

Nonbinding Voting for Shareholder Proposals

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ABSTRACT

Shareholder proposals are a common form of shareholder activism. Voting for shareholder proposals, however, is nonbinding since management has the authority to reject the proposal even if it received majority support from shareholders. We analyze whether nonbinding voting is an effective mechanism for conveying shareholder expectations. We show that, unlike binding voting, nonbinding voting generally fails to convey shareholder views when manager and shareholder interests are not aligned. Surprisingly, the presence of an activist investor who can discipline the manager may enhance the advisory role of nonbinding voting only if conflicts of interest between shareholders and the activist are substantial.

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According to the SEC Rule 14a-8, shareholders of a public company are permitted to submit a proposal to be voted on at the annual shareholder meeting. Unlike voting for management-initiated proposals, the resolutions of votes on shareholder-initiated proposals are nonbinding in the following sense: the company's board can make its own determination as to whether adoption of all or any part of a shareholder proposal is in the company's best interests, even if the proposal received substantial majority support from shareholders.^{1,2}

Nonbinding shareholder proposals have become increasingly common in recent years, especially in the post-Enron era. While the number of governance-related proposals in the U.S. was about 270 per year over the period 1997 to 2002, it spiked to more than 400 per year over 2003 to 2006 (see Ertimur, Ferri and Stubben (2010) and Buchanan, Netter and Yang (2010)).³

Voting support for shareholder proposals has also steadily increased in the recent years. "There are increasing numbers of shareowner proposals, more 'for' votes of support for them, and 'withhold' votes for directors who are unresponsive to shareowners. This trend will continue as we seek better alignment with boards to implement corporate governance practices that will pay off in higher investment returns," said Russell Read, CalPERS Chief Investment Officer (August 13, 2007, CalPERS website). Indeed, Ertimur, Ferri and Stubben (2010) document that the fraction of governance-related proposals receiving a majority vote was only 10.5% in 1997 but more than 29% in 2004. Similarly, Buchanan, Netter, and Yang (2010) find that the number of majority-vote proposals has increased from 12.9% in 2000 to 21.2% in 2006.⁴

The majority of shareholder proposals, about two thirds according to Buchanan, Netter

¹More specifically, Rule 14a-8 allows companies to exclude most binding proposals as "not a proper subject for action by shareholders" under the corporate law of the company's state of incorporation. On the other hand, proposals that are cast as recommendations are usually considered to be proper under state law. For these reasons, the vast majority of shareholder proposals in the U.S. are precatory and therefore, nonbinding: according to the 2007 Institutional Shareholder Services report (ISS (2007)), nonbinding proposals accounted for 98% of the total shareholder resolutions in the U.S. in 2007.

²Shareholder proposals are not universally nonbinding. In the UK and most of Continental Europe, voting for shareholder proposals is binding (see, e.g., Cziraki, Renneboog, and Szilagyi (2010)).

³For comparison, the number of management-initiated proposals in the U.S. was about 1,450 per year over the period 1994 to 2003 (see, e.g., Maug and Rydqvist (2009)). This large number can be explained by several reasons. First, management-initiated proposals relate to a broader set of issues, including restructuring and financing decisions. Second, the company's management is usually obligated by law to bring an agenda, such as a merger agreement, to a shareholder vote.

⁴Maug and Rydqvist (2009) find that 98% of management-initiated proposals in their sample were approved by shareholders. This might not be very surprising, because voting on management proposals is binding, and therefore managers are likely to put proposals to a vote only if they are sufficiently confident that shareholders will approve them.

and Yang (2010), are related to firms' corporate governance practices such as anti-takeover defenses, executive compensation, board independence and elections, and shareholder rights. In most cases, the agenda is to tighten the corporate governance of the firm or to express general dissatisfaction with the company's management. For this reason, and due to potential conflict of interest, boards and managers may ignore the resolutions of shareholder proposals. According to Ertimur, Ferri and Stubben (2010), only 30% of the proposals that received majority support were implemented within one year from the vote.

If resolutions of shareholder proposals can be ignored by boards and managers, to what extent is this form of shareholder activism effective? This question is especially relevant in light of the Dodd-Frank Act, which requires a nonbinding vote on executive compensation at publicly traded companies that should be held at least every three years. The goal of this paper is to examine a potential mechanism that may lead management to respond to or to ignore shareholder concerns as reflected in the nonbinding vote.

We develop a model of nonbinding voting that focuses on the information revealed during the voting process and the manager's reaction to this information. The model considers voting for a proposal whose value to shareholders is uncertain and may increase or decrease the value of the firm. Information about the value of the proposal is dispersed among shareholders: shareholders receive private signals about the proposal and then decide how to vote. The manager of the firm is uninformed about the value of the proposal.⁵ Once shareholders have voted, the manager observes the vote tally, updates his beliefs about shareholders' expectations, and only then decides whether to approve the proposal. Because the vote is nonbinding, the manager is permitted to reject the proposal even if a majority of shareholders voted for it. We assume that the manager cares about shareholder value and hence, accepts the proposal if he believes that it is sufficiently valuable for the firm. However, the manager may also have private benefits of control and thus be more inclined than shareholders to reject the proposal.

Our first result shows that when the preferences of shareholders and the manager are not closely aligned, nonbinding voting fails to convey shareholders' expectations. Essentially, shareholders optimally decide to ignore their private information and vote for the proposal regardless of their signals. Thus, nonbinding voting for shareholder proposals generally has little advisory

⁵Whether or not the manager is privately informed does not change our results in any significant way. See the discussion at the end of Section I for more details.

role for the management.

The intuition is as follows. Shareholders vote strategically, taking into account that their vote only matters in situations where it changes the manager's decision to accept the proposal. A rational shareholder therefore conditions his decision not only on his private signal, but also on the information that is true in the situation when his vote is pivotal for the manager's decision. Because the manager is more inclined than shareholders to reject a shareholder proposal, he accepts the proposal only if there is strong evidence that it is value increasing, i.e., if the proposal receives sufficiently strong support from shareholders. It follows that when a shareholder's vote is pivotal for the manager's decision, it must be the case that a vast majority of other shareholders support the proposal. Therefore, the information embedded in the event of being pivotal overwhelms the shareholder's own private information and gives him incentives to vote for the proposal independent of his own signal. As a result, the vote tally does not reflect shareholders' expectations.

In our basic setting the manager can ignore majority-supported resolutions without bearing any real consequences. In practice, however, the market for corporate control can impose discipline on managers and directors if it becomes evident that they have failed to act in the best interests of shareholders. An important mechanism of such managerial discipline are proxy fights initiated by activist investors. For example, Del Guercio and Hawkins (1999) find that the frequency of a proxy contest attempt is significantly higher following majority-supported shareholder proposals. A notable case illustrating this mechanism is the 2007 proxy fight at CSX organized by the activist hedge fund TCI.⁶

To incorporate managerial discipline, we extend the basic model and introduce an activist investor who observes the vote outcome and the manager's decision. If the activist believes that the manager takes a value reducing action, she can incur some costs and organize a proxy fight in order to replace the manager, thereby reversing his decision. We allow for a conflict

⁶The proxy contest followed a nonbinding proposal to allow large shareholders to call special meetings, which was approved by about 70% of votes at CSX's 2007 annual meeting. Pressured by strong shareholder support, the company adopted a bylaw on special meetings which, however, was significantly limited and, among other things, excluded director elections from shareholder-called special meetings. Dissatisfied with the management's response to the proposal and overall reluctance to engage in a productive dialogue, TCI nominated a dissident slate of directors to stand for election at the 2008 CSX shareholder meeting. In addition, it urged shareholders to repeal the bylaw amendment made by the CSX board and instead, approve TCI's own special meeting proposal. See, for example, RiskMetrics Group - Risk & Governance Blog, "CSX Proxy Fight Preview", June 13, 2008.

of interest between the activist and shareholders and in particular, assume that the activist may have private benefits from opposing the manager and accepting the shareholder proposal. Thus, while the manager is biased against the approval of the proposal, the activist is biased against its rejection.⁷

Our main result shows that the presence of an activist investor can improve information aggregation in nonbinding voting. Surprisingly, however, information aggregation is improved only if the activist is sufficiently biased towards approving the proposal, i.e., if there is significant conflict of interest between the activist and shareholders. If, on the other hand, the activist's interests are closely aligned with those of shareholders, nonbinding voting still fails to convey shareholder expectations.

Intuitively, the activist whose interests are closely aligned with those of shareholders does not engage in a costly proxy fight unless there is sufficiently strong evidence that the manager has rejected a beneficial proposal. This gives the manager discretion to reject some value increasing proposals, inducing shareholders to disregard their private information and vote affirmatively by a similar reasoning as before. On the other hand, if the activist's private benefits from accepting the proposal are substantial, she organizes a proxy fight even if there is only weak evidence that the manager rejected a value increasing proposal, thereby inducing the manager to accept the proposal more often. Essentially, the activist's over tendency to accept the proposal counterbalances the manager's over tendency to reject the proposal, resulting in a balanced decision rule that gives shareholders incentives to vote according to their information. Interestingly, our analysis emphasizes that shareholders may benefit from having an opportunistic activist investor, even though such activist is biased and sometimes takes actions that are ex-post value reducing.

Finally, we show that when nonbinding voting has advisory role for the management (e.g., in the presence of an opportunistic activist), shareholders may prefer the nonbinding mechanism over binding voting - a voting mechanism where an exogenous voting rule determines the outcome based on the vote tally. As our analysis of nonbinding voting demonstrates, there exists an endogenous threshold such that in equilibrium the manager accepts the proposal if

⁷Anabtawi and Stout (2008) provide a comprehensive discussion of common conflicts of interest between activist investors and minority shareholders. Examples include short-termist goals of certain types of activists, self dealing involving other companies in activists' portfolios, and the expansion of labor rights desired by union fund managers. See Section II for more examples.

and only if the number of affirmative votes exceeds this threshold. In other words, nonbinding voting is effectively binding with an endogenously determined voting threshold that depends on the company and proposal characteristics. This flexibility to tailor the voting threshold to the firm does not exist in binding voting, suggesting potential inefficiencies. Our analysis confirms this intuition and shows that a binding mechanism restricted to a pure majority rule is often inferior to a nonbinding mechanism.

We contribute to the literature on corporate governance and shareholder voting in several ways. Our paper is the first to present a formal model of nonbinding voting and suggest a mechanism that could lead management to implement shareholder proposals. The model provides new predictions about the determinants of managerial responsiveness to nonbinding proposals and the likelihood of a proxy fight. Second, we show that some corporate governance imperfections, such as the presence of an opportunistic activist, may actually be beneficial for shareholders ex-ante, by allowing more informative decision making. We also demonstrate that the nonbinding voting mechanism is very different from the binding mechanism in its ability to aggregate shareholders' information, and that the former can often be superior. Last, we emphasize the signaling role of shareholder voting, not only to the firm's management, but also to activist investors and potential raiders.

Our paper is not the first to examine information aggregation in voting in the presence of conflicts of interest. Maug and Yilmaz (2002) and Maug (1999) focus on the conflict of interest between different voters in the binding voting mechanism. Their reasoning of why the conflict of interest between voters may lead to worse information aggregation is close to our result that nonbinding voting fails to convey shareholders' information when the manager is in conflict of interest with the shareholders. While these papers propose, respectively, the two-class binding voting mechanism and trading in the stock market prior to the vote as possible solutions to improve information aggregation, we emphasize the role of the market for corporate control. Bond and Eraslan (2010) examine efficiency of different binding voting rules when the proposal that is put to a vote is endogenous, and the proposer and voters have different preferences. They show that the unanimity rule may be preferred to any other voting rule by both the proposer and the voters. By contrast, our paper compares efficiency of nonbinding and binding voting when the proposal on the agenda is exogenous. Coughlan (2000) considers a two-stage game where voters with heterogeneous preferences first communicate with each other and then

participate in a binding vote. He demonstrates that truthful communication among voters is possible only if their preferences are sufficiently close to each other. This result is related to our result that communication between shareholders and the manager through the nonbinding vote is possible only if the manager's preferences are sufficiently aligned with those of shareholders.

In the context of two candidate binding elections, Feddersen and Pesendorfer (1997, 1998) show that whenever the voting rule is different from the unanimity rule, information is efficiently aggregated in large elections, in the sense that the chosen candidate would not change if all private information was common knowledge. In other words, binding voting efficiently aggregates private information when the population of voters is large. In contrast, the analysis of our paper demonstrates that nonbinding voting may fail to aggregate shareholders' private information when the manager's interests are not closely aligned to those of shareholders, even with a large number of voters.

