# Blockholder Disclosure Thresholds and Hedge Fund Activism *

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**Abstract**

Hedge fund activists discipline corporate management in exchange for trading profits obtained by secretly acquiring shares in target companies prior to intervention. We show how blockholder disclosure thresholds regulate market transparency and hence the extent of activism. We characterize how disclosure thresholds structure the complex interactions between (a) initial investors in a firm—who value the value-enhancing disciplining effects of activism on management, but incur costs trading with activists who know their own value-enhancing potential; (b) activists—who value higher thresholds when establishing equity stakes, but incur costs if high thresholds reduce real investment or discourage managerial misbehavior; and (c) firm managers—who weigh private benefits of value-reducing actions against potential punishment if activists intervene. When managerial behavior is sufficiently unresponsive to threats of activism, initial investors and society value tighter disclosure thresholds than activists whenever the costs of activism tend to be low, making the probability of activism insensitive to the level of activist trading profits. In contrast, activists value tighter thresholds when managerial behavior is responsive to potential activism.

*Keywords:* Hedge fund activism, blockholder disclosure thresholds, informed trading, investor activism.

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# 1 Introduction

Hedge fund activism mitigates agency problems that affect governance in publicly-traded companies with dispersed owners. An extensive empirical literature establishes that activist funds generate gains to their targets in terms of performance and stock prices (Brav et al. 2008; Clifford 2008; Klein and Zur 2009; Boyson and Mooradian 2011; Brav et al. 2015; Bebchuk et al. 2015). However, their strong financial incentives to make profits and the relative short-termism of their strategies (Brav et al. 2010) often generate controversy.[1] In particular, activist hedge funds are, by nature, informed traders that profit from trading on their information advantages at the expense of uninformed shareholders. As a result, activists can impair real investment, destroying value (Leland 1992; Bernhardt et al. 1995).

Our paper models the inter-linkages between real investment, hedge fund activism and managerial behavior, showing that hedge fund activism creates value when sufficiently limited, but that it can harm uninformed investors and society otherwise. Our analysis contributes to the regulatory debate about optimal blockholder disclosure thresholds, when these thresholds limit trading profits of activist funds and hence their incentives to engage in costly, value-enhancing interventions. We determine how disclosure thresholds structure complex interactions between (a) initial investors in a firm—who value the direct and indirect value-enhancing disciplining effects of activism on management, but may incur costs trading with activists who are privately-informed of their value-enhancing potential; (b) activists—who value higher thresholds when establishing equity stakes, but incur costs if high thresholds deter real investment or discourage managerial misbehavior that is the source of their profits; and (c) firm managers—who weigh private benefits of malfeasance against potential punishment if activists intervene. We characterize how the optimal disclosure thresholds vary with economic primitives from the perspectives of uninformed investors, activists and a welfare-maximizing regulator. When managerial behavior is sufficiently unresponsive to threats of activism, initial investors and society value tighter disclosure thresholds than activists when the costs of activism tend to be low, so that the probability of activism is relatively insensitive to the level of activist trading profits. In contrast, when managerial behavior is responsive to potential activism, activists value tighter thresholds.

In 2011, senior partners at Wachtell, Lipton, Rosen & Katz (WLRK), a prominent law firm specializing in corporate and securities law and corporate governance, submitted a rule-making petition—the WLRK (2011) Petition—to the Securities and Exchange Commission

[1] Brav et al. (2010) report that hedge fund managers typically receive a significant proportion (e.g. 20%) of excess returns as performance fees on top of fixed management fees, and that managers often invest a substantial amount of their personal wealth into their own funds. In their sample of activist events in the US in the period 2001-2007, the median duration from disclosure to divestment is 266 days.

(SEC) advocating that rules governing the disclosure of blocks of stock in publicly traded companies be tightened.[2] WLRK argued that the US disclosure threshold of 5% allows activist investors to secretly accumulate enough stock to control target companies. Empirical evidence shows that while activist funds create fundamental changes in targeted companies (Brav et al. 2008; Klein and Zur 2009), they rarely own more than 10% of shares and only hold positions for short periods of time (Brav et al. 2010; Becht et al. 2017). This, WLRK argued, undermines the original purpose of Section 13(d), and damages market transparency and investor confidence. Academics responded, questioning the desirability of the proposed measures (Bebchuk and Jackson 2012; Bebchuk et al. 2013). They argued that a crucial incentive for activist funds is the ability to purchase stock at prices that do not yet reflect the value of their actions, and that tighter disclosure rules would discourage hedge fund activism. In turn, they argued that discouraging activism would harm small investors, who would then not glean the value-enhancing benefits of hedge fund activism on corporate behavior.

Despite the importance of blockholder disclosure thresholds and the heated debate,[3] there has not yet been a comprehensive analysis to provide a rationale for this rule or guidance for potential adjustments. Why a threshold of 5%? When and how do interests of uninformed investors and activist hedge funds conflict? Can activists benefit from disclosure thresholds? Our paper sheds light on these issues. It presents a model of hedge fund activism and shows how disclosure thresholds affect (i) incentives of activist funds to engage in costly managerial disciplining; (ii) real investment of small uninformed investors; (iii) choices by managers of whether to pursue potentially value-destroying activities.

Activist funds profit from secretly acquiring undervalued stock and selling it at higher prices after they intervene. Share prices typically rise sharply when an activist's presence is revealed because the market anticipates subsequent intervention, and Bebchuk et al. (2015) provide evidence that these post-disclosure spikes in share prices reflect the long-term value

[2]The WLRK (2011) Petition asks the SEC to update Schedule 13D reporting requirements to reduce a 10-day window between crossing the 5% threshold and the initial filing deadline, and to broaden definitions of beneficial ownership. External link to the WLRK (2011) Petition *here*.

[3]The debate is built around interventions by leading academics and important figures in the industry. Examples of law experts promoting reductions in disclosure thresholds include interventions in the *Harvard Law School Forum on Corporate Governance and Financial Regulation*: "Section 13(d) Reporting Requirements Need Updating" and "13(d) Reporting Inadequacies in an Era of Speed and Innovation" by David A. Katz of WLRK in 2012 and 2015 respectively; "Activist Abuses Require SEC Action on Section 13(d) Reporting" and "Proposed Revisions to 13(d) Beneficial Ownership Reporting Rules" by Theodore N. Mirvis of WLRK in 2014 and 2016 respectively. Letters of both the Managed Funds Association and the Alternative Investment Management Association in (2013) to the Canadian Securities Administrators contain arguments by hedge funds against such proposals (external link *here*). Academic work against the WLRK Petition includes Bebchuk and Jackson (2012) and Bebchuk et al. (2013). An example of political intervention in line with the WLRK Petition is reported by *The Wall Street Journal*, December 18, 2017: "Activist Investors' Role Needs More Transparency, SEC Nominee Says"

of intervention. Accordingly, the main source of rents for activist funds is the price change caused by their own interventions, and the value of the shares acquired prior to revealing themselves is key to their profitability (WLRK 2011 Petition, Bebchuk and Jackson 2012; Becht et al. 2017). A disclosure threshold limits the equity position that can be secretly acquired, reducing incentives to intervene. Importantly, the expected levels of activism affect the expected profitability of real investment by uninformed investors. In turn, this real investment affects the value of activist interventions, creating a feedback effect on the incentives of activists to participate. The optimal disclosure threshold policy for each party reflects the tensions faced with regard to the preferred level of market transparency.

Consider the tradeoffs faced by uninformed investors. Higher transparency (a lower disclosure threshold) reduces their trading losses, but it also reduces the willingness of hedge fund activists to intervene. In turn, this encourages management to pursue its own interests at the expense of shareholders. Uninformed investors value binding disclosure thresholds when the expected trading losses saved outweigh the disciplining benefits. They gain from the reduced shares that activists acquire when those shares are not needed to induce activism, but they are harmed when the share limit discourages activism. Their optimal disclosure threshold, when interior, trades these considerations off. In particular, uninformed investors value binding disclosure thresholds whenever the profit elasticity of activism is sufficiently small.

Despite the long-term value of hedge fund activism (Brav et al. 2015; Bebchuk et al. 2015), researchers have found that activist funds tend to have short investment horizons,[4] and that they acquire stock after targeting a firm.[5] We model this by considering a large informed (potential) activist fund that is external to the firm, and whose incentives to incur the cost of intervention are provided by the increase in the value of the stock that he acquires. That is, the activist's sole source of rents is the increase in stock value due to intervention relative to the acquisition price, making activism directly related to block size.[6]

The activist endogenously determines how many shares to acquire. We develop a static dealership model in which a competitive market maker posts prices conditional on the sign of the net order flow. Then the activist trades along with a random, uniformly-distributed measure of shareholders (initial investors) who receive liquidity shocks that force them to sell their shares. The activist's order trades off between the benefits of a larger block size

[4] Brav et al. (2010) finds that the median duration of investment from when the Schedule 13D is filed until divestment is about nine months. Brav et al. (2008) and Boyson and Mooradian (2011) provide more details on the duration of activist hedge funds investment in target companies.

[5] Bebchuk et al. (2013) find that much of an activist's position is built on the day they cross the 5% disclosure threshold.

[6] Shleifer and Vishny (1986) are the first to recognize the positive relation between monitoring incentives and block size, showing that large minority shareholders can alleviate free-riding in the disciplining of corporate management. Edmans and Holderness (2016) review the large literature that follows.

and the costs of the information revealed. This formulation is related in spirit to that in Edmans (2009), who introduces exponentially-distributed liquidity trade. This allows Edmans to solve for informed trade and expected profits in closed form. Here, uniformly-distributed liquidity trade serves the same purpose, delivering simple closed-form solutions. What matters for our analysis and findings are how an activist's ex-ante expected trading profits are affected by disclosure thresholds at the moment the activist decides to intervene.

The second key tension in our model is that the activist's trading profits depend on the value of intervention, which is directly related to real investment—value-enhancing actions in larger companies have bigger impacts. When the expected losses of initial shareholders to the activist are too high relative to the benefits of disciplining management, the ability to secretly acquire too many shares reduces real investment, reducing the profits that an activist can extract. The activist does not internalize the investment feedback effect in his trading because he participates only after initial investment has been sunk. A disclosure threshold can serve as a commitment device for an activist to limit his trade, and thereby raise real investment. Surprisingly, we establish the activist never wants a binding disclosure threshold just because it boosts real investment: as long as managerial malfeasance is sufficiently insensitive to the threat of investor activism, we prove that this tension is always resolved against the investment feedback effect—the activist never wants a binding disclosure threshold.

The negative effect of market opacity on real investment captures the original concerns of the Williams Act (1968), which was designed to "alert investors in securities markets to potential changes in corporate control and to provide them with an opportunity to evaluate the effect of these potential changes".[7] Trading is a zero-sum game in which the activist's expected trading profits represent expected trading losses to uninformed investors. When trading losses outweigh the benefits of monitoring, i.e., when the profit elasticity of activism is small, hedge fund activism harms uninformed investors, causing them to reduce investment. The opposite happens when the profit elasticity of activism is high. By regulating these trading transfers, disclosure thresholds affect real investment. This link between market efficiency and economic efficiency was first made in Bernhardt et al. (1995). Here, we identify twin real effects of informed trade by hedge fund activists: (i) it encourages activists to create value by intervening in underperforming companies, and (ii) it affects real investment.

The third strategic agent is the firm's management. The manager can take a value-destroying action to obtain private benefits, but she incurs a reputation cost if disciplined by the activist. Improvements in the performance and governance achieved by activists often

[7]Quote of the case resolution Wellman v. Dickinson, 682 F.2d 355, 365-66 (2d. Cir. 1982), citing GAF Corp. v. Milstein, 453 F.2d 709, 717 (2d Cir. 1971), cert. denied, 406 U.S. 910 (1972). (External link *here* ). Used in "Section 13(d) Reporting Requirements Need Updating" by David A. Katz of WLRK in *Harvard Law School Forum on Corporate Governance and Financial Regulation*, 2012.

come at the expense of managers and directors who see sharp reductions in compensation and a higher likelihood of being replaced (Brav et al. 2010; Fos and Tsoutsoura 2014). Keusch (2017) finds evidence that following activist campaigns, companies dismiss underperforming CEOs. As a consequence, the threat of being disciplined by an activist improves managerial performance (Gantchev et al. 2017). We capture this mechanism, recognizing the ex-ante disciplining role of hedge fund activists in discouraging managerial malfeasance. Since higher trading transfers make an activist more willing to act *if* management misbehaves, they also induce better behavior by management. We call this the managerial feedback effect.

The managerial feedback benefits uninformed investors, but, paradoxically, by reducing the likelihood that a manager pursues actions that benefit himself at the expense of shareholders, it reduces an activist's opportunities to extract profit from its business of disciplining management. When managers are sensitive to the threat of activism, initial shareholders are happy to increase the block disclosure threshold, as their trading losses are only realized when the activist intervenes, so they are conditional on managers' malfeasance. Raising the disclosure threshold both increases activists' intervention rates (ex-post disciplining) and discourages malfeasance (ex-ante disciplining). The same mechanism represents a tension for an activist fund, which trades off higher conditional trading profits against a lower probability of profiting. When the activism elasticity of malfeasance is sufficiently large, i.e., when managerial feedback is strong, activist hedge funds benefit from tighter disclosure thresholds. Indeed, we establish that whenever activists value a binding disclosure threshold, it is always lower than that preferred by uninformed investors. In effect, the willingness of an activist hedge fund to act discourages excessively—from its perspective, but not shareholders—the desire of management to pursue its own interests at the expense of shareholders. Shareholders gain from an activist's willingness to engage without having to pay in terms of trading costs.

We characterize the socially-optimal disclosure threshold and show that it rarely coincides with the preferred policies of uninformed investors or activists. Society (a regulator) does not internalize the transfer of trading profits from uninformed investors to the hedge fund, caring only about the expected value of the firm net of the cost of capital and the cost of activism. Intuitively, society is not directly concerned about trading in financial markets, but only the indirect real effects of such trading. We show that the socially-optimal disclosure threshold is always weakly between the thresholds preferred by shareholders and the activist hedge fund.

We next relate the paper to the literature. Section 2 studies a simple model of hedge fund activism in which managerial behavior is exogenous. Section 3 introduces blockholder disclosure thresholds and derives the optimal policies for the different parties. Section 4 endogenizes managerial behavior. Section 5 concludes. An Appendix contains all proofs.

## 1.1 Related Literature

This paper contributes to a rapidly growing body of research on hedge fund activism. Shleifer and Vishny (1986) introduced the role of blockholders as monitors of corporate management. More recently, research has focused on the relation between financial markets and the monitoring incentives of blockholders (see Edmans and Holderness, 2016's review).[8] The literature on hedge fund activism underscores that disciplining management often *is* the business of blockholders. The key role of financial markets follows from the strategies of blockholders, who acquire stock in target companies before the price reflects the value of their actions.

We motivate our main modelling assumptions using findings from the empirical literature on hedge fund activism. Collin-Dufresne and Fos (2015) and Gantchev and Jotikasthira (2017) provide evidence that hedge fund activists exploit liquidity sales to purchase stock in target companies. A host of papers document that activist funds enhance the value of companies by disciplining management (Brav et al., 2008; Clifford, 2008; Klein and Zur, 2009; Boyson and Mooradian, 2011; Brav et al., 2015; Bebchuk et al., 2015) through costly interventions (Gantchev, 2013). Brav et al. (2010), Fos and Tsoutsoura (2014) and Keusch (2017) provide empirical foundations for our assumption that managers in target companies are penalized when disciplined by activist funds. Our paper endogenizes firm value by assuming that investors react to the expected value of the company, which is determined by corporate governance. While this relation has not been established in the literature on hedge fund activism, La Porta et al. (2006) and Djankov et al. (2008) find evidence of higher investment in markets with more legal investor protection.

Some of our predictions have empirical support, while others remain to be tested. The model predicts that the stock price reaction that follows disclosure of an activist fund captures the value of their actions (Bebchuk et al., 2015), and that disclosure thresholds constrain their acquisitions (Bebchuk et al., 2013). Gantchev et al. (2017) provides evidence of the ex-ante disciplining effect of hedge fund activism.

Few papers have formally studied hedge fund activism. Our paper recognizes the role of financial markets on the incentives of activists to take positions in a target company and intervene. This property is shared with Back et al. (2018), who characterize the dynamic trading by an activist investor. They follow Kyle (1985) by introducing stochastic liquidity trade that provides camouflage for a blockholder's trades. Back et al. (2018) revisit the classic question of the relationship between liquidity and economic efficiency, and show how the intervention cost function affects outcomes. We simplify the trading process (static) and cost of interven-

[8] Broadly, this can be classified as "exit" (Admati and Pfleiderer, 2009; Edmans, 2009; Edmans and Manso, 2011); "voice" literature in shareholder interventions; and the interaction between the two (Back et al., 2018; Levit, 2018; Fos and Kahn, 2018).

tion (fixed) in order to endogenize investment and study the role of market transparency, i.e., of blockholder disclosure thresholds. In these ways, the two papers complement each other.

Market liquidity plays a key role in our model. The activist fund is initially external to the target company, so liquidity camouflages its purchases of shares and diminishes adverse price impacts, making intervention more profitable. This positive relationship was formalized by Maug (1998) and Kahn and Winton (1998) in the context of general blockholder interventions, and Kyle and Vila (1991) in the context of takeovers.[9]

Other analyses of hedge fund activism share with our paper the core trade-off between the financial benefit of increasing a target company's value (and thus share price) and the cost of intervention. Fos and Kahn (2018) study the relation between ex-ante and ex-post correction effects of hedge fund activism. Our analysis shares with theirs the key distinction between the conditional and unconditional probability of activism, as well as the efficiency gains generated by threats of intervention. Burkart and Lee (2018) compare hedge fund activism with hostile takeovers in a complete information setting, showing that they can be viewed as polar approaches to the free-riding problem of Grossman and Hart (1980). Burkart and Dasgupta (2015) model hedge fund activism as a dual-layered agency model between investors, activists and managers. Activist funds compete for investor flows, which affects their governance as blockholders. In their paper, funds inflate short-term performance by increasing payouts financed by leverage, which discourages value-creating interventions in economic downturns due to debt overhang. Brav et al. (2018) recognize the complementarity of costly interventions by distinct funds in the same target and model the resulting coordination problem.

Our paper is also related to the insider trading literature. In our model, the hedge fund activist is an informed trader that profits from trading with uninformed investors. This reduces the profitability of uninformed investors, who then reduce their investments. Leland (1992) and Bernhardt et al. (1995) first model this mechanism to study the welfare effects of insider trading. This literature focuses on the informational role of prices for investment and anticipation of future trading by uninformed agents with informed traders; our current paper combines this anticipation of future trading with how such informed trading provides incentives for managerial disciplining. A more direct link to the insider trading literature concerns the impact of mandatory disclosure rules for insiders (see Huddart et al. 2001).

