analysis by deriving the market maker's pricing rule based on these conjectured trading strategies. The market maker sets the price P_1 equal to the firm's expected payoff, conditional on the observed order flow. Table 1 lists all possible order combinations that can occur for the two possible realizations of v. If two (or more) buy or sell orders for a quantity of ϕ shares are observed, at least one of them must stem from an informed trader, since the orders of the activist investor and the speculator are perfectly correlated if both trade on their private information. The market maker thus sets the price equal to $P_1^+ = 1$ (in case of two or more buy orders) or $P_1^- = 0$ (in case of two or more sell orders). If the market maker observes one buy and one sell order for ϕ shares, she knows that one of them originated from an informed trader (i.e., from the activist investor if no sell order for α shares is observed, and from the speculator otherwise) and one from liquidity traders, but she does

v	x_A	x_S	x_L	P_1	v	x_A	x_S	x_L	P_1
1	$+\phi$	$+\phi$	$+\phi$	1	0	$-\phi$	$-\phi$	$+\phi$	0
1	$+\phi$	$+\phi$	$-\phi$	1	0	$-\phi$	$-\phi$	$-\phi$	0
1	$+\phi$	0	$+\phi$	1	0	$-\phi$	0	$+\phi$	$\tilde{\mu}$
1	$+\phi$	0	$-\phi$	$\tilde{\mu}$	0	$-\phi$	0	$-\phi$	0
1	$-\alpha$	$+\phi$	$+\phi$	1	0	$-\alpha$	$-\phi$	$+\phi$	$\tilde{\mu}$
1	$-\alpha$	$+\phi$	$-\phi$	$\tilde{\mu}$	0	$-\alpha$	$-\phi$	$-\phi$	0
1	$-\alpha$	0	$+\phi$	$\tilde{\mu}$	0	$-\alpha$	0	$+\phi$	$\tilde{\mu}$
1	$-\alpha$	0	$-\phi$	$\tilde{\mu}$	0	$-\alpha$	0	$-\phi$	$\tilde{\mu}$

Table 1: Possible order combinations and corresponding prices.

not know which is which. The market maker thus sets a price of

$$P_1^{\emptyset} = \text{prob}\left[x_I = +\phi | x \in \{+\phi, -\phi, 0\} \cup \{+\phi, -\phi, -\alpha\}\right] \text{prob}\left[v = 1 | x_I = +\phi\right] \tag{3}$$

$$= \frac{\frac{1}{2}\tilde{\mu}}{\frac{1}{2}\tilde{\mu} + \frac{1}{2}(1-\tilde{\mu})}(1) = \tilde{\mu}, \tag{4}$$

where $\tilde{\mu}$ is the conjectured equilibrium probability with which the activist chooses to monitor the firm (i.e., the conjectured probability that $v = 1$) and x_I denotes the order of the informed trader (i.e., the order of the activist investor, x_A, or that of the speculator, x_S). Finally, if the market maker observes only one order for ϕ shares, she knows that it stems from liquidity traders and thus contains no information about the payoff v.[9] Clearly, in this case she sets the price equal to $P_1^{\emptyset} = \tilde{\mu}$ as well. Of course, in equilibrium the market maker's conjecture about the activist's monitoring strategy has to be correct. The prices for all possible order combinations are summarized in Table 1.

For the conjectured trading strategies to constitute an equilibrium, we need to make sure that there are no profitable deviations for the activist and the speculator. Clearly, since the price always lies between the two possible payoffs of 0 and 1, an informed investor cannot make a trading profit by selling shares if the payoff is known to be 1 and by buying shares

[9]Note that, in our conjectured equilibrium, a block sale of α shares does not convey any information about the firm's payoff v, because the activist investor only sells her block if she is hit by a liquidity shock.

if the payoff is known to be 0. Similarly, submitting an order cannot generate a positive expected profit for the speculator if she has no informational advantage over the market maker (either because she received an uninformative signal $s = \emptyset$ or because she decided not to acquire any information).[10] Further, the order size of information-based trades has to match that of liquidity-motivated trades. Indeed, an order for any amount other than ϕ shares would be identified by the market maker as originating from an informed trader, thus revealing the trader's private information and destroying her opportunity to make a trading profit.[11] The only exception are block sales of α shares, which can be the result of a liquidity shock. Although block sales cannot be conducted anonymously, the activist investor may nevertheless have an incentive to sell her block—in addition to submitting a sell order for ϕ shares—if she decided not to monitor the firm and $v = 0$, essentially pretending that she was hit by a liquidity shock. To prevent such behavior, the following incentive compatibility (IC) constraint has to hold:

$$\phi\left(\left(\frac{1-\theta}{2}\right)P_1^{\emptyset} + \left(\theta + \frac{1-\theta}{2}\right)P_1^{-}\right) \geq (\alpha+\phi)\left((1-\delta)\left(\frac{1-\theta}{2}\right)P_1^{\emptyset} + \left(\delta + (1-\delta)\left(\theta + \frac{1-\theta}{2}\right)\right)P_1^{-}\right). \quad (5)$$

