Advising Shareholders In Takeovers

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Abstract

This paper studies the advisory role of a target company board in takeovers. I show that coordination failures among target shareholders, such as free-riding, limit the board’s ability to properly advise shareholders whether accepting a takeover offer is in their best interest based on its information. Even if there are no agency problems and the board’s objective is to maximize shareholders’ value, the board conceals information from shareholders in equilibrium, and shareholders might be better off if they could commit to ignoring the board’s advice. By contrast, when the board is biased and behaves opportunistically, it becomes possible for information to be fully revealed and, consequently, shareholders’ welfare might increase. More broadly, the paper emphasizes the potential value of an expert’s bias when advising a group of agents whose collective actions must be coordinated. The paper discusses shareholder activism in takeovers and communication during debt restructuring as examples for possible applications.

Keywords: Coordination, Tender Offer, Takeover, Merger, Advice, Communication, Cheap-Talk, Free-riding, Externalities

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Introduction

Target shareholders who receive an offer to sell their shares to a corporate bidder are faced with a non-trivial decision. First, whether the buyout offer would benefit shareholders depends on how it compares with the target’s value in the event that it remains independent. If capital markets are informationally inefficient, shareholders cannot simply estimate this fundamental value from the share’s price. In the absence of more information, there is a concern that shareholders mistakenly view as adequate an offer that is, in fact, inadequate. Second, the decision to sell the firm is made collectively by all target shareholders. The takeover succeeds if and only if a (super) majority of shareholders approve it. As noted by Grossman and Hart (1980), there is a free rider problem when shareholders decide whether to accept a tender offer. In the absence of coordination, the allocation of control is subject to substantial inefficiencies.

To assist target shareholders in their decision making, target boards are often required by law and as part of their fiduciary duty, to advise shareholders whether accepting a buyout offer is in their best interests. Indeed, a vast majority of takeover attempts are accompanied by a public recommendation from the target company board to its shareholders.\footnote{In the US, rule 14d-9 imposes this requirement on target boards. A similar requirement exists in Australia (see e.g., Henry (2005)) and Europe (see e.g., Lobe (2007)).}

In practice, however, target boards’ ability to persuade shareholders to follow their advice is limited and varies across deals. For example, Baker and Savasoglu (2002) study 1901 US takeover offers between 1981 and 1996. Around 11\% of the offers in their sample were classified as hostile by the SDC, and hence were resisted by the target board. Among the resisted offers, in 38\% of the cases the target was eventually taken over by the acquirer. By contrast, 18\% of the offers that were supported by the target board, failed (the target remained independent at least for one year). Overall, around 20\% of the offers either succeeded despite the resistance of target board, or failed in spite of the board’s support.\footnote{More systematic evidence on the mismatch between the success of a takeover offer and the target board’s response is given by Bango and Mazzeo (2004), Schwert (2000), and Officer (2003) for US deals; Brenan (1999) for UK deals; and Maheswaran and Pinder (2005) for Australian deals.}

In light of this evidence, it is important to understand why target shareholders follow the board’s recommendations in some takeovers but not in others. Moreover, what is the effect of the board’s recommendations on the premium that target shareholders get and on the allocation of control? Can the target board resolve the aforementioned inefficiencies and create value to its shareholders by advising them on the takeover? How do agency problems between the board and its shareholders affect the board’s advisory role?
To address these questions, this paper develops a model of "cheap talk" communication between an expert and target shareholders in light of a takeover attempt. The main focus of the analysis is on the advisory role of the target board. However, it can be applied to study the advisory role of other market participants such as analysts, institutional investors, and regulators.

The analysis is based on Grossman and Hart (1980) model of tender offers, with the addition of a privately informed incumbent board of directors (henceforth, the board). The board’s control of the target company is challenged by a bidder, who has private benefits from the acquisition. The stand-alone value of the target, as well as its value under the bidder’s management, are uncertain. Moreover, the takeover can either increase or decrease the value of the target. To focus attention on the board’s advisory role, I assume that the only means by which it can affect the outcome of the control contest is by communicating its private information to target shareholders. In particular, once the bidder has submitted a bid (a bid to which he is committed), but before target shareholders decide how to respond, the board posts a public recommendation. The board’s information about the target’s value given either outcome is soft and non-verifiable. Hence, the mode of communication is "cheap talk" a la Crawford and Sobel (1982). Shareholders use the board’s advice to update their beliefs about the prospects of the takeover and then decide whether to tender their shares. If a majority of shareholders tendered their shares, the takeover succeeds and non-tendering shareholders become the minority of the acquired firm.