Our paper is also closely related to the cheap talk literature when there is a conflict of interest between the sender and the receiver (see, e.g., Crawford and Sobel (1982)). Nonbinding voting is a form of cheap talk since shareholders' votes do not affect their payoffs directly, but only through their effect on the manager's decision. Morgan and Stocken (2008) study information aggregation in polls when the constituents' ideology is heterogeneous. Polls and nonbinding voting are similar in that by expressing their views, poll constituents do not change the outcome directly and only affect it indirectly by conveying their information to the decision maker. The authors show that information can be perfectly aggregated only if the poll size is sufficiently small. In the context of corporate governance, our analysis shows how imperfections of the market for corporate control can enhance the advisory role of nonbinding voting. Our paper is also related to Krishna and Morgan (2001), who study communication between multiple informed but biased experts and a single decision maker. They show that revelation of information can be improved by consulting more than one expert only if experts are biased in opposite directions. In contrast, we find that aggregation of information is improved when the conflict of interest is between the decision makers rather than between the experts. That is, nonbinding voting has an advisory role only when the activist investor and manager compete for control.

Finally, our paper is related to the literature on formal vs. real authority in organizations (e.g., Aghion and Tirole (1997)). In our model of nonbinding voting the firm's management

has formal authority: it can reject or accept the proposal independently of the vote outcome. The focus of our paper is studying the circumstances under which shareholders, who have information, retain real authority. We demonstrate that the company's management is likely to "give up" its formal authority and follow shareholders' voice when it is subject to discipline by activists. We also show that providing shareholders with formal authority, i.e., introducing binding voting on shareholder proposals, can be inferior to nonbinding voting whenever shareholders retain real authority. Overall, our analysis contributes to the literature on authority in organizations by focusing on the strategic aspects of communication in the context of nonbinding voting.

The remainder of the paper is organized as follows. Section I presents the basic model of nonbinding voting. Section II extends the model by introducing the market for corporate control. Section III analyzes comparative statics of the model. Section IV compares the relative efficiency of binding and nonbinding voting mechanisms. Section V offers some concluding remarks. All proofs, supplemental results, and the summary of notations used in the paper are collected in the Appendix and the Internet Appendix.⁸

I Basic Model

A Setup

Consider a firm that is owned by $N > 1$ shareholders and run by a manager. Each shareholder holds the same stake in the firm (for simplicity, one share). We restrict attention to the "one-share-one-vote" rule, where each share provides exactly one vote. There are two stages in the model: first, shareholders participate in a nonbinding vote for a proposal, and then the manager decides whether to accept or reject the proposal. The model does not distinguish between the board and the manager of the firm. Let d represent whether the proposal is accepted ($d = A$) or rejected ($d = R$).

The value of the proposal to the firm is uncertain. We denote this value by $v(d, \theta)$, where $\theta \in \{G, B\}$ is the state of the world. When $\theta = G$, we say that the state is good, and otherwise, the state is bad. In particular, firm value per share increases by 1 if the proposal is accepted in

⁸The Internet Appendix is available on *The Journal of Finance* website at <http://www.afajof.org/supplements.asp>.

the good state, $v(A, G) = 1$, and decreases by 1 if it is accepted in the bad state, $v(A, B) = -1$.⁹ If the proposal is rejected, the value of the firm does not change: $v(R, \theta) = 0$. For example, consider a proposal to remove the company's takeover defense such as a poison pill. While the presence of a poison pill may deter some value increasing takeovers, it can also protect shareholders from coercive, value decreasing takeovers and inadequate bids. The value from the proposal thus crucially depends on the synergies from the potential merger: the proposal to remove the pill should be accepted if the merger is value increasing (the state is good) and should be rejected if the merger is value decreasing (the state is bad).

The manager and shareholders share the same prior belief that the probability of the good state is 0.5. Considering prior beliefs different from 0.5 would not qualitatively change our results.

Shareholders might use nonbinding proposals to communicate their opinions and expectations, thereby advising corporate decision makers about issues on the agenda. To focus attention on the flow of information from shareholders to the firm's management, we assume that the manager is uninformed, but each shareholder observes a private signal $s_i \in \{g, b\}$ (good or bad), whose precision is represented by $\rho \in (0.5, 1)$:

$$\Pr(s_i = g | \theta = G) = \Pr(s_i = b | \theta = B) = \rho. \quad (1)$$

All signals are independent conditional on the state of the world.¹⁰

Shareholders have sufficient incentives to become informed if they have significant holdings in the company. For example, large shareholders could be informed about the presence of a value increasing raider and communicate this knowledge to the manager by voting to remove a poison pill or declassify the board (more than 25% of governance-related proposals are related to poison pill repeals or declassification of the board, as documented by Ertimur, Ferri, and

⁹The analysis could be extended to a proposal with arbitrary value in each state without qualitatively changing any results.

¹⁰There is a broad literature on how corporate insiders may learn value-relevant information from outsiders. In Holmstrom and Tirole (1993), stock prices provide information about the manager's actions and are therefore useful for managerial incentive contracts. Marquez and Yilmaz (2008) examine tender offers where shareholders have information about the firm value that the raider does not have. In Dow and Gorton (1997), Foucault and Gehrig (2008), and Goldstein and Guembel (2008), firms use information in stock prices to make investment decisions. In the context of IPOs, Rock (1986), Benveniste and Spindt (1989), and Benveniste and Wilhelm (1990) assume that investors have information about the firm that is unknown to the manager or underwriter.

Stubben (2010)). Alternatively, blockholders can be better informed about the quality of a particular director than the manager and hence, their votes may be useful for board-related shareholder proposals, which account for 28% of governance-related proposals. Finally, some proposals submitted by activist hedge funds are focused on strategic, operating, and financing practices of targeted firms - areas in which the hedge funds may have significant expertise.

The discussion above suggests that by informed shareholders we implicitly mean large shareholders and therefore, the number of shareholders, N , is typically small. Given that most publicly traded U.S. companies have multiple blockholders, the assumption that there are at least two informed shareholders ($N > 1$), which is needed for our results, is consistent with this interpretation.¹¹ At the end of Section I, we discuss that our results continue to hold for firms where part of the shareholders are uninformed.

Shareholders have homogeneous preferences and maximize the value of the firm. Hence, if the manager makes decision d with respect to the proposal and the state of the world is θ , each shareholder's utility is $v(d, \theta)$.¹²

In practice, most shareholder proposals are related to changes in corporate governance, which have the potential to deprive the manager of his private benefits of control. For example, removal of a poison pill makes the manager more vulnerable to job loss by increasing the probability of a hostile takeover. Therefore, it is natural to assume that the manager is less inclined to accept the proposal than shareholders. On the other hand, the manager's compensation is usually tied to firm value, which partly aligns his interests with those of shareholders. To incorporate these two features into the model, we assume that the manager's preferences are a weighted average of the proposal value to the firm and his private benefits of control, which he loses if the proposal is accepted. In particular, the manager's utility function is given by $k_M v(d, \theta) - (1 - k_M)1_{\{d=A\}}$. The parameter $k_M \in [0, 1]$, which is common knowledge, measures the extent to which the manager's interests are aligned with those of shareholders. In the extreme case when $k_M = 1$, the manager's and shareholders' interests are perfectly aligned, while for $k_M = 0$ the manager only cares about his private benefits and always wants the proposal to

¹¹Edmans and Manso (2011) define a blockholder as a shareholder with at least 5% of the firm's equity and document that 57% of firms in 2001 had multiple outside blockholders, and 17% of firms had at least four outside blockholders.

¹²In the Internet Appendix, we analyze an extension of the model where in addition to their concern about the value of the firm, shareholders are also reluctant to vote in favor of the proposal for fear of managerial retaliation.

be rejected.

The timeline of the model is as follows. At the first stage, the proposal is exogenously put to a vote. Shareholders privately observe their signals and decide to vote "for" or "against" the proposal. All votes are cast simultaneously, and shareholders cannot communicate their private information prior to voting. Therefore, shareholders have to vote on the proposal without knowing each other's information. As standard in the literature on strategic voting, we restrict attention to symmetric voting strategies. In particular, each shareholder follows a mixed voting strategy

$$\omega = (\omega_b, \omega_g) \in [0, 1] \times [0, 1], \quad (2)$$

where ω_s is the probability of voting "for" (the complement being the probability of voting "against") after receiving signal $s \in \{b, g\}$. The outcome of the vote is public and is characterized by $T \in [0, N]$, which is the number of shareholders who voted affirmatively.

At the second stage, once T is revealed, the ultimate decision whether to accept or to reject the proposal is made by the manager. Thus, a key assumption of our model is that regardless of shareholder support for the proposal, the vote outcome does not bind the management of the firm. We denote the manager's strategy by

$$d_M(T) : \{0, 1, \dots, N\} \rightarrow \{A, R\}, \quad (3)$$

where $d_M(T)$ is the decision the manager makes after observing T affirmative votes. Without loss of generality, we assume that if the manager is indifferent between accepting and rejecting the proposal, he rejects it.

We summarize the timeline of the game as follows. First, shareholders observe their private signals and then vote. After the vote outcome is made public, the manager decides whether or not to accept the proposal based on the vote tally. Finally, the state of the world is realized, and all agents receive their payoffs.

B Equilibrium Analysis

We consider the set of perfect Bayesian equilibria. Suppose that in equilibrium shareholders follow a voting strategy $\omega = (\omega_b, \omega_g)$, and the manager follows a decision rule $d_M(T)$. We say

that an equilibrium is *responsive* if shareholder support for the proposal has an impact on the manager's decision regarding the proposal. This definition implies that every shareholder is pivotal with a strictly positive probability, i.e., his decision to vote for or against the proposal might change the outcome. Formally,

DEFINITION 1: *An equilibrium $(\omega, d_M(\cdot))$ is responsive if there exist $T_1, T_2 \in \{0, 1, \dots, N\}$ such that $d_M(T_1) \neq d_M(T_2)$.*

It follows that in any responsive equilibrium $\omega_b \neq \omega_g$. That is, shareholders' voting behavior depends on the signal they receive, and hence, their private information is conveyed through the vote. Otherwise, if $\omega_b = \omega_g$, the vote tally does not convey any relevant information about the value of the proposal, and therefore, the manager has no reason to change his decision based on the vote.

It is important to note that a non-responsive equilibrium always exists in our setting. For example, voting strategies $(\omega_b, \omega_g) = (\frac{1}{2}, \frac{1}{2})$ form an equilibrium. The manager understands that votes do not convey any information and hence, ignores the vote tally and always rejects the proposal. Realizing that, shareholders are indifferent between voting for and against the proposal, and thus, strategies $(\frac{1}{2}, \frac{1}{2})$ are indeed optimal and constitute an equilibrium. Note, however, that non-responsive equilibria are inefficient in the following sense. Since the final decision does not reflect shareholders' private information, there is a high probability of taking the wrong action, i.e., rejecting the proposal in the good state of the world or accepting it in the bad state. For this reason, we are mostly interested in responsive equilibria. This selection of equilibria is standard in the literature.

We focus on equilibria where shareholders with a good signal are more likely to vote for the proposal than shareholders with a bad signal, i.e., $\omega_b \leq \omega_g$.¹³ In these equilibria, more affirmative votes are a stronger indication that the state of nature is good. In other words, if $\beta_\omega(T)$ is the posterior belief that the state is good conditional on the vote tally, $\beta_\omega(T) \equiv$

¹³Formally, since voting is nonbinding, for any equilibrium of this type there exists a corresponding equilibrium with $\omega_b \geq \omega_g$. In this equilibrium voting for the proposal is relabeled with voting against the proposal. The manager takes into account that shareholders with a bad signal vote affirmatively more often and correctly infers the distribution of positive signals. Hence, the two types of equilibria have exactly the same properties, and we only focus on the first type of equilibria.

$\Pr[\theta = G \mid T]$, then $\beta_\omega(T)$ is increasing in T . We use a subscript ω to indicate that the way posterior beliefs are updated depends on the equilibrium voting strategies $\omega = (\omega_b, \omega_g)$.

Given the voting strategies of shareholders, there is a one-to-one correspondence, $\tau_\omega(\cdot)$, between the posterior belief that the state is good, and the number of affirmative votes for the proposal, presented by the following lemma.¹⁴

LEMMA 1: *Let $\omega = (\omega_b, \omega_g)$ be shareholders' voting strategies such that $\omega_g > \omega_b$. Then there exists an increasing function $\tau_\omega(\beta)$ such that the posterior belief that the state is good equals β if and only if $\tau_\omega(\beta)$ voters have voted affirmatively.*

Ex-post, shareholders prefer the proposal to be accepted if and only if $\Pr[\theta = G \mid T] \geq 0.5$. Hence, $\tau_\omega(0.5)$ can be considered the voting requirement that optimally implements the shareholders' objective.

To find responsive equilibria of the game, we solve the model by backward induction. First, we fix shareholders' voting strategies (ω_b, ω_g) with $\omega_b < \omega_g$ and analyze the manager's decision whether to approve the proposal given the vote tally. Then, we consider shareholders, who decide how to vote foreseeing the manager's reaction to their votes, and formulate conditions for strategies (ω_b, ω_g) to be optimal.

