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# Delegated Shareholder Activism

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# DELEGATED SHAREHOLDER ACTIVISM*

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**Abstract**

Hedge fund activists often aim to convince other shareholders to vote for a particular corporate policy, while majority shareholders recognize that activist recommendations serve their own interests, not necessarily maximizing firm value. We show how an activist can increase the likelihood of a favorable vote by delegating the tasks of acquiring information and making recommendations to another activist. This choice balances motivating the delegated activist to acquire costly information against ensuring shareholders trust the recommendation. We characterize how the hedge fund activist's bias affects the delegation bias, information acquisition, recommendation and shareholder voting decisions, and firm value.

**Keywords:** Hedge Fund Activism, Delegation, Information Acquisition, Recommendations, Shareholder Voting

**JEL Classification:** D72, G23, G34, D83, K22

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# 1 Introduction

Shareholder votes are often used to determine whether a firm adopts a particular corporate policy. These policies run the gamut from ESG policies to directors in proxy contests to major transactions (stock splits, buybacks, M&As), and so on. Justifications for this reliance on shareholding votes often lie on the premise that shareholders are willing to acquire information to properly assess proposals and vote accordingly. However, in practice, shareholders who collectively own the majority of shares typically have minimal incentives to acquire information themselves. This could be because their individual stakes are too small to significantly influence voting results,[1] i.e., their votes are vanishingly unlikely to be pivotal, or their investment decisions do not hinge on firm-specific information (e.g., index funds that passively track market performances).[2] This manifests itself in the finding by Matsusaka and Shu (2023) that in 2021, 33% of mutual funds robo-voted, following proxy advice,[3] and Brav, Cain and Zytnick (2022) finds that most retail shareholders vote based on public information.

These observations suggest that the primary role of most shareholders is not to individually acquire information about the merits of a corporate policy, with voting somehow aggregating that information to obtain the right outcome. Instead, their role is to assess a policy's merits based on information provided by *other* agents, including activist shareholders, proxy advisors, and management. Our paper endogenizes this information provision by motivated activists, and the consequences for policy outcomes and firm value. Crucially, rather than small pivotal voting probabilities determining information acquisition, it is the probability that information acquisition and provision of information to *other* shareholders proves pivotal for shareholder voting outcomes that matters for activists—and this probability can be large.

Hedge fund activists are motivated to expend resources to acquire information to persuade other shareholders that their preferred policies should be adopted (Brav et al. (2008,

[1]Brav, Cain and Zytnick (2022) find the aggregate share ownership of retail domestic shareholder averages 26% of shares outstanding. Holderness (2009) finds that, on average, large shareholders who own at least 5% of shares collectively only control 39% of the common stock; non-blockholders typically control a majority.

[2]Index funds comprise over 25% of U.S. mutual funds and ETF assets (Heath et al. (2018)). Bebchuk, Cohen and Hirst (2017) find index funds have weak incentives to monitor management. More generally, Gao and Huang (2022) find that most voting decisions of mutual funds are uninformed.

[3]Relatedly, Iliev and Lowry (2015) found that over 25% of mutual funds rely on Institutional Shareholder Services (ISS) recommendations to vote, while 8% of funds always vote with management's recommendations.

2010, 2024)). Majority shareholders, who recognize that their interests do not perfectly align with those of activists, combine the information provided by activists with other public information (e.g., from a proxy advisor or management) to make their voting decisions.

Our paper delves into the strategic calculus of an activist shareholder whose corporate policy interests may not align with maximizing share value. We analyze how the activist's motivations affect the quality and bias of her voting recommendations. We characterize the implications for how the otherwise uninformed pivotal shareholders weigh an activist's recommendation when determining how to vote on a proposed policy. We refer to these uninformed pivotal shareholders as passive shareholders.

Our model considers an activist shareholder A with a minority stake in a firm. Activist A identifies a potential corporate policy/project with unknown cash flow consequences. Activist A differs from passive shareholders in that she would gain an additional private benefit if the firm pursues the project. This private benefit means that A holds a bias toward approval relative to the passive shareholders whose votes determine whether the project is pursued. Activist A must convince passive shareholders of the policy's merit to win approval. Her problems are that (1) the unconditional expected cash flows from the policy are negative, so passive shareholders would vote against it absent positive information about payoffs; (2) passive shareholders understand that A is biased, so they may not trust her recommendations; and (3) information is costly to acquire.

To mitigate shareholder concerns, Activist A can delegate information acquisition choices to another, possibly less biased, activist, Activist B, who can investigate the policy and then make a recommendation (yes or no) to shareholders. Shareholders base voting decisions on the recommendation together with additional public information about the project's cash flows (e.g., gathered by a proxy advisor). In recent years,[4] it has become common for mul-

[4]A notable example featured two hedge fund activists, Barington Capital Group and Starboard, against Darden, the owner of U.S. restaurant chains Olive Garden and Red Lobster. In September 2013, Barington, which held a 2% share, criticized Darden's board and proposed to split the company up to enhance shareholder value. Darden's board rejected this proposal. In December, Starboard filed its initial 13D, disclosing its ownership stake in Darden. Echoing Barington, Starboard presented a report detailing strategies to boost earnings, and nominated candidates to replace the existing board. Subsequently, both major proxy advisors, Institutional Shareholder Services and Glass Lewis, recommended that all directors be replaced. Ultimately, shareholders elected all of Starboard's nominated directors. Source: "Activist Hedge Fund Starboard Succeeds in Replacing Darden Board", New York Times, 10/10/2014.

tiple activist investors to target a single firm, with subsequent activists backing the lead activist and providing advice to shareholders ahead of proxy voting.

To solve A's problem, we first solve for how the bias of a potential Activist B affects (i) the likelihood that the investigation is undertaken; (ii) the probability B recommends the project; (iii) the probability shareholders approve the project; (iv) expected project revenues; and (v) expected payoffs to the different activists as a function of their biases.

In our baseline model, Activist B initially has no shares, but can acquire a stake in the firm at the competitive and market-clearing price that reflects the expected value of any recommendations about the policy that he may provide shareholders. But this means that B does not benefit in expectation from increases in share value from his recommendations, so to be willing to acquire a stake, his expected private benefits from approved projects must cover his expected investigation costs. Moreover, even if Activist B acquired his stake *before* shareholders learned of the potential policy, the expected payoff from a recommendation must still cover his investigation costs.

Activist A could select someone who would gain a large private payoff if the policy is approved. But then shareholders would account for this bias and not weigh a recommendation strongly, making rejection likely and undermining A's goals. Conversely, shareholders would strongly weigh a recommendation by an unbiased activist, as their interests would be perfectly aligned. However, share prices will reflect this alignment of interests, fully accounting for the expected value of future information acquisition and recommendations, leaving the unbiased activist unable to cover any information costs. Thus, selecting an Activist B who would benefit more from project approval may help motivate B to acquire information, but shareholders then require better public information to follow a positive recommendation.

We recursively characterize the equilibrium. We prove that there is a (payoff) unique equilibrium to the recommendation-shareholder voting subgame that satisfies the Perfect Sequential credibility refinement of Grossman and Perry (1986). This equilibrium is in cutoff strategies, with B recommending approval if and only if the project's revenues exceed a cutoff; and shareholders approving the project if and only if (i) the activist recommended approval *and* (ii) subsequent information arrival indicates high enough revenues. B's cutoff strategy and, hence, shareholder approval decisions only depend on the ratio of B's private benefit from project approval to his shareholdings. The greater is this ratio, the more biased are B's recommendations—B is willing to recommend projects with more negative expected revenues. In turn, to protect themselves, passive shareholders raise their revenue cutoff for approval for these more biased and less informative recommendations. Thus, when B obtains more private benefits from an approved project, passive shareholders make both more Type 1 and more Type 2 errors, reducing expected cash flows from approved projects.

While B's recommendations only depend on the ratio of his private benefit to shareholdings, ceteris paribus, the larger are B's shareholdings, the more willing he is to incur the cost of investigating the project, and hence the more likely the project is to be approved. This reflects that B's payments for his shares are sunk when he decides whether to investigate, and the more shares he has, the more B profits in expectation from approved projects. From an ex-ante perspective, there are two countervailing effects on B of having a larger equity stake. On the positive side, a larger stake makes passive shareholders more willing to approve B's recommendation by better aligning his interests with theirs. B values shareholder approval by more than the passive shareholders themselves because B also gains the private benefit. However, on the negative side, B is harmed by his increased willingness to incur the costs of investigation due to a larger stake. The share price fully accounts for the expected increase in firm value from increased investigation—so only other shareholders and not B gain from the social value added by B's investigations, and B privately incurs all of the investigation costs.

We then characterize Activist A's delegation choice. The central strategic tension is that a (somewhat) more biased Activist B is more incentivized to acquire information, raising the probability that information is gathered that leads to the project ultimately being pursued, but the increased willingness of a more biased Activist B to recommend negative NPV projects reduces cash flows even after passive shareholders account for this bias.

A more biased Activist A, with a larger ratio of private benefits to shareholdings, resolves this tension by delegating information to an Activist B who also gains more private benefits from approved projects. This reflects that A cares relatively more about raising the probability that the project is both investigated and recommended by B and approved by shareholders and relatively less about the reductions in ex-ante expected project revenues.

We also identify conditions under which outcomes are unchanged when the set of activists from whom A selects hold shares prior to passive shareholders learning of the opportunity. When this is so, delegation choices are not constrained by the need to ensure that B expects to break even ex-ante on his share purchases and investigation. We prove that when uncertainty is uniformly distributed or more generally, when Activist A's private benefit is large enough that she prefers an activist who is sufficiently biased, A makes the same choice as in our baseline setting. It follows directly that, for example, with uniform uncertainty, our findings can describe "wolf pack" activism, where the pack delegates to the activist who maximizes expected activist surplus, as encapsulated by the bias associated with their total private benefits from an approved project divided by their total share holdings. The pack would otherwise trade-off in exactly the same way as Activist A in our base model.

We conclude our analysis by showing how outcomes are affected qualitatively if B knows the cost of investigation cost *before* deciding whether to buy shares. Relative to the base case scenario, the rational expectations share price rises when B acquires shares, reflecting that shareholders now *know* that B will investigate; once again, in equilibrium, B expects neither to gain nor lose from the cash flows generated by his investigation. A naïve conjecture in this scenario might be that since B never undertakes an unprofitable investigation, A must be better off than in our baseline setting. In fact, the opposite is true. When B knows the cost before purchasing shares, only the private benefit to stake ratio matters for his decision to *investigate*. In contrast, when B only learns $c$ after buying shares, those share purchases are sunk, so B subsequently internalizes the expected revenue added from investigation for the value of his shares and hence investigates more. As a result, when B knows the investigation cost before making share purchases, A prefers a more biased Activist B, forsaking some expected cash flows from approved projects to increase the approval probability. Relative to the baseline setting, social value is reduced—in addition to the reduced expected cash flows, investigation is a privately-provided public good from which all shareholders benefit.

**Related Literature.** Our paper contributes to the literature on hedge fund activism and its impact on firm value. A common concern of this literature is that the interests of hedge fund activists may not align perfectly with shareholders' goal of maximizing firm value and that these divergences in interests hurt firm value (Anabtawi and Stout (2007); Kahan and Rock (2017)). However, empirical evidence suggests that, on average, hedge fund activism increases shareholder value in the long run (Brav et al. (2008); Brav, Jiang and Kim (2015)). Our paper offers a novel rationale for these seemingly conflicting findings. In our setting, activist bias is *necessary* for enhancing firm value through hedge fund activism, as this bias incentivizes activists to acquire the information on which they then base recommendations. In equilibrium, even if the activist's bias were determined by shareholders who only care about firm value, they would still select a biased activist. Thus, our paper provides a fresh take on the impact of hedge fund activists' bias on corporate governance.