The first result shows that when there are no agency problems and the board’s objective is to maximize target shareholders’ value (i.e. the board is independent and unbiased), meaningful communication is severely limited. In particular, in any equilibrium the board strategically withholds and conceals information from shareholders, information that otherwise would affect their decision making. This result is puzzling in light of the literature on cheap talk, which emphasizes that communication is distorted only if the parties’ interests are conflicted. Indeed, if the board is unbiased, why would not it fully reveal its private information and target shareholders follow the face value of the recommendation? The driving force behind the result

3 That target senior executives and directors might have superior information has been long accepted by takeover law: “No one, after all, has access to more information concerning the corporation’s present and future condition [than managers].” (see Paramount Communications, Inc v Time Inc, 1989 Del Ch LEXIS 77, *56 (Allen) “). Moreover, in its decision in Smith vs. Van Gorkom, the Delaware Supreme Court created the obligation that when evaluating a takeover proposal, the corporate boards of target firms must inform themselves of all reasonably available and relevant information to the decision.

4 The main results are presented under the assumption that the bidder does not have private information. Section 7 shows that the analysis is robust to relaxing this assumption.
is the fact that shareholders fail to coordinate their collective action. Each individual shareholder ignores how his own tendering decision affects the welfare of his peers, and therefore free rides. By contrast, the unbiased board accounts for these externalities. Hence, when advising shareholders, the board distorts its advice in order to manipulate shareholders’ individual decisions, thereby resolving the coordination failure. This paternalism, however, is anticipated by shareholders. Consequently, shareholders limit the extent to which they follow the board’s recommendation and information is lost in the communication process. This result may explain why, even apart from business secrecy or complexity considerations, boards and managers might not disclose takeover-related information.

In practice, control contests can leave the target’s board, as well as senior management, facing a conflict of interest with their shareholders. In particular, a successful bid may be value maximizing for existing shareholders, but have a negative effect on the wealth of directors and managers if it threatens their power, reputation, or company-specific human capital. For example, Harford (2003) finds that target directors are frequently removed from their positions after the completion of a successful takeover. Alternatively, the board and senior management may favor a bidder for self-serving reasons. They may feel that a bid undervalues the firm, but an assurance by the bidding firm of continuity in their positions, or a promised bonus upon successful transaction (e.g., golden parachute), can lead the board to be biased in favor of the bid (e.g., see Hartzell, Ofek, and Yermack (2004) for benefits received by target CEOs). Either way, an opportunistic board would base its advice to shareholders on factors that are unrelated to maximizing shareholders’ value.

Seemingly, agency problems would reduce the board’s advice reliability, and less information is revealed. Surprisingly, however, the second result shows that when the board is biased, its advice can reveal more information than when it is unbiased. Moreover, there exists a level of bias for which full revelation of information by the board is feasible in equilibrium. Thus, in conjunction with our first result, a conflict of interests between the board and its shareholders can significantly enhance the quality of communication between target board and shareholders as it relates to takeovers.

To see the intuition, note that while the preferences of the unbiased board are aligned with shareholders’ objective as a collective, the collective action problem among shareholders creates a disagreement between the board and each shareholder individually. The existence of disagreement on the individual level impedes effective communication even if the board is unbiased. However, when there are agency problems, the misalignment of interests is interchanged. That
is, even though the objective of the biased board deviates from maximizing shareholders’ total welfare, the bias can "correct" for the discrepancy in preferences between the unbiased board and each individual shareholder. Thus, while the decisions of the biased board and shareholders are distorted relative to the optimal decision, they are distorted in a similar fashion. The removal of disagreement on the individual level can enhance the quality of communication, and it can lead to full revelation of information.

In the absence of agency problems, the board’s failure to fully communicate its private information could limit its ability to affect the takeover. More generally, the analysis shows that when the board is unbiased, communication matters if and only if the target’s valuations under the bidder’s and the incumbent management are positively interdependent. Thus, when target’s valuations are independent or negatively related, communication is severely distorted, no information is revealed in any equilibrium, and the unbiased board’s advice has no effect on the outcome of the takeover.