B.1 Manager's Approval Decision

Consider the manager's decision whether to accept the proposal. If the manager had no conflict of interest with shareholders, he would accept the proposal if and only if the posterior belief that the state is good was greater than 0.5. However, because of the conflict of interest, the manager may prefer to reject the proposal even if the posterior belief is greater than 0.5. We show below that in equilibrium the manager follows a threshold strategy and accepts the proposal if and only if his posterior belief is greater than a cutoff β^* , which translates into a cutoff number of shareholders supporting the proposal, T_ω^* .

¹⁴The function $\tau_\omega(\beta)$, which is the inverse of the function $\beta_\omega(\cdot)$, may not be an integer for various values of β and ω . Nevertheless, we refer to $\tau_\omega(\beta)$ as the number of affirmative votes that is required for a posterior belief β , and deal with this technicality in Lemma 2.

LEMMA 2 (Endogenous Voting Threshold): *Suppose that shareholders' voting strategies are (ω_b, ω_g) with $\omega_g > \omega_b$, and let $\beta^* \equiv \frac{1}{2k_M}$. Then the manager accepts the proposal if and only if the number of affirmative votes is strictly greater than T_ω^* , where $T_\omega^* \equiv \lfloor \tau_\omega(\beta^*) \rfloor$.*¹⁵

It follows that the manager is (weakly) more likely to accept the proposal if it receives stronger support from shareholders. Intuitively, in order to approve the proposal and forego his private benefits, the manager requires strong evidence that rejection of the proposal is truly suboptimal. Note also that the manager rejects some value increasing proposals ($\beta^* > \frac{1}{2}$) if and only if he is biased ($k_M < 1$). Last, note that T_ω^* is essentially the endogenous voting threshold, which depends on the conflict of interest between the shareholders and the manager.

B.2 Existence of a Responsive Equilibrium

At the voting stage, shareholders observe their private signals and then decide how to vote, comparing the expected benefit from voting "for" to the expected benefit from voting "against" the proposal. When a shareholder votes strategically, he takes into account that his decision has an effect on his utility only in certain events - those where the shareholder's vote is pivotal for the final outcome. Therefore, an informed shareholder rationally conditions his decision not only on his private signal, but also on the information that must be true when he is pivotal. In the current setting, a shareholder is only pivotal if his vote induces the manager to accept the proposal. Because the manager follows a decision rule T_ω^* , the shareholder is pivotal if and only if the number of affirmative votes among other shareholders is exactly T_ω^* .

As was shown above, non-responsive equilibria always exist in this setting. However, our next result demonstrates that unless the manager's preferences are closely aligned with those of shareholders, these are the only possible equilibria and hence, the nonbinding vote fails to have any impact on the manager's decision.

For the ease of exposition, we assume from now on that N is even. If N is odd, all the results remain the same except for a slight change in the constants in the formulations. In the Appendix we consider both cases simultaneously.

THEOREM 1: *A responsive equilibrium exists if and only if $k_M > \frac{1}{2} + \frac{1}{2} \left(\frac{1-\rho}{\rho} \right)^2$.*

¹⁵We use $\lfloor x \rfloor$ to denote the highest possible integer that is smaller or equal to x .

To understand the intuition behind Theorem 1, recall that a shareholder conditions his decision on his private signal and on the event when his vote is pivotal, i.e., when the number of affirmative votes among other shareholders equals T_ω^* . By construction, when the number of affirmative votes is T_ω^* , the manager's posterior belief that the state is good is close to β^* . Then, conditional on being pivotal, the shareholder's posterior belief that the state is good is also close to β^* . To see why this is true, consider a responsive equilibrium in pure strategies, in which every shareholder votes for the proposal if and only if his signal is good (the argument for mixed strategy equilibria is similar). Suppose that the shareholder's own signal is bad. Conditional on being pivotal, such shareholder knows with certainty that there are T_ω^* good signals among the remaining $N - 1$ shareholders. Combining it with his own bad signal, he realizes that there are exactly T_ω^* good signals out of all N signals. The manager who observes T_ω^* affirmative votes, infers that there are exactly T_ω^* good signals among all N shareholders and hence, has exactly the same information as the shareholder with a bad signal. Therefore, both the manager who observes T_ω^* affirmative votes and the pivotal shareholder with a bad signal share exactly the same posterior belief, which by construction is close to β^* . If the conflict of interest between the manager and shareholders is sufficiently strong (k_M is low), then $\beta^* = \frac{1}{2k_M}$ is significantly greater than 0.5, and hence, the pivotal shareholder believes that the proposal is strictly beneficial for the company even though his own private signal is bad. A shareholder with a good signal is even more inclined towards the proposal. Thus, each shareholder prefers the proposal to be accepted and votes affirmatively regardless of his signal, which contradicts the existence of this equilibrium. This intuition is similar to the intuition behind the result of Morgan and Stocken (2008) that information is not well aggregated for sufficiently large polls when constituents have diverse ideologies.

Several comments are in place. First, as follows from the proof of Theorem 1, when a responsive equilibrium exists, it may not be unique. In particular, in addition to a pure strategy equilibrium, which always exists for any $k_M > \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$, there also exist mixed strategy equilibria for some values of k_M in this range.

Second, our result that nonbinding voting may fail to aggregate shareholders' information does not depend on the number of shareholders, N , and continues to hold even if the number of shareholders is large. This contrasts a well-known result by Feddersen and Pesendorfer

(1998), who show that the probability of making the wrong decision converges to zero as the population of voters increases. The key to understanding the fundamental difference between the models is the following. In binding voting, the voting threshold needed for proposal approval is determined exogenously. Given the voting threshold, shareholders find their optimal voting strategies, and this in turn determines the posterior belief conditional on being pivotal for the outcome. Hence, the posterior belief conditional on being pivotal, which is the main factor that guides shareholders how to vote, is affected by the number of voters and their strategies. As a result, there might exist an equilibrium in which information is aggregated. By contrast, in a nonbinding vote, the posterior belief conditional on being pivotal is determined by the manager's preferences. Given this posterior belief, shareholders find their optimal voting strategies, which in turn determine the endogenous voting threshold. It follows that regardless of shareholders' voting strategies and regardless of the number of shareholders, the posterior belief conditional on being pivotal is always close to β^* , the manager's threshold belief. When this threshold belief is sufficiently different from 0.5, any equilibrium must be non-responsive.

Third, to simplify the analysis, we have ignored the possibility that the manager may have private information about the value of the proposal and that some shareholders may be completely uninformed. However, our result that nonbinding voting fails to aggregate shareholders' information when the manager is sufficiently biased, continues to hold even in those situations. The only necessary condition is that at least some shareholders have information that is incremental to the manager's information and that the manager could use to make a more knowledgeable decision. Intuitively, if the manager is informed, then shareholders, when voting, also condition on the private information that the manager must have when they are pivotal for his decision. Alternatively, if some shareholders are uninformed and vote in a particular direction (for example, always vote with the management) or even randomly, then both the manager and informed shareholders "clean out" these uninformative votes from the vote tally when making their inference. In both cases, a pivotal shareholder has roughly the same information and posterior belief as the manager when the manager is indifferent between accepting and rejecting the proposal. The same logic that leads to Theorem 1 then implies that nonbinding voting fails to aggregate shareholders' information when the preferences of shareholders and the manager are not closely aligned. Hence, our model can be applied to widely held firms, even if the number of informed shareholders is relatively small and the manager has relevant

information about the value of the proposal.

Finally, the concept of nonbinding voting is related to the role of veto power under binding voting.¹⁶ In both cases, a sole decision maker can maintain the status quo even if the majority of voters register their support for the proposal. In contrast to nonbinding voting, however, the agent with veto power cannot change the status quo (accept the proposal) if the majority of voters oppose it. Therefore, and unlike the full authority that the company's management retains in nonbinding voting, the agent with veto power does not have full discretion over the final decision, which leads to different implications for information aggregation. In particular, our result that there is no responsive equilibrium in nonbinding voting when the conflict of interest between the manager and shareholders is significant, does not depend on the direction of the manager's bias: it is also valid when the manager is biased towards accepting the proposal relative to shareholders. In contrast, under veto power and a pure majority rule, there is no responsive equilibrium only if the agent with veto power is biased against the proposal, whereas if he is biased towards the proposal, a responsive equilibrium exists.

II Managerial Discipline

In our basic model, the manager can disregard a shareholder proposal without facing any consequences, even if the proposal is supported by the majority of shareholders. However, corporate decision makers of public firms are often subject to implicit discipline if it becomes evident that they have failed to act in the best interests of shareholders. For example, dissatisfaction with the management may encourage activist investors to wage formal proxy fights, motivate potential raiders to launch tender offers, or induce large shareholders to vote with their feet and follow the "Wall Street Walk" (see Admati and Pfleiderer (2009) and Edmans (2009)). Alternatively, opportunistic behavior by the manager can result in "just vote no" campaigns (see Del Guercio, Seery and Woidtke (2008)), negative recommendations by proxy advisory firms for future management proposals, submission of binding bylaw amendments, or even lobbying for regulatory change. Fama (1980), Fama and Jensen (1983), and Grundfest (1993) argue that the labor market penalizes suboptimal behavior and thereby provides incentives for

¹⁶We are grateful to the referee for pointing out the connection of nonbinding voting to veto power. The paper that is most closely related to the role of veto power in strategic voting is Maug and Yilmaz (2002) on two-class voting. A special case of their model could be interpreted as an example of veto power.

directors to develop their reputation as effective monitors. Last, stronger voting support for a proposal is likely to attract greater press coverage, increasing the political costs from ignoring the vote. Some evidence in support of managerial discipline is provided by Ertimur, Ferri, and Stubben (2010), who find a one-fifth reduction in the probability of director turnover at the targeted firm after the implementation of majority-supported shareholder proposals.

The common feature of all these mechanisms is that they can impose discipline on the manager and make him more responsive to shareholder proposals. We incorporate this feature into our model by introducing an activist investor who can organize a proxy fight to discipline the manager. We focus on the proxy fight mechanism because it is a direct mechanism through which activists can influence and discipline the management. Indeed, a successful proxy fight removes the incumbent board from its position. However, as described below, we model the proxy fight in a reduced form. Therefore, it can be given a broader interpretation of any corporate intervention technology that has binding implications on the management.

We allow the activist's preferences to be different from those of shareholders. In particular, the activist may have private benefits from the proposal that are not shared with other shareholders and hence, be more biased towards accepting the proposal. For example, as discussed in the introduction, private benefits may arise from short-termist strategies of certain activist investors or from labor goals pursued by union fund managers. The proxy campaign organized by CalPERS to remove Safeway's CEO and Chairman Steven Bird from his position is a well-known example of the use of shareholder activism to pursue labor goals (see, e.g., Los Angeles Times, "Backlash Confronts CalPERS", May 20, 2004, p. C1). Finally, private benefits can also come from the supportive media publicity surrounding proposals to limit executive compensation or increase board diversity, which are likely to enhance the political reputation of fund managers. It is key to our results that the manager's and the activist's private benefits from the proposal go in opposite directions. Otherwise, as will become clear later, the only possible equilibria are non-responsive ones.

In what follows, we demonstrate that the presence of an activist investor leads to a responsive equilibrium only if the activist is sufficiently biased towards accepting the proposal.

A Modified Setup

We augment the model with a third stage. At the third stage, the activist investor observes the outcome of the vote and the manager's approval decision, and only then decides whether to incur solicitation costs $c_A > 0$ in order to organize a proxy fight.¹⁷ Thus, potentially, the nonbinding vote has an advisory role not only for the manager, but also for the activist. Without loss of generality, we assume that if the activist is indifferent between initiating and not initiating the proxy fight, she does not initiate it. A proxy fight succeeds with probability $\lambda \in (0, 1]$. A successful proxy fight has two implications. First, it imposes a cost $c_M > 0$ on the manager. For example, the manager can be removed from his position, and his reputation might be damaged. Second, the proxy fight reverses the manager's decision: if the manager rejected the proposal, a successful proxy fight results in its approval, and vice versa.

To focus attention on the impact of shareholder voting and abstract from signaling considerations, we assume that neither the manager nor the activist have private information. Under this assumption, the activist's vote will be fully predicted by other participants and therefore, will not affect aggregation of information. Thus, we assume for simplicity that the activist does not participate in the nonbinding vote.¹⁸

Last, the activist's preferences are given by $k_A v(d, \theta) + (1 - k_A) 1_{\{d=A\}}$, where d represents whether the proposal is eventually accepted ($d = A$) or rejected ($d = R$), and $k_A \in [0, 1]$ measures the conflict of interest between the activist and shareholders.¹⁹ Parameter k_A is common knowledge. If $k_A = 1$, then the interests of the activist are perfectly aligned with those of shareholders. If $k_A < 1$, then the activist is more biased towards approving the proposal than shareholders.

¹⁷Formally, the activist's strategy is given by $e(T, d_M) : \{0, 1, \dots, N\} \times \{A, R\} \rightarrow \{0, 1\}$, where $e(T, d_M)$ equals 1 if the activist organizes a proxy fight, and equals 0 otherwise.