Our work also contributes to the literature on trading and shareholder voting. Unlike traditional civic voting, where voting rights are not traded, in a shareholder democracy, the opportunity to trade shares can impact voting (Fos and Holderness (2023); Li, Maug and Schwartz-Ziv (2022)). Some studies focus on how interactions between voting and trading affect the aggregation of preferences (Levit, Malenko and Maug (2023, 2024)) or information (Meirowitz and Pi (2022, 2023); Parlasca and Voss (2023); Bouton et al. (2021)). Our paper falls into this latter category. This literature often highlights the negative externalities of trading on voting efficiency.[5] In contrast, we identify a positive effect of trading opportunities on voting efficiency: the ability to buy shares prior to voting at a price that fully reflects the expected value-added from a possible subsequent investigation better aligns an activist's recommendations with shareholder interests, increasing the probability shareholders follow a positive recommendation. We also identify a new role for majority shareholders: rather than rely on information acquisition by shareholders with weak incentives to acquire costly information (e.g., because their holdings are small) as in much of the literature, we focus on their use of information provided by agents with greater incentives to acquire information.

Our paper also contributes to research on collaboration among activist hedge funds. Empirical research suggests that hedge fund collaboration is crucial for shareholder campaigns (Wong (2020); Coffee, Palia et al. (2016); Brav et al. (2008)). Theoretical papers (Brav, Dasgupta and Mathews (2022); Doidge, Dyck and Yang (2019); Pi (2020)) show how collaboration can overcome free-riding problems. We identify a novel reason for activists to collaborate and provide insights about who collaborates. In our model, collaboration arises via delegation

[5] Meirowitz and Pi (2022, 2023) note that the opportunity to trade can motivate shareholders to strategically vote against their information, causing information aggregation to fail, and in Parlasca and Voss (2023) shareholders want to sell shares when their vote would be most valuable, impairing information aggregation.

of information acquisition and persuasion to an activist whose bias both incentivizes information acquisition and shareholder approval. For example, when a lead activist would derive large private benefits from a policy, her recommendations would not be persuasive to fellow shareholders. In this instance, delegating these tasks to a less-biased activist, who is willing to acquire information and whose closer alignment with shareholder interests causes his recommendations to be influential, becomes key to securing majority support with high probability.

Our paper also relates to private politics theories (e.g., Baron (2001, 2003, 2009); Baron, Harjoto and Jo (2011); Baron and Diermeier (2007); Egorov and Harstad (2017)) that examine how activists compel firms to change their practices without relying on the law or public orders. We contribute in two ways. First, we explore the interactions between private politics and financial markets. A crucial factor for an activist's success in private politics is the ability to persuade the public to support them. In our model, an activist can purchase shares in a firm. We analyze how the size of her holdings influences her decision to acquire information, her recommendation to the public (other shareholders), and the likelihood that shareholders follow a recommendation. Second, we consider delegation among activists. In practice, many shareholder campaigns involve multiple activists. We show how delegation of information acquisition and recommendations among activists impacts the effectiveness of private politics.

# 2 Model

## 2.1 Modeling Considerations

Empirical literature and anecdotes identify four key features of collaboration among hedge fund activists. We next outline these features and explain how our model incorporates them.

First, collaborations are typically organized and led by a lead activist who initiates a campaign, rather than by several activists independently targeting the same firm simultaneously. Wong (2019) provides empirical evidence of this orchestration. Brav et al. (2008) find such collaboration among activists is extensive—indeed in 22% of their sample of hedge fund campaigns, multiple hedge funds jointly file Schedule 13Ds. We capture this with a lead Activist A who has access to a broad pool of activists and selects Activist B to collaborate with her.

Second, the lead activist exercises exclusive control over selecting collaborators and wields significant bargaining power over the terms of collaboration. Often, only a few high-profile activists (e.g., Carl Icahn, Bill Ackman, or Nelson Peltz) have the requisite status to lead collaborations. Collaborations must be disclosed and filed with the SEC, so collaborators generally cannot later invite other hedge funds to join or share costs. Given A's exclusive bargaining power over orchestrating collaboration and the transparency required, our model considers that B agrees to collaborate with A as long as B expects to break even.[6]

Third, a lead activist typically owns close to 10% of the firm and usually does not acquire more shares during the campaign. SEC regulations (Section 16 of the Exchange Act) treat activists as insiders once their stake in a firm exceeds 10%, imposing significant restrictions. Consistent with such costs, Fos and Jiang (2016) and Greenwood and Schor (2009) find activists hold mean ownership stakes over 9% but under 10%. Gantchev (2013) notes that activists generally do not significantly alter their ownership once established. In line with this evidence, we assume that A has a minority stake in a firm (e.g., close but less than 10%) when she launches the campaign and does not buy or sell shares during the campaign.

Fourth, proposed corporate policies often combine an activist's interests with an appeal to shareholders who care only about cash flows. For example, most successful ESG proposals combine ESG issues with business fundamentals.[7] More generally, activists may have differential incentives to take actions to boost short-term returns (e.g., by increasing dividends or stock buybacks (Brav et al. (2008)) or spinning off non-core assets), possibly because they have different tax considerations than most shareholders, or because activist investment horizons tend to be under two years (Becht et al. (2009), Brav et al. (2008)). Such changes would both impact cash flows and yield private benefits for activists. For instance, spinning off a firm may lead to positive spillovers for a hedge fund's other investments; or newly-appointed board members might share information gained in the boardroom (Bishop, Jackson Jr and Joshua (2017)). Such private benefits can incentivize hedge funds to engage in activism at the

[6]Moreover, there is limited scope for cost sharing when investigation costs are unobservable, as a payment cannot be conditioned on the cost realization; and if payments are conditioned on a positive recommendation, shareholders become more reluctant to approve.

[7]Glass Lewis, one of the two primary proxy advisors, writes that "The situations at both AGL and RWE and at oil supermajor Exxon... serve as examples of how the most effective environmental-focused activism campaigns occur at companies where ESG considerations are intertwined with business fundamentals, economics, and value." https://www.glasslewis.com/ma-roundup-esg-activism-case-studies

expense of firm value, a phenomenon called "horizontal agency cost" (Coffee (2017)). Our model, by incorporating a premise that activists receive returns from shareholdings as well as private benefits if their proposed policy is approved, encapsulates these considerations.[8]

## 2.2 The Model

We consider an activist shareholder of a firm, Activist A, who identifies a potential investment project with unknown cash flows. Activist A (she) differs from most shareholders in that she would gain an additional private benefit if the firm pursues the project. A shareholder vote determines whether the project is adopted. Passive shareholders, who do not acquire information, comprise a majority of shareholders. Thus, the project is adopted if and only if passive shareholders vote in favor. The project's ex-ante expected cash flows are negative, so the project would be rejected absent positive information about its payoffs. Activist A can identify a potentially less-biased Activist B (he) to provide that information. In our baseline model, B first chooses whether to acquire an equity stake, and then whether to acquire costly information about the project's cash flows that would form the basis of a recommendation to shareholders on whether to approve the project. In Section 4, we consider a scenario in which B has already acquired a stake prior to shareholders becoming aware of the project, qualitatively extending the analysis to a "wolf pack" setting. We also consider a scenario in which B learns the cost of investigation before making trading decisions.

The details of our baseline model are as follows. The ex-ante public information per-share value of the firm's cash flows is $v_0$. At date 0, Activist A learns of the investment project. If the firm pursues this opportunity, the value of cash flows per share will be $v_0 + v + s \geq 0$. Here, $v$ is distributed according to a CDF $F(\cdot)$ with an associated PDF $f(\cdot)$ that is strictly positive on its support $[v_L, v_H]$. An activist can learn $v$ after a costly investigation and make a recommendation to shareholders of whether or not to vote for the project. After this recommendation, shareholders receive other information about the project's cash flows. Specifically, shareholders learn $s$, a mean zero shock to project payoffs that is distributed

[8]We adopt a standard assumption in the literature that investors' private value from a proposal is common knowledge and exogenous (see, e.g., Malenko and Malenko (2023), Levit, Malenko and Maug (2023), or Levit, Malenko and Maug (2024)).

according to a CDF $G(\cdot)$, with a PDF $g(\cdot)$ that is strictly positive on $[s_L, s_H]$. We do not model the source of this information, but it could, for example, come from the efforts of proxy advisors who provide detailed research reports to their subscribers (e.g., index funds). After observing $s$, shareholders vote on whether or not to approve the project, with the outcome being determined by the choice of the pivotal passive shareholders.

Shareholders only care about cash flows. In contrast, Activist A gains an additional private benefit of $\beta_A > 0$ if the project is adopted. Activist A holds $a$ shares, so her payoff is $\beta_A + a(v_0 + v + s)$ if the project is adopted, and it is $av_0$ if it is not.

At date 1, Activist A can select an activist who can acquire costly information about $v$.[9] Activist A has access to a wide pool of activists who differ in the private benefits that they would receive if the project is pursued. Activist A can select any activist B with $\beta_B \geq 0$.[10]

At date 2, B decides whether to buy $\bar{b} > 0$ shares from existing shareholders, buying $b \in \{0, \bar{b}\}$ shares at the competitive rational expectations price of $P(\beta_B, b)$.

At date 3, B learns the cost $c$ that must be incurred to learn $v$, where $c \sim H(\cdot)$. Given $c$, B decides whether to investigate. The act of investigation is publicly observable, but only B can observe $v$. Let $\delta_R = 0$ indicate that B does not investigate. If B investigates, then B makes a voting recommendation, $\delta_R \in \{Y, N\}$, to shareholders about whether to pursue the project.

At date 4, $s$ becomes public information. Shareholders then vote on whether to pursue the project. Shareholders adopt the weakly dominant strategy of voting in favor whenever the expected payoff from adoption, given their information, exceeds $v_0$.

We impose the following structure on cash flows:

**Assumption 1.**

1. *$E[v] + s_H < 0 < v_H + s_H$.*

2. *$s_L + v_H \leq 0$.*

3. *The CDFs $F(v)$ and $G(s)$ are log concave, and $H(c)$ has support $(0, \bar{c})$, where $\bar{c}$ is sufficiently large.*

[9] We later consider costly delegation; A faces some delegation costs and chooses to delegate or not before she selects Activist B. As delegation costs are sunk when she selects B, our core results qualitatively extend.

[10] The preferred choice by shareholders, whose payoff only depends on share value, corresponds to a choice by an Activist A with $\beta_A = 0$. Activist A would never select someone with $\beta_B < 0$.

Here, $E[v] + s_H < 0$ ensures that if B does not investigate to learn $v$, then expected cash flows from the project are negative, so shareholders would never approve it; while $0 < v_H + s_H$ means that the project could be a positive NPV project that shareholders would want to adopt. $s_L + v_H \leq 0$ is a sufficient condition for negative information about $s$ to cause shareholders to vote against a positive recommendation by B. The assumption that the CDFs are log-concave implies that the hazard functions, e.g., $\frac{f(v^*)}{1-F(v^*)}$, are monotone increasing and the mean residual lifetime functions, e.g., $MRL(v^*) = \int_{v^*}^{v_H} \frac{vf(v)}{1-F(v^*)} dv - v^*$, are monotone decreasing (Bagnoli and Bergstrom (2006)). Finally, the support assumption on $H(c)$ ensures that when $\beta_B > 0$, B will investigate when $c$ is sufficiently low as long as a positive recommendation is sometimes pivotal for shareholder voting, but not when $c$ is sufficiently high.

Of important note, equilibrium outcomes are completely unaffected if, rather than $s$ becoming public information, shareholders simply observe the binary voting recommendations ("yes" or "no") of proxy advisors who issue recommendations that maximize the expected shareholder payoff. That is, shareholders only need to know how to vote, i.e., whether it is or is not optimal to approve a project, and not the precise information that determines whether the project should be accepted.[11] In this setting, B would never want to change his recommendation after observing the proxy advisor's recommendation.