Our paper is motivated by a regulatory debate that has been largely overlooked by the finance literature. Many calls for revisions of blockholder disclosure rules have been made by prominent lawyers, hedge funds and academics.[10] Bebchuk and Jackson (2012) provide a

[9] In contrast, Coffee (1991) and Bhide (1993) argue that liquidity facilitates exit when management underperforms, and therefore discourages intervention. In the dynamic analysis of Back et al. (2018), the relationship between liquidity and intervention depends on the structure of the cost function.

[10] *Harvard Law School Forum on Corporate Governance and Financial Regulation* contains a discussion

comprehensive analysis in corporate law of the law and economics of blockholder disclosure thresholds, and Bebchuk et al. (2013) empirically analyse pre-disclosure accumulations of hedge fund activists. In line with their findings, our paper shows that lower disclosure can increase investor value. This is against a widely-held view that higher transparency *must* provide more investor protection,[11] a view that ignores investor protection from activists.

# 2 Hedge Fund Activism

In this section we model hedge fund activism and characterize the inter-linkage with real investment. We consider a firm that raises capital for a project whose value depends on the initial investment by uninformed *investors* and a business plan that may be either good or bad. The *manager* can deliberately adopt the bad business plan in order to obtain private rents at the expense of shareholders. The bad plan reduces value for shareholders unless an outside *activist* hedge fund intervenes to discipline management and implement the good plan. All agents are risk neutral. There are four dates, $t = 0, 1, 2, 3$. There is no discounting.

At date $t = 0$ a continuum of dispersed investors invest capital $k$ in a project with an expected date $t = 3$ payoff of

$$V = f(k)\left[1 - \delta \cdot 1_{\{m=0\}}\right]. \tag{1}$$

Here, $f$ is a standard production technology with $f'(\cdot) > 0$, $f''(\cdot) < 0$, $f'(0) \to \infty$. The indicator function accounts for the business plan $m \in \{0, 1\}$ implemented by the manager at $t = 1$. The good plan ($m = 1$) yields cash flows $f(k)$ to investors. The bad plan ($m = 0$) yields nothing with probability $\delta \in [0, 1]$. Equivalently, the bad plan destroys a fraction $\delta$ of the project's value. Investors are uninformed, unable to distinguish between good and bad business plans. We initially assume that the manager adopts the bad business plan ($m = 0$) with some exogenous probability $z$. Section 4 endogenizes managerial malfeasance. The marginal cost of capital is $r > 0$. Initial investors become shareholders who receive claims to terminal project payoffs that they may trade in a market at $t = 2$. We normalize shares outstanding to have measure one.

At market at $t = 2$ features initial investors who receive liquidity shocks that force them to sell their shares, an activist hedge fund when it identifies that the bad business plan was adopted (and by acting can change this plan) and a competitive market maker. The market

of interventions by different parties.

[11] See Schouten and Siems (2010) and references therein for the corporate law literature; and see La Porta et al. (2006) and Djankov et al. (2008) for papers in the economics literature that use ownership disclosure rules in an index of investor protection.

maker posts prices $\{P_l, P_h\}$ that break even in expectation conditional on the sign of the net order flow, and then traders place orders. Orders are executed at the low price $P_l$ if sell orders exceed buy orders, i.e., if net order flow is negative; and they are executed at the high price $P_h$ if buy orders exceed sell orders, i.e., if net order flow is positive. We assume that the amount of liquidity-driven sell orders $l$ is drawn from a uniform distribution on $[0, b]$. We let $x(l)$ denote the associated density, and observe that $b \in [0, 1]$ is a measure of market liquidity—when $b$ is larger, an activist can submit a larger buy order with reduced risk of being uncovered by the market maker. The activist fund is an outsider to the firm that has no initial stake but can acquire shares if it identifies managerial malfeasance that it can address, allowing it to profit. The activist identifies managerial malfeasance when it occurs with probability $\lambda$. The activist can discipline management by incurring a fixed cost $c$, forcing the firm to shift from the bad business plan to the good one. The activist privately observes this cost $c$. Other market agents share a common prior that $c$ is distributed on $[0, C]$ according to a strictly positive and weakly decreasing density $g$ and associated cumulative function $G$. The activist chooses how many shares $\alpha \in [0, 1]$ to acquire, which we term his *position*. We denote net order flow by $\omega = \alpha - l$: $\omega$ equals the difference between liquidity sales and the position acquired by the activist. Thus, orders are executed at $P_l$ when $\omega \leq 0$ and at $P_h$ when $\omega > 0$.

To ease presentation, we assume that the activist cannot act as a mere inside trader, only intervening when $m = 0$. In Appendix B we show that the assumption does not qualitatively affect our results.[12] For simplicity we also assume that the activist disciplines management whenever he takes a position in the firm; i.e., he does not "cut-and-run" by selling his shares before engaging with management.[13]

At $t = 3$, the project delivers cash flows $f(k)$ if the manager implemented the good plan or if the activist disciplines the manager. Otherwise, expected cash flows are $(1 - \delta) f(k)$. Figure 1 summarizes the timing of events.

The parameters $\delta$ and $z$ capture the severity of the agency problem between management and ownership. If $\delta = 0$, both business plans yield cash flows $f(k)$, so there are no frictions between investors and the manager, and thus no room for managerial disciplining; and if $z = 0$ the manager always implements the good business plan. In contrast, $\delta > 0$ and $z > 0$ imply that the manager may destroy shareholder value to obtain private benefits, creating a potential role for hedge fund activism. In Section 4 we endogenize the probability $z$ that

[12] Appendix B allows the activist to acquire stock when the business plan is good ($m = 1$) and there is no need for him to intervene. This *increases* his information rents without affecting the net value of the project. This hurts uninformed investors reducing their investment.

[13] Cutting and running becomes unattractive when it impairs the reputation of activist funds, which Johnson and Swem (2017) find to be important for their profitability. Empirical evidence shows that hedge fund activism increases the value of target companies via costly disciplining (see Gantchev (2013) for the costs of activism, and Bebchuk et al. (2015) for evidence on the value of hedge fund activism).

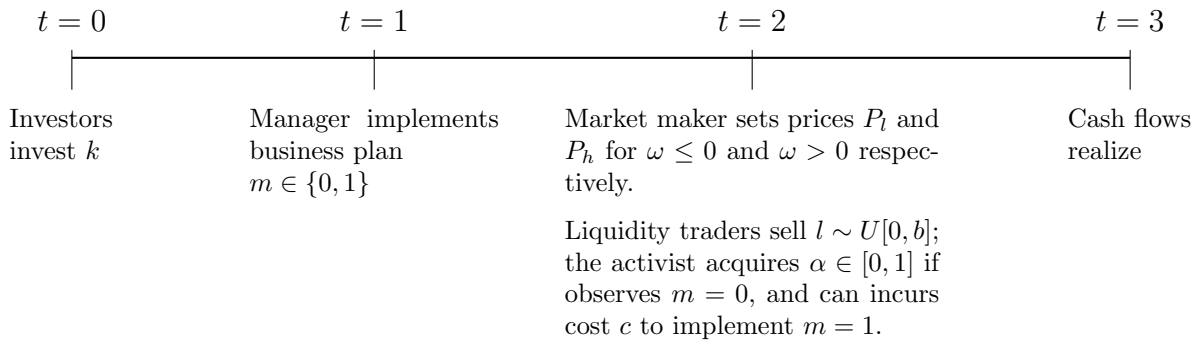


Figure 1: Time line

the manager implements the bad business plan.

We assume that the activist correctly identifies the good business plan and can discipline management at cost $c$,[14] and that the activist buys shares in the target company at a single time where shareholders (investors) face liquidity shocks. In practice, these processes are dynamic,[15] with uncertain costs[16] and outcomes.[17] We abstract from these mechanics to study the incentives provided by financial markets. What matters for our analysis are the *expectations* that the activist forms about these costs and outcomes at $t = 2$ when deciding *whether* to attempt to discipline management. The decision is based on the balance between *expected* financial benefits and engagement costs, and the likely dynamic price impacts of trading—and not the particular paths that can be realized given a decision to move forward.

Our static trading model preserves the fundamental property that there is an adverse price effect via trading that reveals information to the market (see, e.g., Bebchuk and Jackson, 2012). The continuum of random liquidity sales $l$ allows us to endogenize the activist's position $\alpha$. The uniform distribution yields a simple closed-form solution for this position and provides an intuitive interpretation of stock sales and purchases in terms of firm's shares. The continuum of liquidity shocks differentiates our model from most corporate finance models that feature simple discrete (typically binary) levels of liquidity trade.

[14] In practice, the intervention cost $c$ depends on factors such as an activist's ability to coordinate with other shareholders and managerial entrenchment. See Back et al. (2018) for how different functional forms for intervention costs affect the incentives to intervene in a dynamic setting.

[15] The dynamics of stock acquisition have been studied in the insider trading literature (see Collin-Dufresne and Fos 2016 and references therein). With regard to hedge fund activism, Collin-Dufresne and Fos (2015) find evidence that activist funds select times of higher liquidity when they trade, while Back et al. (2018) analyse the incentives of "exit" versus "voice" during the trading process.

[16] For an analysis of the engagement process see Gantchev (2013), who builds a sequential decision model to estimate the costs of proxy fights and other stages of shareholder activism. See Becker et al. (2013) for details on the costs of launching a proxy fight.

[17] Becht et al. (2017) distinguish two points in time when activist funds profit from a change in stock prices due to their intervention. First, the initial position disclosure captured in our analysis. Second, the realization of the outcome of their campaign, which in our paper is always positive and hence conveys no new information.

For tractability we consider a stock market where the market maker posts two prices before receiving orders, similar to a bid and an ask price, executing all transactions at the same price. In Appendix C we consider an alternative distributional and timing formulation that is a variant of that in Edmans (2009), who also endogenises informed trading in a static setting. Edmans assumes exponentially-distributed liquidity purchases to characterize the sales of an informed blockholder. Here, because one needs to deal with *shares* of a firm (of which there is a finite measure that we normalize to one), we assume that cumulative liquidity trade (investor sales) is given by $\gamma Y(l)$, where $Y(l) = 1 - e^{\mu l}$ is the cdf of an exponential distribution. The activist chooses the equity position $\gamma Y(\alpha)$ to acquire in the firm, and the market maker sees $\omega = \alpha - l$ and then sets price equal to the expected project payoff given $\omega$, i.e., the market maker breaks even in expectation. All qualitative findings extend in this setting.

## 2.1 Market Equilibrium

We solve recursively for the perfect Bayesian Nash equilibrium. At $t = 2$, real investment has been sunk by uninformed investors and is observable to all parties, the manager adopted the bad business plan with probability $z$, and the activist observes malfeasance with probability $\lambda$. A competitive risk-neutral market maker posts prices $P_l$ and $P_h$ for net sales and net purchases; then uninformed investors receive liquidity shocks and trade simultaneously with the activist. At $t = 0$, investors anticipate the subsequent events and invest capital.

### 2.1.1 Trading

Proposition 1 summarizes the Bayesian Nash equilibrium in the subgame at date 2. The market maker sets prices that earn it zero expected profits given the activist's decisions, and the activist participation and trade is optimal given the prices posted by the market maker.

**Proposition 1** *At $t = 2$ real investment is sunk and observable to all parties. The market maker posts the following prices*

$$\begin{aligned} P(\omega) = P_l &\equiv \left[\tfrac{2[1-z(1-\lambda G(c_t^*))\delta]-z\lambda G(c_t^*)}{2-z\lambda G(c_t^*)}\right] f(k) \quad \text{if} \quad \omega \leq 0 \\ P(\omega) = P_h &\equiv f(k) \qquad\qquad\qquad\qquad\qquad\quad \text{if} \quad \omega > 0. \end{aligned} \tag{2}$$

*After prices are posted, $l \sim U[0, b]$ initial investors sell their shares. If the activist observes managerial malfeasance ($m = 0$) and the cost of activism is sufficiently small, $c \leq c_t^*$ where*

$$c_t^* = z\left[\frac{1-\lambda G(c_t^*)}{2-z\lambda G(c_t^*)}\right]\frac{b}{2}\delta f(k), \tag{3}$$

*then he takes a position*

$$\alpha^* = \frac{b}{2} \tag{4}$$

*and disciplines management. Otherwise the activist does not participate.*

A full proof is in Appendix A; here we provide the key intuition. The market maker has a conjecture about the size $\alpha$ of the activist's position conditional on participating. In equilibrium, this conjecture is correct. The market maker uses Bayes rule to set prices $P_l$ and $P_h$. Letting $a_1$ denote activism and $a_0$ denote the absence of activism, the market maker's pricing rule is given by

$$\begin{aligned} P(sgn(\omega)) &= E\left[V|sgn(\omega)\right] \\ &= \Big[\Pr\left[a_1|sgn(\omega)\right]\Pr\left[V=f\left(k\right)|a_1\right]+\Pr\left[a_0|sgn(\omega)\right]\Pr\left[V=f\left(k\right)|a_0\right]\Big]f\left(k\right), \end{aligned} \tag{5}$$

where $sgn(\omega)$ denotes the sign of net order flow.

A net buy order $\omega > 0$ reveals with probability one that the activist took a position, in which case the project is sure to pay $f(k)$. That is, $\Pr\left[a_1|\omega>0\right]=1$ and $\Pr\left[V=f\left(k\right)|a_1\right]=1$. In contrast (weakly) net sell orders $\omega \leq 0$ are consistent with both the presence and the absence of activism, and allow the activist to extract information rents from uninformed investors. Conditional on the activist buying $\alpha$ shares when participating, the expected value of the project when there is a net sale of stock is

$$P_{l(\alpha)} = \left[\frac{b-\alpha z\lambda G(c_t)-bz(1-\lambda G(c_t))\delta}{b-\alpha z\lambda G(c_t)}\right]f(k). \tag{6}$$

When the activist participates and liquidity shocks outweigh the number of shares that he buys, i.e., when $l \geq \alpha$, there is a net supply of shares and the activist acquires the stock below its true value at $P_l < f\left(k\right)$. If, instead, $l < \alpha$, there is a net demand for stock and the activist pays $P_h$ for each share, making no profit. The probability that the activist camouflages his share purchase with liquidity sales is $\int_\alpha^b \frac{1}{b}dl = \frac{b-\alpha}{b}$. It follows that his expected gross profits conditional on buying $\alpha$ shares are

$$E[\Pi_A|a_1] = \left(\frac{b-\alpha}{b}\right)\alpha\left[f(k)-P_l\right]. \tag{7}$$

Inspection of (7) reveals that the activist faces a trade-off between the number of undervalued shares that he may acquire $\alpha$ and the expected cost of information revelation $\frac{b-\alpha}{b}$. This captures adverse price effects by which the expected stock price paid by the activist rises as he buys more shares. The activist's expected trading profits in (7) are maximized

by a share purchase of $\alpha^* = b/2$; the price $P_l$ in (2) is obtained by evaluating (6) at $\alpha = \alpha^*$. Greater liquidity $b$ makes it easier for the activist to camouflage his trade, encouraging him to acquire a larger position.[18]

If the activist observes managerial malfeasance, he disciplines management when doing so is expected to be profitable, i.e., when $E[\Pi_A|a_1] \geq c$. This relation pins down the activist's cost participation cut-off in equilibrium:

$$c_t = (b - \alpha)\alpha z \left[\frac{1 - \lambda G(c_t)}{b - \alpha z \lambda G(c_t)}\right] \delta f(k), \tag{8}$$

which takes the form in (5) when evaluated at the optimal position of $\alpha^* = b/2$, i.e., $c_t^* \equiv c_t(\alpha^*)$.[19] The cut-off $c_t$ is unique.[20] In equilibrium, the activist employs a threshold strategy such that, conditional on observing malfeasance, he buys $\alpha^*$ shares and disciplines management if and only if $c \leq c_t^*$.

Analysis of (8) reveals that the cut-off $c_t$ is maximized by a position that exceeds $\alpha^*$. Price function $P_{l(\alpha)}$ in (6) decreases with the activist position reflecting that the bigger the stock purchase conditional on participating, the less likely is activism from the market maker's perspective given a net sale of stock $\omega \leq 0$. We call this mechanism *market feedback* and it is not internalized by the activist because prices are set before traders place orders.[21] Corollary 2 captures a direct consequence of our argument.

**Corollary 2** *Given initial investment $k$, the activist would maximize gross expected profits and participation by committing to a larger position $\alpha^{**} \in (\alpha^*, b)$ when participating before prices were posted.*

The characterization of $\alpha^{**}$ is in Appendix A, which also shows that $c_t$ in (8) increases with $\alpha$ for $\alpha < \alpha^{**}$ and decreases for $\alpha \in (\alpha^{**}, b]$. If the activist could commit to a more aggressive trade, he would benefit from both a lower price and a larger number of undervalued shares whenever his stock purchase was concealed by liquidity sales, which would occur with a smaller probability. In equilibrium, the inability to commit leads the activist to acquire a smaller position $\alpha^*$ when he participates.

[18] The positive relation between informed trading and market liquidity has long been studied in the literature. See Bond et al. (2012)'s review of the role of liquidity in the real effects of financial markets, and the review by Edmans and Holderness (2016) of the effect of liquidity in the context of blockholder interventions.

[19] To obtain (8) set $c_t = E[\Pi_A|a_1]$ using the expression in (7) substituting for the price $P_{l(\alpha)}$ in (3).

[20] To verify uniqueness note that the left-hand side of (8) increases in $c_t$ and the right-hand side decreases in $c_t$ for $\alpha \leq b$.

[21] The inability to internalize market feedback arising from equilibrium prices remains if prices and trading orders are determined simultaneously. This property is shared by other static dealership models that endogenize the informed trading of a large blockholder, e.g., Edmans (2009). *This* market feedback is not mentioned in Edmans (2009), although it underlies the characterization of equilibrium trade.

The cut-off $c_t^*$ captures two key equilibrium features. First, it represents the activist participation threshold, and thus the extent of managerial disciplining. The probability that the activist intervenes to discipline the manager after observing the manager taking an action that reduces shareholder value is $G(c_t^*)$. Thus, a higher $c_t^*$ implies superior governance. Second, $c_t^*$ captures the activist's expected conditional trading profits. In equilibrium, the activist's expected trading profits *equal* the expected trading losses of uninformed investors because trading is a zero-sum game in which the market maker expects to break even. Thus, $c_t^*$ represents the expected transfer of trading profits from uninformed investors to the activist conditional on the activist intervening.