Importantly, when valuations are positively interdependent, communication could matter even if the board’s advice is ex-post uninformative. The mere threat of warning shareholders that an offer is inadequate, might be sufficient to encourage the bidder to submit an attractive offer in the first place. Thus, observing uninformative recommendations cannot be a direct evidence against the target board for breaching its fiduciary duties and not properly advising its shareholders.

Once the conditions under which communication matters have been identified, the third result of the paper shows that when there are no agency problems, the unbiased board can hurt shareholders by advising them on the takeover. That is, despite the board’s intention to maximize shareholders’ value, shareholders can end up with a lower value than what they could have obtained had they ignored the board’s advice. Therefore, the unbiased board would rather stay uninformed if it could (for example, by not acquiring information on the takeover).

The reasoning behind the third result is the rise of a “lemons problem”. Because of the collective action problem, a takeover can succeed in equilibrium only if the board reveals that the offer is high relative to value of the merged firm. This exposes the bidder to adverse selection. Hence, when the bidder’s private benefits from the acquisition are not sufficiently high, the bidder finds it too costly to acquire the target, and target shareholders are left with an inferior management. The combination of revelation of information and a collective action problem deters value increasing bidders, and therefore reduces shareholders’ ex-ante welfare.

While an unbiased board may reduce shareholders’ welfare, a biased board can increase
it. In particular, the fourth result shows that when there are agency problems and the board is biased, shareholders’ welfare could be higher compared to a situation where the board is independent and unbiased. That is, agency problems can benefit shareholders in the context of takeovers. Intuitively, when the board’s bias is such that the quality of communication is enhanced, and information about the takeover is sufficiently valuable, target shareholders would choose to keep their board biased if they could. The analysis highlights that in the presence of coordination failures, corporate charters and managerial compensation contracts that leave senior management and directors with a bias, could benefit shareholders by enhancing the quality of communication.

Taking the composite of the above results, another contribution of the present study is identifying factors that could explain the cross sectional variation of the likelihood that target shareholders follow their board’s recommendations. The analysis relates the board’s advisory role in takeovers to bidder’s characteristics, information asymmetry between shareholders and their management, the nature of interdependency between target’s valuations, and the target board’s independence. For example, the model predicts that the likelihood that shareholders follow the board’s recommendation decreases with the bidder’s private benefits from control. The paper discusses the new empirical predictions that emerge from this theoretical analysis.

While the theoretical analysis of this paper mainly focuses on the advisory role of target boards, its insights are not restricted to this interpretation. For example, the results of this study can be applied to study communication between an informed blockholder and small shareholders as a form of shareholder activism in takeovers. It is demonstrated that compared to target boards, the blockholder’s advisory role is weaker, but a conflict of interests between the blockholder and small shareholders can enhance the effectiveness of the blockholder’s activism, and thereby improve target shareholders’ total welfare.

More broadly, the present analysis highlights the potential value of expert’s bias when advising a group of agents whose actions must be coordinated. To the extent that the company’s stakeholders cannot perfectly coordinate their decision making, the insights of this study could be applied to other settings in corporate finance and beyond. The paper discusses the relevance of the main results in the context of debt restructuring, and demonstrates that there is a significant similarity between this setting and that of tender offers. In particular, credit rating agencies, regulators, and large institutional creditors, cannot truthfully reveal their information unless they are biased. For example, the credit rating of a distressed firm may convey more information if the rating agency benefits from future businesses with the management of the
rated firm, or if it has incentives to justify its previous optimistic rating. A privately informed institutional creditor would reveal more information if it is subject to private liquidity shocks, and hence would rather liquidate a viable firm in order to address its own financial constraints. Finally, the public announcements of a regulator who is concerned with its reputation for protecting creditors’ rights, might be more credible. We conclude with a short discussion on the relevance of the paper’s main results to study other applications. For example, the role of regulators’ public announcements in preventing bank runs.