The other model structure captures reality. Activists are not controlling shareholders and hence are not pivotal. In practice, many reasons (e.g., risk aversion, limited capital, regulatory requirements) underlie why B acquires a limited number of shares. We omit the determinants of the size of the stake $\bar{b}$. We show in an online appendix that if $H(c)$ is uniform and B can choose any stake $b \in [0, \bar{b}]$, then along the equilibrium path, Activist A selects $\beta_B$ such that B's optimally buys $\bar{b}$ shares. Thus, with uniformly-distributed costs of investigation, it is without loss of generality to assume that $b$ has support $\{0, \bar{b}\}$.

Because activist holdings are limited, activists must convince passive shareholders that the project's expected cash flows are high enough that they should vote to pursue the project. The assumption that information arrives after B's recommendation captures the uncertainty that exists in practice about whether shareholders will support a positive recommendation.

[11] See Vaeth (2024) for a model of costly voter learning that revolves around this central observation.

# 3 Equilibrium Analysis

A strategy for Activist A is a choice of $\beta_B \in R_+$. A strategy for Activist B is a triple: a choice of how many shares to buy, $b(\beta_B, P(\beta_B, \cdot)) : R_+ \times R_+ \to \{0, \bar{b}\}$, where $P(\beta_B, b)$ is the competitive equilibrium price at which B can purchase $b$ shares; a choice of whether to incur the cost $c$ to investigate and learn $v$, $d_B^I(\beta_B, b, c) : R_+ \times \{0, \bar{b}\} \times R_+ \to \{0, 1\}$, where $d_B^I = 1$ indicates that B learns $v$; and a probability $\pi_Y$ of recommending "Yes" to shareholders to approve the project when B learns $v$, $d_B^R(\beta_B, b, v) : R_+ \times \{0, \bar{b}\} \times [v_L, v_H] \to [0, 1]$ (and the probability of voting "No" is $\pi_N = 1 - \pi_Y$).

Let $\delta_R \in \{Y, N, 0\}$ indicate B's recommendation (or choice not to investigate). Passive shareholders are described by their beliefs $\rho(\beta_B, b, \delta_R) : R_+ \times \{0, \bar{b}\} \times \{Y, N, 0\} \to R_+$ about $v$ and their voting strategy $V(\beta_B, b, \delta_R, s) : R_+ \times \{0, \bar{b}\} \times \{Y, N, 0\} \times [s_L, s_H] \to \{0, 1\}$. Let $\delta_v \in \{0, 1\}$ indicate the vote outcome, where $\delta_v = 1$ indicates that the project is approved.

An equilibrium is a collection of a strategy $\beta_B^A$ for $A$, a pricing function $P^*(\beta_B, \cdot)$, a strategy $b^*(\beta_B, P^*(\beta_B, \cdot))$, $d_B^{I*}(\beta_B, b, c)$, $d_B^{R*}(\beta_B, b, v)$ for B, and a strategy and beliefs for voters, $V^*(\beta_B, b, \delta_R, s)$ and $\rho^*(\beta_B, b, \delta_R)$, such that (a) Activists A and B, and shareholders maximize expected payoffs, (b) shareholder beliefs are consistent with B's choices, and (c) when B buys $b$ shares, $P^*(\beta_B, b)$ equals expected per share cash flow, leaving passive shareholders indifferent between selling their shares to B and retaining them, clearing the market:

1. $V^*(\beta_B, b, \delta_R, s) = 1$ solves $\max_{\delta_v \in \{0,1\}} \delta_v[\rho^*(\beta_B, b, \delta_R) + s]$.

2. $d_B^{R^*}(\beta_B, b, v)$ maximizes

$$W_2(\beta_B, b, v) \equiv \max_{\pi_Y \in [0,1]} \sum_{j=Y,N} \pi_j Pr(V^*(\beta_B, b, j, s) = 1)[b(v + E[s|V^*(\beta_B, b, j, s) = 1]) + \beta_B].$$

3. $d_B^{I^*}(\beta_B, b, c)$ maximizes $W_3(\beta_B, b, c) \equiv \max_{d_B^I \in \{0,1\}} d_B^I(E_v[W_2(\beta_B, b, v)] - c)$.

4. $b^*(\beta_B, P^*(\beta_B, \cdot))$ maximizes

$$W_4(\beta_B, b, v) \equiv \max_{b \in \{0, \bar{b}\}} E_c[W_3(\beta_B, b, c)] - P^*(\beta_B, b)b, \quad (1)$$

where

$$\begin{aligned}P^*(\beta_B, b) &= v_0 \\ &+ Pr(d_B^{I^*}(\beta_B, b, c) = 0) \\ &\times Pr(V^*(\beta_B, b, 0, s) = 1)(E[v|d_B^{R^*}(\beta_B, b, v) = 0] + E[s|V^*(\beta_B, b, 0, s) = 1]) \\ &+ Pr(d_B^{I^*}(\beta_B, b, c) = 1) \\ &\times \sum_{j=Y,N} [\pi_j^* Pr(V^*(\beta_B, b, j, s) = 1)(E[v|d_B^{R^*}(\beta_B, b, v) = j] + E[s|V^*(\beta_B, b, j, s) = 1])].\end{aligned}$$

5. $\beta_B^A$ solves

$$\begin{aligned}\max_{\beta_B} av_0 + Pr(d_B^{I^*}(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), c) = 1) \sum_{j=Y,N} [\pi_j^* Pr(V^*(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), j, s) = 1) \quad (2)\\ \times \quad (a(E[v|d_B^{R^*}(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), v) = j] + E[s|V^*(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), j, s) = 1]) + \beta_A)] \\ + \quad \Pr(d_B^{I^*}(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), c) = 0) \\ \times \quad Pr(V^*(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), 0, s) = 1)(a(E[v] + E[s|V^*(\beta_B, b^*(\beta_B, P^*(\beta_B, \cdot)), 0, s) = 1]) + \beta_A).\end{aligned}$$

6. Shareholder beliefs $\rho^*(\beta_B, b, \delta_R)$ are consistent: $\rho^*(\beta_B, b, \delta_R) = E[v|\beta_B, b, \delta_R]$.

We focus on Perfect Sequential Equilibria, i.e., equilibria that satisfy the credibility refinement of Grossman and Perry (1986). We first solve for equilibria in the subgame given any $\beta_B$ and $\bar{b}$ (as B never investigates if he does not buy a stake). We prove that there is a (payoff) unique equilibrium in this subgame that satisfies the credibility refinement.

We begin with some preliminary observations. First, passive shareholders' voting decisions depend on their beliefs about the expected value of $v$ and the realization of $s$. Passive shareholder optimization yields that after seeing Activist B acquire information about $v$, they vote to approve the project if and only if $\rho(\beta_B, \bar{b}, \delta_R) + s \geq 0$. That is, if shareholders ever approve the project after a recommendation of $\delta_R$, then their voting strategy takes a cutoff form, approving the project if and only if the post-recommendation shock to expected project revenues, $s$, exceeds some cutoff $s(\rho(\beta_B, \bar{b}, \delta_R))$. In turn, given that passive shareholder voting decisions take a cut-off form, optimization by Activist B implies that B wants the project to be approved if and only if $v$ is sufficiently high that $\bar{b}(v + E[s|s \geq s(\rho(\beta_B, \bar{b}, \delta_R = Y]) + \beta_B \geq 0$.

Finally, note that if $\rho(\beta_B, \bar{b}, \delta_R = Y) + s_H > 0$ then $E[v] + s_H < 0$ implies that $\rho(\beta_B, \bar{b}, \delta_R = N) + s_H < 0$. Thus, in equilibrium, shareholders would always reject the project after $\delta_R = N$ (or $\delta_R = 0$). It follows that it is without loss of generality to suppose that shareholders always reject the project after $\delta_R \in \{N, 0\}$.

Denote the cut-off point at which activist B is indifferent between recommending "Y" and recommending "N," when it exists, by $v^*$. Similarly, let $s^*$ be the realization of $s$ that leaves shareholders indifferent between approving and rejecting the project. To begin, we identify when $B$'s effective bias, $\beta_B/\bar{b}$, toward recommending the project is so large that shareholders would never trust a positive recommendation enough to approve it. As a result, activist B never acquires information in equilibrium, and hence the project is never pursued.

**Proposition 1.** *Suppose Activist B's effective bias $\beta_B/\bar{b}$ is so high that*

$$s_H + E[v|v \geq -\beta_B/\bar{b} - s_H] \leq 0. \tag{3}$$

*Then, in any equilibrium subgame following $(\beta_B, \bar{b})$, passive shareholders would reject any project that is recommended so Activist B never investigates.*

*Proof.* See the Appendix. □

Of note, if (3) holds when computed using $\beta_A/a$ instead of $\beta_B/\bar{b}$, then A *has* to delegate to a less biased activist in order for a positive recommendation to possibly encourage shareholders to approve the project. In the rest of our analysis, we focus on subgames in which the chosen $\beta_B$ is small enough that B's effective bias, $\beta_B/\bar{b}$, is not that high. We prove that A always chooses such a $\beta_B$ in equilibrium. In essence, this assumption focuses comparative static analyses on non-trivial subgames (i.e., where the effect is non-zero).

**Assumption 2.** *$\beta_B/\bar{b}$ is sufficiently small that $s_H + E[v|v \geq -\beta_B/\bar{b} - s_H] > 0$.*

Given any $\bar{b} > 0$, the assumption that $v_H + s_H > 0$ ensures that Assumption 2 is satisfied by all sufficiently small $\beta_B \geq 0$. We now show that under Assumption 2, in the (payoff) unique perfect sequential equilibrium, B acquires information if and only if $c$ is sufficiently low, and when B investigates, the project is pursued if and only if $v$ and $s$ are sufficiently large that B recommends the project and shareholders approve. To ease notation, we often omit the arguments of the cutoffs $v^*$, $s^*$ and $c^*$.

**Proposition 2.** *Under Assumption 2 there exists a payoff-unique perfect sequential equilibrium to the subgame following $(\beta_B, \bar{b})$. This equilibrium is fully characterized by three cutoffs, $s^*(\beta_B/\bar{b})$, $v^*(\beta_B/\bar{b})$, and $c^*(\beta_B, \bar{b})$ that solve*

$$v^*(\beta_B/\bar{b}) + \beta_B/\bar{b} + E[s|s \geq s^*(\beta_B/\bar{b}))] = 0, \quad (4)$$

$$s^*(\beta_B/\bar{b}) + E[v|v \geq v^*(\beta_B/\bar{b})] = 0, \quad (5)$$

$$(1 - F(v^*))(1 - G(s^*))[\bar{b}(E[v|v \geq v^*] + E[s|s \geq s^*]) + \beta_B] = c^*(\beta_B, \bar{b}) > 0. \quad (6)$$

*In equilibrium, B acquires information if and only if $c \leq c^*$, recommends shareholders approve the project if and only if $v \geq v^*$, and shareholders vote to adopt the project if and only if B investigates the project, recommends approval, and $s \geq s^*$.*

*Proof.* See the Appendix. □

The intuition for Proposition 2 reflects that in any equilibrium subgame with information acquisition, voting and recommendation strategies both take cutoff forms that only depend on $(\beta_B, \bar{b})$ via their ratio. That is, B only wants the project to be approved if

$$\bar{b}(E[v|v \geq v^*] + E[s|s \geq s^*]) + \beta_B \geq 0 \Leftrightarrow E[v|v \geq v^*] + E[s|s \geq s^*] \geq -\beta_B/\bar{b}.$$

Equilibria with information acquisition are described by the fixed-point in best responses,

$$s^* + E[v|v \geq -\beta_B/\bar{b} - E[s|s \geq s^*]] = 0. \quad (7)$$

Log-concavity of the CDFs of $s$ and $v$ implies that the left-hand side of (7) is strictly increasing in $s^*$. It follows that there is a unique fixed point, i.e., there is a (payoff) unique equilibrium with information acquisition in the subgame following $(\beta_B, b)$.