The term on the left-hand side is the activist's expected equilibrium profit from selling ϕ shares. If the activist is the only trader selling shares, which happens with probability $(1-\theta)/2$ (the speculator abstains from trading with probability $1-\theta$ and liquidity traders submit a buy order with probability $1/2$), the market maker cannot infer the firm's payoff from the order flow and sets the price to $P_1^{\emptyset}$. In all other cases, the order flow reveals the firm's payoff and the market maker sets the price to P_1^{-}. The activist can only benefit from deviating from her equilibrium strategy and selling her block of α shares at a price above

[10] In fact, submitting a buy or sell order for ϕ shares when $s = \emptyset$ leads to an expected trading loss, because a buy (sell) order in some cases increases (decreases) the share price above (below) the expected payoff.

[11] This argument follows from the off-equilibrium belief that any buy (sell) order for a quantity other than ϕ (or α in case of a sell order) stems from an informed trader knowing that $v = 1$ ($v = 0$).

the fundamental value, if the speculator abstains from trading (probability $1-\theta$), liquidity traders are buying shares (probability $1/2$), and the activist's liquidity needs (or rather the lack thereof) do not become public (probability $1-\delta$). This case is captured by the first term on the right-hand side of the IC constraint. In all other cases, the price equals the fundamental value, leaving the activist with a zero return (second term on the right-hand side). Substituting the equilibrium prices into the above IC constraint yields

$$\alpha \leq \left(\frac{\delta}{1-\delta}\right)\phi \equiv \hat{\alpha}. \tag{6}$$

Of course, rather than selling α additional shares, the activist can also choose to cancel her order for ϕ shares and sell her block of α shares instead. Such a deviation from the conjectured trading strategy can be beneficial for the activist investor, because it reduces the probability that the order flow reveals the firm's payoff to $\theta/2$, the probability that both the speculator and liquidity traders submit a sell order. The following IC constraint ensures that this is not the case:

$$\phi\left(\left(\frac{1-\theta}{2}\right)P_1^{\emptyset}+\left(\theta+\frac{1-\theta}{2}\right)P_1^{-}\right) \geq \alpha\left((1-\delta)\left(1-\theta+\frac{\theta}{2}\right)P_1^{\emptyset}+\left(\delta+(1-\delta)\frac{\theta}{2}\right)P_1^{-}\right). \tag{7}$$

In case her liquidity needs are not made public, the activist benefits from pretending to have suffered a liquidity shock by selling her block at a price $P_1^{\emptyset}$ if the speculator does not trade (probability $1-\theta$) or trades in the opposite direction of liquidity traders (probability $\theta/2$). In all other cases, the deviation from the conjectured equilibrium strategy does not pay off, because the price equals the fundamental value. Note that the IC constraint in equation (6) is a sufficient condition for the IC constraint in equation (7) if δ is small, that is, if

$$\delta \leq \frac{1-\theta}{2-\theta}, \tag{8}$$

which we assume to be the case in the ensuing analysis. The following lemma summarizes the above discussion.

Lemma 1. *Suppose that the speculator decided to collect information and that the activist's IC constraints in equations (6) and (8) hold. Then, there exists an equilibrium at the trading stage in which the activist investor and the speculator follow the trading strategies specified in equations (1) and (2), respectively. Equilibrium prices are as specified in Table 1.*

In this equilibrium, the activist investor earns an expected trading profit of

$$\pi_T = \phi\,(1-\lambda)\left(\frac{1-\theta}{2}\right)\left[\mu\left(v_h - P_1^{\emptyset}\right) + (1-\mu)\left(P_1^{\emptyset} - v_\ell\right)\right] \tag{9}$$

$$= \phi\,(1-\lambda)(1-\theta)\mu(1-\mu), \tag{10}$$

where we have used the fact that, in equilibrium, the market maker's conjecture about the activist's monitoring strategy must be correct (i.e., $\tilde{\mu} = \mu$). The activist only earns a trading profit if she does not experience a liquidity shock (probability $1-\lambda$) and if the price P_1 does not fully reflect her private information, which is the case if she is the only informed trader (probability $1-\theta$) and if her order is offset by a liquidity-motivated order in the opposite direction (probability $1/2$). In this case, the activist can buy (if she decided to monitor the firm) or sell (if she decided not to monitor the firm) ϕ shares at a price $P_1^{\emptyset}$ that is below (respectively, above) their fundamental value.

Not surprisingly, the activist's expected trading profit increases in the amount of uninformed trading, ϕ, and decreases in the probability that the activist experiences a liquidity shock, λ, and the probability that an informed speculator is present, θ. It is strictly positive as long as the market maker faces some uncertainty regarding the activist's monitoring activity (i.e., as long as $\mu \in (0,1)$). More importantly, if the presence of a rival informed trader is unlikely, the above trading profit exceeds the profit that the activist could earn in any equilibrium in which she sells her block of α shares after deciding not to monitor the firm

(which she prefers to do if the IC constraint in equation (6) does not hold).