The paper proceeds as follows. The remainder of this section discusses the relationship to the existing literature. Section 1 presents the benchmark case when no communication takes place. Section 2 introduces communication between an independent board and target shareholders. Section 3 studies communication in takeovers when there are agency problems and the board is biased. Section 4 discusses the empirical predictions of the proposed theory. Section 5 extends the analysis to study communication between shareholders as a form of shareholder activism. Section 6 discusses the analogy between tender offers and debt restructuring. Section 7 shows that the main results continue to hold under different specifications of the model: bidder’s private information, bidder’s ability to revise its bid, and freezeout of non-tendering shareholders. Section 8 concludes. All proofs are collected in the Appendix.

Relation to the Literature

This study is related to several strands of the literature. Foremost is the literature on corporate takeovers. The analysis builds on Grossman and Hart’s (1980) seminal work on tender offers, to study communication between the target board and shareholders in takeovers. The board’s ability to persuade shareholders to resist a takeover attempt could be considered a form of managerial resistance. Resistance by target’s management was studied, for example, by Bagnoli, Gordon, and Lipman (1989), Baron (1983), Berkovitch and Khanna (1990) Hirshleifer and Titman (1990), Harris and Raviv (1988) and Ofer and Thakor (1987). In those studies, the incumbent management can take binding actions (anti-takeover defense) to change the outcome of the control contest. By contrast, in this paper it is assumed that target shareholders retain the formal authority to reject buyout offers. The incumbent management can change the outcome of the takeover only by communicating its private information to shareholders, thereby persuading them to follow a particular course of action. Thus, unlike the majority of this literature, the board’s ability to resist a takeover is endogenously determined in this study.

Asymmetric information is a central theme of this paper. Takeovers with asymmetric in-
formation have been studied, for example, by Baron (1983), Hirshleifer and Titman (1990), Marquez and Yilmaz (2006, 2008), Offer and Thakor (1987), Shleifer and Vishny (1986) and Yilmaz (1998). In those studies, private information is communicated by the informed parties through costly signaling. By contrast, the mode of communication in the present work is cheap-talk. Indeed, the analysis of this paper emphasizes that without any binding role, there is a danger that the target’s board could not advise shareholders properly even in the absence of any conflict of interests. In a related paper, Ohta and Yee (2008) use cheap talk to rationalize "Texas-wide" fair opinions in takeovers. In their model, however, target shareholders can perfectly coordinate their collective action, and by contrast with the results of this paper, information is concealed if and only if the board is biased.

The second related literature is the literature on persuasion of groups and strategic transmission of information. Unlike the majority of the literature that followed Crawford and Sobel’s (1982) seminal work, in the present framework the conflict of interests between the independent board (the sender) and shareholders (the receivers) stems from the existence of externalities in shareholders’ collective action. In this respect, the current paper is close to Dessi (2008), who studies the role of collective memory when individuals’ investment decisions exhibit spillovers, and Teoh (1997), who studies disclosure in games of voluntary contribution to public goods. While these studies focus on disclosure of hard information, similar to the present paper, externalities create the potential for welfare-enhancing manipulation of information transmission. By contrast, the present paper emphasizes the potential value of a conflict of interests between sender and receivers for transmission of soft and multi-dimensional information. Moreover, this paper endogenizes the alternative cost of making a decision (i.e. the buyout offer), and hence studies broader welfare implications.

The present study is also related to Caillaud and Tirole (2007) and Farrell and Gibbons (1989). Similar to these papers, I study communication between a sender and multiple receivers. However, Caillaud and Tirole (2007) focus on persuasion strategies that transmit hard information that is costly to assimilate to a selectively chosen subset among several receivers. The main interest of this paper is, instead, in public communication of soft information, where the same message reaches all receivers. Farrell and Gibbons (1989) consider a model of cheap talk with multiple audiences and address the problem of selective communication to several receivers. A key difference with the present framework is that the members of the audience do not form a single decision making body and actions taken by one audience do not affect the payoff of the other audience.
Finally, Battaglini (2002) studies communication of multidimensional and soft information to a single receiver. He shows that full revelation of information is possible even when the conflict of interest is large. Key to his results is the presence of multiple senders. By contrast, in the present paper full revelation of information by a single biased sender is feasible when shareholders’ collective decision making embeds externalities.

1 No-Communication Benchmark

To emphasize the advisory role of the target board in takeovers, the analysis starts by considering the outcome of the control contest when the board is absent. I refer to this equilibrium outcome as the no-communication benchmark. Apart from minor modifications, this benchmark coincides with Grossman and Hart (1980) model.