There is also an equilibrium with no information acquisition in which passive shareholders believe that B always babbles and hence always reject the proposal since $E[v] + s_H \leq 0$;

and if shareholders always reject, then B never wants to acquire costly information. However, such equilibria are not supported by credible beliefs; they are not perfect sequential equilibria. In particular, after a posited out-of-equilibrium action in which B acquires information and recommends the project, shareholders should update to conclude that this can only be strictly optimal if $c < c^*$ and $v > v^*$, given that the unique best response by passive shareholders to this inference is that they should approve if and only if $s \geq s^*$.

Importantly, while equilibrium recommendation decisions by B and passive shareholder approval decisions only depend on B's relative bias $\beta_B/\bar{b}$, we now show that Activist B is more willing to investigate the project when his stake $\bar{b}$ is larger:

**Corollary 1.** *Under Assumption 2, given relative bias $\beta_B/\bar{b}$, B's cutoff $c^*(\beta_B, \bar{b})$ for acquiring information increases in $\bar{b}$.*

*Proof.* Immediate. The equilibrium information acquisition cutoff equates the cost of information with the expected payoffs from information, which, fixing the relative bias $\beta_B/\bar{b}$ that determines recommendations and voting decisions, are increasing in B's shareholdings $b$:

$$c^*(\beta_B, \bar{b}) = \bar{b}\Big[(1 - F(v^*))(1 - G(s^*))\Big(E[v|v \geq v^*] + E[s|s \geq s^*] + \beta_B/\bar{b}\Big)\Big]. \tag{8}$$

□

The intuition reflects that B's payment $\bar{b}P(\beta_B, \bar{b})$ for his stake is sunk at the time B acquires information, and the greater is $\bar{b}$, the more B profits from his stake when the project is approved since $E[v|v \geq v^*] + E[s|s \geq s^*] > 0$.

We next calculate how the market-clearing price at which B can purchase the stake $\bar{b}$ hinges on $\beta_B$. Shares are more valuable both (i) when expected cash flows and the probability that a project is recommended and approved are higher, and (ii) when B is more willing to acquire information, which depends on his payoff from his stake $\bar{b}$ and $\beta_B$. The market-clearing price leaves passive shareholders indifferent to holding and selling shares:

$$\begin{aligned} P(\beta_B, \bar{b}) &= v_0 + H(c^*(\beta_B, \bar{b})) \\ &\times (1 - F(v^*(\beta_B/\bar{b})))(1 - G(s^*(\beta_B/\bar{b})))\Big(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]\Big). \end{aligned} \tag{9}$$

We will show that the tensions that manifest themselves in $P(\beta_B, \bar{b})$ matter for the optimal choices of B's bias $\beta_B$ by Activist A. Specifically, we show that the greater is $\beta_B$, the more willing B is to recommend a project after investigation. However, this means that when $\beta_B$ is larger, a positive recommendation also contains less information. In turn, this leads to more Type 1 and Type 2 errors in shareholder votes to approve or reject the project, and hence lower expected cash flows, $E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]$, from approved projects. There is an important third effect: B's willingness to incur the costs of investigation depends on his expected payoffs from investigation, which depend both directly on $\bar{b}$ and $\beta_B$ and indirectly on expected cash flows upon approval and the willingness of shareholders to approve.

We next investigate these considerations in detail. We first observe that B values cash flows in exactly the same way as passive shareholders. This means that along the equilibrium path, B's expected direct net (of price) payoff from buying claims to cash flows is zero:

$$\begin{aligned}&\bar{b}(v_0 + H(c^*(\beta_B, \bar{b})(1 - F(v^*(\beta_B/\bar{b})))\\ &\qquad \times(1 - G(s^*(\beta_B/\bar{b})))\Big(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]\Big) = \bar{b}P(\beta_B, \bar{b}).\end{aligned}$$

Posed differently, from an ex-ante perspective, B is not directly harmed when he recommends negative NPV projects that reduce expected cash flows because shareholders expect and account for such value-reducing recommendations in the form of a reduced equilibrium share price. That is, the price that B pays for his shares falls dollar for dollar with the reductions in expected cash flows due to his recommendations of projects with negative expected NPVs. Thus, from an ex-ante perspective, B is fully insulated from the consequences of his choices—B neither gains nor loses from the cash flow impacts of his recommendations.

However, B also gains an additional private $\beta_B$ relative to shareholders whenever the project is pursued. It follows that B's expected net payoff from buying $\bar{b}$ shares, accounting for his expected costs of acquiring information equals

$$H(c^*(\beta_B, \bar{b}))\Big(-E[c| \leq c^*(\beta_B, \bar{b}))] + (1 - F(v^*(\beta_B/\bar{b})))(1 - G(s^*(\beta_B/\bar{b})))\beta_B\Big). \quad (10)$$

Re-arranging yields that B wants to buy a stake, i.e., $b^*(\beta_B, P(\beta_B, \cdot)) = \bar{b}$, if and only if

$$\beta_B \geq \frac{E[c|c \leq c^*(\beta_B, \bar{b})]}{(1 - F(v^*(\beta_B/\bar{b})))(1 - G(s^*(\beta_B/\bar{b})))} > 0. \tag{11}$$

An important insight comes from comparing this minimum cutoff on $\beta_B$ for B to break even on share purchases accounting for his expected costs of investigation with how B makes his decision of whether to investigate given a realized cost of investigation. Re-arranging equation (8) describing the equilibrium path cutoff $c^*(\beta_B, \bar{b})$ for investigation yields:

$$\begin{aligned} \beta_B &= \frac{c^*(\beta_B, \bar{b})}{(1 - F(v^*(\beta_B/\bar{b})))(1 - G(s^*(\beta_B/\bar{b})))} \\ &\qquad - \bar{b}\Big(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]\Big). \end{aligned} \tag{12}$$

The larger is $\bar{b}$, the more B internalizes expected cash flows in his decision-making and the more willing he is to investigate. However, those expected cash flows were already capitalized into the share price that B paid. Thus, from an ex-ante perspective, B does not benefit from those cash flows, but he does pay for the costs incurred subsequently due to the incentives they provide; and the more shares B holds, the greater are those incentives. Combining (11) and (12) yields that B is only willing to purchase shares and potentially acquire information if

$$\begin{aligned} c^*(\beta_B, \bar{b}) &- E[c|c \leq c^*(\beta_B, \bar{b})] \\ &\geq \bar{b}\Big(1 - F(v^*(\beta_B/\bar{b})))(1 - G(s^*(\beta_B/\bar{b}))\Big)\Big(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]\Big). \end{aligned} \tag{13}$$

We next turn to the consequences for the preferred choices of $\beta_B$ by Activist A and shareholders, and how those choices vary with the primitives of the economy. To begin, we observe that the vote by shareholders maximizes expected firm value given the information contained in B's equilibrium cutoff strategy: the expected value-maximizing cutoff $s^*$ equates $E[v|v \geq v^*] + s + v_0 = v_0$, with solution $s^* = -E[v|v \geq v^*]$. We have:

**Proposition 3.** *If information about $v$ were costless for B to acquire, then an Activist A with $\beta_A = 0$ (e.g., passive shareholders) would select an unbiased Activist B with $\beta_B = 0$.*

*Proof.* See the Appendix. □

This result just reflects that when B is endowed with information about $v$, he does not need to be incentivized to acquire information—in essence $c^*(\beta_B = 0, \bar{b}) = \infty$. Further, the interests of an unbiased Activist B perfectly align with those of shareholders—an unbiased activist also wants to maximize expected cash flows—so an unbiased Activist B would make the ideal recommendation from the perspective of shareholders. The fact that B's expected payoffs from investigation just equal the share price, yielding B zero expected profit from his share purchases, is irrelevant for outcomes when information is costless to acquire.

Unfortunately for passive shareholders, information is not free, implying that B must be incentivized to acquire information. As a result, in equilibrium, both shareholders and Activist A would choose biased activists with $\beta_B > 0$. This just reflects that both Activist A and shareholders' expected payoffs are higher when B buys shares and hence possibly acquires information; and (11) is a necessary condition for information acquisition to be optimal.

To understand how passive shareholders or Activist A would choose Activist B's bias, we first derive how $(\beta_B, \bar{b})$ affects B's recommendations.

**Proposition 4.** *A more biased Activist B sets a lower recommendation standard,* $\frac{\partial v^*}{\partial \beta_B} < 0$*. With a more biased activist, shareholders require better news to approve a project,* $\frac{\partial s^*}{\partial \beta_B} > 0$*.*

*Proof.* See the Appendix. □

Since B's recommendation cutoff only depends on $(\beta_B, \bar{b})$ via the ratio $\beta_B/\bar{b}$, we also have:

**Corollary 2.** *Increases in B's stake* $\bar{b}$ *induce B to set a higher recommendation standard, making shareholders more willing to approve them:* $\partial v^*/\partial \bar{b} > 0$ *and* $\partial s^*/\partial \bar{b} < 0$*.*

Proposition 4 and Corollary 2 reflect the direct intuition that the larger is $\beta_B$ relative to $\bar{b}$, the more B values having the project approved relative to the cash flows from approved projects. Thus, the larger is $\beta_B$ or the smaller is $\bar{b}$, the more willing B is to recommend a project that has a negative expected NPV. In response, to protect themselves, shareholders raise the cutoff on $s$ for approving the project. The next proposition presents the consequences for the expected cash flows of projects that B recommends and shareholders approve.

**Proposition 5.** *The larger is* $\beta_B/\bar{b}$*, the strictly lower are the expected cash flows per share,* $E[v|v \geq v^*] + E[s|s \geq s^*(v^*)]$*, of approved projects.*

*Proof.* Substituting $s^*(v^*) = -E[v|v \geq v^*]$ yields

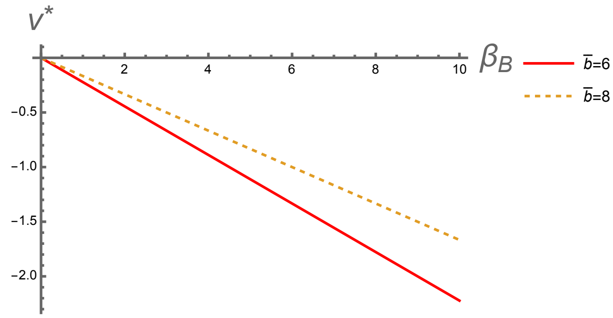
$$\begin{aligned}
\frac{d(E[v|v \geq v^*] + E[s|s \geq s^*(v^*)])}{d(\beta_B/\bar{b})} &= \frac{d(-s^* + E[s|s \geq s^*(v^*)])}{d(\beta_B/\bar{b})} \\
&= \frac{d(-s^* + E[s|s \geq s^*(v^*)])}{ds^*} \frac{ds^*}{d(\beta_B/\bar{b})} \qquad (14) \\
&= \frac{dMRL(s^*)}{ds^*} \frac{ds^*}{d(\beta_B/\bar{b})} < 0,
\end{aligned}$$

by log concavity of $G(s)$ and $\frac{ds^*}{d(\beta_B/\bar{b})} > 0$. □

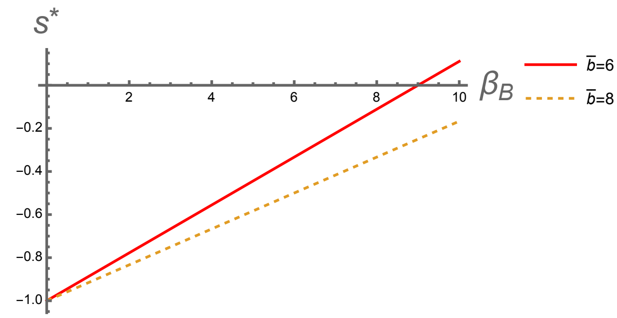
The intuition is simple. When $\beta_B/\bar{b}$ is larger, B recommends more projects that have negative expected NPVs, reducing the information content in his recommendation. This leads passive shareholders to make both more Type 1 and Type 2 errors, approving more projects that should be rejected and rejecting more projects that should be accepted. As a consequence, the expected cash flows from approved projects fall.