¹⁸If the activist is privately informed and participates in the vote, the analysis becomes less tractable. In particular, the activist's voting strategy could be different from that of other shareholders since the activist internalizes the cost of organizing a proxy fight. Besides, she knows more than other shareholders about the probability that a proxy fight will be organized (the activist has private information, which affects her incentives to organize a proxy fight). Since the activist may follow a different voting strategy, the manager's inference from the vote would crucially depend on whether the activist's vote is observable or not. We believe that our results would not change significantly under this alternative setup, but showing that requires a formal analysis.

¹⁹Here d is the final decision that is taken after the proxy fight, if it is organized. Shareholders', manager's, and activist's preferences are affected by the profile strategies (ω, d_M, e) , where e , defined in footnote 16, is the activist's decision whether to launch a proxy fight. The exposition is straightforward from the description above and is thus relegated to the Internet Appendix.

B Analysis

Our model emphasizes that if any information is conveyed in the nonbinding vote, the activist will use it when deciding whether to organize a proxy fight.

Consider the activist's decision to organize a proxy fight given that T shareholders voted for the proposal and the manager's action. Our first observation is that since the manager is more inclined than the activist to reject the proposal, the activist never initiates a proxy fight when the manager accepts the proposal. Instead, the activist launches a proxy fight only when the manager rejects the proposal and the vote tally indicates that the probability that the state is good is sufficiently high.

More specifically, the activist's incentives to initiate a proxy fight are balanced by two different considerations. First, initiation of a proxy fight is costly for the activist ($c_A > 0$). Hence, it only pays off when there is sufficiently strong evidence that the manager's decision to reject the proposal is detrimental for shareholder value. In other words, when the posterior belief $\beta_\omega(T)$ is higher but close from above to 0.5, an unbiased activist ($k_A = 1$) refrains from organizing a proxy fight and leaves the decision to the manager. Second, the activist extracts private benefits from the approval of the proposal regardless of the value it delivers to shareholders. Thus, a sufficiently biased activist would like the proposal to be accepted even if shareholders strictly prefer its rejection. Combining these considerations, we show that the activist follows a threshold strategy and initiates a proxy fight to reverse the manager's rejection decision if and only if $\beta_\omega(T) > \frac{1}{2} + \frac{1}{2k_A} \left(k_A - \frac{\lambda - c_A}{\lambda}\right)$ (see auxiliary Lemma B.1 in the Appendix).

The manager's decision whether to accept the proposal must account for the activist's intervention. We show that similarly to the basic model, the manager follows a threshold strategy and accepts the proposal if and only if his posterior belief that the state is good exceeds some cutoff β^* , which results in an endogenous voting threshold $T_\omega^* = \lfloor \tau_\omega(\beta^*) \rfloor$ (see auxiliary Lemma B.2 in the Appendix). The threshold arises due to a combination of two effects. First, as in the basic model, the manager cares about shareholder value and therefore, prefers to accept the proposal if there is sufficiently strong evidence that it is value increasing. The threat of a proxy fight by the activist investor adds an additional force. The greater is the posterior belief that the proposal is value increasing, the greater is the risk of the proxy fight if the manager rejects the proposal, which makes him more willing to accept the proposal. Note that the threshold β^* now depends not only on the conflict of interest between the manager

and shareholders (k_M), but also on the proxy fight technology (c_A, c_M, λ) and the activist's preferences (k_A).

Despite her ability to organize a proxy fight, an activist whose preferences are strongly aligned with those of shareholders fails to impose sufficient discipline on an opportunistic manager in the following sense.

LEMMA 3: *If the activist is sufficiently unbiased ($k_A > \frac{\lambda - c_A}{\lambda}$), an opportunistic manager ($k_M < 1$) rejects some value increasing proposals ($\beta^* > \frac{1}{2}$) without facing a proxy fight. If the activist is biased ($k_A \leq \frac{\lambda - c_A}{\lambda}$), then the activist always organizes a proxy fight whenever the manager rejects a value increasing proposal.*

Intuitively, when the activist's private benefits are sufficiently small, the cost c_A prevents her from organizing a proxy fight, which leaves some discretion to the manager. If the manager is in conflict of interest with shareholders, he exploits this discretion by rejecting the proposal even when shareholders would like him to approve it. In contrast, when the activist is sufficiently biased towards the proposal, she is willing to organize a proxy fight whenever the manager rejects the proposal that is likely to be value increasing.

Recall from Theorem 1 that in the absence of managerial discipline, a responsive equilibrium does not exist if the manager is biased, $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$. We next examine under what conditions the presence of an activist investor can alleviate this problem. Our next result shows that, if the activist's private benefits are sufficiently small (but not necessarily zero), all possible equilibria are still non-responsive.

THEOREM 2: *Suppose that the manager is in sufficient conflict of interest with shareholders, $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$, and that the costs of organizing a proxy fight are non negligible, $c_A > \underline{c}_A \equiv \lambda \frac{2\rho-1}{\rho^2+(1-\rho)^2}$. If the activist is sufficiently unbiased, $k_A \geq \frac{\lambda - c_A}{\lambda - \underline{c}_A}$, then all equilibria are non-responsive.*

Theorem 2 emphasizes that the problem of uninformative voting, which arises due to the manager's bias, is not alleviated by the presence of an activist investor if the activist's interests are aligned with those of shareholders. To see the intuition behind this result, notice that

when voting, shareholders can now be pivotal not only for the manager's decision to approve the proposal, but also for the activist's decision to initiate a proxy fight. Recall from the discussion after Theorem 1 that when a shareholder is pivotal for the manager's decision, the posterior belief that the state is good is close to β^* , the manager's threshold belief. By a similar argument, when a shareholder is pivotal for the activist's decision, the posterior belief is around $\frac{1}{2} + \frac{1}{2k_A} \left(k_A - \frac{\lambda - c_A}{\lambda} \right)$, the activist's threshold belief. Under the assumptions of Theorem 2, each of these posterior beliefs is strictly greater than 0.5. Following a reasoning similar to the one in the basic model, shareholders will not vote according to their signals since the events of being pivotal for the activist and the manager both provide strong indication that the state is good.

However, if the activist's private benefits from accepting the proposal are significant, she is willing to organize a proxy fight even when the evidence in favor of the proposal is weak. Effectively, since the activist's and manager's biases are in the opposite directions, the activist's over tendency to approve the proposal counteracts the manager's inclination to reject the proposal too often. This leads to a balanced decision rule such that conditional on being pivotal, shareholders are neither too optimistic, nor too pessimistic about the proposal. Shareholders therefore have incentives to use their own signals when deciding how to vote, and the vote becomes informative about shareholder expectations. Theorem 3 below formalizes this intuition and shows that if the manager is biased, the presence of a sufficiently biased activist investor ensures existence of a responsive equilibrium.

THEOREM 3: *Suppose that the manager is biased, $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$ and that the costs of organizing a proxy fight are moderate, $c_A \in (\underline{c}_A, \lambda)$. Then,*

- (i) *If the proxy fight is sufficiently costly to the manager ($c_M \geq \underline{c}_M \equiv \frac{1-\lambda}{\lambda}$), there exists a responsive equilibrium if and only if*

$$k_A \in \left[\frac{\lambda - c_A}{\lambda - \underline{c}_A} \left(\frac{1 - \rho}{\rho} \right)^2, \frac{\lambda - c_A}{\lambda - \underline{c}_A} \right). \quad (4)$$

In this equilibrium the proxy fight is never organized.

- (ii) *If the proxy fight is sufficiently costless to the manager ($c_M < \underline{c}_M$), then*

- (ii.a) *If $k_M > \left(1 - \frac{c_M}{\underline{c}_M} \right) \left[\frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2 \right]$, there exists a responsive equilibrium if (4) holds.*

(ii.b) If $k_M \leq \left(1 - \frac{c_M}{\underline{c}_M}\right) \left[\frac{1}{2} + \frac{1}{2}\left(\frac{1-\rho}{\rho}\right)^2\right]$, there exists a responsive equilibrium if

$$k_A \in \left[\frac{\lambda - c_A}{\lambda}, \frac{\lambda - c_A}{\lambda} \frac{1}{2(1-\rho)}\right). \quad (5)$$

In this equilibrium the proxy fight is organized with a strictly positive probability.

When $c_A > \underline{c}_A$, the upper bounds in (4) and (5) are strictly smaller than one, which emphasizes that the activist has to be sufficiently biased in order for a responsive equilibrium to exist.

Theorem 3 demonstrates that the presence of managerial discipline can enhance the advisory role of nonbinding votes even if a proxy fight is never organized in equilibrium. In particular, when the manager's costs from the proxy fight are high, the threat of a proxy fight induces him to accept the proposal more often. This decreases the manager's threshold belief β^* , moving it closer to the shareholder's threshold belief 0.5. As a result, the shareholders' posterior belief conditional on being pivotal for the manager's decision is around 0.5, giving them incentives to vote according to their private information.

However, when the proxy fight is relatively costless to the manager, the threat itself might be insufficient to deter managerial misbehavior, and the proxy fight has to occur in equilibrium to ensure informative voting by shareholders. This is because the manager's threshold belief β^* is still sufficiently high, so that conditional on being pivotal for the manager's decision shareholders are optimistic and always prefer to vote for the proposal. Hence, in order for shareholders to have incentives to use their private information, they have to be sometimes pivotal for the activist's decision to organize a proxy fight, when their posterior beliefs are lower.

Theorem 3 emphasizes that when solicitation costs are moderate, the presence of a biased activist can improve information aggregation in nonbinding voting. Aggregation of information is important since it allows more informed decision making and hence, increases shareholder welfare. Indeed, in any non-responsive equilibrium, the decision rule is highly inefficient because the manager rejects the proposal regardless of the state of the world. In contrast, in a responsive equilibrium, the proposal is accepted with a higher probability if shareholder support is higher,

indicating that the state is more likely to be good. Surprisingly, this implies that under the assumptions of Theorem 3, shareholders may ex-ante prefer a biased activist to an unbiased one:

COROLLARY 1: *If $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$ and $c_A \in (\underline{c}_A, \lambda)$, then shareholders strictly prefer a biased activist (with $k_A = 1 - c_A/\lambda$) over an unbiased activist ($k_A = 1$).*

Note, however, that if the manager is unbiased so that a responsive equilibrium exists in the absence of managerial discipline, then the presence of a biased activist may actually harm the advisory role of nonbinding votes by inducing shareholders to vote against the proposal regardless of their signals. This observation emphasizes that the bias of an activist investor can only be beneficial if the manager is biased as well.

Our results rely on the assumption that the costs of organizing a proxy fight are moderate: $c_A \in (\underline{c}_A, \lambda)$. In practice, the costs of organizing a proxy fight stem from soliciting shareholders to vote for the alternative slate of directors. To attract shareholders' attention and gain their support, the activist must run a high profile campaign, which involves hiring professional proxy solicitors, public relations experts, and legal counsel. These costs are often a barrier that discourages challengers from engaging in this type of activism. Yet, we do occasionally observe proxy fights taking place, at least in the U.S., implying that solicitation costs are not high enough to deter proxy fights completely. Moreover, a proxy fight need not take place in order to impose discipline on the board. The credible threat of initiating a proxy fight may by itself be sufficient to make the board more accountable to shareholders. Overall, we believe that our assumption is reasonable.

To see why this assumption is necessary, consider two extreme cases. Suppose first that the activist is unbiased, the cost of organizing a proxy fight is zero, and the damage to the manager from a successful proxy fight is substantial. In this setting a responsive equilibrium always exists, which explains why a lower bound on c_A is necessary for Theorem 2 to hold. Indeed, since the activist is unbiased and has no costs of intervention, she initiates a proxy fight whenever the manager takes an action that is ex-post suboptimal for shareholders. The manager realizes this and, in order to avoid the detrimental consequences of a proxy fight, implements the shareholders' optimal decision rule regardless of his own preferences: $\beta^* = 0.5$.

Therefore, shareholders have incentives to vote according to their private information, and a responsive equilibrium exists. By contrast, suppose that the cost of initiating a proxy fight is very large. Clearly, the activist never launches a proxy fight regardless of her preferences, and the model is reduced to the setting of Section I. By Theorem 1, no responsive equilibrium exists when the manager is sufficiently biased, which explains why an upper bound on c_A is necessary for Theorem 3 to hold.

III Comparative Statics

Central to our analysis is the existence of the endogenous voting threshold T_ω^* (Lemma 2). Indeed, our results indicate that in any responsive equilibrium the management is more likely to implement the proposal if it receives stronger shareholder support, other factors equal. This result is consistent with the observed empirical evidence on board responsiveness. Ertimur, Ferri, and Stubben (2010) and Thomas and Cotter (2007) document a positive relation between the percentage of votes in favor of the proposal and the likelihood of its implementation for a broad sample of shareholder proposals. Ferri and Sandino (2009) find similar evidence for shareholder proposals to expense employee stock options.