Lemma 2. *The expected trading profit that the activist investor can earn in any equilibrium in which she strategically liquidates her stake in the firm after observing a payoff of* $v = 0$ *converges to zero as* $\theta \to 0$.

This result shows that the possibility for the activist investor to strategically liquidate her position in case of a low firm value (i.e., to take the "Wall Street Walk") has an important implication for her choice of block size α: it essentially imposes an upper limit of $\hat{\alpha}$ on the amount of shares that a profit-maximizing activist seeks to acquire. The larger the activist's stake in the firm, the stronger is her incentive to forego her profit from anonymously trading with uninformed liquidity traders and to instead sell her entire block of shares in case of bad news. Although such a trading strategy is ex post optimal for large enough block sizes, it is not optimal from an ex ante perspective because it prevents the activist from profitably trading on her private information, thereby lowering her expected trading profit. Thus, a large block, while alleviating the activist's commitment problem with respect to her monitoring strategy, may destroy the activist's opportunity to earn a trading profit, which is the very reason why the activist investor acquires a block of shares in the first place.

3.2 Monitoring Decision

To determine the activist investor's optimal monitoring policy, we need to compare her expected profit from monitoring the firm with that from not monitoring the firm. Recall that the monitoring decision is made before the liquidity shock is realized. For a given initial stake

α, the activist's expected payoff from monitoring the firm is given by

$$\pi_h = -c + \alpha \left[\lambda \left(\frac{\theta}{2} P_1^+ + \left(\frac{\theta}{2} + 1 - \theta \right) P_1^\emptyset \right) + (1-\lambda) v_h \right] + \phi (1-\lambda) \left(\frac{1-\theta}{2} \right) \left(v_h - P_1^\emptyset \right) \tag{11}$$

$$= -c + \alpha \left(1 - \lambda \left(1 - \frac{\theta}{2} \right) (1 - \tilde{\mu}) \right) + \phi (1-\lambda) \left(\frac{1-\theta}{2} \right) (1 - \tilde{\mu}). \tag{12}$$

The first term captures the activist's monitoring cost. The second term represents the expected value of the activist's block of α shares. The value of a share equals the fundamental value v_h if the activist is not forced to sell her block (probability $1-\lambda$), and equals the stock price P_1 otherwise. In case the activist faces a liquidity shock, the stock price reflects the fundamental value only if both the speculator and liquidity traders submit a buy order for ϕ shares (probability $\theta/2$). In all other cases, the price equals $P_1^\emptyset$ and hence is below the fundamental value. Finally, the third term reflects the activist's expected trading profit from buying ϕ shares. As explained in Section 3.1, the activist can only earn a trading profit when $v = 1$ if she does not experience a liquidity shock (probability $1-\lambda$), if the speculator does not trade (probability $1-\theta$), and if liquidity traders decided to sell shares (probability $1/2$). In this case, the activist can buy ϕ shares at a price $P_1^\emptyset < v_h$.

The activist investor's expected payoff from not monitoring the firm is equal to

$$\pi_\ell = \alpha \left[\lambda \left(\frac{\theta}{2} P_1^- + \left(\frac{\theta}{2} + 1 - \theta \right) P_1^\emptyset \right) + (1-\lambda) v_\ell \right] + \phi (1-\lambda) \left(\frac{1-\theta}{2} \right) \left(P_1^\emptyset - v_\ell \right) \tag{13}$$

$$= \alpha \lambda \left(1 - \frac{\theta}{2} \right) \tilde{\mu} + \phi (1-\lambda) \left(\frac{1-\theta}{2} \right) \tilde{\mu}. \tag{14}$$

In this case, the value of the activist's block equals the firm's fundamental value of zero unless the activist can sell her stake at a price of $P_1^\emptyset$. In equilibrium, the activist only sells her block if she is hit by a liquidity shock (probability λ). If this happens, the stock price exceeds the firm's fundamental value if the speculator is uninformed and hence does not trade

(probability $1-\theta$) or if the speculator is informed and her sell order is offset by a buy order from liquidity traders (probability $\theta/2$). The second term in the above expression represents the activist's expected trading profit from selling ϕ shares. As in the case of a buy order, the activist can only profit from selling ϕ shares if she does not experience a liquidity shock (probability $1-\lambda$) and the stock price does not fully reflect her private information, which is the case if there is no informed speculator (probability $1-\theta$) and if liquidity traders trade in the opposite direction (probability $1/2$).

Monitoring the firm is optimal for the activist investor if and only if $\pi_h \geq \pi_\ell$ or, equivalently, if and only if

$$c \leq \alpha\left(1-\lambda\left(1-\frac{\theta}{2}\right)\right)+\phi\left(1-\lambda\right)\left(\frac{1-\theta}{2}\right)\left(1-2\tilde{\mu}\right) \equiv \hat{c}. \tag{15}$$

Note that, for $\tilde{\mu}=\frac{1}{2}$, $\hat{c}$ increases in θ. This means that, as the stock price becomes more informative about the activist's monitoring efforts, the activist has an incentive to engage in value-enhancing activities even at a higher personal cost. However, if $\tilde{\mu}<\frac{1}{2}$ (as will be the case in equilibrium), an increase in price informativeness also reduces the activist's expected trading profit from buying shares by a larger amount than that from selling shares, thereby decreasing the activist's benefit from monitoring.