One can also look at equilibrium outcomes from B's perspective. Activist B is hurt when shareholders set a more demanding standard on $s$ to approve the project, as it reduces the probability a recommended project is approved. The larger is $\bar{b}$, the more B weighs cash flows in his recommendation, inducing shareholders to set a less demanding standard on $s$ to approve a recommendation; and B values approval by more than the passive shareholders because B also gains the payoff $\beta_B$ from approval. Offsetting this, B also weighs the payoff consequences of a larger stake in his decision about whether to undertake an investigation. The larger stake induces B to investigate after higher information cost realizations; and crucially, from an ex-ante perspective, B internalizes none of the benefit from the increase in share value, but does fully internalize the private cost of increased investigation. Whether B is better off with a larger stake depends on the tradeoff between these two strategic forces. We show in an online appendix that when costs are uniformly distributed, B always gains more from a larger stake—the gains from the positive impacts on shareholder approval more than offset the negative impacts from the incentive to investigate when costs are higher.

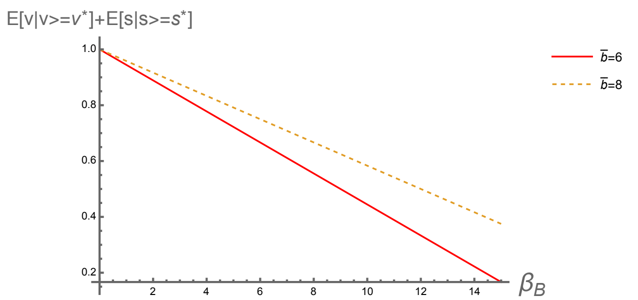
Figure 1 illustrates the results in Proposition 4, Corollary 2 and Proposition 5 when $c$, $v$ and $s$ are each uniformly distributed. Panel (a) shows that an unbiased activist B with $\beta_B = 0$ recommends the project if and only if it has a positive NPV; and the higher is B's



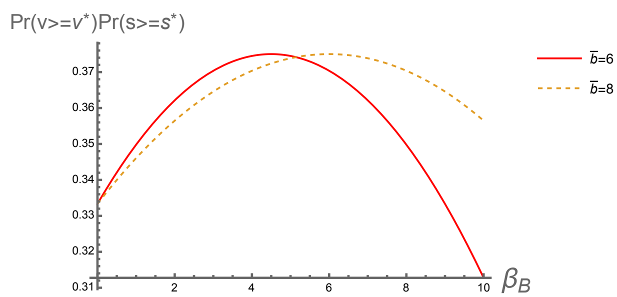

(a) Cut-off $v^*(\beta_B/\bar{b})$



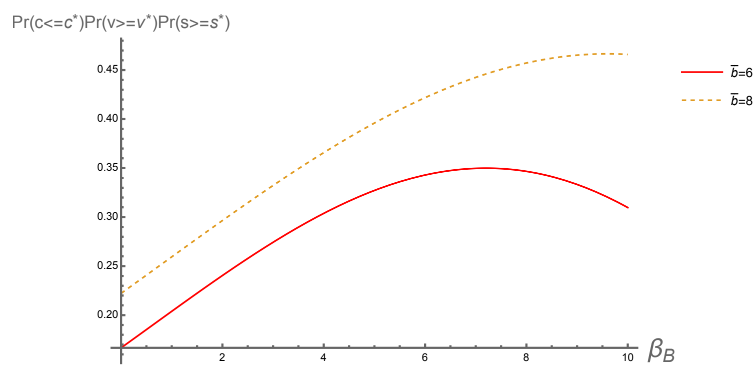

(b) Cut-off $s^*(\beta_B/\bar{b})$




(c) Expected Project Cash Flows Given Approval




(d) $Pr(v \geq v^*(\beta_B/\bar{b}))Pr(s \geq s^*(\beta_B/\bar{b}))$




(e) $Pr(c \leq c^*(\beta_B, \bar{b}))Pr(v \geq v^*(\beta_B/\bar{b}))Pr(s \geq s^*(\beta_B/\bar{b}))$

Figure 1: **How $\beta_B$ affects cutoffs, expected project cash flows, and the probability that the project is finally approved after investigation:** $c$, $v$ and $s$ are uniformly distributed with $c \sim U[0,4]$, $v \sim U[-4,2]$, and $s \sim [-1,1]$. We contrast outcomes for $\bar{b} = 6$ vs. $\bar{b} = 8$.

bias, $\beta_B/b$, the more willing he is to recommend negative NPV projects. Panel (b) shows that to protect against a more biased activist B's negative NPV recommendations, shareholders require better news about $s$ to approve the project. In turn, panel (c) illustrates how expected cash flows from recommended projects that win shareholder approval fall when activist B is more biased due to the greater Type 1 and Type 2 approval errors. Panel (d) shows that the probability that a project is both recommended *and* approved is a $\cap$-shaped function of $\beta_B$. In turn, panel (e) shows that the probability a project is investigated, recommended and approved, while first increasing in $\beta_B$, decreases once $\beta_B$ is too large. Of course, A would never choose $\beta_B$ so high that this probability is decreasing, as such a high $\beta_B$ also results in reduced expected project cash flows from projects that win shareholder approval.

We next provide a lemma that shows how A's choice of $\beta_B$ involves a tradeoff. Define

$$\Pi(\beta_B, \bar{b}) \equiv Pr(c \leq c^*(\beta_B, \bar{b}))Pr(v \geq v^*(\beta_B/\bar{b}))Pr(s \geq s^*(\beta_B/\bar{b}))$$

to be the probability the project is investigated, recommended and approved given $\beta_B$.

**Lemma 1.** *Activist A always chooses a $\beta_B$ that is below the level that maximizes the probability the project is investigated, recommended and approved, choosing $\beta_B$ such that $\frac{\partial \Pi(\beta_B,\bar{b})}{\partial \beta_B} > 0$.*

*Proof.* See the Appendix. □

The intuition for Lemma 1 is simple. From Proposition 5, reducing $\beta_B$, i.e., selecting a less-biased Activist B, always increases expected project revenues from projects that win shareholder approval. Thus, for it not to be optimal to reduce $\beta_B$ from a given level, it must be that doing so reduces the probability that the project is investigated and recommended by B and then approved by shareholders. That is, there has to be an opportunity cost of reducing $\beta_B$ in order to increase expected project revenues from approved projects—in the form of a lower probability that a project is ultimately approved.

**Proposition 6.** *In equilibrium, a more biased Activist A chooses a more biased activist B: the greater is $\beta_A/a$, the larger is A's choice of $\beta_B$.*

*Proof.* Defining $\Pi(\beta_B, \bar{b})$ to be the probability the project is investigated, recommended and approved given $\beta_B$ and $E[R(\beta_B)]$ to be the associated cash flows, A chooses $\beta_B$ to maximize

$$\Pi(\beta_B, \bar{b})\Big(E[R(\beta_B/\bar{b})] + \frac{\beta_A}{a}\Big). \tag{15}$$

Suppose by way of contradiction that $\beta_A^2/a_2 > \beta_A^1/a_1$ but their associated delegation choices are $\beta_B^1 > \beta_B^2$. Then, optimization by Activist A implies

$$\begin{aligned}
\Pi(\beta_B^2, \bar{b})\Big(E[R(\beta_B^2/\bar{b})] + \beta_A^2/a_2\Big) &\geq \Pi(\beta_B^1, \bar{b})\Big(E[R(\beta_B^1/\bar{b})] + \beta_A^2/a_2\Big) \\
\Pi(\beta_B^1, \bar{b})\Big(E[R(\beta_B^1/\bar{b})] + \beta_A^1/a_1\Big) &\geq \Pi(\beta_B^2, \bar{b})\Big(E[R(\beta_B^2/\bar{b})] + \beta_A^1/a_1\Big).
\end{aligned}$$

Adding the inequalities and rearranging yields

$$(\Pi(\beta_B^2, \bar{b}) - \Pi(\beta_B^1, \bar{b}))(\beta_A^2/a_2 - \beta_1^A/a_1) \leq 0,$$

implying that $\Pi(\beta_B^2, \bar{b}) \leq \Pi(\beta_B^1, \bar{b})$, and hence $E[R(\beta_B^1/\bar{b})] \geq E[R(\beta_B^2/\bar{b})]$. But from Proposition 5, $\beta_B^1 > \beta_B^2$ implies $E[R(\beta_B^1/\bar{b})] < E[R(\beta_B^2/\bar{b})]$, a contradiction. Finally, it is immediate from the first-order condition

$$0 = \frac{\partial \Pi(\beta_B, \bar{b})}{\partial \beta_B}(E[R(\beta_B/\bar{b})] + \beta_A/a) + \Pi(\beta_B, \bar{b})\frac{\partial E[R(\beta_B/\bar{b})]}{\partial \beta_B}$$

that $\beta_B^1 = \beta_B^2$ cannot simultaneously satisfy the first-order conditions for $\beta_A^2/a_2 \neq \beta_A^1/a_1$. □

**Corollary 3.** *The greater is Activist A's bias $\beta_A/a$, the more likely the project is to be investigated and recommended by B and approved by shareholders, but the lower are both ex-ante expected project revenues and the equilibrium share price $P(\beta_B, \bar{b})$.*

*Proof.* Immediate. If $\Pi(\beta_B^2, \bar{b}) > \Pi(\beta_B^1, \bar{b})$ and $\Pi(\beta_B^2, \bar{b})E[R(\beta_B^2/\bar{b})] \geq \Pi(\beta_B^1, \bar{b})E[R(\beta_B^1/\bar{b})]$, then $\beta_B^1$ cannot be an optimal choice for any $\beta_A$. □

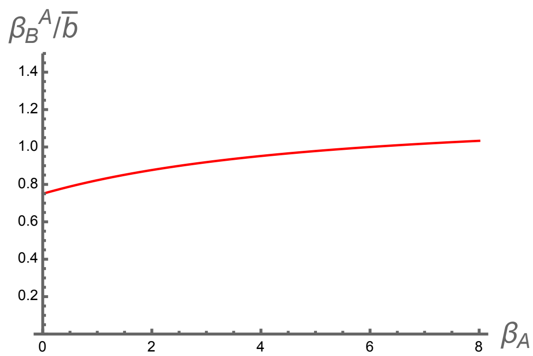
The central tension in the economic environment is that a (somewhat) more biased Activist B is more incentivized to acquire information, raising the probability that information is gathered that leads to the project ultimately being pursued, but the increased willingness of a more biased Activist B to recommend negative NPV projects reduces cash flows even after passive shareholders account for this bias. That is, Proposition 5 showed that increasing $\beta_B/\bar{b}$ (not necessarily equilibrium selections) always reduces expected cash flows from *accepted* projects. Corollary 3 reveals how the size of Activist A's bias resolves this tension in equilibrium, generating stronger predictions about *equilibrium ex-ante* expected revenues and the equilibrium share price. In equilibrium, a more biased Activist A chooses a more biased (but not too biased) Activist B in order to raise the probability that the project is adopted—but in equilibrium A has to face an opportunity cost of raising the probability of adoption in the form of reduced expected firm revenues (and, hence, a lower share price).

Putting these results together reveals that increases in $\beta_B/\bar{b}$ from zero first result in both increased expected firm revenues and an increased probability that the project is ultimately approved (as they increase the probability that B investigates). At some point, increases in $\beta_B/\bar{b}$ reach the level that maximizes expected firm revenues, while the probability the project is investigated, recommended and approved still increases. This point would be the optimal choice of $\beta_B/\bar{b}$ by passive shareholders or, equivalently, by an unbiased Activist A. In equilibrium, a more biased Activist A selects a more biased Activist B, with higher associated equilibrium probabilities of project adoption, but lower expected equilibrium firm revenues.