Our results also suggest that the endogenous voting threshold T_ω^* is a function of the structure of managerial compensation, the degree of managerial entrenchment, proposal characteristics, and the activist's bias.²⁰ More specifically, the following comparative statics hold. Given the potential multiplicity of equilibria, we focus on the pure strategy equilibrium, which is the most informative of all equilibria, and present comparative statics results for this equilibrium.

PROPOSITION 1: *Suppose that a pure strategy responsive equilibrium exists. Then, the endogenous voting threshold T_ω^**

- (i) increases with the conflict between shareholders and the manager (decreases with k_M),*
- (ii) decreases with the conflict between shareholders and the activist (increases with k_A),*
- (iii) decreases with the cost of a proxy fight to the manager (c_M),*

²⁰The endogenous voting threshold is also a function of the number of shareholders N . However, $\frac{T_\omega^*}{N}$ effectively does not depend on N .

(iv) *increases with solicitation costs (c_A),*

(v) *decreases with the probability that a proxy fight succeeds (λ).*

Proposition 1 provides new insight about the relation between company and proposal characteristics and the likelihood that the proposal is implemented.

First, the model predicts that for a given level of shareholder support, the proposal is more likely to be implemented in companies with a lower degree of conflict of interest between shareholders and the manager (higher k_M). The degree of conflict of interest is affected by the sensitivity of CEO compensation to firm performance, which can be measured by the amount and types of options, equity, restricted stock, and bonuses that compose the CEO compensation package.

Second, Proposition 1 implies that when the consequences of a proxy fight are harmful for the firm's management (c_M is high), the likelihood that the proposal is implemented is higher. A successful proxy fight is particularly harmful for the company's manager if the probability of finding a new job with at least the same level of compensation and prestige is low. Thus, the damage from a proxy fight can be estimated by the level of excess compensation that the CEO receives relative to comparable CEOs in the industry. Another proxy could be the age of the CEO because older CEOs are closer to retirement and hence have less career concerns.

Third, high solicitation costs (c_A) reduce the discipline that the activist imposes on the manager, and hence decrease the likelihood that shareholder proposals are implemented. Solicitation costs are likely to be higher in companies whose ownership is more diffused (e.g., the percentage of institutional ownership is low), or whose stocks have a higher turnover rate (if shareholders are changing frequently, it becomes more difficult to isolate current voting shareholders, as discussed in Pound (1988)). Note also that the Securities and Exchange Commission (SEC) has taken steps to allow easier proxy solicitation by activist investors. First, on August 25, 2010, the SEC approved the proxy access rule, which, under certain circumstances, provides shareholders with the right to include their director nominees on the company's proxy statement. In addition, the SEC is considering facilitating proxy solicitation through the Internet for soliciting persons other than the issuer.²¹ Because these changes are expected to

²¹See, for example, the Harvard Law School Forum on Corporate Governance and Financial Regulation,

decrease activists' solicitation costs, the model predicts that shareholder proposals will be more frequently implemented after these amendments take effect.

Following a similar logic, shareholder proposals should be implemented more frequently if proxy fights, once initiated, are more likely to be successful (higher λ). On July 1, 2009, the SEC approved elimination of broker discretionary voting in the election of directors at annual meetings.²² Because, traditionally, these votes supported the incumbent's slate of directors, elimination of broker non-votes is likely to increase λ . The model therefore predicts that the likelihood that shareholder proposals are approved should be higher in the period following the adoption of the new rule.

Finally, the structure of the model also allows us to predict the frequency of proxy fights in the context of shareholder proposals. A proxy fight occurs in equilibrium with a positive probability whenever the manager's preferences are sufficiently misaligned. In this case, the manager rejects the proposal too often, even if it is likely to trigger a proxy fight. Alternatively, if the activist is highly biased in favor of accepting the proposal, even responsive behavior by the manager does not discourage her from organizing a proxy fight. Thus, our analysis predicts the relation between firm characteristics (using similar proxies as above) and the probability of observing a proxy fight. The following proposition summarizes our findings.

PROPOSITION 2: *Suppose that a pure strategy responsive equilibrium exists. Then, the ex-ante probability of a proxy fight*

- (i) *increases with the conflict of interest between shareholders and the manager, and between shareholders and the activist (decreases with k_M and k_A),*
- (ii) *decreases with the costs of a proxy fight to the manager (c_M) and solicitation costs (c_A).*

IV Binding vs. Nonbinding Voting

In this section we compare the relative efficiency of nonbinding and binding voting mechanisms. Unlike the nonbinding mechanism that has been introduced in this study, a binding

²²Proxy Solicitation Through the Internet", October 27, 2009.

²²See the SEC's press release at <http://www.sec.gov/news/press/2009/2009-147.htm>.

vote implies that a predetermined enforceable voting rule based on the vote tally determines whether the proposal is accepted. Therefore, in binding voting, neither the manager nor the board have any discretion over the approval of the proposal. As has already been mentioned in the introduction, most shareholder-initiated proposals are nonbinding. Would shareholders prefer voting for their proposals to be binding if they had a choice?

Our previous analysis demonstrates that nonbinding voting is virtually binding with a voting threshold endogenously determined by different company and proposal characteristics. Below we show that if the designer of the mechanism has the flexibility to tailor the voting threshold to each company and proposal, then the binding mechanism could perform better.

LEMMA 4: *Suppose that ω and T_ω^* are shareholders' voting strategies and the corresponding endogenous threshold that arise in equilibrium of the nonbinding voting mechanism. Then ω also form an equilibrium in a binding voting mechanism with a voting threshold T_ω^* .*

In other words, any responsive equilibrium in the nonbinding mechanism is also an equilibrium in the binding mechanism with the corresponding voting threshold, and hence, the binding mechanism may seem superior. However, this reasoning implicitly assumes that the designer of the binding mechanism has the knowledge of all firm-specific characteristics and can easily adjust the voting threshold to these parameters.

In practice, the distribution of statutory voting rules is extremely concentrated. In particular, Maug and Rydqvist (2009) show that 96% of companies in their sample follow a pure majority rule in binding voting for management-initiated proposals. Clearly, these companies are heterogeneous, but despite their freedom to change the voting rule, they choose not to do so. Moreover, statutory voting rules are chosen a long time before the vote and apply to broad classes of proposals, so they are certainly not tailored to individual proposals. Therefore, if a binding mechanism is, for any reason, restricted to some subset of voting rules, it leaves an opportunity for the nonbinding mechanism to be superior. Below we provide some conditions when this is the case.

Let us compare a binding mechanism with a pure majority rule (50%) and the nonbinding mechanism considered in the paper. We now deviate from the assumption of the main model that the prior belief that the state is good is 0.5. In particular, suppose that the prior probability

that the state is good, μ , is 0.3. It is easy to see that in a binding mechanism with a pure majority rule there is no equilibrium in which information is fully aggregated, i.e., in which shareholders play pure strategies and vote according to their private signals. Intuitively, in such equilibrium, being pivotal implies that half of the population has a bad signal, and the other half has a good signal. Thus, the posterior belief about the state of the world roughly equals the prior, which is 0.3. Since shareholders prefer the proposal to be accepted if and only if the posterior is greater than 0.5, being pivotal makes shareholders pessimistic about the proposal and induces them to vote against it regardless of their private information. Therefore, information is not fully aggregated in any equilibrium.

By contrast, in nonbinding voting, a responsive equilibrium in pure strategies exists whenever the manager's interests are sufficiently aligned with those of shareholders (k_M is close to 1). This result follows from repeating the proof of Theorem 1 for the case of general priors: prior beliefs do not change the results because the manager's and shareholders' decisions are based only on the posterior beliefs. Intuitively, when the conflict of interest between the manager and shareholders is relatively small, the manager follows a threshold rule such that the posterior belief in the event of being pivotal is close to 0.5. Therefore, information is well aggregated in the nonbinding voting mechanism, and the proposal is approved when it is efficient to do so.

More generally, as we show in the following proposition, the probability of making the correct decision is strictly higher under nonbinding voting than under binding voting with a pure majority rule whenever the manager is sufficiently unbiased and the prior beliefs that the state is good are either sufficiently optimistic or sufficiently pessimistic.

PROPOSITION 3: *Suppose that the prior probability that the state is good, μ , satisfies $\frac{\mu}{1-\mu} \notin ((\frac{1-\rho}{\rho})^{\frac{N}{2}}, (\frac{\rho}{1-\rho})^{\frac{N}{2}+1})$ and $k_M > \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$. Then the probability of making the correct decision is strictly higher under nonbinding voting than under binding voting with a pure majority rule.*

Proposition 3 demonstrates that when the binding mechanism is restricted to a pure majority rule and the manager's interests are sufficiently aligned, shareholders may optimally choose to have nonbinding voting instead. This result can explain why, although the Delaware law permits submission of binding shareholder proposals requesting a majority voting standard for director elections, this type of shareholder proposals has been mostly nonbinding. For example,

in 2006, binding shareholder proposals requesting majority voting were included in the proxy materials of only four companies, compared to more than 150 nonbinding proposals (see the 2006 Institutional Shareholder Services report (ISS (2006))). Proposition 3 might also provide an explanation why, contrary to expectations, there are no significant positive abnormal returns for firms announcing the adoption of some form of majority voting (pure majority voting for most of them) instead of plurality voting for director elections (see Sjostrom and Kim (2007)). Before the adoption of the proxy access rule, plurality voting for directors was essentially non-binding since in most cases the number of nominees was equal to or lower than the number of positions on the board, and therefore, every nominee was elected independently of the fraction of affirmative votes cast for him. Finally, Proposition 3 is also consistent with Buchanan, Netter and Yang (2010), who find that U.S. shareholder proposals have a more significant effect than their UK counterparts, although UK shareholder proposals are legally binding.

As a final comment, note that for large N the condition in Proposition 3 is not satisfied, and both mechanisms are equally efficient. Indeed, information in binding voting is efficiently aggregated when the number of voters is infinitely large (see, e.g., Feddersen and Pesendorfer (1998)). However, as discussed in Section I, N is interpreted as the number of blockholders of the firm, which is typically small (this does not exclude the possibility that there are also many uninformed shareholders). Therefore, the condition of Proposition 3 is likely to be satisfied in our context.

V Concluding Remarks

This paper examines nonbinding voting for shareholder proposals. The main difference of nonbinding voting from the conventional binding voting mechanism is that the vote tally does not, at least directly, determine the outcome. Instead, the manager has the discretion to decide whether or not to accept the proposal, even if the majority of shareholders support it.

We show that in the absence of managerial discipline, nonbinding voting often fails to convey shareholder views and therefore is disregarded by the company's management. Thus, shareholder proposals do not always play their advisory role for the management. Our main result demonstrates that the market for corporate control has the potential to enhance the advisory role of nonbinding votes. In particular, nonbinding voting becomes effective in conveying share-

holder expectations if the company's management is subject to the threat of a proxy fight by an activist investor, but only if there is sufficient conflict of interest between the activist and shareholders.

Altogether, the presence of an activist investor who can discipline the management can improve information aggregation in nonbinding voting. One implication of this result is that nonbinding shareholder proposals are likely to become more prominent if the number of shareholder activists increases and their costs of organizing a proxy fight decrease. This prediction is consistent with the recent contemporaneous increase in the number of shareholder proposals and the number of proxy contests, as well as the rise of hedge funds. In particular, there were 91 proxy contests in 2006, compared to 40 in 2005 and 30 in 2004, and most of this increase has been due to the growth of hedge funds engaged in such contests (see Gillan and Starks (2007)).

The analysis of this paper left out several important issues. First and foremost, the proposal on the agenda is exogenous in our model. Shareholders can benefit from submitting a proposal if it has an advisory role for the company's management. However, the effort, the cost of hiring legal advisors, or the fear of managerial retaliation, might deter shareholders from submitting a proposal. The tradeoff between these benefits and costs may vary across shareholders, depending on their holdings in the company, the accuracy and content of their private information, and their preferences. In the Internet Appendix we show that blockholders are those who are most likely to submit shareholder proposals: because of their large holdings in the firm, their benefits from the proposal submission are sufficiently high to overcome the associated costs.

Second, activist investors are often large shareholders of the firm and are likely to be those who sponsor proposals. We hypothesize that the positive effect of the biased activist's discipline on the efficiency of the voting process will exist even after taking into account her decision to submit the proposal. Indeed, shareholders would infer from the proposal submission that the activist's bias is sufficiently large to overcome the costs of submission. If these costs are not too high, then, similar to the reasoning that leads to Theorem 3, the presence of the biased activist would benefit shareholders overall. Nevertheless, if the agenda of the proposal is selected by the activist investor, there is a concern that the set of proposals that are submitted to a vote is pre-selected in a way that can harm shareholders. This and other important questions, such as what kinds of proposals are more likely to be introduced, are left for future research.