1.1 Benchmark Setup

A target firm is faced with a potential acquirer, henceforth the bidder. The target is owned by a continuum of homogeneous shareholders, each of whom holds exactly one non-divisible share. All shares carry the same number of votes, for simplicity, one vote per share. The governance rules of the target company are such that a successful takeover requires at least half of its voting rights.\(^5\) All agents are risk neutral.

The target’s valuations under the bidder’s management and when it remains independent are given by \(v\) and \(q\), respectively. Both valuations lie in the interval \([l, h]\), which is potentially unbounded.\(^6\) Ex-ante, the valuations \(v\) and \(q\) are uncertain and jointly distributed according to the probability density function \(f(v, q)\). The function \(f\) is common knowledge between all agents, and the marginal distributions of \(v\) and \(q\) have strictly positive density over \([l, h]\). The benchmark extends Grossman and Hart (1980) by considering value-decreasing takeovers as well. However, \(f\) is non-degenerate in the sense that the possibility that the takeover increases the target’s value can never be ruled out.\(^7\) Grossman and Hart (1980) assumed complete and

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\(^5\)Allowing for supermajority rules does not qualitatively change the results. All proofs are given for the general case where the majority rule is \(k \in \left[\frac{1}{2}, 1\right]\).

\(^6\)It can be shown that the analysis of the paper carries over to restricted offers. Note that when the offer is unconditional, an equilibrium may not exist. See Yilmaz (1998) and Burkart, Gromb, and Panunzi (2000) for potential ways to overcome this problem.

\(^7\)Formally, there exists small \(\varepsilon > 0\) such that \(\Pr[v - q > \varepsilon | q] > 0\) for any \(q \in [l, h - \varepsilon]\), and \(v\) is unbounded from above.
symmetric information. To keep the benchmark close to their setting, it is assumed that the bidder and target shareholders are uninformed about target’s valuations.

The game consists of two stages. At the outset, the bidder makes a take-it-or-leave-it offer to shareholders. Tender offers are the only admissible mode of takeover. An offer consists of a cash payment \( p \) that each shareholder receives in return for selling his share of the target firm. If a shareholder decides to keep his share, he retains exactly one share of the target under either management. When making an offer, the bidder commits to buying all tendered shares conditional on gaining control in the target. The offer is therefore conditional and unrestricted.\(^8\)

At the second stage and given the bidder’s offer \( p \), shareholders simultaneously decide whether to tender their shares. Target shareholders are negligible in size and hence believe that their individual decisions cannot change the outcome of the control contest. As is standard in this literature, the analysis focuses on symmetric equilibrium where each shareholder follows the same tendering strategy. Let us denote by \( \phi(p) \in [0, 1] \) the probability that each shareholder tenders his share given the bidder’s offer. A version of the law of large numbers ensures that shareholders are never pivotal for the outcome even when they play mixed strategies. In particular, the outcome of the tendering stage is always deterministic: exactly fraction \( \phi \) of all shareholders tender their shares, and the takeover succeeds if and only if \( \phi \geq \frac{1}{2} \).\(^9\)

The bidder’s motives to control the target are not necessarily related to \( \nu \) or \( \eta \). In particular, the bidder has additional benefits from acquiring the target, benefits that do not accrue to target shareholders (e.g., empire building, self dealing with the target, or diversification of managerial human capital). Let us denote these private benefits from control by \( b \geq 0 \), and assume that \( b \) is common knowledge.\(^10\)

Given the tender offer \( p \) and shareholders’ tendering strategy \( \phi \in [0, 1] \), the bidder’s profit is given by the expected value of,

\[
\Pi(\phi, p, v) = \begin{cases} 
  b + \phi(v - p) & \text{if } \phi \geq \frac{1}{2} \\
  0 & \text{otherwise}
\end{cases}
\]  

\(^8\)It can be shown that the analysis of the paper carries over to restricted offers. Note that when the offer is unconditional, an equilibrium may not exist. See Yilmaz (1998) and Burkart, Gromb, and Panunzi (2000) for potential ways to overcome this problem.

\(^9\)This symmetric equilibrium is very different from asymmetric equilibria in pure strategies in which exactly fraction \( \phi \) of a finite number of shareholders tender. In these equilibria shareholders are pivotal for sure, but the equilibria are sensitive to noisy behavior and requires substantial amount of coordination, which is unlikely in widely held companies (see Bagnoli and Lipman (1988)).