Assuming that the right-hand side of the above inequality is between 0 and $\bar{c}$, the probability that the activist investor chooses to monitor the firm is therefore equal to

$$\mu = \text{prob}\left[c \leq \hat{c}\right] = \frac{1}{\bar{c}}\left[\alpha\left(1-\lambda\left(1-\frac{\theta}{2}\right)\right)+\phi\left(1-\lambda\right)\left(\frac{1-\theta}{2}\right)\left(1-2\tilde{\mu}\right)\right]. \tag{16}$$

In equilibrium, the market maker's conjecture about the activist investor's monitoring strategy must be correct, that is, $\tilde{\mu}=\mu$. The equilibrium monitoring frequency can hence be

written as a function of the initial stake α as follows:

$$\mu = \frac{\alpha\,(2 - \lambda(2-\theta)) + \phi\,(1-\lambda)(1-\theta)}{2\,(\bar{c} + \phi\,(1-\lambda)(1-\theta))}. \tag{17}$$

In the above derivation we have implicitly assumed that the block size α is such that μ does not exceed one. As we will show below, this is always the case in equilibrium. The monitoring probability linearly increases in the activist's equity stake α. Thus, by acquiring a larger block α, the activist can commit to a more aggressive monitoring strategy. Interestingly, the block size required to commit to a certain monitoring intensity may be smaller in the presence of an informed speculator, as the following result shows.

Lemma 3. *For a given block size α, there exists a threshold $\hat{\lambda} \in [0,1)$ such that, for $\lambda > \hat{\lambda}$, the activist's monitoring probability, μ, increases in the likelihood that an informed speculator is present, θ.*

This result implies that, in addition to the direct negative effect that the presence of an informed speculator has on the activist's expected trading profit, an increase in informed trading may indirectly benefit the activist by allowing her to commit to a higher monitoring intensity. The reason is that a more informative stock price makes the value of the activist's equity stake more sensitive to her monitoring decision, especially if the activist is likely to experience a liquidity shock that forces her to sell her stake before the effect of her monitoring decision is publicly observed. Informed speculation thus strengthens the commitment mechanism of the activist investor.[12]

3.3 Block Size

Having characterized the activist's monitoring strategy, we now investigate her incentive to acquire a stake in the firm at time 0. As demonstrated in the previous section, the activist's

[12] A similar result has been obtained by Faure-Grimaud and Gromb (2004) who show that monitoring effort increases in price informativeness. However, their analysis ignores the effect of informed speculation on the activist's trading profit and hence on her incentive to become a blockholder.

initial stake acts as a commitment device: a larger stake allows the activist to commit to a more aggressive monitoring policy. In fact, since the activist does not directly profit from the block transaction, this commitment effect is the only reason why the activist acquires an equity stake.

Correctly anticipating the activist's monitoring strategy, time-0 shareholders are willing to sell shares to the activist at a price of $P_0 = \mu$, that is, at the expected firm value. At this price, the activist's ex ante expected profit from acquiring a stake of α shares at time 0 and following the monitoring and trading strategies derived above is equal to

$$\pi = -\alpha P_0 + \mu \mathbb{E}[\pi_h | c \leq \hat{c}] + (1-\mu) \mathbb{E}[\pi_\ell | c > \hat{c}] \tag{18}$$

$$= -\mu \mathbb{E}[c | c \leq \hat{c}] + \phi (1-\lambda)(1-\theta)\mu(1-\mu), \tag{19}$$

where $\hat{c}$ denotes the threshold cost below which the activist chooses to monitor. Note that the monitoring probability increases in the threshold cost $\hat{c}$: $\mu = \text{prob}[c \leq \hat{c}] = \hat{c}/\bar{c}$. Thus, the expected monitoring cost can be written as $\mathbb{E}[c | c \leq \hat{c}] = \hat{c}/2 = \bar{c}\,\mu/2$ and we have

$$\pi = -\bar{c}\,\mu^2/2 + \phi (1-\lambda)(1-\theta)\mu(1-\mu). \tag{20}$$

The activist's expected profit is equal to her expected trading profit minus her expected monitoring cost. This is not surprising given that the stock price P_0 fully reflects the expected benefits from monitoring.