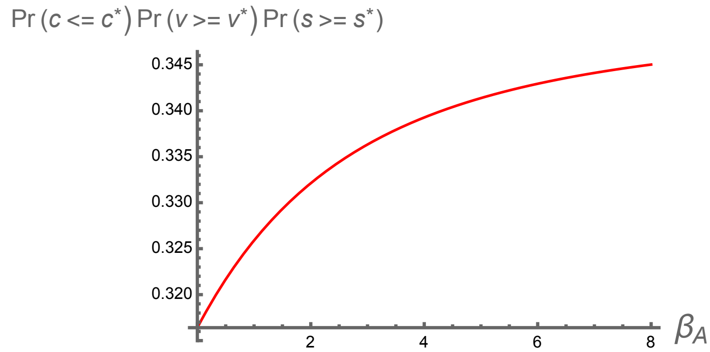
Figure 2 illustrates these results for the same parameters as Figure 1. Panel (a) shows that even an unbiased Activist A (or passive shareholders) chooses $\beta_B = 4.5$, introducing extensive bias into B's recommendations, sharply lowering expected cash flows from approved projects (recall Figure 1). This reflects that A understands that an unbiased Activist B does not expect to profit from recommendations, and hence would never investigate. Accordingly, to motivate investigation an unbiased Activist A delegates to a significantly biased Activist B.

When Activist A is biased, she prefers an even more biased Activist B. Panel (b) illustrates how her optimal selection raises the ex-ante probability that the project is investigated and recommended by B, and approved by shareholders, with panel (c) showing the reduced ex-ante expected cash flow consequences. The greater is $\beta_A$, the more willing Activist A is to accept reduced expected cash flows from her $a$ shares in order to raise the probability that the project is ultimately approved so she can realize her private benefit $\beta_A$. Of note, the optimal bias in $\beta_B/\bar{b}$ rises only slowly with $\beta_A$. This reflects that A understands that if B were substantially more biased, then his recommendations would be viewed with such suspicion by shareholders that they would be unlikely to approve, counter-productively lowering the probability a project is ultimately approved (and reducing ex ante expected cash flows).

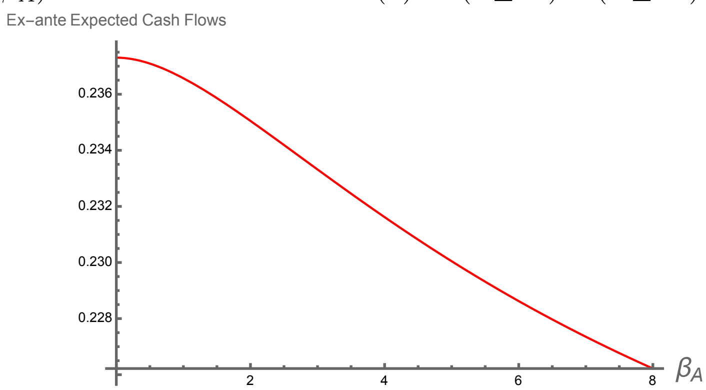
Figure 3a shows how the distribution of investigation costs on $[0, 4]$ affects A's choice of $\beta_B$. When $h(c) = c/8$, investigation costs are likely to be high, causing Activist A to increase




(a) $\beta_B^A(\beta_A)$



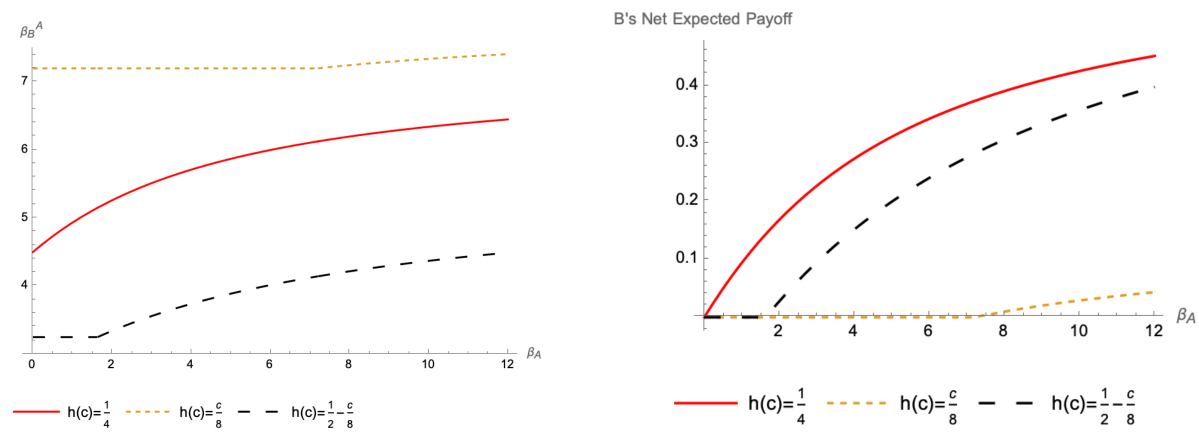

(b) $Pr(c \leq c^*)Pr(v \geq v^*)Pr(s \geq s^*)$




(c) Ex-ante Expected Project Cash Flows

Figure 2: **How $\beta_A$ affects Activist A's optimal choice of $\beta_B^A/\bar{b}$, the probability the proposal is ultimately approved, and ex-ante expected project cash flows.** $c$, $v$ and $s$ are uniformly distributed with $c \sim U[0,4]$, $v \sim U[-4,2]$, and $s \sim [-1,1]$. Activist A has $a = 6$ and $\bar{b} = 6$.

Activist B's bias to incentivize B to pay those costs. Conversely, when $h(c) = 1/2 - c/8$ so that investigation costs are unlikely to be high, A is less concerned about the need to motivate B to acquire information, and hence selects a far less-biased B. Indeed, for $\beta_A$ sufficiently small, A is constrained in her choice of $\beta_B$ by the necessity that B expects to break even on average on his share purchases and investigation, i.e., constraint (11) binds for $\beta_A < 1.63$, forcing A to choose $\beta_B > 3.25$. Again, this reflects that B's share purchases are sunk when he decides whether to acquire information, and the share price fully reflects the expected cash flows that his investigations and recommendations generate, leaving B to rely on the private payoff $\beta_B$ realized when a project is approved to cover, on average, the investigation costs.




(a) $\beta_B^A(\beta_A)$ (b) Activist B's Net Expected Payoff

Figure 3: **How different density functions of $c$ affect Activist A's optimal choice of $\beta_B$, and B's net expected payoff.** The density function of $c$ is uniform, $\frac{c}{8}$, or $\frac{1}{2} - \frac{c}{8}$ over $[0, 4]$. $v$ and $s$ are uniformly distributed with $v \sim U[-4, 2]$, and $s \sim U[-1, 1]$. Activist A has $a = 6$ and $\bar{b} = 6$.

# 4 Alternative Scenarios

In our base setting, (i) B acquires shares at a price that reflects the value-added from his investigation to firm value, and (ii) B only learns the cost of an investigation *after* buying shares. We now show how changing these scenarios affects our qualitative findings and how the results extend to a setting with multiple activists (e.g. wolf pack activism). We also discuss cost-sharing and costly delegation.

## 4.1 B acquires shares ex ante, multiple activists, and cost sharing

When Activist B acquires shares before shareholders learn of the project, B purchases $\bar{b}$ shares at $v_0$. Qualitatively, the sole change to the analysis is that Activist A's choice of $\beta_B$ is no longer potentially constrained by the need to ensure that B expects to break even on his share purchases and investigation. That constraint can possibly force A to choose a more biased activist B than her most-preferred choice. To see the possible consequences, observe that for the parameterizations in Figure 3, outcomes are completely unaffected when $c$ is uniformly distributed, as for all $\beta_A$, A is unconstrained by the need for B to break-even. However, for the increasing and decreasing cost density scenarios, $h(c) = c/8$ and $h(c) = 1/2 - c/8$, while a significantly biased Activist A is unconstrained, if A only receives a small private benefit from an approved project, then she would select a less-biased Activist B when B acquires shares in advance, as A no longer has to worry about B breaking even.

These results identify conditions (e.g., uniformly-distributed costs) under which our findings immediately describe a setting where multiple activists who already have stakes in the firm seek to maximize the expected total activist surplus rather than the surplus of an activist A with a given bias. It is immediate that the wolf pack's optimal selection of an activist who decides whether to undertake a costly investigation and make a recommendation is the same as that of an activist A whose bias equals the effective bias of the wolfpack, i.e., by the sum of their private benefits from having the project approved divided by their total shareholdings.

One can contemplate extending the framework to consider the possibility that activist A (or a wolfpack) can defray some of the investigation costs via a transfer. A fixed, lump sum transfer has no impact on strategic behavior save that A may not delegate investigation if the expected delegation gains are less than the transfer. Moreover, the potential of cost-sharing is limited when B privately observes $c$. In particular, the payment for investigation cannot vary with $c$, else B would always report the value of $c$ that maximizes the transfer. Further, a transfer conditioned on whether an investigation takes place cannot be too high else when $c$ is high, B has an incentive to fake an (unobservably inexpensive) investigation to receive the transfer and then recommend that the project not be pursued. Third, conditioning transfers on a positive recommendation, ceteris paribus, makes shareholders more reluctant to approve.

## 4.2 B learns $c$ before making a share purchase decision

Lastly, consider the scenario in which B learns how costly it is to investigate the project *before* deciding whether to buy shares at the competitive rational expectations price. It is immediate that the equilibrium to the recommendation-voting subgame following investigation is the same as in our base case scenario. That is, an Activist B with $(\beta_B, \bar{b})$ sets the same recommendation cutoff as in our base case scenario, and hence shareholders set the same cutoff for approving the policy.

Thus, only A's choice of $\beta_B$ and B's choices of whether to buy shares and investigate are affected by this timing scenario. Because B observes $c$ before deciding on share purchases, it is always profitable for B to buy shares and investigate when $c$ is low enough—unlike in our base scenario, Activist B always investigates with strictly positive probability regardless of $\beta_B$ as long as $\beta_B > 0$. Clearly, B will purchase $\bar{b}$ shares if and only if $c$ is low enough that B subsequently investigates to learn $v$ and make a voting recommendation.

The rational expectations price that clears the market when B purchases $\bar{b}$ shares becomes

$$P(\beta_B, \bar{b}) = Pr(v \geq v^*(\beta_B/\bar{b})Pr(s \geq s^*(\beta_B/\bar{b}))(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]) + v_0.$$

This price exceeds that in the base case scenario because shareholders infer that B will always investigate after acquiring shares. B's expected payoff from buying $\bar{b}$ shares and investigating given cost $c$ is

$$\begin{aligned} Pr(v \geq v^*(\beta_B/\bar{b}))Pr(s \geq s^*(\beta_B/\bar{b}))(\bar{b}(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})]) + \beta_B) + \bar{b}v_0 - c - \bar{b}P(\beta_B, \bar{b}) \\ = Pr(v \geq v^*(\beta_B/\bar{b}))Pr(s \geq s^*(\beta_B/\bar{b}))\beta_B - c, \quad (16) \end{aligned}$$

As in our base case scenario, the share price adjusts so that B expects neither to gain nor lose from the cash flows generated by the firm.

It follows that along the equilibrium path, B buys $\bar{b}$ shares and investigates if and only if

$$c \leq c^*(\beta_B, \bar{b}) = Pr(v \geq v^*(\beta_B/\bar{b})Pr(s \geq s^*(\beta_B/\bar{b}))\beta_B. \quad (17)$$

Comparisons of equations (8) and (17) reveal that B investigates *less* when B knows $c$ before buying shares than in our base case scenario (as long as $\beta_B$ is high enough for B to purchase $\bar{b}$ shares, and hence ever investigate). Perversely, even though B's expected profits are *lower* when B does not learn $c$ until after he purchases his stake, those sunk expenditures also make B *more willing* to investigate. The intuition is that when B sees $c$ before purchasing his stake, the size of $\bar{b}$ has *no* impact on his decision to investigate (see (17)), because the share price just equals expected cash flows. In contrast, when B buys shares before seeing $c$, those share purchases are sunk. As a result, B subsequently internalizes that the expected revenue added to the firm from investigation is positive, and B realizes that revenue gain on his $\bar{b}$ shares, increasing the break-even value of $c$ to (8), i.e., B investigates more.