Conditional trading transfers $c_t^*$ increase with investment $k$: The greater is real investment, the greater is the project value, and hence (i) the more valuable is managerial disciplining, and (ii) the more profitable it is for the activist to intervene. Two assumptions drive this result. First, the cost of activism is independent of the company's value, so the incentives for disciplining are positively related to stock ownership (Shleifer and Vishny 1986).[22] Second, because the value enhanced by the intervention is multiplicative, rather than additive, the relevant measure of incentives is the activist's *dollar* ownership, not its *share* ownership (Edmans and Holderness 2016).[23]

These conditional trading transfers $c_t^*$ also rise with market liquidity $b$. High liquidity increases activist trading profits and thus the probability $G(c_t^*)$ that the activist finds it profitable to discipline management. In line with Kahn and Winton (1998) and Maug (1998), higher liquidity allows the activist to increase his position with a reduced risk of discovery, thereby encouraging intervention. Back et al. (2018) model the dynamics of position building by activist funds and show the potentially positive effects of liquidity. Consistent with this, Collin-Dufresne and Fos (2015) and Gantchev and Jotikasthira (2017) provide evidence that activist funds camouflage their purchases with liquidity trades by other parties.

### 2.1.2 Investment

At $t = 0$, uninformed investors anticipate trading outcomes and activism levels, and invest capital so as to maximize expected profits. In addition to the investment decision, Proposition 3 characterizes expected project payoffs and how they are split among market participants in expectation at $t = 0$. This sets the ground for the analysis of the key interacting forces in the model and the introduction of blockholder disclosure thresholds.

[22] Brav et al. (2018) argue that it can be harder for activists to intervene in larger companies due to credit constraints. Our model can be modified to provide a similar prediction in the presence of financial constraints.

[23] In the related context of CEO incentives, Baker and Hall (2004) and Edmans et al. (2009) show theoretically that a CEO's dollar ownership and not percentage ownership is relevant when the CEO has a multiplicative effect on firm value.

**Proposition 3** *The expected value at $t = 0$ of the project given investment $k$ is*

$$E[V] = [1 - z(1 - \lambda G(c_t^*))\delta]f(k) \equiv \pi_V f(k). \tag{9}$$

*The expected gross profits of the activist are:*

$$E[\Pi_A] = z\lambda G(c_t^*)\frac{c_t^*}{f(k)}f(k) \equiv \pi_A f(k). \tag{10}$$

*The expected gross profits of uninformed investors are:*

$$E[\Pi_I] = (\pi_V - \pi_A)f(k) \equiv \pi_I f(k). \tag{11}$$

*The investment $k$ by uninformed investors solves*

$$\pi_I f'(k) - r = 0. \tag{12}$$

Total expected cash flows are the product of $f(k)$ and the probability $\pi_V \in [0, 1]$ that the project succeeds. Proposition 2 reveals that expected total rents are split between the activist and uninformed investors in proportions $\pi_A/\pi_V$ and $\pi_I/\pi_V$ respectively. This follows because the market maker earns zero expected profits, which means that activist trading profits are extracted one-for-one from uninformed investors. The expected gross profits of the activist equal the product of the unconditional probability that he participates $z\lambda G(c_t^*)$ and the expected trading profits $c_t^*$ from participating. Uninformed investors obtain, in expectation, the rest of the "pie", $(\pi_V - \pi_A) f(k)$. Real investment, characterized by (12), maximizes the ex-ante expected profits of uninformed investors at date 0.

Proposition 3 shows that activism has an impact on real investment via its effect on the expected profits of uninformed investors. Investors face a tension as to their preferred extent of activism, where the extent of activism is captured by $G(c_t^*)$. Higher transfers of trading profits $c_t^*$ increase the proportion of cash flows taken by the activist in expectation $\pi_A$, reducing the investors' portion $\pi_I$. However, higher trading transfers also incentivize activist participation, and the increased managerial discipline raises total expected cash flows $\pi_V f(k)$. As a result, greater trading transfers $c_t^*$ to activists need not hurt uninformed investors. In particular, activism fosters real investment when investor gains from managerial disciplining outweigh the associated trading losses, and it discourages real investment otherwise.

This mechanism underscores the *investment feedback effect* faced by the activist. The value of activism is directly related to the size of the project—the profitability of the activist grows with real investment, i.e., $c_t^*$ grows with $k$. But, expected levels of activism affect

investment. Therefore, expected activism affects real investment, which, in turn, affects the extent of activism. Crucially, the activist does not internalize this investment feedback in his trading decision at $t = 2$, because real investment has already been sunk. Thus, when the activist participates, he takes a position $\alpha^*$ to maximize *conditional* expected profits (7), i.e., for a given $k$, rather than *unconditional* expected profits (10).

Our analysis identifies novel strategic interactions between uninformed investors and activist funds. The linkage between investment and trading profit transfers is similar to that found in papers studying the real effects of informed trading (Leland 1992; Bernhardt et al. 1995). We incorporate a new element: the informed trader is an activist fund who can increase investment value by alleviating agency problems between owners and managers (Brav et al. 2008; Klein and Zur 2009, Brav et al. 2015; Bebchuk et al. 2015). The effect of hedge fund activism on real investment is thus twofold: Informed trading reduces the profitability of uninformed investors who respond with lower investment; but it also encourages the intervention of activist funds that discipline management, thereby incentivizing investment.

# 3 Blockholder Disclosure Thresholds

Blockholder disclosure thresholds are rules that require a shareholder to disclose stock holdings once they reach a certain fraction of the overall voting rights in a publicly-traded firm. In recent years, hedge fund activism has led some market participants and commentators to call for an expansion of these rules. We briefly describe the institutional framework, and then derive the optimal threshold policies for investors, hedge fund activists and society.

## 3.1 Institutional Framework and Regulatory Debate

A key concern for financial regulators is the protection of minority shareholders against dominant shareholders. Ownership disclosure rules are considered to be one such protection mechanism. The OECD's Principles of Corporate Governance of 2004 advocate that "one of the basic rights of investors is to be informed about the ownership structure of the enterprise" (OECD, 2004). In the US, the disclosure of "beneficial ownership" is regulated by the Williams Act of 1968, passed in response to a wave of hostile takeover attempts, mostly through tender offers.[24] In Europe, the EU Transparency Directive of 2004 claims that the disclosure of major holdings in listed companies should enable investors to acquire or dispose of shares in full knowledge of changes in the voting structure (EC, 2004). Along with other corporate transparency rules, blockholder disclosure thresholds are set to prevent the

[24]See Nagel et al. (2011) for a more extensive analysis and detailed arguments.

expropriation of rents by large shareholders that gain influence or control of their companies at the expense of uninformed investors.[25]

Investor protection is key to increasing confidence and encouraging real investment. For instance, the EU Transparency Directive belongs to a range of measures that aim, among other things, to enable issuers to raise capital on competitive terms across Europe (Schouten 2010). La Porta et al. (2006) and Djankov et al. (2008) provide evidence that greater legal protection of investors is associated with more developed financial markets. Both studies construct protection indices that include ownership disclosure rules. Our paper captures the link between investor protection and investment, but it challenges the extended view on the relationship between corporate transparency and protection. Our earlier analysis shows that the ability to secretly acquire stock encourages activist funds to discipline management, alleviating agency problems between uninformed investors and managers, consistent with the empirical evidence that hedge fund activists enhance the value of their target companies.

Blockholder disclosure thresholds differ across financial systems. For example, investors that intend to introduce corporate changes in US publicly-listed companies must fill a 13(d) file when their holdings reach 5% of voting rights. In Canada, equivalent disclosure of ownership is not required until a 10% stake is acquired. In the EU, Germany recently reduced the threshold to 3%, which is also the cutoff in the UK, while the threshold in France remains at 5%. Regulation across jurisdictions also differs in such elements as the time window to report acquisitions, the information that must be disclosed, and the types of securities subject to disclosure.[26] Schouten and Siems (2010) identify a historical trend and convergence towards greater ownership disclosure, i.e., towards lower thresholds. Yet, despite the vast potential impacts of small differences in these rules, it remains unclear what brings regulatory bodies to set a disclosure threshold of, for instance, 5% rather than 2% or 10%; and Edmans and Holderness (2016) ask why regulators (and researchers) tend to focus on measures of percentage ownership and neglect those of absolute ownership.

The increasing importance of hedge fund activism has altered the regulatory debate. Broadly, ownership disclosure rules were set to inform investors about stock acquisitions that can result in takeovers or proxy fights. The WLRK (2011) Petition argued that these rules no longer serve their purpose because activist funds can gain control of target companies with small positions. Several academics opposed the petition arguing that hedge fund activism increases the value of target companies and hence has positive externalities for other investors. According to Bebchuk and Jackson (2012) this was at the heart of the Williams

[25] See Edmans and Holderness (2016) for a review of the literature on the costs imposed by blockholders that pursue their own private benefits.

[26] "Stakebuilding, mandatory offers and squeeze-out comparative table" by Practical Law, of Thomson Reuters provides a synthesis of ownership disclosure rules in financial systems. External link to the table *here*.

Act, which considered that outside investors who acquire large blocks of stock "should not be discouraged, since they often serve a useful purpose by providing a check on entrenched but inefficient management." The debate is not confined to the US. For instance, in Canada, a recent proposal to reduce the disclosure threshold from 10% to 5% was opposed by two major associations of investment funds that argued "the lower threshold will make share acquisitions by engaged investors more expensive and, in many circumstances, too costly to justify the resources, time and effort for such activity. This, in turn, will chill the market for engaged investing, and erode the benefits of the value creation that results from having shareholder engagement" (MFA and AIMA 2013).

## 3.2 Optimal Policies

We now show how blockholder disclosure thresholds can regulate the level of hedge fund activism, deriving the optimal policies for investors, activist and society. Ownership disclosure rules may limit the number of undervalued shares that the activist can acquire, reducing his incentives to participate. If a legal disclosure threshold $\overline{\alpha}$ is implemented, an activist must publicly announce his position when it crosses the threshold. Then the activist has no incentive to establish a larger position because doing so would reveal his presence causing the stock price to rise to $P_h = f(k)$, which would eliminate his information rents, rendering intervention unprofitable.[27] Corollary 4 follows immediately:

**Corollary 4** *A disclosure threshold $\overline{\alpha}$ is binding if and only if $\overline{\alpha} < \alpha^*$. In equilibrium, when a disclosure threshold binds the activist sets $\alpha = \overline{\alpha}$.*

The activist's conditional trading profits $c_t(\alpha)$ in (8) increase with his position for $\alpha < \alpha^*$.[28] Thus, when the activist participates, he acquires a position $\alpha = \min\{\overline{\alpha}, \alpha^*\}$. The mechanism implies that for a given firm characterized by $f(k)$, a binding threshold necessarily reduces both the profits and extent of hedge fund activism. To see this, let $\overline{c}_t$ represent the trading profits, and hence participation cut-off, associated with a position determined by a binding threshold $\overline{\alpha} < \alpha^*$.[29] Because trading profits increase in $\alpha$, activism is now less profitable, i.e., $\overline{c}_t < c_t^*$, making the activist less likely to participate, i.e., $G(\overline{c}_t) < G(c_t^*)$.[30] A direct consequence is that managerial malfeasance is more likely to destroy value. This

[27] This price reaction is consistent with evidence by Bebchuk et al. (2015) that the stock-price spike that follows disclosure reflects the long-term value of the intervention.

[28] Corollary 2 shows that $c_t$ in (8) increases with $\alpha$ for $\alpha < \alpha^{**}$ where $\alpha^* < \alpha^{**}$.

[29] The cut-off $\overline{c}_t$ is obtained by substituting $\alpha = \overline{\alpha}$ into (8), i.e., $\overline{c}_t \equiv c_t(\overline{\alpha})$ . Note that a binding threshold determines the activist's conditional trade ex ante, so, in equilibrium, the market maker sets a price $P_{l(\overline{\alpha})}$ for net sell orders $\omega \leq 0$ when $\overline{\alpha} < \alpha^*$.

[30] It follows from the analysis in Section 2 that $\overline{c}_t = (b - \overline{\alpha})\overline{\alpha}z\left[\frac{1-\lambda G(\overline{c}_t)}{b-\overline{\alpha}z\lambda G(\overline{c}_t)}\right]\delta f(k) < c_t^*$.

mechanism is consistent with arguments against expanding ownership disclosure rules (see Section 3.1). However, our paper shows that they only comprise part of the overall effect.

The argument is incomplete because it neglects the effects of a disclosure threshold on real investment. Changes in expected levels of activism at $t = 2$ also alter real investment at $t = 0$, which, in turn, affects the activist's incentives to participate. A binding disclosure threshold reduces the conditional transfer of trading profits from investors to the activist, which may incentivize real investment, creating a positive investment feedback that can increase activism.

Proposition 5 derives the consequences of blockholder disclosure thresholds by characterizing the ordering of the optimal disclosure threshold policies for investors, the activist and a welfare-maximizing regulator representing society. We denote these policies $\overline{\alpha}_I$, $\overline{\alpha}_A$ and $\overline{\alpha}_R$ respectively. We present our results as a function of the *profit elasticity of activism*,

$$\varepsilon_a(c_t) = \frac{\partial G\left(c_t\right)}{\partial c_t} \frac{c_t}{G(c_t)}.$$

Here, $\varepsilon_a$ captures the responsiveness of activism to informed trading: the higher is $\varepsilon_a$, the bigger is the increment in the probability that the activist intervenes $G(c_t)$ in response to a marginal increase in expected trading profits $c_t$. Absent a binding disclosure threshold, when the activist participates he buys $\alpha^*$ shares, earns expected gross profits $c_t^*$, and the profit elasticity of activism is $\varepsilon_a\left(c_t^*\right) \equiv \varepsilon_a^*$.

**Proposition 5** *There exists cutoffs* $\varepsilon_a^{*R} \equiv -\left(\frac{c_t^*}{\delta f(k) - c_t^*}\right)\left[\frac{\frac{df(k)/d\alpha}{f(k)}}{\frac{dc_t^*/d\alpha}{c_t^*}}\right]$ *and* $\varepsilon_a^{*I} \equiv \left(\frac{c_t^*}{\delta f(k) - c_t^*}\right)$, *on the profit elasticity of activism where* $\varepsilon_a^{*R} < \varepsilon_a^{*I}$ *such that*

1. *No one benefits from a binding disclosure threshold if the profit elasticity of activism is sufficiently high:* $\varepsilon_a^* \geq \varepsilon_a^{*I} \Rightarrow \alpha^* \leq \{\overline{\alpha}_I, \overline{\alpha}_A, \overline{\alpha}_R\}$.

2. *Only investors benefit from a binding disclosure threshold if the profit elasticity of activism is intermediate:* $\varepsilon_a^{*R} \leq \varepsilon_a^* < \varepsilon_a^{*I} \Rightarrow 0 < \overline{\alpha}_I < \alpha^* \leq \{\overline{\alpha}_A, \overline{\alpha}_R\}$.

3. *Both investors and society gain from a binding disclosure threshold if the profit elasticity of activism is low, with investors gaining more:* $\varepsilon_a^* < \varepsilon_a^{*R} \Rightarrow 0 < \overline{\alpha}_I < \overline{\alpha}_R < \alpha^* \leq \overline{\alpha}_A$.

Figure 2 illustrates the results; a full proof is in Appendix A. Optimal disclosure threshold policies are characterized by the first order conditions (FOCs) of net profit functions with respect to the activist position $\alpha$. Corollary 4 implies that when the optimal position is less than $\alpha^*$, it can be achieved in equilibrium by a binding disclosure threshold.

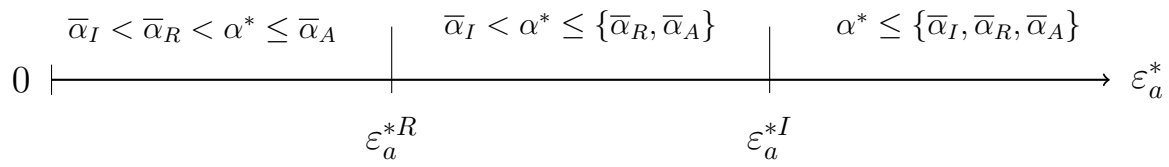


Figure 2: Optimal Disclosure Thresholds

Uninformed investors maximize $\pi_I f(k) - rk$. The associated FOC reveals that they benefit from a binding disclosure threshold if and only if

$$g(c_t^*)\left[\delta f(k) - c_t^*\right] < G(c_t^*), \tag{13}$$

which can be rearranged to $\varepsilon_a^* < \varepsilon_a^{*I}$. The left-hand side (LHS) represents the marginal benefits to uninformed investors of increasing the transfer of trading profits to the activist when $\alpha = \alpha^*$, i.e., for $c_t^*$. Higher transfers cause the probability that the activist participates conditional on observing managerial malfeasance to rise by $g\left(c_t^*\right)$. The associated benefit for investors is the difference between the total value enhanced by the activist $\delta f(k)$ and their trading losses $c_t^*$. The right-hand side (RHS) captures the conditional loss from marginally higher transfers: with probability $G(c_t^*)$ the activist would have participated anyway, even if expected trading profits had not increased.

A binding disclosure threshold $\overline{\alpha}$ reduces transfers of trading profits, $c_t(\overline{\alpha}) \equiv \overline{c}_t < c_t^*$. Equation (13) shows that this raises the marginal benefits to investors of activism (LHS) and reduces the associated losses (RHS), increasing marginal profitability. Equivalently, a binding threshold raises the profit elasticity of activism $\varepsilon_a$, and it requires less trading transfers from investors to encourage higher activism. Transfers of trading profits are the cost that investors incur in exchange for managerial discipline, and this cost rises with the extent of activism.

The optimal extent of activism for investors solves this FOC: $\overline{\alpha}_I$ solves $\varepsilon_a = c_t / \left[\delta f(k) - c_t\right]$ when $\varepsilon_a^* < \varepsilon_a^{*I}$. Full disclosure is never optimal. If the activist cannot acquire stock secretly, trading profits and hence transfers vanish, i.e., if $\alpha \to 0$ then $c_t \to 0$. But then the activist never participates. Then, the marginal benefits of discipline for investors outweigh the corresponding trading losses, i.e., $g(c_t)\left[\delta f(k) - c_t\right] > G(c_t)$. Thus, uninformed investors always benefit from some degree of market opacity, i.e., $\overline{\alpha}_I > 0$: the marginal profitability to uninformed investors of activism is always positive whenever $\overline{\alpha}_I$ is sufficiently small.