The activist investor's optimal block size maximizes her expected profit π, subject to the IC constraint that $\alpha \leq \hat{\alpha}$. As demonstrated in Section 3.1, if the block size exceeded $\hat{\alpha}$, the activist would liquidate her entire position upon observing a low firm value, thereby destroying any profitable trading opportunities (at least for low values of informed speculation, θ). The problem can be simplified by noting that the profit π depends on the block size α only through

its effect on the monitoring probability μ.[13] The optimal block size can therefore be found by first solving for the optimal monitoring probability and then finding the block size that induces this monitoring probability. From equation (20), it follows that the activist's expected profit is increasing in the monitoring probability over the interval $[0, \mu^*]$ and decreasing in μ over the interval $[\mu^*, 1]$, where

$$\mu^* = \frac{\phi\,(1-\lambda)(1-\theta)}{\bar{c} + 2\,\phi\,(1-\lambda)(1-\theta)}. \tag{21}$$

Note that, for any $\bar{c} > 0$, the monitoring frequency μ^* is below one half. This is rather intuitive since a monitoring probability of one half maximizes the market maker's uncertainty about the firm value v and hence the activist's expected trading profit. Thus, if monitoring were costless, the activist would optimally choose a block size α that would induce him to monitor half the time. Since monitoring is costly, the optimal monitoring probability is less than one half: the activist trades off a larger trading profit against a lower expected monitoring cost.

The optimal block size that induces the activist investor to monitor the firm with probability μ^* can be found by substituting the expression for μ^* into equation (17):

$$\alpha^* = \frac{\bar{c}\,\phi\,(1-\lambda)(1-\theta)}{(2-\lambda(2-\theta))\,(\bar{c} + 2\,\phi\,(1-\lambda)(1-\theta))}. \tag{22}$$

Note that α^* is strictly positive. Since the activist investor's expected profit is increasing in α up to α^*, the size of the block that the activist optimally acquires at time 0 is given by

$$\alpha = \min\{\alpha^*, \hat{\alpha}\}. \tag{23}$$

[13] This argument implicitly assumes that the activist has sufficient control rights to influence the firm's operations.

3.4 Information Acquisition

For the stock market equilibrium characterized in Section 3.1 to exist, the speculator must have an incentive to collect information about the firm. This is the case if the speculator's expected trading profit exceeds her cost of acquiring information, κ. Clearly, the speculator can only earn a trading profit if there is some uncertainty about the value of the firm (i.e., if $\mu \in (0,1)$). For a given monitoring probability μ and prior to observing the signal s, the speculator expects to earn a trading profit of

$$\rho = \phi\,\theta\,\lambda\left[\frac{\mu}{2}\left(v_h - P_1^{\emptyset}\right) + \frac{1-\mu}{2}\left(P_1^{\emptyset} - v_\ell\right)\right] \tag{24}$$

$$= \phi\,\theta\,\lambda\,\mu\,(1-\mu). \tag{25}$$

The speculator can only profitably trade on her private information if her signal is informative (probability θ) and if the order flow does not fully reveal her information to the market maker, that is, if the activist investor experiences a liquidity shock (probability λ) and liquidity traders trade in the opposite direction (probability $1/2$). Similar to the activist investor, the speculator prefers the market maker's uncertainty about the firm's value to be as large as possible (which is the case if $\mu = 1/2$). However, in contrast to the activist, the speculator does not incur any monitoring costs, implying that her profit-maximizing monitoring probability exceeds that of the activist. Since the speculator's expected trading profit is strictly positive for any monitoring probability $\mu \in (0,1)$, an equilibrium featuring active and speculative monitoring exists if the speculator's cost of collecting information, κ, is sufficiently low.

Proposition 1. *For a sufficiently low cost of information production, κ, there exists an equilibrium in which the speculator collects information about the firm. Equilibrium prices and trading strategies are as specified in Lemma 1. The size of the activist's initial stake in the firm, α, is given by equation (23), and the equilibrium monitoring probability, μ, is given*

by equation (17).

4 The Trade-Off between Liquidity and Control

There is a long-standing debate in the literature regarding the effect of stock market liquidity on corporate governance. A number of papers have argued that liquidity deters intervention, as it reduces the cost to a large shareholder of selling her stake in response to adverse information about the firm (e.g., Coffee 1991; Bhide 1993). In a seminal paper, Maug (1998) shows that, once the activist investor's incentive to acquire a block is taken into account, this apparent trade-off between liquidity and control does not exist: a liquid stock market encourages intervention because it also facilitates the acquisition of additional shares and hence increases the activist's marginal benefit from intervening.

In our model, market liquidity can be measured by the price impact of the activist's trades, which depends on the amount of informed and uninformed trading. An increase in the amount of uninformed trading, ϕ, improves market liquidity: the more shares liquidity traders buy or sell, the larger is the size of the transaction that the activist can undertake without revealing her information. The effect of the informed speculator's trades on market liquidity can best be seen from the activist's expected bid-ask spread, that is, from the difference between the price at which the activist expects to buy ϕ shares and the price at which she expects to sell ϕ shares:

$$S = \mathbb{E}\left[P_1 | x_A = +\phi\right] - \mathbb{E}\left[P_1 | x_A = -\phi\right] = (1+\theta)/2. \tag{26}$$

An increase in the likelihood that an informed speculator is present increases the expected spread and hence reduces market liquidity. This is because the speculator's and the activist's orders are perfectly correlated, making the aggregate order flow more informative and pushing the price closer to the firm's fundamental value.