\(^10\)The analysis would not change if \( b \) is the bidder’s private information as long as \( b \) is independent of target’s values.
When $\phi < \frac{1}{2}$ the takeover fails and the bidder gets zero. Otherwise, the takeover succeeds for sure, the bidder consumes his private benefits from control $b$, and expects to earn $E[v] - p$ on each of the $\phi$ tendered shares.

By contrast, shareholders’ value arises solely from the expected cash flows generated by their holdings in the target. Their total welfare is given by the expectation of

$$W(\phi, p, v, q) = \begin{cases} v + \phi(p - v) & \text{if } \phi \geq \frac{1}{2} \\ q & \text{otherwise} \end{cases}$$

(2)

When the takeover succeeds, there are $\phi \geq \frac{1}{2}$ shareholders who tender their shares and get $p$, and $(1 - \phi)$ non-tendering shareholders who become the minority of the merged firm and get $E[v]$. Shareholders’ total welfare is the weighted average of these quantities. If the takeover fails, shareholders get the expected value of the target when it remains independent, $E[q]$.

1.2 Benchmark Analysis

Solving the game backward, consider first the tendering sub-game given the bidder’s offer $p$. Recall that shareholders are never pivotal for the outcome and the offer is conditional on the success of the takeover. When shareholders expect the takeover to fail, they are indifferent with respect to their tendering decision since either way they get $E[q]$. Thus, there always exists an equilibrium in which the takeover fails. When shareholders expect the takeover to succeed, each shareholder compares the offer $p$ to the value of his share if he does not tender his share and becomes a minority shareholder of the merged firm. Thus, a takeover can succeed in equilibrium if and only if $p \geq E[v]$. To summarize,

**Lemma 1** For any offer $p$ there exists an equilibrium of the tendering sub-game where each shareholder tenders his share with probability $\phi < \frac{1}{2}$, and the takeover fails with probability 1. If $p < E[v]$ this is the only equilibrium outcome. If $p > E[v]$, then in addition there exists an equilibrium where all shareholders tender their shares, $\phi = 1$. If $p = E[v]$, there also exists an equilibrium where each shareholder tenders with probability $\phi \geq \frac{1}{2}$. No other equilibria exist.

Shareholders’ tendering decisions embed two sources of (ex-post) inefficiency: free-riding and "the pressure to tender". When $p < E[v]$ shareholders have incentive to free ride by keeping their share when all the other shareholders tender. If in addition $E[q] < p$, shareholders
collectively forego a value-increasing takeover. When \( E[v] < p < E[q] \), each shareholder tenders out of fear that, if he does not tender, the bidder might still gain control, in which case the shareholder would be left with low-value minority shares in the acquired target. Thus, when the takeover decreases value, shareholders are "pressured to tender" their shares even if they view the offered acquisition price as inadequate (Bebchuk (1988)).

It follows from Lemma 1 that multiple of equilibria can arise at the tendering stage. To emphasize the coordination failure in shareholders’ collective action and similar to Grossman and Hart (1980), the analysis focuses on the equilibrium with the highest probability of success at the tendering stage. Thus a takeover succeeds if and only if \( p \geq E[v] \). In equilibrium, the bidder anticipates shareholders’ behavior, he offers shareholders \( p = E[v] \), and the takeover succeeds.

**Proposition 1 (Grossman and Hart (1980))**  
In the no-communication benchmark the bidder offers shareholders \( p = E[v] \) and takes over the target with certainty. The bidder’s expected profit is \( b \) and shareholders’ total welfare is given by \( E[v - q] \).

Note that when the takeover increases value, free-riding implicitly allows shareholders to commit to rejecting offers that leave them with less than the entire cash flows surplus from the transaction. As will be demonstrated in the next section, the benefit from this implicit bargaining power will turn into a double-edged sword when the board can communicate with its shareholders.

## 2 The Advisory Role of Independent Boards

To study communication, I extend Grossman and Hart’s (1980) framework by introducing a privately informed target board, which can communicate its private information to target shareholders. In this section, it is assumed that there are no agency problems between the board and shareholders. This assumption is relaxed in section 3.