The optimal extent of activism can be achieved by a disclosure threshold when the corresponding trading transfers are lower than those in the unconstrained equilibrium, i.e., when (13) holds, but not otherwise. The mechanism highlights the asymmetric role of disclosure rules, which can only limit, but not foster, informed trading. If, absent regulation, the

marginal profitability of activism for investors is positive, i.e., if (13) is not satisfied, the desired extent of activism cannot be achieved and the optimal policy is non-binding, i.e., $\overline{\alpha}_I \geq \alpha^*$. We discuss below the role of market liquidity, which determines $\alpha^*$ and thus whether a particular disclosure threshold binds.

Our argument builds on the result that transfers of trading profits increase with the activist's position, i.e., $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$. It follows that restricting $\alpha$ reduces $c_t$. *This is not immediate.* We earlier established that the activist faces an investment feedback effect that he does not internalize. In particular, the activist's position at $t = 2$ influences initial investment $k$, and this determines the trading profits from a given position $\alpha$. A binding disclosure threshold regulates the number of shares that the activist buys in equilibrium. We have

$$\frac{dc_t}{d\alpha} = \underbrace{\frac{\partial c_t}{\partial \alpha}}_{\text{mg. net trading transfer}} + \underbrace{\frac{\partial c_t}{\partial k}\frac{\partial k}{\partial \alpha}}_{\text{investment feedback}}. \tag{14}$$

Net trading transfers capture the effect of the activist's position on transfers at $t = 2$ for a given investment $k$. Corollary 2 revealed that $\frac{\partial c_t}{\partial \alpha} > 0$ for $\alpha < \alpha^{**}$, even though the activist takes a position $\alpha^* < \alpha^{**}$ in the absence of a disclosure threshold (Proposition 1). The investment feedback effect captures the impact of the activist's position on real investment $\frac{\partial k}{\partial \alpha}$, and hence on trading transfers $\frac{\partial c_t}{\partial k}$. Real investment always raises trading transfers, and thus the extent of activism, i.e., $\frac{\partial c_t}{\partial k} > 0$. However, the activist's position $\alpha$ might be large enough to hurt investors, who respond by reducing investment. That is, if $\alpha > \overline{\alpha}_I$ then $\frac{\partial k}{\partial \alpha} < 0$, and the effect of a larger position on trading transfers is determined by the balance of two opposing forces: positive net transfers and a negative investment feedback. We show that, surprisingly, the tension is always resolved against the investment feedback effect, so $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$.

This result reflects the subordinated nature of investment feedback with respect to the direct impact of trading transfers. Intuitively, these transfers lead the activist to take a position $\alpha^*$, which, in turn, affects investment. If the reduction of investment from increasing $\alpha$ was strong enough to reduce the activist's trading profits, i.e., if $\frac{dc_t}{d\alpha} < 0$, then it would also increase investor profits because $g(c_t)\left[\delta f(k) - c_t\right] < G(c_t)$ when $\frac{\partial k}{\partial \alpha} < 0$. But then investors would *increase* investment, not reduce it, benefiting activists. Because trading transfers are the activist's sole source of income, this mechanism explains why he never benefits from a binding disclosure threshold:

**Corollary 6** *Negative investment feedback reduces the positive impact of increasing the activist position on trading profits $c_t$ and thus on the extent of activism $G(c_t)$. However, it does not alter the sign of the impact, i.e., $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$: the activist never benefits from a blockholder disclosure threshold just because it boosts investment.*

Thus, when investors seek a binding disclosure threshold $\overline{\alpha}_I < \alpha^*$, a conflict of interest arises between them and the activist. An activist position that exceeds $\overline{\alpha}_I$ harms investors, reducing real investment. This, in turn, reduces the profitability of activism and the levels of managerial discipline (negative investment feedback). Nonetheless, the investment response is never strong enough to outweigh the net positive effect of additional shares on activist profits. Therefore, the activist never wants a binding disclosure threshold to increase investment.

Society maximizes total expected value net of the costs of capital $rk$ and the expected costs of activism $z\lambda G\left(c_t\right) E[c|c \leq c_t]$. Society gains from a binding disclosure threshold if

$$z\lambda g\left(c_t^*\right)\left[\delta f(k) - c_t^*\right] \frac{dc_t^*}{d\alpha} + \pi_A f'\left(k\right) \frac{\partial k}{\partial \alpha} < 0, \tag{15}$$

which can be rearranged to $\varepsilon_a^* < \varepsilon_a^{*R}$.[31] The condition reveals that society cares about both the value-enhancing effects of activism and real investment. The first term in (15) captures the impact of the activist's equity position on project value via managerial discipline. This is positive for all $\alpha < \alpha^*$. In particular, Corollary 6 shows that the extent of activism is directly related to the activist's position regardless of the investment feedback, i.e., $\frac{dc_t}{d\alpha} > 0$. Moreover, greater managerial discipline always creates value. Here, $g\left(c_t\right)\delta f(k)$ is the conditional increase in gross value, and $g\left(c_t\right)c_t$ is the corresponding increase in expected cost of activism. The second term in (15) represents investment feedback that is not internalized by investors. More specifically, real investment solves $\pi_I f'\left(k\right) - r = 0$, but the optimal investment for society sets $\left(\pi_I + \pi_A\right) f'\left(k\right) - r = 0$,

Society only benefits from a disclosure threshold if investors gain, but the converse is not true. For $\varepsilon_a^* < \varepsilon_a^{*R}$ to hold, the investment feedback must be negative, i.e., $\frac{\partial k}{\partial \alpha} < 0$, implying that $\varepsilon_a^* < \varepsilon_a^{*I}$. Intuitively, society only cares about the real economy, and not about secondary markets (trading transfers). The only social cost of increasing managerial disciplining is the potential reduction in investment. If this is sufficiently strong, then (15) holds and the regulator wants to set a binding disclosure threshold. Still, this threshold always exceeds the optimal threshold from the perspective of investors who do care about trading transfers.

That society's preferred disclosure threshold lies (weakly) between those preferred by investors and activists also arises in models of insider trading where real investment is endogenous (Leland 1992; Bernhardt et al. 1995). The social cost of increasing activism is a potential reduction of real investment due to lower market transparency. Thus, a regulator only considers implementing a disclosure threshold when this also benefits investors. Yet, while investors incur trading losses society does not, so the socially-optimal level of market transparency is lower. Therefore, when the regulator seeks a binding threshold, it always exceeds the pre-

[31] See Appendix A. Rearrangement of (15) to obtain $\varepsilon_a^* < \varepsilon_a^{*R}$ uses $\frac{df(k)}{d\alpha} = f'(k)\frac{\partial k}{\partial \alpha}$.

ferred threshold of investors, and sometimes they disagree on the need for a binding policy.

### 3.2.1 The role of liquidity and the cost of activism

Results in Proposition 5 are influenced by the interaction of two opposing forces: (i) market liquidity and (ii) the cost of activism. We discuss and interpret their role.

**Corollary 7** *Let cost distribution function $g$ be such that no one benefits from a binding disclosure threshold, i.e., $\varepsilon_a^* \geq \varepsilon_a^{*I}$. Reduce the cost of activism with a transfer of probability mass $\min\{g(c), \tau\}$ from each realization $c \in (0, C]$ to $c = 0$. Then there exist cutoffs $\tau^I(b) < \tau^R(b)$ such that*

1. *Investors gain from a binding disclosure threshold if and only if $\tau > \tau^I(b)$.*
2. *Society gains from a binding disclosure threshold if and only if $\tau > \tau^R(b)$.*

*Both cutoffs decrease with market liquidity, i.e., $\tau^{I\prime}(b) < 0$ and $\tau^{R\prime}(b) < 0$.*

Corollary 7 considers the effect of a reduction in the cost of activism consisting of an even decrease in the probability of any positive cost. The transformation $\tau > 0$ scales down the weakly-decreasing density $g$, reducing both the expected cost and the profit elasticity of activism $\varepsilon_a$. As a result, the marginal profitability of trading transfers for investors is less at any given $c_t$, and they benefit from a binding disclosure threshold when the cost reduction is large enough. In particular, $\varepsilon_a^* = \varepsilon_a^{*I}$ when $\tau = \tau^I(b)$, and a larger $\tau$ tightens the optimal threshold. The analogous intuition holds for society. At the limit, as $\tau$ grows large so that almost all probability mass is transferred to zero, activism becomes almost costless, and investors do not need to incentivize activist participation with higher trading profits. Then, the optimal policy for both investors and society approaches full transparency, i.e., $\{\overline{\alpha}_I, \overline{\alpha}_R\} \to 0$.

Both cutoffs $\tau^I(b)$ and $\tau^R(b)$ decrease with the extent of market liquidity $b$ because this makes activism more profitable: $\alpha^*$ and $c_t^*$ both rise. All else equal, this reduces the profit elasticity of activism, and may make a binding disclosure beneficial for investors. In (13), the LHS decreases and the RHS increases. It follows that the cost reduction that leads investors to gain from a binding policy falls as market liquidity rises.

These results are intuitive. The activist requires market liquidity to establish an equity stake and profit from intervention (Maug 1998; Kahn and Winton 1998). Disclosure thresholds operate against liquidity by increasing market transparency and limiting the activist's position (Bebchuk et al. 2013). Greater liquidity reduces the marginal profitability of activism for investors, making a disclosure threshold more desirable. The cost of activism operates in the opposite direction. When the cost of managerial discipline is likely to be

high, investors want to concede further trading transfers to incentivize activism, and they do not benefit from a disclosure threshold. In particular, with high costs, i.e., large $g(c_t)$, the profit elasticity of activism is large for relatively opaque markets, and investors do not want to limit the potential trading profits of activists.

The cost of activism is often related to managerial entrenchment. Staggered boards make it harder to gain control of a company in a proxy contest, discouraging activism. Our model is consistent with Gompers et al. (2003) and Bebchuk and Cohen (2005), who find evidence of a negative correlation between firm value and management-favouring provisions. In such instances, relaxing disclosure thresholds can benefit investors by alleviating the negative effect of these provisions at the expense of market opacity and investor trading losses.

# 4 Managerial Feedback

We next endogenize the probability of managerial malfeasance to characterize the complete inter-linkage between investment, hedge fund activism and corporate management, and the consequences for optimal blockholder disclosure threshold policies.

We extend our model by assuming that if the manager implements the good business plan ($m = 1$) at $t = 1$, she receives a payoff that is normalized to zero at $t = 3$. If, instead, the manager adopts the bad plan ($m = 0$), her payoff depends on whether she is disciplined by the activist. If the activist does not intervene, adopting the bad business plan gives the manager a fixed benefit $\varphi$. If the activist disciplines the manager, she does not receive the private benefit and incurs a privately-observed reputation cost $\rho > 0$. Other market agents share a common prior that $\rho$ is distributed on $[0, R]$ according to a strictly positive density $h$ and associated cumulative function $H$. Because the manager only cares about the *net* benefit of malfeasance, one could alternatively assume that the benefits of malfeasance are random, and the reputation cost is fixed. To make it easier to establish that second-order conditions hold in the derivation of optimal blockholder disclosure threshold policies, we assume that private benefits from malfeasance are sufficiently high: $2R < \varphi(1 - \lambda)^2$.

Both private benefits from malfeasance $\varphi$ and the reputation costs of being disciplined by an activist $\rho$ allow for multiple interpretations. For instance, managerial benefits from acting against shareholders might be related to increasing executive compensation or empire-building mergers and acquisitions that managers value but harm firm value. The costs of being disciplined by an activist may reflect career prospects. For example, Fos and Tsoutsoura (2014) report that facing a direct threat of removal is associated with \$1.3-\$2.9 million in foregone income until retirement for the median incumbent director in their sample; and Keusch (2017) finds that in the year after activists intervene, internal CEO turnover rises 7.4%.

## 4.1 Market Equilibrium

The manager employs a threshold strategy, implementing the bad business plan if and only if $\rho \leq \rho_t$. At the cut-off, the expected private benefits from malfeasance equal the expected loss due to punishment, $(1 - \lambda G(c_t))\varphi = \lambda G(c_t)\rho_t$, which we solve for:

$$\rho_t = \varphi \left[ \frac{1 - \lambda G(c_t)}{\lambda G(c_t)} \right]. \tag{16}$$

The probability of managerial malfeasance is $H(\rho_t)$. The equilibrium analysis is analogous to Section 2.1, where both Propositions 1 and 2 extend by directly setting $z \equiv H(\rho_t)$.

The solution for $\rho_t$ reveals that malfeasance declines with the *conditional* probability of activism $G(c_t)$: the more likely the activist is to participate after observing malfeasance, the less likely is the manager to misbehave. We call the managers' response to the threat of activism, the *managerial feedback* effect. This effect is negative, reflecting that the threat of activism deters managers from destroying shareholder value. Activism disciplines management through two complementary channels: (i) ex post, the activist intervenes to change the business plan when it is bad; (ii) ex ante, it discourages the adoption of the bad plan.

The mechanism is consistent with anecdotes suggesting that executives of firms that are yet-to-be-targeted by activist funds feel threatened and proactively work to evaluate firm policies that minimize their vulnerability to attacks by activist funds.[32] Gantchev et al. (2017) find evidence that non-target firms, observing that their peers are being targeted by activists, perceive a higher risk of becoming a future target, and change their policies to mitigate this risk. Relatedly, Fos and Kahn (2018) develop a model where the threat of intervention by a blockholder discourages managers from destroying shareholder value. They study the incentives for the blockholder to exit and the impact on ex-ante and ex-post correction mechanisms; we analyse how managerial feedback responds to market transparency.

## 4.2 Optimal Policies

We study optimal blockholder disclosure threshold policies when the probability of managerial malfeasance is endogenous. Managerial feedback raises new policy questions. For example, additional trading profits increase the conditional profitability of activism (Proposition 5) and reduce activists' opportunity to profit (managerial feedback). Do investors still benefit from a disclosure threshold? What are the implications for real investment, and thus for so-

[32] See, for instance, "Key Issues for Directors in 2014" by Martin Lipton of Wachtell, Lipton, Rosen and Katz, The Harvard Law School Forum on Corporate Governance and Financial Regulation, December 16, 2013; "Boardrooms Rethink Tactics to Defang Activist Investors", The New York Times, November 11, 2013.

ciety? How does managerial feedback affect the reluctance of hedge fund activists to support ownership disclosure rules? Could activist funds seek lower thresholds than investors?

Proposition 7 answers these questions, characterizing the ordering of optimal disclosure policies for market participants. We define an elasticity measure that allows us to present results intuitively: the *activism elasticity of management,*

$$\varepsilon_m = \frac{\partial H(\rho_t)}{\partial G(c_t)} \frac{G(c_t)}{H(\rho_t)}.$$

Here, $\varepsilon_m < 0$ captures a manager's reaction to the threat of activism. The bigger is $\varepsilon_m$ (in absolute value), the larger is the reduction in the probability of managerial malfeasance $H(\rho_t)$ in response to a marginal increase in the conditional probability of activism $G(c_t)$. In the absence of a binding disclosure threshold, when the activist participates he buys $\alpha^*$ shares and has expected gross profits $c_t^*$. Moreover, the manager adopts the bad business plan if and only if $\rho \leq \rho_t(c_t^*) \equiv \rho_t^*$ and the activism elasticity of management is $\varepsilon_m(c_t^*, \rho_t^*) \equiv \varepsilon_m^*$. In the proposition below, we assume that second-order conditions are well-behaved for investors and activists; the Appendix shows that this will be so when the costs of intervention for the activist and the reputation costs of management have uniform distributions.

**Proposition 8** *Suppose that the net expected profits of investors and activists are quasiconcave in $\alpha$ for $\alpha \leq \alpha^*$. Then there exist cutoffs on the activism elasticity of management, $\varepsilon_m^{*A} \equiv -\frac{1}{\varepsilon_a^*}\left(\frac{c_t^*}{c_t^* - E[c|c \leq c_t^*]}\right)$, $\varepsilon_m^{*I} \equiv -\left(\frac{\partial \pi_A/\partial H(\rho_t^*)}{\partial \pi_I/\partial H(\rho_t^*)}\right)\left[\frac{\delta f(k) - c_t^*}{c_t^*} - \frac{1}{\varepsilon_a^*}\right]$ and $\varepsilon_m^{*R} \equiv \left[\frac{\delta f(k) - c_t^*}{c_t^*} + \frac{1}{\varepsilon_a^*}\left(\frac{\frac{df(k)/d\alpha}{f(k)}}{\frac{dc_t^*/d\alpha}{c_t^*}}\right)\right]\left[-\frac{\partial \pi_I/\partial H(\rho_t^*)}{\partial \pi_A/\partial H(\rho_t^*)} - \frac{c_t^* - E[c|c \leq c_t^*]}{c_t^*}\right]^{-1}$, with $\varepsilon_m^{*A} < \varepsilon_m^{*I} < \varepsilon_m^{*R}$ such that*

1. *If the activism elasticity of management is sufficiently high, then only the activist benefits from a binding disclosure threshold: $\varepsilon_m^* < \varepsilon_m^{*A} \Rightarrow 0 < \overline{\alpha}_A < \alpha^* \leq \{\overline{\alpha}_I, \overline{\alpha}_R\}$.*

2. *If the activism elasticity of management is moderately high, then no one benefits from a binding disclosure threshold: $\varepsilon_m^{*A} \leq \varepsilon_m^* \leq \varepsilon_m^{*I} \Rightarrow 0 < \alpha^* \leq \{\overline{\alpha}_I, \overline{\alpha}_A, \overline{\alpha}_R\}$.*

3. *If the activism elasticity of management is moderately low, then only investors benefit from a binding disclosure threshold: $\varepsilon_m^{*I} < \varepsilon_m^* \leq \varepsilon_m^{*R} \Rightarrow 0 < \overline{\alpha}_I < \alpha^* \leq \{\overline{\alpha}_A, \overline{\alpha}_R\}$.*

4. *If the activism elasticity of management is low enough, then investors and society gain from a binding disclosure threshold, but activists do not: $\varepsilon_m^{*R} < \varepsilon_m^* \Rightarrow 0 < \overline{\alpha}_I < \overline{\alpha}_R < \alpha^* \leq \overline{\alpha}_A$.*

Figure 3 illustrates the results. When the activism elasticity of managerial malfeasance is high, both the regulator and investors want more activism because they gain from deterring malfeasance—neither wants a binding disclosure threshold: $\varepsilon_m^* < \varepsilon_m^{*I}$. In contrast, the activist is harmed by reduced malfeasance and can gain from a threshold that limits his capacity to intervene if management is sensitive enough to the profitability of intervention, i.e., if $\varepsilon_m^* < \varepsilon_m^{*A}$. When, instead, this elasticity is low enough, the ordering of optimal policies is reversed, and the considerations of Proposition 5 dominate for the three parties. Then, investors gain more from a tighter threshold than the regulator ($\varepsilon_m^* > \varepsilon_m^{*I}$) because they incur the trading losses that society does not internalize; the regulator wants a tighter threshold than the activist ($\varepsilon_m^* > \varepsilon_m^{*R}$) because the negative investment feedback harms society; and while lower investment hurts the activist, it does not modify his optimal position (Corollary 5). Investors, activist funds and society can only agree on disclosure thresholds for intermediate activism elasticity levels $\epsilon_m$, where everyone believes that disclosure thresholds should not bind.