Consistent with Maug (1998), our analysis shows that an increase in liquidity trading unambiguously leads to more monitoring by the activist investor. Intuitively, a higher ϕ makes the activist's private information about the firm's payoff more valuable. Since more monitoring increases the activist's informational advantage over the market maker by making the firm's payoff more uncertain (as long as $\mu < 1/2$), a higher ϕ therefore increases the marginal benefit from monitoring.[14]

The effect of an increase in informed trading is more ambiguous. If the activist investor's IC constraint is not binding (i.e., if $\alpha^* \leq \hat{\alpha}$), then an increase in θ leads to a reduction in monitoring incentives because it reduces the activist's expected profit from trading on her private information and hence her marginal benefit from monitoring. However, if the activist investor faces a binding IC constraint (i.e., if $\alpha^* > \hat{\alpha}$), the negative competition effect of informed trading may be outweighed by a positive commitment effect: an increase in informed trading makes the value of the activist's stake more sensitive to her monitoring decision if she is forced to liquidate her position early due to a liquidity shock, thereby allowing her to commit to a higher level of monitoring with a given block size $\alpha = \hat{\alpha}$. As demonstrated in Section 3.2, this effect is particularly pronounced if the activist is likely to experience a liquidity shock.

Proposition 2. *The activist investor's equilibrium probability of monitoring the firm, μ, increases in the size of liquidity-motivated trades, ϕ; it decreases in the probability that an informed speculator is present, θ, if the IC constraint on the activist investor's block size is not binding (i.e., if $\alpha^* \leq \hat{\alpha}$). If the constraint is binding (i.e., if $\alpha^* > \hat{\alpha}$), there exists a threshold $\hat{\lambda} \in [0, 1)$ such that, for $\lambda > \hat{\lambda}$, the activist's equilibrium monitoring probability, μ, increases in the probability that an informed speculator is present, θ.*

Proposition 2 has several important implications. First, it shows that it is not (only) the change in the level of liquidity that matters, but whether this change in liquidity is caused

[14] Recall that, due to monitoring costs, the activist's equilibrium monitoring probability never exceeds 1/2, the level that maximizes the activist's expected trading profit.

by a change in the level of informed or uninformed trading. Whereas an increase in liquidity due to an increase in uninformed trading unambiguously encourages monitoring by activist investors, an increase in liquidity due to a decrease in informed trading may discourage it.

Second, the result suggests that, even if the activist endogenously chooses the size of her equity stake, there may be a trade-off between liquidity and control. This is in contrast to Maug (1998) who argues that market liquidity unambiguously encourages intervention. Our analysis complements Maug's argument by showing that, in addition to enhancing her trading profit, a reduction in price informativeness also weakens the activist's incentives to monitor the firm. If the activist is unable to acquire a larger stake in the firm to compensate for this reduction in monitoring incentives (or if doing so is costly), an improvement in market liquidity may hence reduce the level of monitoring by the activist.

Finally, Proposition 2 indicates a complementarity between intervention ("active monitoring") and informed trading ("passive monitoring"). By making the stock price more informative about the activist's monitoring activity, informed trading increases the activist's incentives to engage in value-enhancing interventions.

5 Shareholder Activism and Informed Speculation

Our analysis in the previous section highlights the importance of informed trading for the activist's monitoring policy. In this section, we examine how the presence of an informed speculator affects the activist investor's incentive to become a blockholder.

As demonstrated in Section 3.3, the activist acquires an equity stake as a commitment device to monitor the firm: to the extent that monitoring gives her an informational advantage over other market participants, committing to a positive level of monitoring allows the activist to make a trading profit at the expense of uninformed liquidity traders. The activist hence has an incentive to become a blockholder if her expected trading profit exceeds her cost of doing so. While not explicitly modeled in our analysis, such a cost may include, for example, the

loss of diversification benefits to the blockholder or the premium paid in block transactions. Moreover, the activist's monitoring efforts may only be effective if she has sufficient voting power, which may require her to invest in a suboptimally large initial stake $\alpha > \alpha^*$. If this is the case, the activist may be committed to a level of monitoring at which her expected trading profit is insufficient to cover her expected monitoring cost. The activist would then forego the option to monitor the firm and decide not to become a blockholder. To study the effect of informed speculation on the activist's incentive to become a blockholder, we therefore analyze how the presence of an informed speculator influences the activist's expected profit.

An increase in the probability of informed speculation, θ, has two opposing effects on π. On the one hand, it reduces the activist's trading profit by making prices more informative, as can be seen from equation (10). On the other hand, it allows the activist to commit to a more aggressive monitoring policy if she is likely to face a liquidity shock (Lemma 3). This benefits the activist if her monitoring activity is suboptimally low (i.e., if $\hat{\alpha} < \alpha^*$). For low levels of informed trading, the positive commitment effect outweighs the negative competition effect and an increase in θ improves the activist's expected profit.