Thus, *if* (and only if) an activist B with private benefit $\beta_B$ expects a strictly positive payoff in our base case scenario, then A's expected payoff is strictly higher than when B observes $c$ prior to deciding on share purchases: the probability of investigation is strictly higher in the base case scenario and the conditional probabilities of positive recommendations and shareholder approval are unchanged. Of course, if the base case profits for an activist B with $\beta_B$ would be negative due to his "excessive" investigations caused by the sunk share purchases, then B would never purchase and never investigate, forcing A to choose a higher $\beta_B$ activist than she otherwise would prefer. In this latter case, whether A is better or worse off in the base case scenario depends on "how binding" the break-even constraint is, and this constraint binds more sharply for smaller $\beta_A$. When this constraint does not bind for A, we have:

**Proposition 7.** *Suppose $H(c)$ is log-concave, and B's expected payoff is strictly positive in the base scenario where B learns c after buying shares. Then, if B sees c before buying shares, A prefers a more biased B than in the base scenario.*

*Proof.* See the Appendix. □

The proof substitutes the optimal choice when B learns $c$ after buying shares into the FOC of the base scenario and shows that the sign is negative. The intuition is that when B learns $c$ before buying shares rather than after, the probability a given $\beta_B$ investigates is reduced. As a result, A chooses an activist with a larger $\beta_B$, trading off reduced expected cash flows from approved projects in order to increase the approval probability. It follows that relative to the baseline setting, social value is reduced—not only are expected cash flows from approved projects reduced, but there is too little investigation, and investigation is a privately-provided public good from which all shareholders benefit.

## 4.3 Costly Delegation

Our model abstracts from the costs of delegation that a lead activist incurs in practice—the expenditures of money and time in organizing her coalition, filing disclosures with the SEC regarding the collaboration. Such costs are routine to integrate. As Activist A first determines whether to delegate or not, the delegation costs are sunk once she selects B. Thus, A faces the same trade-off as in the main model so her optimal choice of Activist B is unchanged. The qualitative consequences are also straightforward: A will tend to want to delegate both when delegation costs are low or when the benefits of delegation are high due to A's interests being poorly aligned with those of shareholders, i.e., when her effective bias is high. This is consistent with empirical observations that activist collaborations—as measured by filing 13Ds together—are more common when a lead activist targets a large company (which often results in a limited share ownership and hence a larger $\beta_A/a$) or has a more prominent status (hence, facing smaller delegation costs associated with finding collaborators).

# 5 Conclusion

Activist shareholders such as hedge funds are often in the position of wanting to convince largely uninformed shareholders to vote in favor of a particular corporate policy. The question this paper addresses is: how best can an activist achieve this outcome? Most shareholders only care about firm value and understand that the activist's recommendations reflect her best interests and not necessarily those of shareholders. As a result, shareholders may place little weight on the activist's recommendation, and hence be unlikely to approve the corporate policy. Our paper shows how the activist can improve her chances of a favorable vote by delegating costly information acquisition about the corporate policy to another activist.

Our paper fully characterizes the considerations that enter the activist's delegation choice and the consequences for the likelihood the corporate policy is adopted and for firm value. The delegation choice must solve the twin problems of (i) motivating the delegated activist to acquire information that can convince shareholders, and (ii) having the activist's recommendation actually convince shareholders to approve the policy. The first consideration demands that the delegated activist also receive a private payoff when the policy is adopted, since the share price at which the delegated activist can acquire shares from shareholders fully impounds the expected value added of an investigation. The second consideration demands that the private benefit not be too high. Otherwise, shareholders will not trust the delegated activist and, hence, often reject a positive recommendation. Our paper derives how the delegation choice that best resolves this trade-off varies with the primitives of the environment.

Even unbiased shareholders would want to delegate to a biased activist in order to incentivize information acquisition. In the unique Perfect Sequential Equilibrium, an activist who cares more about adoption will delegate information acquisition to someone who is also more biased. This raises the equilibrium probability that the project is ultimately adopted by shareholders, but it also results in more Type 1 and Type 2 errors arising in the recommendation-voter approval game that reduce expected revenues from approved projects.

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# 6 Appendix: Proofs Omitted in the Main Text

**Proof of Proposition 1.** In any equilibrium subgame with information acquisition, voting and recommendation strategies both take cutoff forms. It follows that any equilibrium with information acquisition can be characterized by the voting cutoff solution $s^*$ to the fixed-point condition describing the best responses of shareholders

$$s^* + E[v|v \geq v^*(s^*)] = 0, \tag{18}$$

where $v^*(s^*)$ solves the analogous best-response condition for activist B,

$$\bar{b}v^*(s^*) + \bar{b}E[s|s \geq s^*] + \beta_B = 0 \;\Leftrightarrow\; v^*(s^*) = -\beta_B/\bar{b} - E[s|s \geq s^*]. \tag{19}$$

Substituting (19) into (18) yields that equilibria with information acquisition are described by

$$s^* + E[v|v \geq -\beta_B/\bar{b} - E[s|s \geq s^*]] = 0. \tag{20}$$

Differentiating the left-hand side of this fixed point condition with respect to $s^*$ yields

$$\frac{dLHS(s^*)}{ds^*} = \frac{dE[v|v \geq v^*(s^*)]}{dv^*(s^*)}\frac{dv^*(s^*)}{ds^*} + 1 \tag{21}$$

where differentiating B's best response function (19) with respect to $s^*$ yields:

$$\frac{dv^*(s^*)}{ds^*} = -\frac{dE[s|s \geq s^*(v^*)]}{ds^*}. \tag{22}$$

Substituting (22) into (21) yields

$$\frac{dLHS(s^*)}{ds^*} = -\frac{dE[v|v \geq v^*(s^*)]}{dv^*(s^*)}\frac{dE[s|s \geq s^*]}{ds^*} + 1 > 0, \tag{23}$$

since, by assumption, the CDFs are log-concave.

It follows that the left-hand side is maximized by $s = s_H$. Thus, an equilibrium with information acquisition can only exist if

$$s_H + E[v|v \geq -\beta_B/\bar{b} - s_H] > 0, \tag{24}$$

where the strict inequality follows because $s = s_H$ is a probability zero event and information acquisition costs are strictly positive, so activist B will never investigate if shareholders almost always reject the proposal. □

**Proof of Proposition 2.** From the proof of Proposition 1, $E[v|v \geq -\beta_B/\bar{b} - E[s|s \geq s^*]] + s^*$ monotonically increases in $s^*$. Thus, $s_H + E[v|v \geq -\beta_B/\bar{b} - s_H] > 0$ together with the assumption that $s_L + v_H \leq 0$ implies that there is a unique $s^* \in [s_L, s_H)$ satisfying $E[v|v \geq -\beta_B/\bar{b} - E[s|s \geq s^*]] + s^* = 0$. That is, the monotonicity of $E[v|v \geq -\beta_B/\bar{b} - E[s|s \geq s^*]] + s^*$ in $s^*$ ensures that it only crosses 0 once, implying that there is a (payoff) unique equilibrium that takes a cutoff strategy form in the subgame following $\beta_B, \bar{b}, d_B^I = 1$.[12]

It follows that B's expected payoff from acquiring information ($d_B^I(\beta_B, \bar{b}) = 1$) is

$$(1 - F(v^*))(1 - G(s^*))\Big(\bar{b}E[v|v \geq v^*] + \bar{b}E[s|s \geq s^*] + \beta_B\Big) + \bar{b}v_0 - \bar{b}P - c. \tag{25}$$

If he does not acquire information ($d_B^I(\beta_B, \bar{b}) = 0$), his expected payoff is $\bar{b}v_0 - \bar{b}P$. Thus, the $c^*(\beta_B, \bar{b})$ that leaves B indifferent between acquiring information and not is given by

$$(1 - F(v^*))(1 - G(s^*))\Big(\bar{b}E[v|v \geq v^*] + \bar{b}E[s|s \geq s^*] + \beta_B\Big) = c^*(\beta_B, \bar{b}) > 0. \tag{26}$$

B's expected payoff from investigating and learning $v$ is linearly decreasing in $c^*(\beta_B, \bar{b})$, so $c^*(\beta_B, \bar{b})$ is unique, implying that information acquisition is (strictly) optimal for $c < c^*(\beta_B, \bar{b})$, but not for $c > c^*(\beta_B, \bar{b})$.

Thus, there is a (payoff) unique equilibrium in the subgame in which information is acquired; and in this equilibrium, strategies take cut-off forms. It remains to rule out equilibria in which information is not acquired.

There is an equilibrium with no information acquisition in which shareholders believe

[12] There is trivially a payoff-identical equilibrium in which B sets $d_R = N$ if and only if $v \geq v^*$, and shareholders vote for the proposal if and only if B acquires information, $d_R = N$ and $s \geq s^*$.

that B always babbles (randomizing with equal probability over $d_B^I = 1$ and $d_B^I = 0$), and hence always reject the proposal since $E[v] + s_H \leq 0$; and if shareholders always reject, then B never wants to acquire costly information. However, the beliefs supporting such no-information acquisition equilibria fail to be credible. In particular, following the out-of-equilibrium action in which B acquires information and recommends "Y", there exists a non-empty set of types—those with $c < c^*$ and $v > v^*$—such that if and only if $c < c^*$ and $v > v^*$, their expected payoff is strictly higher than their posited equilibrium payoff of $\bar{b}v_0 - \bar{b}P$ when shareholders approve the project if and only if $s \geq s^*$. In turn, given this set of types, the unique best response of shareholders whenever $s \geq s^*$ is to approve the project (and to reject it when $s < s^*$). Thus, no-information acquisition equilibria fail to be credible, i.e., they are not Perfect Sequential equilibria. □

**Proof of Proposition 3.** When $c = 0$, Activist B always acquires information. Let $v_M$ maximize expected firm value given $s^* = -E[v|v \geq v^*]$. Then,

$$v_m \in \ argmax \ Pr(s \geq s^*(v_m))(v_m + E[s|s \geq s^*(v_m)]) \tag{27}$$

The FOC is

$$\frac{dPr(s \geq s^*(v_m))}{dv_m}(v_m + E[s|s \geq s^*(v_m)]) + Pr(s \geq s^*(v_m))(1 + \frac{dE[s|s \geq s^*(v_m)]}{dv_m}) = 0, \tag{28}$$

with solution $v_m = -E[s|s \geq s^*]$. This corresponds to the cutoff strategy of $\beta_B = 0$, who from (4) also chooses $v^*(\beta_B = 0, \bar{b}) = -E[s|s \geq s^*]$. It follows that if B were endowed with information, shareholders would select an unbiased activist B. □

**Proof of Proposition 4.**

$$\frac{\partial v^*(\beta_B, \bar{b})}{\partial \beta_B} = -1/\bar{b} - \frac{dE[s|s \geq s^*]}{ds^*}\frac{ds^*}{dv^*}\frac{\partial v^*(\beta_B, \bar{b})}{\partial \beta_B}.$$

Substituting

$$\frac{ds^*}{dv^*} = -\frac{dE[v|v \geq v^*]}{dv^*}$$

yields

$$\frac{\partial v^*(\beta_B,\bar{b})}{\partial \beta_B} = -1/\bar{b} + \frac{dE[s|s \geq s^*]}{ds^*}\frac{dE[v|v \geq v^*]}{dv^*}\frac{\partial v^*(\beta_B,\bar{b})}{\partial \beta_B}.$$