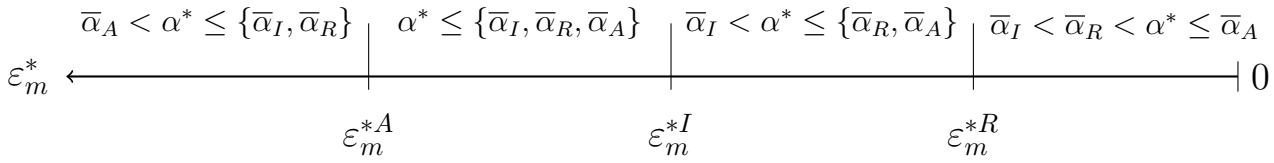


Figure 3: Optimal Disclosure Thresholds with Managerial Feedback

The full proof is in the Appendix. Here, we develop the main intuition. Setting $\left\{\varepsilon_m^{*A}, \varepsilon_m^{*I}, \varepsilon_m^{*R}\right\} = 0$ and rearranging terms with respect to $\varepsilon_a^*$ yields the cutoffs in Proposition 5. Proposition 8 then reveals how those findings are altered when management's behavior is sensitive to the possibility of hedge fund activism.

The activist benefits from a binding disclosure threshold when

$$\begin{aligned} H(\rho_t)\lambda G\left(c_t^*\right) + M_A &< 0 \qquad (17) \\ \textit{where} \quad M_A \equiv \frac{dH\left(\rho_t^*\right)}{dc_t}\lambda G\left(c_t^*\right)\left[c_t^* - E\left[c|c \leq c_t^*\right]\right] &< 0. \end{aligned}$$

The condition can be rearranged to $\varepsilon_m^* < \varepsilon_m^{*A}$. Here, $M_A$ represents the managerial feedback effect, which hurts the activist—well-behaving management destroys the raison dêtre of activists. Higher trading profits $c_t^*$ increase the *conditional* profitability of activism, and the extent of activism upon managerial malfeasance $G\left(c_t^*\right)$—Proposition 5. However, it also deters management from acting against uninformed investors, reducing the activist's opportunity to profit. As a result, increasing a binding disclosure threshold, $\bar{\alpha}$, and hence increasing *trading* profits, need not increase the activist's *unconditional* expected profits.

Here, $\frac{dH(\rho_t^*)}{dc_t} = h(\rho_t^*)\frac{d\rho_t^*}{dc_t}$ captures the responsiveness of management to the threat of ac-

tivism. A large $h$ implies a high activism elasticity of management $\varepsilon_m$, and a large reduction in malfeasance in response to a marginal increase in the conditional profitability of activism. Then, the activist benefits from a disclosure threshold that effectively commit the activist to reducing intervention rates, thereby encouraging managerial malfeasance. In contrast, when $h$ is very small,[33] activism does not meaningfully deter managerial malfeasance, and the activism elasticity of management goes to zero. With minimal managerial feedback, $M_A \to 0$, so (17) never holds and predictions reduce to those in Proposition 5: the activist is hurt by a binding disclosure threshold.

The cut-off $\varepsilon_m^{*A}$ increases with $\varepsilon_a^*$—the higher is the profit elasticity of activism, the more the activist values a disclosure threshold. When higher trading profits greatly increase the extent of activism, they may also strongly deter managerial malfeasance. Then, the responsiveness $\varepsilon_a^*$ of the activist to its potential trading profits harms it—so that the activist gains from a binding disclosure threshold that restrains its responsiveness. In those circumstances, neither investors nor the regulator want a binding disclosure threshold. This reflects that the activist's gains from a binding disclosure threshold are due to the increased managerial malfeasance that it causes, malfeasance that destroys surplus directly when the activist does not intervene and indirectly when the activist incurs costs of intervention. But then, investors and the regulator value the extensive discouragement effect of potential activism on managerial malfeasance. In particular, when the marginal value to the activist of tightening the disclosure threshold is positive, it is negative for investors and the regulator; and vice versa.

Proposition 7 shows that there exists a range of values $\varepsilon_m^* \in \left[\varepsilon_m^{*A}, \varepsilon_m^{*I}\right]$ such that no market participant gains from a binding disclosure threshold. If $\varepsilon_m^* \geq \varepsilon_m^{*A}$, managerial feedback is small enough from the activist's perspective not to outweigh the benefits of higher conditional profits from participating. Moreover, if $\varepsilon_m^* \leq \varepsilon_m^{*I}$ then the benefits to uninformed investors from deterring managerial malfeasance exceed the associated trading losses of activism, which they incur only if management misbehaves. Thus, investors, too, do not want to limit an activist's trading profits, even though those profits come at their expense. In particular, investors gain from a binding disclosure threshold if

$$\begin{aligned} \frac{H(\rho_t^*)\lambda}{f(k)}\Big[g\left(c_t^*\right)\left(\delta f\left(k\right)-c_t^*\right)-G\left(c_t^*\right)\Big]+M_I &< 0 \qquad (18)\\ \textit{where} \quad M_I \equiv \frac{dH(\rho_t^*)}{dc_t}\frac{\partial \pi_I}{\partial H(\rho_t^*)} &> 0, \end{aligned}$$

which can be rearranged to $\varepsilon_m^* > \varepsilon_m^{*I}$.

[33] When the second-order conditions hold, local statements about $h$ hold globally for all $c_t$ associated with binding disclosure thresholds.

Comparing equations (13) and (18) reveals the effect of managerial feedback for investors, $M_I$. Equation (13) in Section 3 shows that, absent managerial feedback, investors' preference over disclosure thresholds only reflects the direct marginal costs and benefits of activism encapsulated in the first term. When management responds to the threat of activism, the positive effects of activism to investors become twofold: it increases managerial discipline, ex post, *and* it deters managerial malfeasance, ex ante. Thus, managerial feedback reduces the desirability of disclosure thresholds to investors. When $h(\rho)$ is tiny for $\rho$ associated with $c_t \leq c_t^*$, feedback vanishes, so $M_I \to 0$, and (18) reduces to (13). When $h$ is higher, management's actions become more sensitive to the extent of activism. As a result, investors may find a binding disclosure threshold undesirable even if the conditional marginal profitability of activism is negative, i.e., even if $g\left(c_t^*\right)\left(\delta f\left(k\right) - c_t^*\right) < G\left(c_t^*\right)$. It follows that if investors find a binding disclosure threshold desirable with managerial feedback, then they also do so in the absence of managerial feedback: $\varepsilon_a^* < \varepsilon_a^{*I}$ is necessary for $\varepsilon_m^{*I} < 0$, and hence for (18) to hold.

Society does not internalize management's private gains from malfeasance, but is affected by the destruction of project value. A regulator wants a binding disclosure threshold when

$$\begin{aligned} \left[H(\rho_t^*)\lambda g\left(c_t^*\right)\left(\delta f(k) - c_t^*\right) + M_R\right]\frac{dc_t^*}{d\alpha} + \pi_A f'(k)\frac{\partial k}{\partial \alpha} &< 0 \\ \textit{where} \quad M_R = M_I f(k) + M_A &> 0, \end{aligned} \tag{19}$$

which can be rearranged to $\varepsilon_m^* > \varepsilon_m^{*R}$. $M_R$ captures the social impact of managerial feedback. Society does not care about transfers of profits between investors and the activist caused by managerial feedback; it only cares about the aggregate effect, $M_R = M_I f(k) + M_A$. Expanding $M_R$ reveals that the social benefits of managerial feedback consist of the sum of two elements, weighted by the response of management $\frac{dH(\rho_t)}{dc_t}$ to the threat of activism.[34] The regulator wants greater *potential* activism and hence weaker ownership disclosure rules when managers respond by more to the threat of discipline. The first element in the expansion is the value enhanced by deterring malfeasance: $\delta f(k)\left[1 - \lambda G(c_t)\right]$. Here, $\delta f(k)$ is the difference in firm value under good and bad business plans; and $1 - \lambda G(c_t)$ is the probability that the activist does stop a bad plan when it is implemented. The second element is the expected cost incurred by the activist when it disciplines management, $\lambda G(c_t) E[c|c \leq c_t]$. Deterring malfeasance means that those costs are not incurred.

The sole social cost of activism is a potential reduction in investment. Thus, the regulator must gain from a nonbinding disclosure threshold if it benefits investors: we can only have $\varepsilon_m^{*R} < \varepsilon_m^*$ if investment is reduced by the transfer of trading profits from investors to the

[34] In particular, $M_R = -\frac{dH(\rho_t)}{dc_t}\Big[\delta f(k)[1 - \lambda G(c_t)] + \lambda G(c_t) E[c|c \leq c_t]\Big]$.

activist, i.e., if $\frac{df(k)}{d\alpha} = f'(k)\frac{\partial k}{\partial \alpha} < 0$.[35] The profit elasticity of activism $\varepsilon_a^*$ reduces the harmful effects of negative investment feedback, raising the optimal disclosure threshold.

# 5 Concluding Remarks

Hedge fund activism has generated a regulatory debate about the desirability of revising blockholder disclosure thresholds. These rules were set to protect small investors from abusive tactics of blockholders. We identify the tradeoffs. Disclosure thresholds may discourage activist funds from intervening to protect small investors from corporate managers who take actions that benefit themselves at the expense of firm value; but activist funds are also informed traders who profit from trading on their information advantage about their value-enhancing actions at the expense of uninformed investors. While managerial discipline creates value and incentivizes real investment, the associated trading rents extracted from uninformed investors reduce their profitability and impair investment, destroying value.

We show that the preferences for binding disclosure thresholds of investors, activist funds and society are never aligned. Whenever activists gain from a binding threshold—which commits them to intervening less frequently, encouraging managerial misbehavior—investors and society are harmed. Managerial discipline increases investment value without the need for investors to incur further trading losses, and the increased investment benefits society. When, instead, investors gain from a binding threshold, they benefit more than regulators, and activists are necessarily harmed even when the excessive trading losses cause investors to reduce their investments. We only find scope for agreement when all market participants gain from non-binding disclosure thresholds. This requires that the willingness of activists to intervene be sufficiently sensitive to the degree of market opacity, but, in turn, that firm management not be too sensitive to the threat of activism in its choices of whether to take actions that benefit itself at the expense of shareholders.

[35] To satisfy $\varepsilon_m^{*R} < \varepsilon_m^*$, the cutoff $\varepsilon_m^{*R}$ must be negative. The denominator is positive because $-\frac{\partial \pi_I / \partial H(\varphi_t^*)}{\partial \pi_A / \partial H(\varphi_t^*)} > 1$ whereas $\frac{c_t^* - E[c|c \leq c_t^*]}{c_t^*} < 1$. Thus, $\varepsilon_m^{*R} < 0$ if and only if $\frac{\delta f(k) - c_t^*}{c_t^*} + \frac{1}{\varepsilon_a^*}\left(\frac{\frac{df(k)/d\alpha}{f(k)}}{\frac{dc_t^*/d\alpha}{c_t^*}}\right) < 0$.

# 6 Appendix A: Proofs

## 6.1 Proof of Proposition 1

**Market maker**. Let $\widehat{\alpha}$ be the market maker's conjecture about the activist trade, which is correct in equilibrium. Denote $\widehat{c}_t \equiv c_t(\widehat{\alpha})$ the corresponding conjecture about his cost participation threshold.

The activist does not participate when either he does not observe the company take the bad business plan, or he observes that the bad business is implemented but it is too costly to intervene. When the activist does not participate, the order flow is negative with certainty, i.e., $Pr[\omega \leq 0|a_0] = \int_0^b \frac{1}{b} dl = 1$. Conversely, the activist participates when he observes that the manager implemented the bad business plan and the cost of intervention is sufficiently small. The probability of a negative net order flow when the activist participates is $Pr[\omega \leq 0|a_1] = \int_\alpha^b \frac{1}{b} dl = \frac{b-\alpha}{b}$. From Bayes rule,

$$Pr[a_1|\omega \leq 0] = \frac{z\lambda G(\widehat{c}_t)\left(\frac{b-\widehat{\alpha}}{b}\right)}{z\lambda G(\widehat{c}_t)\left(\frac{b-\widehat{\alpha}}{b}\right) + [1 - z\lambda G(\widehat{c}_t)]}. \tag{20}$$

and

$$\begin{aligned} Pr[V = f(k)|a_0] &= \frac{(1-z) + z(1-\lambda G(\widehat{c}_t))(1-\delta)}{(1-z) + z(1-\lambda G(\widehat{c}_t))(1-\delta) + z(1-\lambda G(\widehat{c}_t))\delta} \\ &= \frac{1 - z\lambda G(\widehat{c}_t) - z(1-\lambda G(\widehat{c}_t))\delta}{1 - z\lambda G(\widehat{c}_t)}. \end{aligned} \tag{21}$$

Substitute both (20) and (21) into (5) and use $Pr[a_0|\omega \leq 0] = 1 - Pr[a_1|\omega \leq 0]$ to obtain $P_{l(\alpha)}$ in (6). Evaluating $P_l(\alpha)$ at the equilibrium position $\alpha^* = b/2$ yields $P_l$ in (2).

**Activist**. The activist's position $\alpha^* = b/2$ is derived in the main text, and the market maker's conjecture is correct in equilibrium, i.e., $\widehat{\alpha} = \alpha^*$. Uniqueness of $c_t$ follows because the left-hand side of (8) increases with $c_t$, while the right hand side decreases with $c_t$ for $\alpha < b$.

## 6.2 Proof of Corollary 2

To study $c_t$ as a function of $\alpha$ and $k$, define $F \stackrel{\Delta}{=} c_t - (b-\alpha)\alpha z \left[\frac{1-\lambda G(c_t)}{b-\alpha z \lambda G(c_t)}\right] \delta f(k)$. From the Implicit Function Theorem, $\frac{\partial c_t}{\partial q} = -\frac{\partial F/\partial q}{\partial F/\partial c_t}$. Direct calculations yield:

$$\begin{aligned}
\frac{\partial F}{\partial c_t} &= 1 + (b-\alpha)\alpha z \lambda g(c_t) \left[\frac{b - z\alpha}{(b-\alpha z \lambda G(c_t))^2}\right] \delta f(k); && (22)\\
\frac{\partial F}{\partial k} &= -(b-\alpha)\alpha z \left[\frac{1-\lambda G(c_t)}{b-\alpha z \lambda G(c_t)}\right] \delta f'(k); && (23)\\
\frac{\partial F}{\partial \alpha} &= -z \left(\frac{1-\lambda G(c_t)}{(b-\alpha z \lambda G(c_t))^2}\right) \Big[(b-2\alpha)(b-\alpha z \lambda G(c_t)) + (b-\alpha)\alpha z \lambda G(c_t)\Big] \delta f(k). && (24)
\end{aligned}$$

For $\alpha < b$, we have $\frac{\partial F}{\partial c_t} > 0$ and $\frac{\partial F}{\partial k} < 0$. Thus, $c_t$ increases with investment, i.e., $\frac{\partial c_t}{\partial k} > 0$.

Inspection of (24) reveals that the sign of $\frac{\partial F}{\partial \alpha}$ is determined by the term in brackets, which can be rearranged to $\alpha^2 z\lambda G(c_t) - \alpha 2b + b^2$. Solving (24)=0 for $\alpha$ yields

$$\alpha^{**} = \frac{b\left[1 - \sqrt{1 - z\lambda G(c_t)}\right]}{z\lambda G(c_t)} \in \left(\frac{b}{2}, b\right) \quad \text{and} \quad \alpha^{\cancel{**}} = \frac{b\left[1 + \sqrt{1 - z\lambda G(c_t)}\right]}{z\lambda G(c_t)} > b \qquad (25)$$

with $\frac{\partial F}{\partial \alpha} > 0 \Leftrightarrow \alpha \in (\alpha^{**}, \alpha^{\cancel{**}})$. To verify $\alpha^{**} \in \left(\frac{b}{2}, b\right)$ notice that $\alpha^{**}$ increases with $z\lambda G(c_t) \in (0,1)$. Further analysis reveals $lim_{z\lambda G(c_t)\to 1}\alpha^{**} = b$, and applying L'Hôpital's rule yields $lim_{z\lambda G(c_t)\to 0}\alpha^{**} = b/2$. To show $\alpha^{\cancel{**}} > b$ use the same intuition and note that $\alpha^{\cancel{**}}$ decreases with $z\lambda G(c_t)$. It is immediate that $\frac{\partial c_t}{\partial \alpha} > 0$ for $\alpha < \alpha^{**}$, and $\frac{\partial c_t}{\partial \alpha} < 0$ for $\alpha \in (\alpha^{**}, b]$.

## 6.3 Proof of Proposition 3

**Gross expected profits**. Consider an arbitrary position $\alpha$. The unconditional project value $E[V]$ in Proposition 3 weighs cash flows $f(k)$ with the probabilities that (i) the manager implements the good business plan, $1-z$; (ii) the manager implements the bad plan but is disciplined by the activist, $z\lambda G(c_t)$; (iii) the manager implements the bad plan and is not disciplined by the activist but the project succeeds anyway, $z[1-\lambda G(c_t)](1-\delta)$.

The activist's gross profits are obtained by weighting his conditional profits $E[\Pi_A|a_1]$ with the probability of participation $z\lambda G(c_t)$,

$$\begin{aligned}
E[\Pi_A] &= \pi_A f(k) \\
\textit{with } \pi_A &= z\lambda G(c_t)(b-\alpha)\alpha z \left[\frac{1-\lambda G\left(c_t\right)}{b-\alpha z \lambda G\left(c_t\right)}\right] \delta \\
&= z\lambda G(c_t)\frac{c_t}{f(k)}. && (26)
\end{aligned}$$

By construction, expected investors' profits are the residual $E[\Pi_I] = [\pi_V - \pi_A] f(k)$,

$$\begin{aligned} E[\Pi_I] &= \pi_I f(k) \\ with\ \pi_I &= [1 - z(1 - \lambda G(c_t))\delta] - z\lambda G(c_t)(b - \alpha)\alpha z \left[\frac{1 - \lambda G(c_t)}{b - \alpha z \lambda G(c_t)}\right] \delta \\ &= [1 - z(1 - \lambda G(c_t))\delta] - z\lambda G(c_t)\frac{c_t}{f(k)}. \end{aligned} \tag{27}$$

Proposition 3 provides expressions for expected profits in equilibrium, substituting $\alpha = \alpha^* = b/2$. Rearranging $\pi_A$ as a function of $c_t$ shows that $\alpha$ affects expected profits only through trading transfers $c_t$ and capital, i.e., $E[\Pi_A](c_t(\alpha), k(\alpha))$ and $E[\Pi_I](c_t(\alpha), k(\alpha))$.