References

- Admati, Anat R., and Paul Pfleiderer, 2009, The "Wall Street Walk" and Shareholder Activism: Exit as a Form of Voice, *Review of Financial Studies* 22, 2645-2685.
- Aghion, Philippe, and Jean Tirole, 1997, Formal and Real Authority in Organizations, *Journal of Political Economy* 105, 1-29.
- Anabtawi, Iman, and Lynn A. Stout, 2008, Fiduciary Duties for Activist Shareholders, *Stanford Law Review* 60, 1255-1308.
- Benveniste, Lawrence M., and Paul A. Spindt, 1989, How Investment Bankers Determine the Offer Price and Allocation of New Issues, *Journal of Financial Economics* 24, 343-361.
- Benveniste, Lawrence M., and William J. Wilhelm, 1990, A Comparative Analysis of IPO Proceeds under Alternative Regulatory Environments, *Journal of Financial Economics* 28, 173-207.
- Bond, Philip, and Hulya Eraslan, 2010, Strategic Voting over Strategic Proposals, *Review of Economic Studies* 77, 459-490.
- Buchanan, Bonnie, Jeffrey M. Netter, and Tina Yang, 2010, Are Shareholder Proposals an Important Corporate Governance Device? Evidence from US and UK Shareholder Proposals, Working paper, Seattle University.
- Coughlan, Peter J., 2000, In Defense of Unanimous Jury Verdicts: Mistrials, Communication, and Strategic Voting, *American Political Science Review* 94, 375-393.
- Crawford, Vincent P., and Joel Sobel, 1982, Strategic Information Transmission, *Econometrica* 50, 1431-1451.
- Cziraki, Peter, Luc Renneboog, and Peter G. Szilagyi, 2010, Shareholder Activism through Proxy Proposals: The European Perspective, *European Financial Management* 16, 738-777.
- Del Guercio, Diane, and Jennifer Hawkins, 1999, The Motivation and Impact of Pension Fund Activism, *Journal of Financial Economics* 52, 293-340.
- Del Guercio, Diane, Laura Seery, and Tracie Woidtke, 2008, Do Boards Pay Attention when Institutional Investor Activists 'Just Vote No', *Journal of Financial Economics* 90, 84-103.
- Dow, James, and Gary Gorton, 1997, Stock Market Efficiency and Economic Efficiency: Is There a Connection?, *Journal of Finance* 52, 1087-1129.

- Edmans, Alex, 2009, Blockholder Trading, Market Efficiency, and Managerial Myopia, *Journal of Finance* 64, 2481-2513.
- Edmans, Alex, and Gustavo Manso, 2011, Governance through Trading and Intervention: A Theory of Multiple Blockholders, *Review of Financial Studies* 24, 2395-2428.
- Ertimur, Yonca, Fabrizio Ferri, and Stephen R. Stubben, 2010, Board of Directors' Responsiveness to Shareholders: Evidence from Shareholder Proposals, *Journal of Corporate Finance* 16, 53-72.
- Fama, Eugene F., 1980, Agency Problems and the Theory of the Firm, *Journal of Political Economy* 88, 288-307.
- Fama, Eugene F., and Michael C. Jensen, 1983, Separation of Ownership and Control, *Journal of Law and Economics* 26, 301-325.
- Feddersen Timothy, and Wolfgang Pesendorfer, 1997, Voting Behavior and Information Aggregation in Elections with Private Information, *Econometrica* 65, 1029-1058.
- Feddersen Timothy, and Wolfgang Pesendorfer, 1998, Convicting the Innocent: The Inferiority of Unanimous Jury Verdicts under Strategic Voting, *American Political Science Review* 92, 23-35.
- Ferri, Fabrizio, and Tatiana Sandino, 2009, The Impact of Shareholder Activism on Financial Reporting and Compensation: The Case of Employee Stock Options Expensing, *Accounting Review* 84, 433-466.
- Foucault Thierry, and Thomas Gehrig, 2008, Stock Price Informativeness, Cross-Listings, and Investment Decisions, *Journal of Financial Economics* 88, 146-168.
- Gillan, Stuart L., and Laura T. Starks, 2007, The Evolution of Shareholder Activism in the United States, *Journal of Applied Corporate Finance* 19, 55-73.
- Goldstein, Itay and Alexander Guembel, 2008, Manipulation and the Allocational Role of Prices, *Review of Economic Studies* 75, 133-164.
- Grundfest, Joseph A., 1993, Just Vote No: A Minimalist Strategy for Dealing with Barbarians Inside the Gates, *Stanford Law Review* 45, 857-937.
- Holmstrom, Bengt, and Jean Tirole, 1993, Market Liquidity and Performance Monitoring, *Journal of Political Economy* 101, 678-709.

Institutional Shareholder Services, 2006, RiskMetrics Group - Postseason Report: "Spotlight on Executive Pay and Board Accountability".

Institutional Shareholder Services, 2007, RiskMetrics Group - Postseason Report: "A Closer Look at Accountability and Engagement".

Krishna, Vijay, and John Morgan, 2001, A Model of Expertise, *Quarterly Journal of Economics* 116, 747-775.

Marquez, Robert, and Bilge Yilmaz, 2008, Information and Efficiency in Tender Offers, *Econometrica* 76, 1075-1101.

Maug, Ernst, 1999, How Effective is Proxy Voting? Information Aggregation and Conflict Resolution in Corporate Voting Contests, Working paper, University of Mannheim.

Maug, Ernst, and Kristian Rydqvist, 2009, Do Shareholders Vote Strategically? Voting Behavior, Proposal Screening, and Majority Rules, *Review of Finance* 13, 47-79.

Maug, Ernst, and Bilge Yilmaz, 2002, Two-Class Voting: A Mechanism for Conflict Resolution? *American Economic Review* 92, 1448-1471.

Morgan, John, and Phillip C. Stocken, 2008, Information Aggregation in Polls, *American Economic Review* 98, 864-896.

Pound, John, 1988, Proxy Contests and the Efficiency of Shareholder Oversight, *Journal of Financial Economics* 20, 237-265.

Rock, Kevin, 1986, Why New Issues Are Underpriced, *Journal of Financial Economics* 15, 187-212.

Sjostrom, William K., and Young Sang Kim, 2007, Majority Voting for the Election of Directors, *Connecticut Law Review* 40, 459-510.

Thomas, Randall S., and James F. Cotter, 2007, Shareholder Proposals in the New Millennium: Shareholder Support, Board Response, and Market Reaction, *Journal of Corporate Finance* 13, 368-391.

Appendix

Table I - Notations

k_M	Measure of the manager's bias against the proposal (no bias if $k_M = 1$)
k_A	Measure of the activist's bias towards the proposal (no bias if $k_A = 1$)
N	Number of shareholders
ρ	Precision of shareholders' signals
c_A	Costs to the activist from organizing a proxy fight (solicitation costs)
λ	Probability that a proxy fight is successful
c_M	Costs to the manager from a successful proxy fight
T	Vote tally: number of votes in favor of the proposal
μ	The prior probability that the state is good ($\mu = 0.5$ in the main model)
$\omega = (\omega_g, \omega_b)$	Shareholders' voting strategy: ω_s = probability of voting "for", given signal s
$d_M(T)$	Manager's strategy: $d_M(T) = 1$ corresponds to accepting the proposal
$e(T, d_M)$	Activist's strategy: $e(T, d_M) = 1$ corresponds to initiating a proxy fight
$\beta_\omega(T)$	Posterior belief that the state is good given the vote tally T and voting strategy ω
$\tau_\omega(\beta)$	Number of affirmative votes required to make the posterior belief equal to β
β^*	Manager's equilibrium threshold belief: he accepts the proposal if and only if $\beta_\omega(T) > \beta^*$
T_ω^*	Manager's equilibrium voting threshold: he accepts the proposal if and only if $T > T_\omega^*$
$T_{N,\omega}$	The realized number of affirmative votes among N shareholders given the voting strategy ω
$\pi_B (\pi_G)$	Probability that a shareholder votes "for" in state B (state G)
$\Phi_{\omega, T^*}(s)$	Expected relative benefit from voting "for", given signal s , threshold T^* and strategy ω
$\beta^R (\beta^A)$	Posterior above (below) which the activist initiates a proxy fight upon rejection (approval)
$\beta^{NP} (\beta^P)$	Posterior above which the manager accepts the proposal without (with) a proxy fight
C_T^N	Binomial coefficient: $C_T^N = \frac{N!}{T!(N-T)!}$

Proofs for Section I

The Appendix includes only the proofs for selected results. All other proofs can be found in the Internet Appendix. We start by proving Lemma 1 and Lemma 2. Before proving Theorem 1, we formulate an auxiliary Lemma A.1, which examines the best response function of a shareholder to the manager's strategy and the strategies of other shareholders. Lemma A.1 will be used to study existence of perfect Bayesian equilibria in Theorems 1, 2, and 3. After that, the proof of Theorem 1 is presented.

Proof of Lemma 1. By Bayes rule, the probabilities (π_G, π_B) that a shareholder votes for the proposal in the good and bad state respectively are given by

$$\begin{aligned}\pi_G &= (1 - \rho)\omega_b + \rho\omega_g \\ \pi_B &= \rho\omega_b + (1 - \rho)\omega_g.\end{aligned}\tag{A1}$$

The posterior belief that the state is good, $\beta_\omega(T)$, is given by

$$\beta_\omega(T) = \frac{1}{1 + \left(\frac{\pi_B}{\pi_G}\right)^T \left(\frac{1-\pi_B}{1-\pi_G}\right)^{N-T}}.$$

Thus, for any strategies ω , number of affirmative votes T , and posterior belief β ,

$$\beta_\omega(T) = \beta \Leftrightarrow \frac{1 - \beta}{\beta} = \frac{\pi_B^T (1 - \pi_B)^{N-T}}{\pi_G^T (1 - \pi_G)^{N-T}}.$$

Taking the logarithm of both sides, rearranging the terms, and isolating T on the left hand side yields the result, where the function $\tau_\omega(\beta)$ is given by

$$\tau_\omega(\beta) = \frac{N \log \frac{1-\pi_B}{1-\pi_G} + \log \frac{\beta}{1-\beta}}{\log \frac{\pi_G}{\pi_B} + \log \frac{1-\pi_B}{1-\pi_G}}.\tag{A2}$$

From (A2) it follows immediately that $\tau_\omega(\beta)$ is increasing in β . ■

Proof of Lemma 2. The manager observes the outcome of the vote, i.e, the number of affirmative votes T , and updates his belief to $\beta_\omega(T)$. Given the manager's utility function, he accepts the proposal if and only if

$$k_M \beta_\omega(T) - k_M (1 - \beta_\omega(T)) - (1 - k_M) > 0 \Leftrightarrow \beta_\omega(T) > \frac{1}{2k_M} \equiv \beta^*.$$

Thus, the manager accepts the proposal if and only if $T > \tau_\omega(\beta^*)$. In general, $\tau_\omega(\beta^*)$ is not an integer, and therefore, the manager's threshold strategy is equivalent to rejecting the proposal for any $T \in \{0, 1, \dots, \lfloor \tau_\omega(\beta^*) \rfloor\}$ and accepting the proposal for any $T \in \{\lfloor \tau_\omega(\beta^*) \rfloor + 1, \dots, N\}$, where $\lfloor x \rfloor$ denotes the highest possible integer that is smaller or equal to x . ■

LEMMA A.1: *Suppose that the manager accepts the proposal if and only if $T > T^*$ for some $T^* \in [0, N - 1]$ and that $N - 1$ shareholders have a voting strategy $\omega = (\omega_b, \omega_g)$ with $\omega_g > \omega_b$. Let $\Phi_{\omega, T^*}(s)$ be the N^{th} shareholder's expected benefit from voting for the proposal relative to voting against the proposal given his signal s . Then $\Phi_{\omega, T^*}(g) > \Phi_{\omega, T^*}(b)$ and*

$$\begin{aligned} \Phi_{\omega, T^*}(g) > 0 &\Leftrightarrow \frac{\Pr[T_{N, \omega} = T^* | B]}{\Pr[T_{N, \omega} = T^* | G]} < \frac{\rho}{1 - \rho} \frac{1 - \pi_B}{1 - \pi_G} \\ \Phi_{\omega, T^*}(b) > 0 &\Leftrightarrow \frac{\Pr[T_{N, \omega} = T^* | B]}{\Pr[T_{N, \omega} = T^* | G]} < \frac{1 - \rho}{\rho} \frac{1 - \pi_B}{1 - \pi_G}, \end{aligned} \tag{A3}$$

where $T_{N, \omega}$ is the realized number of affirmative votes among N shareholders, assuming that all of them follow the strategy ω .

The proof of Lemma A.1 is relegated to the Internet Appendix.