Solving yields

$$\frac{\partial v^*(\beta_B,\bar{b})}{\partial \beta_B} = -1/\bar{b} \cdot \frac{1}{1 - \frac{dE[s|s\geq s^*]}{ds^*}\frac{dE[v|v\geq v^*]}{dv^*}} < 0,$$

as Assumption 1 (log concavity of the CDFs) implies that the denominator is positive. Substituting $\frac{\partial v^*(\beta_B,\bar{b})}{\partial \beta_B} < 0$ yields

$$\frac{\partial s^*(\beta_B,b)}{\partial \beta_B} = -\frac{dE[v|v \geq v^*]}{dv^*}\frac{\partial v^*(\beta_B,b)}{\partial \beta_B} > 0.$$

□

**Proof of Lemma 1.** Activist A with bias $\beta_A$ chooses $\beta_B$ to maximize

$$\Pi(\beta_B,\bar{b})\Big(a(E[v|v \geq v^*] + E[s|s \geq s^*(v^*)]) + \beta_A\Big). \tag{29}$$

The equilibrium choice of $\beta_B$ is characterized by an interior solution and hence solves

$$\begin{aligned} 0 = {} & \frac{\partial \Pi(\beta_B,\bar{b})}{\partial \beta_B}(a(E[v|v \geq v^*] + E[s|s \geq s^*(v^*)]) + \beta_A) \\ & + a\Pi(\beta_B,\bar{b})\frac{\partial(E[v|v \geq v^*] + E[s|s \geq s^*(v^*)])}{\partial \beta_B}. \end{aligned} \tag{30}$$

The second line is negative since $\frac{\partial(E[v|v\geq v^*]+E[s|s\geq s^*(v^*)+\beta_A])}{\partial \beta_B} < 0$ by Proposition 5. Further, $a(E[v|v \geq v^*]+E[s|s \geq s^*(v^*)])+\beta_A > 0$. Thus, $\frac{\partial \Pi(\beta_B,\bar{b})}{\partial \beta_B} > 0$, whereas the $\beta_B$ that maximizes $\Pi(\beta_B,\bar{b})$ sets this derivative to zero. □

**Proof of Proposition 7.** In the base scenario, denote A's optimal choice of $\beta_B$ by $\beta_B^{AM}$ and the cut-off at which B is indifferent between investing or not by $c_M^*(\beta_B,\bar{b})$; and denote the counterparts when B sees $c$ before buying shares by $\beta_B^{AE}$ and $c_E^*(\beta_B,\bar{b})$. Defining $K(\beta_B,\bar{b}) \equiv$

$Pr(v \geq v^*(\beta_B/\bar{b}))Pr(s \geq s^*(\beta_B/\bar{b}))(E[v|v \geq v^*(\beta_B/\bar{b})] + E[s|s \geq s^*(\beta_B/\bar{b})])$, $\beta_B^{AE}$ solves

$$\begin{aligned}
0 &= FOC_E(\beta_B^{AE}, \bar{b}) \\
&= \frac{h(c_E^*(\beta_B^{AE}, \bar{b}))}{H(c_E^*(\beta_B^{AE}, \bar{b}))} \frac{\partial c_E^*(\beta_B^{AE}, \bar{b})}{\partial \beta_B} (aK(\beta_B^{AE}, \bar{b}) + Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A) \\
&+ a\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} + \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A}{\partial \beta_B} \\
&= \frac{h(c_E^*(\beta_B^{AE}, \bar{b}))}{H(c_E^*(\beta_B^{AE}, \bar{b}))} \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_B}{\partial \beta_B} \\
&\times (aK(\beta_B^{AE}, \bar{b}) + Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A) \\
&+ a\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} + \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A}{\partial \beta_B}.
\end{aligned}$$

Substituting $\beta_B^{AE}$ into the FOC of the base scenario yields:

$$\begin{aligned}
FOC_M(\beta_B^{AE}, \bar{b}) &= \frac{h(c_M^*(\beta_B^{AE}, \bar{b}))}{H(c_M^*(\beta_B^{AE}, \bar{b}))} \frac{\partial c_M^*(\beta_B^{AE}, \bar{b})}{\partial \beta_B} (aK(\beta_B^{AE}, \bar{b}) + Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A) \\
&+ a\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} + \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A}{\partial \beta_B} \\
&= \frac{h(c_M^*(\beta_B^{AE}, \bar{b}))}{H(c_M^*(\beta_B^{AE}, \bar{b}))} \left( \bar{b}\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} + \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b})\beta_B}{\partial \beta_B} \right) \\
&\times (aK(\beta_B^{AE}, \bar{b}) + Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A) \\
&+ a\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} + \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_A}{\partial \beta_B}.
\end{aligned}$$

Because $\frac{h(\cdot)}{H(\cdot)}$ is weakly decreasing in $c$ (by log-concavity of $H(c)$) and $c_M^*(\beta_B^{AE}, \bar{b}) > c_E^*(\beta_B^{AE}, \bar{b})$, we have $\frac{h(c_M^*(\beta_B^{AE}, \bar{b}))}{H(c_M^*(\beta_B^{AE}, \bar{b}))} \leq \frac{h(c_E^*(\beta_B^{AE}, \bar{b}))}{H(c_E^*(\beta_B^{AE}, \bar{b}))}$. Thus,

$$\frac{h(c_E^*(\beta_B^{AE}, \bar{b}))}{H(c_E^*(\beta_B^{AE}, \bar{b}))} \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b})\beta_B}{\partial \beta_B} > 0.$$

This, combined with $\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} < 0$, yields

$$\begin{aligned}
\frac{h(c_M^*(\beta_B^{AE}, \bar{b}))}{H(c_M^*(\beta_B^{AE}, \bar{b}))} & \left( \bar{b}\frac{\partial K(\beta_B^{AE}, \bar{b})}{\partial \beta_B} + \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_B}{\partial \beta_B} \right) \\
& < \frac{h(c_E^*(\beta_B^{AE}, \bar{b}))}{H(c_E^*(\beta_B^{AE}, \bar{b}))} \frac{\partial Pr(v \geq v^*(\beta_B^{AE}/\bar{b}))Pr(s \geq s^*(\beta_B^{AE}/\bar{b}))\beta_B}{\partial \beta_B},
\end{aligned}$$

which implies that

$$FOC_M(\beta_B^{AE}, \bar{b}) < 0.$$

Restoring balance requires increasing $\beta_B^{AE}$ above $\beta_B^{AM}$, i.e., choosing $\beta_B^{AM} < \beta_B^{AE}$. □

# 7 Online Appendix: Continuous Share Choice

This Appendix shows that when the distribution of investigation costs is uniform, it is without loss of generality to suppose that B's share choice set has a two-point support, $b \in \{0, \bar{b}\}$.

**Proposition 8.** *Suppose that $H(\cdot)$ is a uniform distribution on $[0, c_H]$ and Activist B can buy any number of shares $b \in [0, \bar{b}]$. Then, in equilibrium, Activist A will select an activist B with $\beta_B$ who optimally chooses $b(\beta_B, P^*(\beta_B, \cdot)) = \bar{b}$.*

We begin with a preliminary lemma.

**Lemma 2.** *Suppose that $H(\cdot)$ is a uniform distribution on $[0, c_H]$. If $\beta_B^1 > \beta_B^2$ then, in equilibrium, $\frac{\beta_B^1}{b_1(\beta_B^1, P^*(\beta_B^1, \cdot))} \leq \frac{\beta_B^2}{b_2(\beta_B^2, P^*(\beta_B^2, \cdot))}$ for $b_1(\beta_B^1, P^*(\beta_B^1, \cdot)) < \bar{b}$.*

*Proof.* Suppose by contradiction that $\beta_B^1 > \beta_B^2$ and $b_1(\beta_B^1, P^*(\beta_B^1, \cdot)) < \bar{b}$, but (using abbreviated notation) $\frac{\beta_B^1}{b_1} > \frac{\beta_B^2}{b_2}$. Define $b_1' = \frac{b_2 \beta_B^1}{\beta_B^2} > b_1 > b_2$ and $b_2' = \frac{b_1 \beta_B^2}{\beta_B^1} < b_2 < b_1$. Define

$$\pi_i = (1 - F(v^*(\beta_B^i, b_i))(1 - G(s^*(\beta_B^i, b_i)), \quad i = 1, 2$$

$$E_i = E[v | v \geq v^*(\beta_B^i, b_i)] + E[s | s \geq s^*(\beta_B^i, b_i)], \quad i = 1, 2.$$

Optimization by B yields that

$$\begin{aligned} H(c_1)(-E[c|c \leq c_1] + \pi_1 \beta_B^1) &> H(c_1')(-E[c|c \leq c_1'] + \pi_2 \beta_B^1) \\ H(c_2)(-E[c|c \leq c_2] + \pi_2 \beta_B^2) &> H(c_2')(-E[c|c \leq c_2'] + \pi_1 \beta_B^2), \end{aligned} \tag{31}$$

where

$$\begin{aligned} c_1 &\equiv \pi_1(b_1 E_1 + \beta_B^1), \quad c_1' \equiv \pi_2(b_1' E_2 + \beta_B^1) \\ c_2 &\equiv \pi_2(b_2 E_2 + \beta_B^2), \quad c_2' \equiv \pi_1(b_2' E_1 + \beta_B^2). \end{aligned} \tag{32}$$

Inequalities (31) imply that

$$\frac{H(c_1)(-E[c|c \leq c_1] + \pi_1 \beta_B^1)}{H(c_2')(-E[c|c \leq c_2'] + \pi_1 \beta_B^2)} > \frac{H(c_1')(-E[c|c \leq c_1'] + \pi_2 \beta_B^1)}{H(c_2)(-E[c|c \leq c_2] + \pi_2 \beta_B^2)} \tag{33}$$

Because $c \sim U[0, c_H]$, this inequality can be written as

$$\frac{c_1(-\frac{c_1}{2} + \pi_1 \beta_B^1)}{c_2'(-\frac{c_2'}{2} + \pi_1 \beta_B^2)} > \frac{c_1'(-\frac{c_1'}{2} + \pi_2 \beta_B^1)}{c_2(-\frac{c_2}{2} + \pi_2 \beta_B^2)} \tag{34}$$

Substituting $c_1, c_2, c_1', c_2'$ from (32), $b_1' = \frac{b_2 \beta_B^1}{\beta_B^2}$, and $b_2' = \frac{b_1 \beta_B^2}{\beta_B^1}$ into this inequality yields that both sides equal $\left(\frac{\beta_B^1}{\beta_B^2}\right)^2$, a contradiction. □

*Proof of Proposition 8.* Suppose by contradiction that activist A chooses $\beta_B$ who optimally chooses $b^*(\beta_B, P^*(\beta_B, \cdot)) < \bar{b}$. We show that Activist A can choose a $\beta_B' > \beta_B$ who optimally buys $b^*(\beta_B', P^*(\beta_B', \cdot)) = \bar{b}$ shares and has relative bias satisfying $\beta_B'/\bar{b} = \beta_B/b(\beta_B)$ that yields a higher payoff for Activist A. By Lemma 2, such a $\beta_B'$ exists: $\beta_B/b(\beta_B, P^*(\beta_B, \cdot))$ is weakly decreasing in $\beta_B$ for $b(\beta_B, P^*(\beta_B, \cdot)) < \bar{b}$, and it is (trivially) continuously increasing in $\beta_B$ for $b(\beta_B, P^*(\beta_B, \cdot)) = \bar{b}$. By Proposition 2, since the relative biases are the same, so are the recommendation and voting cutoffs, $v^*$ and $s^*$. Therefore, the strictly positive expected project revenues from funded projects are the same. From Corollary 1, for a fixed relative bias, B's investigation cutoff $c^*(\beta_B, b)$ increases in $b$. Therefore, selecting $\beta_B'$ leads to a strictly higher probability of project approval, and hence a strictly higher expected payoff for A. □