**Real Investment**. The first-order condition for investors' *net* profits $\pi_I f(k) - rk$ characterizes real investment. Note that while $\pi_I$ is a function of both activism and investment, small investors are price takers who do not internalize the effects of their own investment.

## 6.4 Proof of Proposition 5

**Investors**. Investor net expected profits are $\pi_I f(k) - rk$. To derive their optimal disclosure threshold we differentiate with respect to $\alpha$:

$$\frac{d}{d\alpha}\{\pi_I f(k) - rk\} = \left[\frac{\partial \pi_I}{\partial c_t}\frac{dc_t}{d\alpha} + \frac{\partial \pi_I}{\partial k}\frac{\partial k}{\partial \alpha}\right] f(k) + [\pi_I f'(k) - r]\frac{\partial k}{\partial \alpha} \tag{28}$$

where $\pi_I$ is given by (27) and $c_t$ is characterized in (8). We show that (28) is strictly positive at $\alpha = 0$, implying that investors always benefit from some degree of market opacity, i.e., $\overline{\alpha}_I > 0$. We then prove that (28) decreases in $\alpha$ for $\alpha < \alpha^*$. Therefore, if (28) is negative at $\alpha = \alpha^*$, then the optimal disclosure threshold $\overline{\alpha}_I$ solves (28) $= 0$ and $\overline{\alpha}_I < \alpha^*$. If, instead, (28) is positive at $\alpha = \alpha^*$, then the optimal threshold is non-binding, i.e., $\overline{\alpha}_I \geq \alpha^*$.

Analysis of (28) simplifies because of two properties. First, Proposition 3 shows that in equilibrium $\pi_I f'(k) - r = 0$, so the last term of (28) vanishes. Second, any interior maximum of $\pi_I f(k) - rk$ satisfies $\frac{\partial k}{\partial \alpha} = 0$ because the activist position that maximizes investor profits, also maximizes investment.[36] Using these two features and the expansion $\frac{dc_t}{d\alpha} = \frac{\partial c_t}{\partial \alpha} + \frac{\partial c_t}{\partial k}\frac{\partial k}{\partial \alpha}$, it follows from (28) that any interior solution $\overline{\alpha}_I < \alpha^*$ solves $\frac{\partial \pi_I}{\partial c_t}\frac{\partial c_t}{\partial \alpha} f(k) = 0$. The proof of Corollary 2 shows that $\frac{\partial c_t}{\partial \alpha} > 0$ for $\alpha < \alpha^{**}$ and $\alpha^* < \alpha^{**}$. Therefore, if there is an interior

[36] From the Implicit Function Theorem, $\frac{\partial k}{\partial \alpha} = -\frac{\frac{\partial \pi_I}{\partial c_t}\frac{\partial c_t}{\partial \alpha} f'(k)}{\pi_I f''(k)}$, where the denominator is negative. The proof of Proposition 5 continues by showing that the numerator in this expression characterizes the sign of (28). Therefore, $\frac{\partial k}{\partial \alpha} > 0$ if and only if $\frac{d}{d\alpha}\{\pi_I f(k) - rk\} > 0$.

solution $\overline{\alpha}_I < \alpha^*$, it must be characterized by $\frac{\partial \pi_I}{\partial c_t} = 0$, where

$$\frac{\partial \pi_I}{\partial c_t} = \frac{z\lambda}{f(k)} \left[ g(c_t) (\delta f(k) - c_t) - G(c_t) \right]. \tag{29}$$

Because $g(c)$ is decreasing in $c$, (29) decreases with $c_t$.

At $\alpha = 0$, activist trading profits are zero, i.e., $c_t = 0$. It follows that if $\alpha = 0$ then (29) $> 0$, and thus (28) $> 0$. Therefore, investors always benefit from some degree of market opacity, i.e., from $\overline{\alpha}_I > 0$. We prove below that trading transfers increase with the activist's position $\alpha < \alpha^*$ despite investment feedback, i.e., that $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$—see the *activist* section of the proof. Hence, (29) decreases with $\alpha$ for $\alpha < \alpha^*$, and the same is true for (28). A binding optimal threshold exists if and only if (28) $< 0$ for $\alpha = \alpha^*$. Moreover, it satisfies (28) $= 0$. The condition (28) $< 0$ can be rearranged as $\varepsilon_a^{*I} < \varepsilon_a^*$.

**Activist**. Net expected activist profits are

$$\pi_A f(k) - z\lambda G(c_t) E[c|c \leq c_t] = z\lambda G(c_t) [c_t - E[c|c \leq c_t]], \tag{30}$$

where the right-hand side uses the solution for $\pi_A$ in Proposition 3. Here, $z\lambda G(c_t)$ is the probability that the activist participates, i.e., the probability that (i) the manager adopts the bad business plan, (ii) the activist observes it, and (iii) his cost of intervention is sufficiently small. Conditional on intervention being optimal, his expected profits are the difference between trading profits $c_t$ and the cost of disciplining management, which is expected to be $E[c|c \leq c_t] = \left[\int_0^{c_t} c g(c)\, dc\right] / G(c_t)$. To derive the activist's optimal disclosure threshold, we differentiate with respect to $\alpha$:

$$\frac{d}{d\alpha} \{ z\lambda G(c_t) [c_t - E[c|c \leq c_t]] \} = z\lambda G(c_t) \frac{dc_t}{d\alpha}. \tag{31}$$

The result follows because

$$\begin{aligned} \frac{dE[c|c \leq c_t]}{d\alpha} &= \frac{\partial E[c|c \leq c_t]}{\partial c_t} \frac{dc_t}{d\alpha} \\ &= \frac{g(c_t)}{G(c_t)} \left[ \frac{\frac{\partial}{\partial c_t} \left\{ \int_0^{c_t} c g(c)\, dc \right\}}{g(c_t)} - E[c|c \leq c_t] \right] \frac{dc_t}{d\alpha} \\ &= \frac{g(c_t)}{G(c_t)} [c_t - E[c|c \leq c_t]] \frac{dc_t}{d\alpha} \end{aligned} \tag{32}$$

where the last line uses $\frac{\partial}{\partial c_t} \left\{ \int_0^{c_t} c g(c)\, dc \right\} = g(c_t) c_t$.

The sign of (31) is determined by $\frac{dc_t}{d\alpha} = \frac{\partial c_t}{\partial \alpha} + \frac{\partial c_t}{\partial k} \frac{\partial k}{\partial \alpha}$. Corollary 2 shows $\frac{\partial c_t}{\partial \alpha} > 0$ for

$\alpha < \alpha^{**}$ with $\alpha^* < \alpha^{**}$, and that $\frac{\partial c_t}{\partial k} > 0$. Hence, for the activist to gain from a binding disclosure threshold it must be that $\frac{\partial k}{\partial \alpha} < -\frac{\partial c_t/\partial \alpha}{\partial c_t/\partial k}$ for $\alpha < \alpha^*$, i.e., that the negative investment response to activism by investors is strong enough to outweigh the positive marginal net trading transfers. We prove that this cannot be so by contradiction.

If $\frac{\partial k}{\partial \alpha} < 0$, a marginal increase in the activist's position must hurt investors, implying that $\frac{\partial \pi_I}{\partial c_t} < 0$. Suppose that the investment feedback satisfies $\frac{\partial k}{\partial \alpha} < -\frac{\partial c_t/\partial \alpha}{\partial c_t/\partial k}$ and thus that $\frac{dc_t}{d\alpha} < 0$. By assumption increasing $\alpha$ reduces $c_t$, so it must increase *investor* profits because $\frac{\partial \pi_I}{\partial c_t} < 0$. But this higher profitability leads investors to increase capital when the activist increases his position $\frac{\partial k}{\partial \alpha} > 0$, a contradiction. It follows that $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$.

This argument yields that $\overline{\alpha}_A \geq \alpha^*$ in the absence of managerial feedback, yielding Corollary 6. This result is used above to solve for the optimal disclosure threshold of investors.

**Regulator**. The regulator maximizes the project value net of capital costs and expected activism costs, maximizing

$$\pi_V f(k) - rk - z\lambda G(c_t) E[c|c \leq c_t], \tag{33}$$

where $\pi_V$ is given in Proposition 3. To derive the optimal disclosure threshold for society, we differentiate (33) with respect to $\alpha$:

$$\begin{aligned}
& \frac{d}{d\alpha}\left\{\pi_V f(k) - rk - z\lambda G(c_t) E[c|c \leq c_t]\right\} && (34)\\
= \; & \frac{\partial \pi_V}{\partial c_t}\frac{dc_t}{d\alpha} f(k) + \pi_V f'(k)\frac{\partial k}{\partial \alpha} - r\frac{\partial k}{\partial \alpha} - z\lambda\left[g(c_t) E[c|c \leq c_t] + G(c_t)\frac{dE[c|c \leq c_t]}{dc_t}\right]\frac{dc_t}{d\alpha} \\
= \; & \frac{\partial \pi_V}{\partial c_t}\frac{dc_t}{d\alpha} f(k) + [\pi_V f'(k) - r]\frac{\partial k}{\partial \alpha} - z\lambda g(c_t) c_t \frac{dc_t}{d\alpha} && (35)\\
= \; & \left[\frac{\partial \pi_V}{\partial c_t} f(k) - z\lambda g(c_t) c_t\right]\frac{dc_t}{d\alpha} + \pi_A f'(k)\frac{\partial k}{\partial \alpha}\,. && (36)
\end{aligned}$$

where the second equality (35) uses (32); the third equality (36) rearranges (35) using both equilibrium relationships $\pi_I f'(k) - r = 0$ (optimal investment by the investors) and $\pi_V = \pi_I + \pi_A$ from Proposition 3. Next, in (36) substitute for $\frac{\partial \pi_V}{\partial c_t} = z\delta\lambda g(c_t)$ obtained by differentiating the expression for $\pi_V$ in Proposition 3, and use $\pi_A = z\lambda G(c_t)\frac{c_t}{f(k)}$ to obtain

$$\begin{aligned}
(34) \quad &= \quad z\lambda g(c_t)[\delta f(k) - c_t]\frac{dc_t}{d\alpha} + z\lambda G(c_t)\frac{c_t}{f(k)} f'(k)\frac{\partial k}{\partial \alpha} && (37)\\
&\underset{sign}{=} \quad g(c_t)[\delta f(k) - c_t]\frac{dc_t}{d\alpha} + G(c_t) c_t \frac{f'(k)}{f(k)}\frac{\partial k}{\partial \alpha}.
\end{aligned}$$

The first line of (37) corresponds to the condition in (15). The second line of (37) can be

rearranged to obtain the expression for $\varepsilon_a^{*R}$ in Proposition 5 by noting that $\frac{df(k)}{d\alpha} = f'(k)\frac{\partial k}{\partial \alpha}$.

It has been shown that $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$. Moreover $\delta f(k) - c_t > 0$ because $c_t$ increases with $\alpha < \alpha^*$ and from (3) it follows that $\delta f(k) - c_t^* > 0$. Thus, $\frac{\partial k}{\partial \alpha} < 0$ is a necessary condition for a binding disclosure threshold to be optimal for the regulator, and $\varepsilon_a^{*R} < \varepsilon_a^{*I}$.

## 6.5 Proof of Corollary 7

We prove Corollary 7 in three steps.

*1. A transfer $\tau > 0$ always reduces $g(c_t)$ and increases $G(c_t)$.* A transfer $\tau > 0$ creates both a direct and an indirect effect on $g(c_t)$. The *direct* effect reduces $g(c_t)$ and increases $G(c_t)$ for any given $c_t \in (0, C]$. The *indirect* effect reduces $c_t$. In particular, from both (8) and the Implicit Function Theorem, $c_t$ decreases in $G$. Thus, the increase in $G$ caused by the direct effect diminishes $c_t$. The two effects have opposite effects on $g(c_t)$, but the direct effect always outweighs the indirect effect, so the transfer unambiguously reduces $g(c_t)$ and increases $G(c_t)$. To see this, suppose that a transfer $\tau > 0$ leads to a bigger $g(c_t)$, so the decrease in $c_t$ outweighs the reduction of $g$. It follows that $G(c_t)$ is smaller, and therefore $c_t$ is larger, a contradiction.

*2. There exist cutoffs $\tau^I$ and $\tau^R$ such that $\varepsilon_a^* < \varepsilon_a^{*I}$ if and only if $\tau^I > \tau$, and $\varepsilon_a^* < \varepsilon_a^{*R}$ if and only if $\tau^R > \tau$. Moreover, $\tau^I < \tau^R$.* We showed that any transfer $\tau > 0$ reduces both $c_t$ and $g(c_t)$, and increases $G(c_t)$. From the characterizations in Proposition 5, it follows that $\varepsilon_a^*$, $\varepsilon_a^{*I}$ and $\varepsilon_a^{*R}$ decrease with a transfer $\tau > 0$. Consider now the biggest possible transfer $\tau = \sup\{g\}$, so that all probability mass accumulates at $c = 0$. Then, for any $c_t > 0$, we have $g(c_t) = 0$ and $G(c_t) = 1$. From the characterizations of cutoffs $\varepsilon_a^*$, $\varepsilon_a^{*I}$ and $\varepsilon_a^{*R}$ in Proposition 5, it follows that a transfer $\tau = \sup\{g\}$ yields $\varepsilon_a^* = 0$, and $\varepsilon_a^{*I} > \varepsilon_a^{*R} > 0$. By continuity, there exist cutoffs $\left\{\tau^I, \tau^R\right\} \in (0, \sup\{g\}]$. Since $\varepsilon_a^{*R} < \varepsilon_a^{*I}$, these thresholds satisfy $\tau^I < \tau^R$.

*3. Cutoffs $\tau^I$ and $\tau^R$ decrease with market liquidity $b$.* Ceteris paribus, higher liquidity $b$ raises $c_t$, and reduces marginal profits of investors $g(c_t)\left[\delta f(k) - c_t\right] - G(c_t)$. Thus, a smaller transfer $\tau^I$ is needed for $\varepsilon_a^{*I} < \varepsilon_a^*$. When $g(c_t)\left[\delta f(k) - c_t\right] < G(c_t)$, raising trading transfers $c_t$ makes investors' marginal profits more negative, and raises the negative investment feedback $\frac{\partial k}{\partial \alpha} < 0$. From (37) it follows that marginal profits for society eventually become negative.

## 6.6 Proof of Proposition 8

We derive the critical cutoffs $\{\varepsilon_m^I, \varepsilon_m^A, \varepsilon_m^R\}$ in an analysis that mirrors the proof of Proposition 5 incorporating $z \equiv H\left(\varphi\left[\frac{1-\lambda G(c_t)}{\lambda G(c_t)}\right]\right)$. The proof then compares the cutoffs and derives the

implications for optimal disclosure thresholds. Finally, it shows that second order conditions hold when the costs of activism and reputation costs are uniformly distributed.

We first verify that the partial effects of $\alpha$ and $k$ on trading transfers $c_t$ preserve the same sign. Substituting $H(\rho_t)$ for $z$ in the function $F$ defined in the Proof of Corollary 2 yields

$$\begin{aligned}\frac{\partial F}{\partial c_t} &= 1-\left[\frac{(b-\alpha)\alpha\delta f(k)}{b-\alpha H(\rho_t)\lambda G(c_t)}\right]\left(\frac{dH(\rho_t)}{dc_t}(1-\lambda G(c_t))-H(\rho_t)\lambda g(c_t)\right) \\ &\quad -\left[\frac{(b-\alpha)\alpha\delta f(k)}{(b-\alpha H(\rho_t)\lambda G(c_t))^2}\right]H(\rho_t)(1-\lambda G(c_t))\alpha\lambda\left(\frac{dH(\rho_t)}{dc_t}G(c_t)+H(\rho_t)g(c_t)\right) \\ &= 1-\left[\frac{(b-\alpha)\alpha\delta f(k)}{b-\alpha H(\rho_t)\lambda G(c_t)}\right]\frac{dH(\rho_t)}{dc_t}(1-\lambda G(c_t))\left(1+\frac{\alpha H(\rho_t)\lambda G(c_t)}{b-\alpha H(\rho_t)\lambda G(c_t)}\right) \\ &\quad +\left[\frac{(b-\alpha)\alpha\delta f(k)}{b-\alpha H(\rho_t)\lambda G(c_t)}\right]H(\rho_t)\lambda g(c_t)\left(1-\frac{\alpha H(\rho_t)(1-\lambda G(c_t))}{b-\alpha H(\rho_t)\lambda G(c_t)}\right),\end{aligned} \tag{38}$$

where the second equality follows from rearranging. The expressions for $\frac{\partial F}{\partial k}$ and $\frac{\partial F}{\partial \alpha}$ follow from substituting $H(\rho_t)$ for $z$ in (23) and (24) respectively.

The first line in the second equality of (38) is positive because $\frac{dH(\rho_t)}{dc_t}<0$. The second line is positive because $\left(1-\frac{\alpha H(\rho_t)(1-\lambda G(c_t))}{b-\alpha H(\rho_t)\lambda G(c_t)}\right)>0$. Thus, $\frac{\partial F}{\partial c_t}>0$. Moreover, the Proof of Corollary 2 shows that $\frac{\partial F}{\partial k}<0$, and that $\frac{\partial F}{\partial \alpha}<0$ for $\alpha<\alpha^{**}$ and $\frac{\partial F}{\partial \alpha}>0$ for $\alpha\in(\alpha^{**},b)$.

From the IFT it follows that $\frac{\partial c_t}{\partial k}>0$ and $\frac{\partial c_t}{\partial \alpha}>0$ for $\alpha<\alpha^{**}$ and $\frac{\partial c_t}{\partial \alpha}<0$ for $\alpha\in(\alpha^{**},b]$. Therefore, adding managerial feedback to the benchmark setting developed in Section 2 does not alter the signs of the effects of $\alpha$ and $k$ on trading transfers $c_t$.

**Investors**. The derivative of investors' net profits with respect to $\alpha$ is given by (28). If no interior solution exists, then investors do not benefit from a disclosure threshold, i.e., $\overline{\alpha}_I\geq\alpha^*$.