THEOREM 1: *A responsive equilibrium exists if and only if $k_M > \frac{1}{2} + \frac{1}{2}(\frac{1 - \rho}{\rho})^2$ if N is even, and if and only if $k_M > \frac{1}{2} + \frac{1}{2}(\frac{1 - \rho}{\rho})^{\frac{2N}{N+1}}$ if N is odd.*

Proof of Theorem 1. To prove the theorem, we consider all possible responsive equilibria characterized by some voting strategy $\omega = (\omega_b, \omega_g)$ with $\omega_g > \omega_b$. For each (ω_b, ω_g) , we find conditions under which such equilibrium exists and is responsive using the following argument. We first assume that all shareholders follow the voting strategy (ω_b, ω_g) . Next, we find the manager's optimal strategy T_ω^* as a best response to the shareholders' strategy ω . We verify that under the conditions of the theorem, T_ω^* takes values in $[0, N - 1]$, and hence, the outcome of the vote has the potential to change the manager's decision. Finally, we find conditions under which the strategy (ω_b, ω_g) is indeed optimal for shareholders, i.e., when (ω_b, ω_g) is the best response of each shareholder to the manager's strategy T_ω^* and to the remaining shareholders' strategy (ω_b, ω_g) .

Suppose that the shareholders' voting strategy is $\omega = (\omega_b, \omega_g)$ with $\omega_g > \omega_b$. As follows from the proof of Lemma 2, the manager accepts the proposal if and only if his posterior belief that the state is good given the vote tally satisfies $\beta_\omega(T) > \beta^* = \frac{1}{2k_M}$, which translates into an endogenous voting threshold $T_\omega^* = \lfloor \tau_\omega(\beta^*) \rfloor$.

Now, consider a shareholder's best response strategy to the manager's strategy T_ω^* and other shareholders' strategy (ω_b, ω_g) . Recall from Lemma A.1 that the shareholder's expected relative

benefit from voting affirmatively is given by $\Phi_{\omega, T_{\omega}^*}(s)$. Thus, if $\Phi_{\omega, T_{\omega}^*}(s) > 0$, the shareholder's best response is to vote affirmatively. If $\Phi_{\omega, T_{\omega}^*}(s) < 0$, the shareholder's best response is to vote against the proposal. Finally, if $\Phi_{\omega, T_{\omega}^*}(s) = 0$, the shareholder is indifferent between voting for and against the proposal and can play a mixed strategy.

According to Lemma A.1, if $T_{\omega}^* \in [0, N-1]$, then $\Phi_{\omega, T_{\omega}^*}(g) > \Phi_{\omega, T_{\omega}^*}(b)$. Hence, if $\omega_b \in (0, 1)$, then $\omega_g = 1$, and if $\omega_g \in (0, 1)$, then $\omega_b = 0$. In other words, if a shareholder with a good (bad) signal plays a mixed strategy because he is indifferent between voting for and against the proposal, then a shareholder with a bad (good) signal strictly prefers to vote against (for) the proposal and votes this way with probability 1. It follows that there can only be three types of responsive equilibria: the equilibrium in pure strategies and these two types of mixed strategy equilibria. Below, we consider each type of responsive equilibria separately.

1. Pure strategy equilibrium: $\omega_b = 0, \omega_g = 1$

This equilibrium exists and is responsive if and only if (1) $T_{\omega}^* \in [0, N-1]$ and (2) $\Phi_{\omega, T_{\omega}^*}(g) \geq 0 \geq \Phi_{\omega, T_{\omega}^*}(b)$.

First, note that according to (A1), $(\pi_G, \pi_B) = (\rho, 1-\rho)$ when $\omega = (0, 1)$. In addition, since $\Pr[T_{N, \omega} = T_{\omega}^* | \theta] = C_{T_{\omega}^*}^N \pi_{\theta}^{T_{\omega}^*} (1 - \pi_{\theta})^{N - T_{\omega}^*}$, it follows from (A3) that

$$\begin{aligned}\Phi_{\omega, T_{\omega}^*}(g) \geq 0 &\Leftrightarrow \frac{\Pr[T_{N, \omega} = T_{\omega}^* | B]}{\Pr[T_{N, \omega} = T_{\omega}^* | G]} \leq \left(\frac{\rho}{1-\rho}\right)^2 \Leftrightarrow T_{\omega}^* \geq \frac{N}{2} - 1 \\ \Phi_{\omega, T_{\omega}^*}(b) \leq 0 &\Leftrightarrow \frac{\Pr[T_{N, \omega} = T_{\omega}^* | B]}{\Pr[T_{N, \omega} = T_{\omega}^* | G]} \geq 1 \Leftrightarrow T_{\omega}^* \leq \frac{N}{2}.\end{aligned}$$

Note that if $T_{\omega}^* \in [\frac{N}{2} - 1, \frac{N}{2}]$ (condition (2) above), then the condition $T_{\omega}^* \in [0, N-1]$ (condition (1) above) is satisfied. Thus, a pure strategy responsive equilibrium exists if and only if $T_{\omega}^* \in [\frac{N}{2} - 1, \frac{N}{2}]$. According to Lemma 2, $T_{\omega}^* = \lceil \tau_{\omega}(\beta^*) \rceil$ and $\tau_{\omega}(\beta^*)$ is given by (A.2). If N is even, then $T_{\omega}^* = \left\lfloor \frac{N}{2} + \frac{\log \frac{\beta^*}{1-\beta^*}}{2 \log \frac{\rho}{1-\rho}} \right\rfloor$, which lies in $[\frac{N}{2} - 1, \frac{N}{2}]$ if and only if $\frac{\log \frac{\beta^*}{1-\beta^*}}{2 \log \frac{\rho}{1-\rho}} \in (-1, 1) \Leftrightarrow \frac{\beta^*}{1-\beta^*} \in \left[\left(\frac{1-\rho}{\rho}\right)^2, \left(\frac{\rho}{1-\rho}\right)^2 \right)$. If N is odd, then $T_{\omega}^* = \left\lfloor \frac{N-1}{2} + \frac{1}{2} + \frac{\log \frac{\beta^*}{1-\beta^*}}{2 \log \frac{\rho}{1-\rho}} \right\rfloor$ which lies in $[\frac{N}{2} - 1, \frac{N}{2}]$ if and only if $\frac{\beta^*}{1-\beta^*} \in \left[\frac{1-\rho}{\rho}, \frac{\rho}{1-\rho} \right)$. We conclude that a pure strategy responsive equilibrium exists if and only if

$$\frac{\beta^*}{1-\beta^*} \in \begin{cases} \left[\left(\frac{1-\rho}{\rho}\right)^2, \left(\frac{\rho}{1-\rho}\right)^2 \right) & \text{if } N \text{ is even} \\ \left[\frac{1-\rho}{\rho}, \frac{\rho}{1-\rho} \right) & \text{if } N \text{ is odd.} \end{cases} \quad (\text{A4})$$

2. Bad type mixing equilibria: $\omega_b \in (0, 1), \omega_g = 1$

Following similar arguments to those that prove the case of a pure strategy equilibrium, we show in the Internet Appendix that responsive equilibria with a bad type mixing exist if and

only if

$$\frac{\beta^*}{1 - \beta^*} \in \begin{cases} \left[1, \left(\frac{\rho}{1-\rho}\right)^{\frac{2N}{N+2}}\right) & \text{if } N \text{ is even} \\ \left[1, \left(\frac{\rho}{1-\rho}\right)^{\frac{2N}{N+1}}\right) & \text{if } N \text{ is odd.} \end{cases} \quad (\text{A5})$$

3. Good type mixing equilibria: $\omega_g \in (0, 1)$, $\omega_b = 0$

The proof for this type of equilibria is analogous to the proof for bad type mixing equilibria. We show in the Internet Appendix that responsive equilibria with a good type mixing exist if and only if

$$\frac{\beta^*}{1 - \beta^*} \in \begin{cases} \left[\left(\frac{1-\rho}{\rho}\right)^{\frac{2N}{N+2}}, 1\right) & \text{if } N \text{ is even} \\ \left[\left(\frac{1-\rho}{\rho}\right)^{\frac{2N}{N+1}}, 1\right) & \text{if } N \text{ is odd.} \end{cases} \quad (\text{A6})$$

Final step - combining the three cases: Combining conditions (A4), (A5), and (A6) for the three types of responsive equilibria and joining the intervals, we conclude that a responsive equilibrium exists if and only if

$$\frac{\beta^*}{1 - \beta^*} \in \begin{cases} \left[\left(\frac{1-\rho}{\rho}\right)^2, \left(\frac{\rho}{1-\rho}\right)^2\right) & \text{if } N \text{ is even} \\ \left[\left(\frac{1-\rho}{\rho}\right)^{\frac{2N}{N+1}}, \left(\frac{\rho}{1-\rho}\right)^{\frac{2N}{N+1}}\right) & \text{if } N \text{ is odd.} \end{cases} \quad (\text{A7})$$

As follows from the proof, for some values of β^* in the range (A7), multiple responsive equilibria exist. Note also that the derivation of (A7) is valid for any threshold belief of the manager β^* and does not rely on the fact that in our case $\beta^* = \frac{1}{2k_M}$.

Finally, since $\beta^* = \frac{1}{2k_M} \geq \frac{1}{2}$ for any $k_M \in [0, 1]$, then by (A7), a responsive equilibrium exists if and only if $\frac{\beta^*}{1 - \beta^*} = \frac{1}{2k_M - 1}$ is less than $\left(\frac{\rho}{1-\rho}\right)^2$ if N is even, and less than $\left(\frac{\rho}{1-\rho}\right)^{\frac{2N}{N+1}}$ if N is odd, which is equivalent to the corresponding conditions on k_M in the statement of the theorem. ■

Proofs for Section II

In order to examine existence of responsive equilibria in the model with an activist investor, we first derive the optimal strategies of the manager and the activist. The auxiliary Lemma B.1 derives the optimal strategy of the activist as a function of the vote outcome and the manager's decision. The auxiliary Lemma B.2 derives the optimal strategy of the manager as a function of the vote outcome, taking into account the activist's strategy found in Lemma B.1. After that, we provide the proofs of Lemma 3, Theorem 2, Theorem 3, and Corollary 1.

LEMMA B.1: *Let ω be shareholders' voting strategies such that $\omega_g > \omega_b$. There exist posterior*

beliefs $\beta^A \equiv 1 - \frac{c_A/\lambda+1}{2k_A}$ and $\beta^R \equiv 1 + \frac{c_A/\lambda-1}{2k_A}$, which are independent of ω , such that in any equilibrium if the manager accepts the proposal, then the activist launches a proxy fight if and only if $\beta_\omega(T) < \beta^A$, and if the manager rejects the proposal, then the activist launches a proxy fight if and only if $\beta_\omega(T) > \beta^R$. Moreover, $\beta^A < \min\{\beta^R, \frac{1}{2}\}$.

The proof of Lemma B.1 is relegated to the Internet Appendix.

LEMMA B.2: *Let ω be shareholders' voting strategies such that $\omega_g > \omega_b$. The manager accepts the proposal if and only if his posterior beliefs satisfy $\beta_\omega(T) > \beta^*$ given by*

$$\beta^* \equiv \min\{\max\{\beta^P, \beta^R\}, \beta^{NP}\}, \quad (\text{A8})$$

where $\beta^{NP} \equiv \frac{1}{2k_M}$ and $\beta^P \equiv \beta^{NP} - \frac{c_M}{2k_M} \frac{\lambda}{1-\lambda}$.

The proof of Lemma B.2 is relegated to the Internet Appendix.

Proof of Lemma 3. According to Lemma B.2, $\beta^* = \min\{\max\{\beta^P, \beta^R\}, \beta^{NP}\}$ and the proxy fight is organized whenever the posterior beliefs about the state lie in the interval $(\beta^R, \beta^*]$. Note that $\beta^{NP} > 0.5 \Leftrightarrow k_M < 1$ and $\beta^R > 0.5 \Leftrightarrow k_A > \frac{\lambda-c_A}{\lambda}$.

First, suppose that the activist is sufficiently unbiased: $k_A > \frac{\lambda-c_A}{\lambda}$. There are two possible cases: $\beta^P \leq \beta^R$ and $\beta^P > \beta^R$. In the first case, $\beta^* = \min\{\beta^R, \beta^{NP}\} > 0.5$ for any $k_M < 1$. Moreover, because $\beta^* \leq \beta^R$, the activist never organizes a proxy fight, letting the manager reject a value increasing proposal whenever the posterior belief is between 0.5 and $\beta^* > 0.5$. In the second case, $\beta^* = \beta^P > \beta^R > 0.5$ and thus, the activist lets the manager reject a value increasing proposal if the posterior belief is between 0.5 and $\beta^R > 0.5$.