Proposition 3. *If the IC constraint on the activist investor's block size is not binding (i.e., if $\alpha^* \leq \hat{\alpha}$), the activist investor's expected profit π decreases in the probability θ that an informed speculator is present. If the IC constraint is binding (i.e., if $\alpha^* > \hat{\alpha}$), there exists a threshold $\hat{\lambda} \in (0,1)$ such that, for $\lambda > \hat{\lambda}$, the activist investor's expected profit π increases in the probability θ for low values of θ.*

Proposition 3 provides one of the key insights of this paper. Informed speculation can foster shareholder activism by making active monitoring more profitable. By increasing price informativeness, speculative monitoring enables the activist to commit to more frequent interventions, thereby increasing the activist's informational advantage over other market participants. This result highlights a complementarity between active monitoring and speculative monitoring. Our discussion in Section 3.4 has already demonstrated that the speculator's

incentive to collect information increases in the activist's monitoring intensity. Proposition 3 implies that the reverse may also be true: the investor's incentive to engage in active monitoring may increase in the level of informed speculation. This complementarity creates incentives for activists and speculators to coordinate their activities and introduces the possibility of multiple equilibria. Indeed, if identifying (or investing in) a suitable target firm is costly to the activist, an equilibrium with (active and speculative) monitoring and an equilibrium without monitoring may coexist.

Proposition 4. *Suppose that the activist investor incurs a cost of identifying a suitable target firm. Then, there exist parameter values such that an equilibrium with a blockholder who actively monitors the firm (with positive probability) and an equilibrium without a blockholder (and without monitoring) coexist.*

The two equilibria differ with respect to the firm's ownership structure. In the equilibrium without monitoring, the activist has no incentive to acquire a stake in the firm.

6 Conclusion

In this paper, we develop a model of blockholder trading to explore the relationship between active monitoring and speculative monitoring. In particular, we examine how the presence of informed speculators affects the incentive of an activist investor to undertake costly interventions that improve firm value.

Our analysis shows that informed speculation has two opposing effects on the activist's expected profit from intervening in the firm's operations. On the one hand, it makes trading on private information that the activist acquires through her monitoring activities less valuable, thereby reducing the activist's incentive to monitor the firm. On the other hand, it decreases the size of the equity stake that the activist has to invest in to credibly commit to a certain level of monitoring. If the activist faces portfolio constraints that limit the size of her stake, the latter effect can dominate the former and an increase in informed trading can

thus encourage intervention. This is especially the case if the activist is likely to experience a liquidity shock that forces her to liquidate her stake before the effect of her activity is publicly observed. We demonstrate that such a portfolio constraint may arise endogenously from the activist's incentive to disguise a block sale motivated by negative private information as one motivated by liquidity needs.

Our findings add a new facet to the debate on the potential trade-off between liquidity and control. In contrast to most of the existing literature, we show that it is the extent of informed and uninformed trading, rather than the average level of liquidity, that determines the level of shareholder activism. An increase in liquidity due to an increase in uninformed trading leads to more interventions, whereas an increase in liquidity due to a decrease in informed trading may lead to fewer interventions.

By endogenizing the information acquisition decision of speculators, we identify a feedback loop between informed speculation and shareholder activism: informed speculation can encourage intervention, which in turn encourages information collection. This complementarity creates incentives for activists and speculators to coordinate their activities and introduces the possibility of multiple equilibria. We find that, for some parameter values, an equilibrium with a blockholder who actively monitors the firm and with informed speculators and an equilibrium without a blockholder and no informed speculation coexist.

Appendix

Proof of Lemma 1. The existence of the stock market equilibrium follows immediately from the discussion in Section 3.1. The equilibrium is supported by the following off-equilibrium beliefs: (i) any buy (sell) order for a quantity other than ϕ (or α in case of a sell order) stems from an informed trader knowing that $v = 1$ ($v = 0$); (ii) a block sale in the absence of a liquidity shock only occurs if $v = 0$. ■

Proof of Lemma 2. In any equilibrium in which the activist liquidates her position after deciding not to monitor the firm, the absence of a block sale reveals the firm's payoff to be $v = 1$, which implies that the activist cannot profit from buying shares. Further, since a block sale reveals the activist's identity to the market maker, the expected sales price must equal the firm's expected payoff, implying that the activist earns zero expected profit from a block sale. Thus, the activist can only benefit from selling ϕ shares (in addition to the block α) if $v = 0$. The reason is that, if the speculator does not trade and liquidity traders happen to buy ϕ shares in this situation, the order flow observed by the market maker is identical to the order flow that arises in case the activist experiences a liquidity shock, the speculator submits a buy (sell) order, and liquidity traders submit a sell (buy) order. The time-1 price in this case thus equals

$$\tilde{P}_1 = \frac{\lambda\,\theta\,\mu}{\lambda\,\theta + (1-\lambda)(1-\theta)(1-\mu)}, \tag{27}$$

and the maximum expected trading profit that the activist can earn is given by

$$\frac{1}{2}(1-\lambda)(1-\theta)(1-\mu)\left(\tilde{P}_1 - v_\ell\right). \tag{28}$$