In equilibrium, $\pi_I f'(k)-r=0$ and $\frac{\partial k}{\partial \alpha}=0$ at an interior maximum, $\overline{\alpha}_I<\alpha^*$. Use $\frac{dc_t}{d\alpha}=\frac{\partial c_t}{\partial \alpha}+\frac{\partial c_t}{\partial k}\frac{\partial k}{\partial \alpha}$ to simplify (28) to $\frac{\partial \pi_I}{\partial c_t}\frac{\partial c_t}{\partial \alpha}f(k)$. We have $\frac{\partial c_t}{\partial \alpha}>0$ for $\alpha<\alpha^{**}$ with $\alpha^*<\alpha^{**}$, and $\frac{\partial c_t}{\partial k}>0$. Hence, an interior maximum $\overline{\alpha}_I<\alpha^*$ is characterized by $\frac{\partial \pi_I}{\partial c_t}=0$, where

$$\frac{\partial \pi_I}{\partial c_t}=\frac{H(\rho_t)\lambda}{f(k)}\left[g(c_t)(\delta f(k)-c_t)-G(c_t)\right]+\underbrace{\frac{dH(\rho_t)}{dc_t}\frac{\partial \pi_I}{\partial H(\rho_t)}}_{M_I} \tag{39}$$

Here, $\frac{dH(\rho_t)}{dc_t}=h(\rho_t)\frac{d\rho_t}{dc_t}=g(c_t)\frac{\partial H(\rho_t)}{\partial G(c_t)}$ and $\frac{\partial \pi_I}{\partial H(\rho_t)}=-\left[\delta(1-\lambda G(c_t))+\lambda G(c_t)\frac{c_t}{f(k)}\right]$. Because $M_I>0$, managerial feedback raises the marginal profitability of a higher cutoff to investors. At $\alpha=0$, activist trading profits are zero, so $c_t=0$, and hence (39) $>0$ and thus (28) $>0$: investors always value some market opacity, i.e., $\overline{\alpha}_I>0$. To characterize $\varepsilon_m^I$,

rearrange (39) = 0 as:

$$0 = \frac{H(\rho_t)\lambda}{f(k)}\left[g(c_t)(\delta f(k) - c_t) - G(c_t)\right] + g(c_t)\frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{\partial \pi_I}{\partial H(\rho_t)}. \tag{40}$$

Substitute $\varepsilon_a = \frac{g(c_t)}{G(c_t)}c_t$ and $\varepsilon_m = \frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{G(c_t)}{H(\rho_t)}$ into (40), then divide by $H(\rho_t)$ and rearrange:

$$\begin{aligned} 0 &= \frac{\lambda}{f(k)}\left[\varepsilon_a\left(\frac{\delta f(k) - c_t}{c_t}\right) - 1\right] + \varepsilon_m \frac{g(c_t)}{G(c_t)^2}\frac{\partial \pi_I}{\partial H(\rho_t)}; \\ &= \frac{\lambda}{f(k)}\left[\varepsilon_a\left(\frac{\delta f(k) - c_t}{c_t}\right) - 1\right] + \varepsilon_m\varepsilon_a \frac{1}{G(c_t)c_t}\frac{\partial \pi_I}{\partial H(\rho_t)}; \\ \Rightarrow\ & -\left(\frac{\lambda G(c_t)\frac{c_t}{f(k)}}{\partial \pi_I / \partial H(\rho_t)}\right)\left[\frac{\delta f(k) - c_t}{c_t} - \frac{1}{\varepsilon_a}\right] = \varepsilon_m. \end{aligned} \tag{41}$$

The expression for $\varepsilon_m^I$ follows directly from $\lambda G(c_t)\frac{c_t}{f(k)} = \frac{\partial \pi_A}{\partial H(\rho_t)}$. When investors value a binding disclosure threshold, i.e., when $\overline{\alpha}_I < \alpha^*$, it satisfies $\varepsilon_m = \varepsilon_m^I$.

**Activist.** Expected net activist profits are given in (30). Differentiating yields

$$\begin{aligned} & \frac{d}{d\alpha}\left\{H(\rho_t)\lambda G(c_t)\left[c_t - E\left[c|c \le c_t\right]\right]\right\} \\ = & \left[H(\rho_t)\lambda G(c_t) + \underbrace{\frac{dH(\rho_t)}{dc_t}\lambda G(c_t)\left[c_t - E\left[c|c \le c_t\right]\right]}_{M_A}\right]\frac{dc_t}{d\alpha}. \end{aligned} \tag{42}$$

where $\frac{dc_t}{d\alpha} = \frac{\partial c_t}{\partial \alpha} + \frac{\partial c_t}{\partial k}\frac{\partial k}{\partial \alpha}$ was derived in the proof of Proposition 5. Because $M_A < 0$, managerial feedback reduces the marginal profits from increasing $\alpha$ to the activist.

Since (42) $> 0$ at $\alpha = 0$, the activist always benefits from some market opacity, i.e., $\overline{\alpha}_A > 0$. If no interior solution exists, then the activist does not want a disclosure threshold, i.e., $\overline{\alpha}_A \ge \alpha^*$. Set (42) $= 0$ to derive $\varepsilon_m^A$, and recall that $\frac{dc_t}{d\alpha} > 0$ for $\alpha < \alpha^*$. Thus, (42) $= 0$ implies

$$H(\rho_t) + \frac{dH(\rho_t)}{dc_t}\left[c_t - E\left[c|c \le c_t\right]\right] = 0. \tag{43}$$

Substitute $\frac{dH(\rho_t)}{dc_t} = g(c_t)\frac{\partial H(\rho_t)}{\partial G(c_t)}$, $\varepsilon_a = \frac{g(c_t)}{G(c_t)}c_t$ and $\varepsilon_m = \frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{G(c_t)}{H(\rho_t)}$ into (43) and divide by

$H(\rho_t)$:

$$\begin{aligned} 0 &= 1 + g(c_t)\frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{1}{H(\rho_t)}\left[c_t - E\left[c|c \leq c_t\right]\right] \\ &= 1 + \frac{g(c_t)}{G(c_t)}\frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{G(c_t)}{H(\rho_t)}\left[c_t - E\left[c|c \leq c_t\right]\right] \\ &= 1 + \varepsilon_m \varepsilon_a \left[\frac{c_t - E\left[c|c \leq c_t\right]}{c_t}\right]. \end{aligned} \tag{44}$$

The characterization of $\varepsilon_m^A$ follows directly.

**Regulator**. The regulator's net expected payoff is given by (33). Differentiating with respect to $\alpha$ yields the marginal payoff to the regulator of increasing the activist's position:

$$\begin{aligned} &\frac{d\pi_V}{dc_t}\frac{dc_t}{d\alpha}f(k) + \pi_V f'(k)\frac{\partial k}{\partial \alpha} - r\frac{\partial k}{\partial \alpha} - \frac{dH(\rho_t)}{dc_t}\lambda G(c_t) E\left[c|c \leq c_t\right]\frac{dc_t}{d\alpha} \\ &-H(\rho_t)\lambda g(c_t) E\left[c|c \leq c_t\right]\frac{dc_t}{d\alpha} - H(\rho_t)\lambda G(c_t)\frac{g(c_t)}{G(c_t)}\left[c_t - E\left[c|c \leq c_t\right]\right]\frac{dc_t}{d\alpha}. \end{aligned} \tag{45}$$

Substitute the equilibrium relationship $\pi_I f'(k) - r = 0$ and $\pi_V = \pi_I + \pi_A$ to rearrange the regulator's marginal payoff from increasing $\alpha$ as:

$$\begin{aligned} (45) &= \frac{d\pi_V}{dc_t}\frac{dc_t}{d\alpha}f(k) + \pi_A f'(k)\frac{\partial k}{\partial \alpha} \\ &\quad -\frac{dH(\rho_t)}{dc_t}\lambda G(c_t) E\left[c|c \leq c_t\right]\frac{dc_t}{d\alpha} - H(\rho_t)\lambda g(c_t) c_t \frac{dc_t}{d\alpha} \\ &= -\frac{dH(\rho_t)}{dc_t}\Big[\delta f(k)\left[1 - \lambda G(c_t)\right] + \lambda G(c_t) E\left[c|c \leq c_t\right]\Big]\frac{dc_t}{d\alpha} \\ &\quad +H(\rho_t)\lambda g(c_t)\left[\delta f(k) - c_t\right]\frac{dc_t}{d\alpha} + \pi_A f'(k)\frac{\partial k}{\partial \alpha}, \end{aligned} \tag{46}$$

where the second equality follows from $\frac{d\pi_V}{dc_t} = H(\rho_t)\delta\lambda g(c_t) - \frac{dH(\rho_t)}{dc_t}\delta\left[1 - \lambda G(c_t)\right]$. Rearranging further yields:

$$\begin{aligned} (45) &= \Big[H(\rho_t)\lambda g(c_t)\left[\delta f(k) - c_t\right] + M_R\Big]\frac{dc_t}{d\alpha} + \pi_A f'(k)\frac{\partial k}{\partial \alpha}, \\ \text{where } M_R &\equiv -\frac{dH(\rho_t)}{dc_t}\Big[\delta f(k)[1 - \lambda G(c_t)] + \lambda G(c_t) E\left[c|c \leq c_t\right]\Big]. \end{aligned} \tag{47}$$

This equation corresponds to the characterization in (19). Since $M_R > 0$, managerial feedback increases the marginal profitability to the regulator of increasing the activist's position.

To ease exposition, we define $\Psi \equiv -\frac{\partial \pi_V}{\partial H(\rho_t)}f(k) + \lambda G(c_t) E\left[c|c \leq c_t\right]$ so that $M_R =$

$-\frac{dH(\rho_t)}{dc_t}\Psi$. Moreover, recall that $\frac{dH(\rho_t)}{dc_t} = g(c_t)\frac{\partial H(\rho_t)}{\partial G(c_t)}$. Substituting, rewrite (47) as:

$$\begin{aligned}
0 &= \left[-\frac{\partial H(\rho_t)}{\partial G(c_t)} g(c_t)\Psi + H(\rho_t)\lambda g(c_t)(\delta f(k) - c_t)\right]\frac{dc_t}{d\alpha} + \pi_A \frac{df(k)}{d\alpha} \\
&= g(c_t)(\delta f(k) - c_t) - \frac{g(c_t)}{G(c_t)}\frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{G(c_t)}{H(\rho_t)}\frac{\Psi}{\lambda} + \frac{\pi_A}{H(\rho_t)\lambda}\frac{df(k)/d\alpha}{dc_t/d\alpha} \\
&= \varepsilon_a\left(\frac{\delta f(k) - c_t}{c_t}\right)G(c_t) - \varepsilon_m\varepsilon_a\frac{\Psi}{\lambda c_t} + \frac{\pi_A}{H(\rho_t)\lambda}\frac{df(k)/d\alpha}{dc_t/d\alpha} \\
&= \varepsilon_a\left(\frac{\delta f(k) - c_t}{c_t}\right) - \varepsilon_m\varepsilon_a\frac{\Psi}{\lambda G(c_t)c_t} + \frac{\frac{df(k)/d\alpha}{f(k)}}{\frac{dc_t/d\alpha}{c_t}} \\
&= -\varepsilon_m + \frac{\lambda G(c_t)c_t}{\Psi}\left[\frac{\delta f(k) - c_t}{c_t} + \frac{1}{\varepsilon_a}\left(\frac{\frac{df(k)/d\alpha}{f(k)}}{\frac{dc_t/d\alpha}{c_t}}\right)\right],
\end{aligned} \tag{48}$$

where the third line uses $\varepsilon_a = \frac{g(c_t)}{G(c_t)}c_t$ and $\varepsilon_m = \frac{\partial H(\rho_t)}{\partial G(c_t)}\frac{G(c_t)}{H(\rho_t)}$. To derive $\varepsilon_m^R$ note in the last line of (48) that using $\pi_V = \pi_I + \pi_A$ we obtain

$$\begin{aligned}
\frac{\lambda G(c_t)c_t}{\Psi} &= \left[-\frac{\frac{\partial \pi_I}{\partial H(\rho_t)}f(k)}{\lambda G(c_t)c_t} - \frac{\frac{\partial \pi_A}{\partial H(\rho_t)}f(k)}{\lambda G(c_t)c_t} + \frac{E[c|c \le c_t]}{c_t}\right]^{-1} \\
&= \left[-\frac{\partial \pi_I/\partial H(\rho_t)}{\partial \pi_A/\partial H(\rho_t)} - \frac{c_t - E[c|c \le c_t]}{c_t}\right]^{-1}.
\end{aligned} \tag{49}$$

**Cutoff relation.** The analysis above rearranges the marginal payoffs to market participants of increasing $\alpha$. When second-order conditions hold, (i) activist marginal profits are decreasing at $\alpha^*$ when $\varepsilon_m^* < \varepsilon_m^{*A}$; (ii) investors' marginal profits are decreasing at $\alpha^*$ if $\varepsilon_m^{*I} < \varepsilon_m^*$; (iii) the regulator's marginal payoff is decreasing at $\alpha^*$ when $\varepsilon_m^{*R} < \varepsilon_m^*$.

Next, we show that $\varepsilon_m^A < \varepsilon_m^I < \varepsilon_m^R$. Because the marginal profits of all market agents are positive at $\alpha = 0$, $\varepsilon_m \in (\varepsilon_m^A, \varepsilon_m^I)$ when $\alpha = 0$. It follows that if second-order conditions hold, when investors want a binding disclosure threshold, activists do not and vice versa. Moreover, no party wants a binding disclosure threshold if $\varepsilon_m^* \in [\varepsilon_m^{A*}, \varepsilon_m^{I*}]$.

To see that $\varepsilon_m^A < \varepsilon_m^I$, note that the relation is equivalent to

$$\frac{1}{\varepsilon_a}\left(-\frac{\partial \pi_A/\partial H(\rho_t)}{\partial \pi_I/\partial H(\rho_t)} - \frac{c_t}{c_t - E[c|c \le c_t]}\right) < -\left(\frac{\partial \pi_A/\partial H(\rho_t)}{\partial \pi_I/\partial H(\rho_t)}\right)\left[\frac{\delta f(k) - c_t}{c_t}\right]. \tag{50}$$

The left-hand side of (50) is negative because

$$-\frac{\partial \pi_A/\partial H\left(\rho_t\right)}{\partial \pi_I/\partial H\left(\rho_t\right)}=-\frac{\lambda G\left(c_t\right)\frac{c_t}{f(k)}}{-\left[\left[1-\lambda G\left(c_t\right)\right]\delta+\lambda G\left(c_t\right)\frac{c_t}{f(k)}\right]}\in(0,1),$$

whereas $\frac{c_t}{c_t-E[c|c\leq c_t]}>1$. The right-hand side of (50) is positive because $\partial \pi_A/\partial H\left(\rho_t\right)>0$, whereas $\partial \pi_I/\partial H\left(\rho_t\right)<0$, so we have $\varepsilon_m^A<\varepsilon_m^I$.

To see that $\varepsilon_m^I<\varepsilon_m^R$, note that a necessary condition for $\varepsilon_m^R<0$ is that investment decrease with $\alpha$, i.e., $\frac{df(k)}{d\alpha}=f'(k)\frac{\partial k}{\partial \alpha}<0$, which implies that activist marginal profits decrease and thus $\varepsilon_m^I<\varepsilon_m$. Hence, if $\varepsilon_m^R=0$, then $\varepsilon_m^I<\varepsilon_m<0$. That is, the sole cost to society of increasing trading transfers is a reduction in real investment, while the benefits exceed those for investors. Thus, for $\varepsilon_m^R<\varepsilon_m$, it is necessary, but not sufficient, that $\varepsilon_m^I<\varepsilon_m$, which implies $\varepsilon_m^R<\varepsilon_m^I$.

### 6.6.1 The uniform-uniform case

We show that when both $c$ and $\rho$ are uniformly distributed, second-order conditions hold.

**Investors**. We rewrite the first-order condition for investors in (40), first substituting in the uniform distribution of the manager's cost of reputation, and then the uniform distribution of the activist's cost of intervention. Substituting $H(\rho_t)=\frac{\rho_t}{R}$ and $h(\rho_t)=\frac{1}{R}$, (40) becomes:

$$\begin{aligned}0 \;=\; & \underbrace{\frac{\varphi}{R}\left[\frac{1-\lambda G(c_t)}{\lambda G(c_t)}\right]}_{H(\rho_t)}\frac{\lambda}{f(k)}\left[g(c_t)(\delta f(k)-c_t)-G(c_t)\right] \\ & +\underbrace{\frac{\varphi}{R}\left[\frac{g(c_t)}{\lambda G(c_t)^2}\right]}_{-\partial H(\rho_t)/\partial c_t}\underbrace{\left[\delta(1-\lambda G(c_t))+\lambda G(c_t)\frac{c_t}{f(k)}\right]}_{-\partial \pi_I/\partial H(\rho_t)}.\end{aligned} \tag{51}$$

Multiplying (51) by $\frac{R}{\varphi}\left[\frac{\lambda G(c_t)}{1-\lambda G(c_t)}\right]\frac{f(k)}{\lambda}$ yields an equivalent condition

$$0=g(c_t)(\delta f(k)-c_t)-G(c_t)+\left[\frac{g(c_t)}{\lambda G(c_t)}\right]\left[\delta f(k)+\frac{\lambda G(c_t)}{1-\lambda G(c_t)}c_t\right], \tag{52}$$

which we multiply yet again by $\frac{1}{g(c_t)}$ and rearrange to obtain

$$0=\delta f(k)\left[\frac{1+\lambda G(c_t)}{\lambda G(c_t)}\right]+c_t\left[\frac{\lambda G(c_t)}{1-\lambda G(c_t)}\right]-\frac{G(c_t)}{g(c_t)}. \tag{53}$$

Substituting $G(c_t) = \frac{c_t}{C}$ and $g(c_t) = \frac{1}{C}$, the first-order condition (53) for investors becomes

$$0 = \delta f(k) \left[ \frac{C + \lambda c_t}{\lambda c_t} \right] + c_t \left[ \frac{\lambda c_t}{C - \lambda c_t} \right] - c_t \tag{54}$$

We prove that there is a unique solution to the first-order condition for investors by showing that the right-hand side (RHS) of (54) decreases in $c_t$. Differentiating yields

$$\begin{aligned} \frac{d}{dc_t} RHS(54) &= \left( \frac{C}{C - \lambda c_t} \right)^2 - \frac{\delta f(k) C}{\lambda c_t^2} - 2 \\ &= \left( \frac{1}{1 - \lambda G(c_t)} \right)^2 - \frac{\delta f(k)}{\lambda G(c_t) c_t} - 2, \end{aligned} \tag{55}$$

where the second line uses $G(c_t) = c_t/C$ for $c_t \leq C$. Notice that (55) is negative for $c_t \to 0$ and increasing in $c_t$. We derive an upper bound for $c_t$ and show that $\frac{d}{dc_t} RHS(54) < 0$ for such trading transfers, establishing that the solution to the first-order condition is unique. Trading profits $c_t$ are maximized by the position $\alpha^{**}$ in (25) and with the highest liquidity shock $b = 1$. Substituting into the expression for $c_t$ in (8) yields an implicit upper bound on $c_t$:

$$\begin{aligned} c_t &\leq \frac{(1 - \lambda G(c_t)) \left( 1 - \sqrt{1 - H(\rho_t) \lambda G(c_t)} \right) \left( H(\rho_t) \lambda G(c_t) + \sqrt{1 - H(\rho_t) \lambda G(c_t)} - 1 \right) \delta f(k)}{H(\rho_t) (\lambda G(c_t))^2 \sqrt{1 - H(\rho_t) \lambda G(c_t)}} \\ &= \frac{(1 - \lambda G(c_t))}{H(\rho_t) (\lambda G(c_t))^2} \left[ 2 - 2\sqrt{1 - H(\rho_t) \lambda G(c_t)} - H(\rho_t) \lambda G(c_t) \right] \delta f(k) \end{aligned} \tag{56}$$

A simpler (and weaker) upper bound on $c_t$ follows from considering the maximum value of the numerator in (56), i.e.,

$$\begin{aligned} c_t &\leq \frac{(1 - \lambda G(c_t))}{H(\rho_t) (\lambda G(c_t))^2} 2\delta f(k) \\ &= (1 - \lambda G(c_t)) \underbrace{\frac{R}{\varphi} \left( \frac{\lambda G(c_t)}{1 - \lambda G(c_t)} \right)}_{1/H(\rho_t)} \frac{2\delta f(k)}{(\lambda G(c_t))^2}, \end{aligned} \tag{57}$$

or equivalently,

$$\frac{\varphi}{2R} \leq \frac{\delta f(k)}{\lambda G(c_t) c_t}. \tag{58}$$

Plugging (58) in (55) and comparing the first two terms reveals that a sufficient condition for $\frac{d}{dc_t} RHS(54) < 0$ is

$$\left( \frac{1}{1 - \lambda G(c_t)} \right)^2 \leq \frac{\varphi}{2R}. \tag{59}$$

The condition $2R < \varphi(1-\lambda)^2$ follows.