Second, suppose that the activist is biased: $k_A \leq \frac{\lambda-c_A}{\lambda}$. There are two possible cases: $\beta^P \leq \beta^R$ and $\beta^P > \beta^R$. In the first case, $\beta^* = \min\{\beta^R, \beta^{NP}\} \leq \beta^R \leq 0.5$, so the manager never rejects a value increasing proposal. In the second case, $\beta^* = \beta^P > \beta^R$. Hence, the activist organizes a proxy fight when the posterior belief is between $\beta^R \leq 0.5$ and β^P , i.e., the manager never rejects a value increasing proposal without facing a proxy fight. ■

Proof of Theorem 2. The proof follows the same logic as the proof of Theorem 1. Assuming by the way of contradiction that some responsive equilibrium (ω_b, ω_g) with $\omega_g > \omega_b$ exists, we find the best response of the manager characterized by the threshold T_ω^* . Then we show that under the conditions of the theorem, given strategies (ω_b, ω_g) of $N-1$ shareholders and the manager's strategy T_ω^* , the strategy (ω_b, ω_g) cannot be the best response for the N^{th} shareholder. In particular, under strategic voting, the shareholder conditions his beliefs on the events when his vote is pivotal. We demonstrate that if $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$, $c_A > \underline{c}_A$, and $k_A \geq \frac{\lambda-c_A}{\lambda-\underline{c}_A}$, the shareholder's beliefs in all those events are sufficiently optimistic, inducing him to vote

affirmatively regardless of his signal and thus, contradicting the fact that the strategy $\omega_g > \omega_b$ must be optimal for him in order for the equilibrium to exist.

We prove the theorem by considering two cases, $\beta^R \geq \beta^P$ and $\beta^R < \beta^P$, corresponding to the situations with and without a proxy fight, respectively. We provide below the detailed proof for case I and relegate the proof for case II to the Internet Appendix.

Case I - $\beta^R \geq \beta^P$. Suppose by the way of contradiction that there exists a responsive equilibrium (ω_b, ω_g) with $\omega_g > \omega_b$. Since $\beta^R \geq \beta^P$, then according to Lemma B.2, $\beta^* = \min\{\beta^R, \beta^{NP}\} \in [\beta^A, \beta^R]$ and according to Lemma B.1, a proxy fight is not organized in equilibrium. Thus, the final outcome is totally determined by the manager's action, and the proposal is accepted if and only if $\beta_\omega(T) > \beta^* = \min\{\beta^R, \beta^{NP}\}$.

As was discussed earlier, in the proof of Theorem 1, the expression (A7) was derived for a general β^* characterizing the threshold beliefs of the manager. Therefore, we can replicate the proof of Theorem 1 and conclude that a responsive equilibrium exists if and only if expression (A7) holds for $\beta^* = \min\{\beta^R, \beta^{NP}\}$. We next show that (A7) is violated for both β^R and β^{NP} under the conditions of the theorem. First, the condition $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$ is equivalent to $\frac{\beta^{NP}}{1-\beta^{NP}} \geq (\frac{\rho}{1-\rho})^2$ and hence, (A7) is violated for $\beta^{NP} \equiv \frac{1}{2k_M}$ for both even and odd N . Second, the condition $k_A \geq \frac{\lambda-c_A}{\lambda-\underline{c}_A}$ is equivalent to $\frac{\beta^R}{1-\beta^R} \geq (\frac{\rho}{1-\rho})^2$ and hence, (A7) is violated for $\beta^R \equiv 1 + \frac{c_A/\lambda-1}{2k_A}$ for both even and odd N . More specifically, the posterior beliefs of the shareholder conditional on him being pivotal (β^{NP} or β^R) are sufficiently high, inducing him to vote for the proposal even if his private signal is bad. Thus, under the conditions of Theorem 2, a responsive equilibrium does not exist when $\beta^R \geq \beta^P$. ■

Proof of Theorem 3. For brevity, the theorem is proved only for even N . The case of odd N follows a very similar set of arguments and hence is omitted. We prove the theorem considering two possible kinds of responsive equilibria - those where the proxy fight occurs, and those where the proxy fight does not occur. Recall from Lemmas B.1 and B.2 that if there exists a responsive equilibrium in which a proxy fight is organized with a strictly positive probability, then it is necessary that $\beta^R < \beta^P$. Hence, if $\beta^R \geq \beta^P$, then either no responsive equilibrium exists or there exists a responsive equilibrium in which the proxy fight is never organized.

Case I - $\beta^R \geq \beta^P$. In the Internet Appendix we prove that if $\beta^R \geq \beta^P$, $k_M \leq \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$, and $c_A \in (\underline{c}_A, \lambda)$, then condition (4) is necessary and sufficient for existence of a responsive equilibrium. In such equilibrium a proxy fight is never organized.

Case II - $\beta^R < \beta^P$. In the Internet Appendix we prove the following:

II.1 If $\beta^R < \beta^P$ and $k_M > \left(1 - \frac{c_M}{\underline{c}_M}\right) \left[\frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2\right]$, then condition (4) is sufficient for existence of a pure strategy responsive equilibrium.

II.2 If $\beta^R < \beta^P$ and $k_M \leq \left(1 - \frac{c_M}{\underline{c}_M}\right) \left[\frac{1}{2} + \frac{1}{2}\left(\frac{1-\rho}{\rho}\right)^2\right]$, then condition (5) is sufficient for existence of a responsive equilibrium in which a proxy fight occurs with a positive probability.

Final step - combining cases I and II: The statement of the theorem follows from the cases considered above. Consider part (i) and suppose that $c_M \geq \underline{c}_M$. This condition implies $\beta^P \leq 0$ for any k_M . For a responsive equilibrium to exist, it is necessary that $\beta^R > 0$ (and hence, $\beta^R > \beta^P$) because otherwise, shareholders are never pivotal. According to case I, (4) is then the necessary condition for existence of a responsive equilibrium. In this equilibrium the proxy fight is never organized. Conversely, condition (4) implies $\beta^R > 0$, so that $\beta^R \geq \beta^P$ is satisfied. According to case I, (4) is then a sufficient condition for existence of a responsive equilibrium. This proves part (i) of the theorem.

Next, suppose that $c_M < \underline{c}_M$. Consider part (ii.a). If $\beta^R \geq \beta^P$, then according to case I, (4) is sufficient for existence of a responsive equilibrium. If $\beta^R < \beta^P$, then according to case II.1, (4) is again sufficient for existence of a responsive equilibrium. Consider part (ii.b). When $k_M \leq \left(1 - \frac{c_M}{\underline{c}_M}\right) \left[\frac{1}{2} + \frac{1}{2}\left(\frac{1-\rho}{\rho}\right)^2\right]$ and (5) is satisfied, then $\frac{\beta^P}{1-\beta^P} \geq \left(\frac{\rho}{1-\rho}\right)^2 > \frac{\rho}{1-\rho} > \frac{\beta^R}{1-\beta^R}$ and hence, $\beta^R < \beta^P$. Then, according to case II.2, condition (5) is sufficient for existence of a responsive equilibrium, and in this equilibrium a proxy fight occurs with a positive probability. ■

Proof of Corollary 1. When $k_M \leq \frac{1}{2} + \frac{1}{2}\left(\frac{1-\rho}{\rho}\right)^2$, the activist is unbiased ($k_A = 1$), and $c_A \in (\underline{c}_A, \lambda)$, then according to Theorem 2, a responsive equilibrium does not exist. Since $k_M \leq \frac{1}{2} + \frac{1}{2}\left(\frac{1-\rho}{\rho}\right)^2$ and since no information is revealed in any non-responsive equilibrium, the manager rejects the proposal with probability one and hence, shareholder value is always zero. Suppose instead that $k_A = 1 - c_A/\lambda$. It is easy to show that $1 - c_A/\lambda \in \left[\frac{\lambda - c_A}{\lambda}, \frac{\lambda - c_A}{\lambda} \frac{1}{2(1-\rho)}\right) \subset \left[\frac{\lambda - c_A}{\lambda - \underline{c}_A} \left(\frac{1-\rho}{\rho}\right)^2, \frac{\lambda - c_A}{\lambda - \underline{c}_A}\right)$. Hence, according to Theorem 3, a responsive equilibrium always exists when $k_A = 1 - c_A/\lambda$. Moreover, since $\beta^R = 1 - \frac{1-c_A/\lambda}{2k_A}$, then $\beta^R = \frac{1}{2}$. Consider two cases. First, if $\beta^P \leq \beta^R$, then it follows from the proof of Theorem 3, Case I, that there exists a responsive equilibrium in which a proxy fight is not organized and $\beta^* = \beta^R = \frac{1}{2}$. In this equilibrium the proposal is accepted if and only if the posterior belief that the state is good is greater than $\frac{1}{2}$, which implies that the shareholders' ex-post optimal decision rule is implemented. Hence, expected shareholder value is strictly greater than zero. Second, if $\beta^P > \beta^R$, then it follows from the proof of Theorem 3, Case II, that there exists a responsive equilibrium in which a proxy fight is organized with a strictly positive probability. In this equilibrium, if the posterior belief is smaller or equal to $\beta^R = \frac{1}{2}$, the proposal is rejected. If the posterior belief is greater than $\beta^P > \frac{1}{2}$, the proposal is accepted. Last, if the posterior belief is greater than $\frac{1}{2}$ but smaller or equal to β^P , the proposal is accepted with probability λ . Either way, the proposal is always rejected when the posterior belief is below $\frac{1}{2}$ and is accepted with a positive probability when

the posterior belief is above $\frac{1}{2}$. Since some information is revealed in any responsive equilibrium, the expected value for shareholders is strictly positive. Hence, in any case, shareholder value under a biased activist with $k_A = 1 - c_A/\lambda$ is strictly positive and is strictly greater than shareholder value under an unbiased activist. ■

A Proofs for Section III

Proof of Proposition 1. By Lemma B.2, $\beta^* = \beta^*(k_A, k_M, c_M, c_A, \lambda)$, where β^* is either $\beta^{NP} = \frac{1}{2k_M}$, or $\beta^R = 1 + \frac{c_A - \lambda}{2k_A\lambda}$, or $\beta^P = \beta^{NP} - \frac{c_M}{2k_M} \frac{\lambda}{1-\lambda}$. Since $T_\omega^* = \lfloor \tau_\omega(\beta^*) \rfloor$ and by Lemma 1, the function $\lfloor \tau_\omega(\beta) \rfloor$ is weakly increasing in β and does not depend on any of the parameters given the voting strategies $(\omega_b, \omega_g) = (0, 1)$, it is sufficient to analyze the comparative statics for β^* . Consider any of the parameters. In the range in which β^* does not shift between regimes (β^{NP} , β^R , or β^P) as we change this parameter, the comparative statics follows immediately from the expressions above. Hence, it remains to prove that the same comparative statics is true in the range where the shift between regimes occurs. Note that the shift between regimes is continuous: the change from one type of threshold to another occurs at the point where the two thresholds are equal. Since each of the thresholds is a continuous function of the parameter and the type change occurs at the point where these two functions coincide, the resulting function β^* is also a continuous function of the parameter. Moreover, if this combined function is increasing (decreasing) or is constant in the parameter at each of the three segments (corresponding to three types of threshold), then the combined function is everywhere weakly increasing (decreasing) in this parameter. ■

The proof of Proposition 2 is relegated to the Internet Appendix.

Proofs for Section IV

Proof of Lemma 4. Both in the nonbinding mechanism and in the binding mechanism with threshold T_ω^* , shareholders understand that the proposal is accepted if and only if the vote tally exceeds T_ω^* . Hence, if ω are incentive-compatible in the nonbinding mechanism, they are also incentive compatible in the binding mechanism, and thus constitute an equilibrium. ■

In order to prove Proposition 3, we first prove an auxiliary Lemma D.1, which finds the necessary and sufficient conditions for existence of a responsive equilibrium in binding voting under general prior beliefs.

LEMMA D.1: *Let μ be the prior probability that the state is good. A responsive equilibrium in binding voting with a pure majority rule exists if and only if $\frac{\mu}{1-\mu} \in ((\frac{1-\rho}{\rho})^{\frac{N}{2}}, (\frac{\rho}{1-\rho})^{\frac{N}{2}+1})$.*
The proof of Lemma D.1 is relegated to the Internet Appendix.

Proof of Proposition 3. Let T_g be the number of good signals among N shareholders. If $\frac{\mu}{1-\mu} \notin ((\frac{1-\rho}{\rho})^{\frac{N}{2}}, (\frac{\rho}{1-\rho})^{\frac{N}{2}+1})$, then according to lemma D.1, there is no responsive equilibrium in binding voting. The only possible equilibria are non-responsive ones, in which the probability of accepting the proposal does not depend on shareholders' signals. Hence, the ex-ante probability of making a correct decision is $\frac{1}{2}$. Repeating the proof of Theorem 1 for general priors, when N is even and $k_M > \frac{1}{2} + \frac{1}{2}(\frac{1-\rho}{\rho})^2$, then for any μ there exists a pure strategy responsive equilibrium in nonbinding voting. In this equilibrium the number of affirmative votes is equal to T_g , and the manager accepts the proposal if and only if $T_g > T^*$ for some threshold T^* . Then the ex-ante probability of making the correct decision is $\Pr(T_g > T^*|G)\frac{1}{2} + \Pr(T_g \leq T^*|B)\frac{1}{2} > \Pr(T_g > T^*|B)\frac{1}{2} + \Pr(T_g \leq T^*|B)\frac{1}{2} = \frac{1}{2}$, i.e., is strictly greater than under binding voting with a pure majority rule. ■