Since $\tilde{P}_1$ converges to zero as $\theta \to 0$, the activist's expected trading profit also converges to zero. ■

Proof of Lemma 3. For a given block size α, it immediately follows from equation (17)

that

$$\frac{d\mu}{d\theta} = \frac{\big(\alpha\lambda - \phi\,(1-\lambda)\big)\,\bar{c} + \alpha\phi\,(1-\lambda)(2-\lambda)}{2\big(\bar{c} + \phi\,(1-\lambda)(1-\theta)\big)^2}. \tag{29}$$

This expression is a continuous function of λ that equals $\alpha/(2\bar{c}) > 0$ at $\lambda = 1$, which proves the result. ■

Proof of Proposition 1. The speculator acquires the signal s if her expected trading profit ρ, given by equation (25), exceeds the cost κ. In the limit as the cost goes to zero, this condition is trivially satisfied because the equilibrium monitoring probability μ is strictly positive (and less than one half) for any block size $\alpha \in [0, \alpha^*]$ (see equations (17) and (21)), implying that ρ is strictly positive.

The existence of the stock market equilibrium then follows from Lemma 1. The activist investor's monitoring strategy and choice of block size follow from our discussions in Sections 3.2 and 3.3. ■

Proof of Proposition 2. If the activist's IC constraint is not binding (i.e., if $\alpha^* \leq \hat{\alpha}$), the equilibrium monitoring probability is given by equation (21). This expression for μ^* increases in ϕ and decreases in θ.

If the activist faces a binding IC constraint (i.e., if $\alpha^* > \hat{\alpha}$), the equilibrium monitoring probability is given by equation (17) with a block size of $\alpha = \hat{\alpha}$. This expression increases in ϕ for any $\alpha \geq 0$. Since $\hat{\alpha}$ is independent of θ, it follows from Lemma 3 that the equilibrium monitoring probability also increases in θ for sufficiently large values of λ. ■

Proof of Proposition 3. The derivative of π with respect to θ can be written as

$$\frac{d\pi}{d\theta} = \frac{\partial\pi}{\partial\theta} + \frac{\partial\pi}{\partial\mu}\,\frac{d\mu}{d\theta}. \tag{30}$$

From equation (20), it follows immediately that the partial derivative $\partial\pi/\partial\theta$ is negative:

$$\frac{\partial \pi}{\partial \theta} = -\phi\,(1-\lambda)\mu(1-\mu) < 0. \tag{31}$$

Further, at the optimum $\mu = \mu^*$, the partial derivative $\partial\pi/\partial\mu$ is zero. Thus, $d\pi/d\theta$ is negative if the activist's IC constraint is not binding and she chooses a block size of $\alpha = \alpha^*$.

In contrast, if the IC constraint is binding and $\alpha = \hat{\alpha}$, it follows from equation (20) that the partial derivative $\partial\pi/\partial\mu$ is positive because $\hat{\alpha} < \alpha^*$ and hence $\mu < \mu^*$:[15]

$$\frac{\partial \pi}{\partial \mu} = -\bar{c}\,\mu + \phi\,(1-\lambda)(1-\theta)(1-2\mu) > 0. \tag{32}$$

Thus, if $d\mu/d\theta > 0$, it follows from equations (30), (31), and (32) that there exists a $\hat{\mu} > 0$ such that $d\pi/d\theta > 0$ for any $\mu < \hat{\mu}$. We are therefore left to show that there exists a $\hat{\lambda} \in (0,1)$ such that (i) $d\mu/d\theta > 0$ for all $\lambda > \hat{\lambda}$, and that (ii) $\lambda > \hat{\lambda}$ implies that $\mu < \hat{\mu}$ for values of θ close to zero. Result (i) follows immediately from the proof of Lemma 3. Result (ii) follows from the fact that the activist's choice of monitoring probability given by equation (17) is a continuous function of λ and θ that approaches zero as $\lambda \to 1$ and $\theta \to 0$. ■

Proof of Proposition 4. Suppose that the activist incurs a cost K of identifying a suitable target firm. From Proposition 3, we know that there exist parameter values such that the activist's expected profit π increases in θ over the interval $[0, \hat{\theta})$, $\hat{\theta} > 0$. This implies that, for these parameter values, there exists a cost $K > 0$ and a probability $\theta \in (0, \hat{\theta})$ such that the activist investor monitors the firm with positive probability if and only if the speculator collects information. The activist only acquires a stake in the firm if she wants to commit to a positive monitoring probability.

Furthermore, it follows from the speculator's expected trading profit ρ in equation (25) that there exists a cost $\kappa > 0$ such that $\rho \geq \kappa$ if and only if the activist monitors the firm

[15] Note that, for any $\alpha^* > 0$, there exists a $\delta \in (0,1)$ such that $\hat{\alpha} < \alpha^*$.

with positive probability. Thus, two equilibria exist: one in which the speculator collects information and the activist acquires a block and monitors the firm with positive probability, and one in which the speculator does not collect information and the activist never monitors the firm (and does not acquire a block). ■

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