**Activist**. Substitute $H(\rho_t) = \frac{\rho_t}{R}$ and $h(\rho_t) = \frac{1}{R}$ to rewrite the activist's first-order condition (43) as:

$$0 = \underbrace{\frac{\varphi}{R}\left[\frac{1-\lambda G(c_t)}{\lambda G(c_t)}\right]}_{H(\rho_t)} + \underbrace{\left(-\frac{\varphi}{R}\frac{g(c_t)}{\lambda G(c_t)^2}\right)}_{\partial H(\rho_t)/\partial c_t}\left[c_t - E\left[c|c \leq c_t\right]\right] \tag{60}$$

Multiplying (60) by $\frac{R}{\varphi}\left[\frac{\lambda G(c_t)}{1-\lambda G(c_t)}\right]$ yields a simpler, equivalent condition

$$0 = 1 - \left[\frac{g(c_t)}{G(c_t)}\right]\left(\frac{c_t - E\left[c|c \leq c_t\right]}{1-\lambda G(c_t)}\right). \tag{61}$$

Substitute $G(c_t) = \frac{c_t}{C}$ and $g(c_t) = \frac{1}{C}$ and note that $c_t - E\left[c|c \leq c_t\right] = \frac{c_t}{2}$. It follows that the activist's first-order condition satisfies

$$0 = 1 - \frac{1}{2}\left(\frac{C}{C-\lambda c_t}\right). \tag{62}$$

The right-hand side decreases in $c_t$, implying a unique solution.

# 7 Appendix B: Allowing for pure informed trading

We relax the assumption that the activist can only take a position when the manager implements the bad business plan and show that it does not qualitatively alter our results. We reproduce the analysis of the market in Section 2.1 assuming that at $t = 2$, if the activist observes the company, which occurs with probability $\lambda$, he can take a position, regardless of the business plan implemented by the manager at $t = 1$.

**Proposition 9** *At $t = 2$, the market maker posts prices*

$$\begin{aligned} P(\omega) = P_l \equiv \left[\tfrac{2[1-z(1-\lambda G(c_t^*))\delta]-z\lambda G(c_t^*)-(1-z)\lambda}{2-z\lambda G(c_t^*)-(1-z)\lambda}\right] f(k) \quad & \text{if} \quad \omega \leq 0 \\ P(\omega) = P_h \equiv f(k) \quad & \text{if} \quad \omega > 0. \end{aligned} \tag{63}$$

*If the activist (a) observes managerial malfeasance ($m = 0$) and the activism cost satisfies*

$$c \leq c_t^* = z\left[\frac{1-\lambda G(c_t^*)}{2-z\lambda G(c_t^*)-(1-z)\lambda}\right]\frac{b}{2}\delta f(k), \tag{64}$$

*or (b) observes that the manager behaves ($m = 1$); then he takes position*

$$\alpha^* = \frac{b}{2}, \tag{65}$$

*and disciplines management in situation (a). Otherwise the activist does not participate.*

We provide the full proof at the end of this section; here we discuss the differences with the model in the main text. Case (a) is equivalent to the setting studied in Section 2.1. The activist intervenes to discipline management if the conditional trading profits of doing so (weakly) outweigh the cost of intervention, i.e., if $c \leq c_t^*$. Case (b) captures the difference from the benchmark model, as the activist can acquire stock when the manager behaves ($m = 1$). It reveals an intuitive result:

**Corollary 10** *Pure informed trading occurs if and only if the activist observes that the manager implemented the good business plan. Therefore, it has unconditional probability $(1-z)\lambda$.*

When the activist observes the good plan, he can profit from his information advantage (trading profits) without incurring activism costs. Thus, he always takes a position. Moreover, the activist would never act as a mere informed trader after observing the bad plan. This would imply acquiring overvalued stock, and has negative expected profits.

Notably, when the activist acts as a mere informed trader, he takes the same position $\alpha^* = b/2$. Whether he intends to discipline management or not, a position of $b/2$ maximizes

trading profits. If management misbehaves, the activist only participates if these trading profits outweigh the cost of intervention. If management behaves, he always participates (upon observing management's action).

A positive net order flow $\omega > 0$ reveals the activist, and activist participation is associated to certain cash flows $f(k)$ —as in the benchmark model. This is because additional participation only occurs if the business plan is good —case (b). A weakly negative order flow $\omega \leq 0$ is consistent with both activist absence and participation. Lemma 10 highlights that the new assumption increases informed trading, but only when the good plan is implemented. A negative order flow is now associated with smaller project expected cash flows and thus $P_l$ is lower than in the benchmark model. This increases the conditional expected trading profits of the activist $c_t^*$ and in turn his participation after observing managerial malfeasance $G(c_t^*)$.

**Proposition 11** *The expected value at $t = 0$ of the project given investment $k$ is*

$$E[V] = [1 - z(1 - \lambda G(c_t^*))\delta] f(k) \equiv \pi_V f(k). \tag{66}$$

*Expected gross profits of the activist are:*

$$E[\Pi_A] = [(1 - z)\lambda + z\lambda G(c_t^*)] \frac{c_t^*}{f(k)} f(k) \equiv \pi_A f(k). \tag{67}$$

*Expected gross profits of uninformed investors are:*

$$E[\Pi_I] = (\pi_V - \pi_A) f(k) \equiv \pi_I f(k). \tag{68}$$

*Investment by uninformed investors $k$ solves*

$$\pi_I f'(k) - r = 0. \tag{69}$$

The proof follows directly from that of Proposition 3 in the text and the subseqent discussion. Given initial investment, the project has the same value $E[V]$ as in the benchmark setting—Proposition 2. The new assumption alters the distribution of revenues between investors and the activist. Equation (67) reveals that the activist, in addition to obtaining larger conditional trading profits (bigger $c_t^*$), also obtains them with higher probability. In particular, trading transfers are realized if either (a) the activist disciplines management, which occurs with probability $z\lambda G(c_t^*)$; or (b) the activist acts as a mere informed trader, which has probability $(1 - z)\lambda$. It follows that $\pi_I$ is smaller than in Proposition 3 and therefore investment levels captured by (69) are lower, too.

## 7.1 Proof of Proposition 9

**Market maker**. Let $\widehat{\alpha}$ be the market maker's conjecture about the size of the activist's trade, which is correct in equilibrium, and let $\widehat{c}_t \equiv c_t(\widehat{\alpha})$ be his conjecture about the cost participation threshold.

The activist does not participate if either he does not observe the business plan, or he observes that the bad plan is implemented but it is too costly to intervene. When the activist does not does not participate, the order flow is negative with certainty, i.e., $Pr[\omega \leq 0|a_1] = \int_0^b \frac{1}{b} dl = 1$. Conversely, the activist participates if he observes the plan and either the manager implemented the good business plan, or she implemented the bad business plan and the cost of intervention is sufficiently small. The probability of a negative net order flow when the activist participates is $Pr[\omega \leq 0|a_1] = \int_\alpha^b \frac{1}{b} dl = \frac{b-\alpha}{b}$. From Bayes rule,

$$Pr[a_1|\omega \leq 0] = \frac{[(1-z)\lambda + z\lambda G(\widehat{c}_t)]\left(\frac{b-\widehat{\alpha}}{b}\right)}{[(1-z)\lambda + z\lambda G(\widehat{c}_t)]\left(\frac{b-\widehat{\alpha}}{b}\right) + (1-z)(1-\lambda) + z(1-\lambda G(\widehat{c}_t))}, \tag{70}$$

and

$$\begin{aligned} Pr[V = f(k)|a_0] &= \frac{(1-z)(1-\lambda) + z(1-\lambda G(\widehat{c}_t))(1-\delta)}{(1-z)(1-\lambda) + z(1-\lambda G(\widehat{c}_t))(1-\delta) + z(1-\lambda G(\widehat{c}_t))\delta} \\ &= \frac{(1-z)(1-\lambda) + z(1-\lambda G(\widehat{c}_t))(1-\delta)}{(1-z)(1-\lambda) + z(1-\lambda G(\widehat{c}_t))}. \end{aligned} \tag{71}$$

Substituting (70) and (71) into (5) and using $Pr[a_0|\omega \leq 0] = 1 - Pr[a_1|\omega \leq 0]$ yields

$$P_{l(\widehat{\alpha})} = \frac{b - \widehat{\alpha}z\lambda G(\widehat{c}_t) - \widehat{\alpha}(1-z)\lambda - bz(1-\lambda G(\widehat{c}_t))\delta}{b - \widehat{\alpha}z\lambda G(\widehat{c}_t) - \widehat{\alpha}(1-z)\lambda}, \tag{72}$$

which, evaluated at the equilibrium position $\alpha^* = b/2$, yields $P_l$ in (64).

**Activist**. The activist's gross expected profits from participating do not depend on whether he intervenes to discipline to discipline management incurring cost $c$, or if he acts as a mere informed trader after observing the good business plan, which is costless. Gross expected profits are therefore given by (7) and maximized by $\alpha^* = b/2$. Upon observing the bad business plan $m = 0$, the activist participates if and only if $c \leq E[\Pi_A|a_1]$, implying that the *intervention* cost cut-off satisfies $c_t = E[\Pi_A|a_1]$. Substituting $P_{l(\alpha)}$ in (72) into $E[\Pi_A|a_1]$ and noting that the market maker's conjecture is correct in equilibrium yields

$$c_t = (b-\alpha)\alpha z \left[\frac{1-\lambda G(c_t)}{b - \alpha z\lambda G(c_t) - \alpha(1-z)\lambda}\right]\delta f(k), \tag{73}$$

which, evaluated at $\alpha = \alpha^*$, reads as $c_t^*$ in Proposition 9.

# 8 Appendix C: Alternative Trading Environment

In this section we develop an alternative formulation of the trading market and show that our qualitative results are preserved.

## 8.1 Trading Environment

At $t = 2$, initial investors receive liquidity shocks that force them to sell shares. For tractability reasons, we follow Edmans (2009) and assume that liquidity shocks are exponentially distributed: liquidity shock $l$ has density

$$y(l) = \begin{cases} \mu e^{-\mu l} & \text{if} \quad l \geq 0 \\ 0 & \text{if} \quad l < 0 \end{cases}. \tag{74}$$

To translate this to our framework we assume that when investors receive shock $l$, they must sell collectively a share $\gamma Y(l)$ of the firm, where $Y(l) = 1 - e^{-\mu l}$ is the cumulative distribution of liquidity shock $l$. If the activist observes managerial malfeasance and decides to participate, it chooses to acquire share $\gamma Y(\alpha)$ of the firm. The market maker observes $\omega = \alpha - l$, but not its components, and sets a price that breaks even in expectation, i.e., setting price equal to the expected project payoffs.

Other than the new trading environment, assumptions remain unchanged. We solve the model recursively, following the steps detailed in Section 2.

**Proposition 12** *At $t = 2$, if the activist observes managerial malfeasance ($m = 0$) and the activism cost satisfies*

$$c \leq c_t^* = z \left[ \frac{1 - \lambda G(c_t^*)}{2 - z\lambda G(c_t^*)} \right] \frac{\gamma}{2} \delta f(k); \tag{75}$$

*then he takes a position $\gamma Y(\alpha^*) = \frac{\gamma}{2}$, which corresponds to*

$$\alpha^* = \frac{ln(2)}{\mu}, \tag{76}$$

*and disciplines management. Otherwise, the activist does not participate.*

*The market maker, upon observing $\omega = \alpha - l$, sets prices*

$$\begin{aligned} P(\omega) = P_l &\equiv \left[ \tfrac{2[1 - z(1 - \lambda G(c_t^*))\delta] - z\lambda G(c_t^*)}{2 - z\lambda G(c_t^*)} \right] f(k) \quad \text{if} \quad \omega \leq 0 \\ P(\omega) = P_h &\equiv f(k) \qquad\qquad\qquad\qquad\qquad\qquad \text{if} \quad \omega > 0. \end{aligned} \tag{77}$$

A full proof is provided later; here we provide the intuition and link it to the benchmark

model. If $\omega > 0$, the market maker knows with certainty that the activist took a position and the project pays off $f(k)$. If $\omega \leq 0$, the expected project value is

$$P_{l(\alpha)} = \left[\frac{1 - z\lambda G(c_t)Y(\alpha) - z(1 - \lambda G(c_t))\delta}{1 - z\lambda G(c_t)Y(\alpha)}\right] f(k). \tag{78}$$

The activist's trade off between the number of undervalued shares that he may acquire $\gamma Y(\alpha)$ and the expected cost of information revelation $\int_{\alpha}^{\infty} y(l)dl = 1 - Y(\alpha)$ is analogous to the benchmark setting. His expected gross profits conditional on buying $\gamma Y(\alpha)$ shares are

$$E[\Pi_A|a_1] = [1 - Y(\alpha)]\gamma Y(\alpha)\left[f(k) - P_l\right]. \tag{79}$$

Expected gross profits are maximized by $\alpha^* = ln(2)/\mu$, which corresponds to a position $\gamma Y(\alpha^*) = \gamma/2$. The activist's cost participation cut-off is pinned down by $E[\Pi_A|a_1] = c_t$:

$$c_t = [1 - Y(\alpha)]\gamma Y(\alpha) z \left[\frac{1 - \lambda G(c_t)}{1 - z\lambda G(c_t)Y(\alpha)}\right] \delta f(k), \tag{80}$$

and takes the form in (75) when evaluated at the optimal position of $\alpha^* = ln(2)/\mu$. The cut-off $c_t$ is unique and the activist employs a threshold strategy. Moreover, $Y(\alpha^*) = 1/2$, which plugged in (78) yields $P_l$ in (77).

Note that $P_{l(\alpha)}$ decreases with $\alpha$: the market feedback effect is also present in this environment and the analogue of Corollary 2 in the main text applies, i.e., the activist would benefit from committing to a more aggressive trade before stock prices are posted.

**Proof of Proposition 12.** Let $\widehat{\alpha}$ be the market maker's conjecture about the activist's trade, which is correct in equilibrium. Let $\widehat{c}_t \equiv c_t(\widehat{\alpha})$ be the analogous conjecture about his cost participation threshold. The market maker observes $\omega$. Given $\omega$, either (i) the activist did not take a position and $l = -\omega$; or (ii) the activist participates and $l = -\omega + \widehat{\alpha}$. From our assumptions it follows that the unconditional probability that the activist does not participate is $[1 - z\lambda G(\widehat{c}_t)]y(-\omega)$, and the unconditional probability that he participates is $z\lambda G(\widehat{c}_t)\, y(-\omega + \widehat{\alpha})$. Thus, the expected project value is

$$\begin{aligned} E[V] \;=\; & \left[\frac{y(-\omega)(1-z) + y(-\omega+\widehat{\alpha})z\lambda G(\widehat{c}_t)}{y(-\omega)(1-z) + y(-\omega+\widehat{\alpha})z\lambda G(\widehat{c}_t) + y(-\omega)z[1-\lambda G(\widehat{c}_t)]}\right] f(k) \\ & + \left[\frac{y(-\omega)z[1-\lambda G(\widehat{c}_t)]}{y(-\omega)(1-z) + y(-\omega+\widehat{\alpha})z\lambda G(\widehat{c}_t) + y(-\omega)z[1-\lambda G(\widehat{c}_t)]}\right](1-\delta)f(k). \end{aligned} \tag{81}$$

Suppose the market maker observes $\omega > 0$. Then $y(-\omega) = 0$, and the activist participates with certainty so $P(\omega) = P_h$. If, instead, $\omega \leq 0$, the market maker does not know

whether the activist participates, with $y(-\omega + \widehat{\alpha}) = \mu e^{\mu(\omega - \widehat{\alpha})}$ and $y(-\omega) = \mu e^{\mu\omega}$. The term $\mu e^{\mu\omega}$ cancels out of the numerator and denominator. Using $Y(\alpha) = 1 - e^{-\mu\alpha}$ yields (78).

## 8.2 Subsequent analysis

Proposition 3 remains unchanged with respect to the main text: in expectation the project's gross expected profits are split in different proportions between uninformed investors and the activist. These proportions are determined by trading transfers in equilibrium $c_t^*$, which provide a role for blockholder disclosure thresholds. The analysis of optimal policies follows.

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