### 2.1 Setup

Suppose the target firm is controlled by the incumbent board, whose objective is to maximize target shareholders’ value. The board’s preferences are represented by \( W(\phi, p, v, q) \) as given
To focus attention on the board’s advisory role, I assume that it perfectly and privately observes \( v \) and \( q \).\(^{12}\) Since target shareholders are uninformed about both target’s valuations, the board is in a better position to estimate by how much the takeover increases or decreases the target’s value, and whether the takeover offer is greater than the target’s value under the incumbent management. The board may also be better informed than the bidder. Bidders rely heavily upon the financial statements of target companies when estimating synergies and other benefits from the merger (see, e.g., Koller, Goedhart and Wessels, 2005, pp. 436–443). Often, this information is privy to the target’s management.\(^{13}\) Consistent with this view, I maintain the assumption that the bidder is uninformed about \( v \) and \( q \). In section 7, I show that the main insights are unchanged when the bidder has private information on \( v \) or \( q \), or if the bidder is better informed than the incumbent board.

The extended game consists of three stages: first, the bidder submits a takeover offer; then the incumbent board posts a recommendation; finally, shareholders decide simultaneously whether to tender their shares. To keep the analysis as close as possible to Grossman and Hart (1980), it is assumed that once the bidder submits the offer and the board’s announcement becomes public, the bidder cannot revise the offer. In section 7 it is shown that relaxing this assumption does not change the results significantly.

A key assumption of the model is that when confronted with an acquisition offer, the board does not remain passive.\(^{14}\) Once the bidder’s acquisition offer becomes public, but before shareholders decide whether to tender their shares, the board can advise shareholders by posting a

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\(^{11}\) The board is treated as a monolithic entity whose members always speak in one voice. Senior management could hold chairs in the board and even control it, but other than that it does not play any role in the analysis. Moreover, board members are not allowed to participate in the tender offer. Under a different interpretation, this assumption is relaxed in section 5.

\(^{12}\) The analysis is qualitatively unchanged if instead the board observes imperfect signals of \( v \) or \( q \). Also, see Corollary 1 for treatment of cases when the board is informed about \( q \) but not about \( v \), and vice versa.

\(^{13}\) A notable example is the $10.3 Billion acquisition of PeopleSoft by Oracle. After a long battle, Oracle was shown PeopleSoft’s books, and consequently offered PeopleSoft’s shareholders 10% higher than its earlier bid of $24 a share, which it had insisted was final. "When we got it and actually looked at the books, that is what justified the higher price," Mr. Ellison, Oracle’s founder and CEO, explained. See New York Times "Raising Offer, Oracle Agrees to Buy PeopleSoft for $10.3 Billion" 12/13/2004.

\(^{14}\) The focus of this paper is on communication and hence the board is not allowed to implement anti-takeover defenses. While in the US, especially where Delaware jurisdiction applies, the board may retain an informal veto power, in UK, Germany and Continental Europe, the use of takeover defenses is subject to shareholders approval, and can be put in place only once a bid has been made (see e.g., Goergen, Martynova, and Renneboog (2005) and Kirchner and Painter (2002)). When the board has a veto power, it can be shown that apart from the information that is conveyed in its decision to reject the offer, no other information can be revealed. See concluding remarks for more discussion on board’s veto power.
public announcement. Let \( m \in [0, 1] \) be the message that the board sends to target shareholders. The existence of a one to one correspondence from the support of \((v, q)\) to the unit interval ensures that there are no technological restrictions on the board’s ability to communicate with shareholders. In particular, the board may do more than simply advising shareholders whether to accept the offer. For example, the board can release earnings forecast to support its view, (e.g., see Brennan (1999)).

It is assumed that the board’s private information is soft and therefore non-verifiable. Hence, the board cannot back-up his recommendation \( m \) with hard information.\(^{15}\) The communication between the board and target shareholders is formally modeled as cheap talk. That is, the content of \( m \) does not affect the board’s payoff directly, but only through its effect on target shareholders’ decisions. This leaves a leeway for manipulation and information concealment by the board. Thus, if communication is imperfect, it is not because the board cannot fully reveal its information, but rather since it does not have the incentives to do it. Let us denote by \( \mu(m|p, v, q) \in [0, 1] \) the probability that the board sends a message \( m \) given the bidder’s offer \( p \), and conditional on its private information about \( v \) and \( q \).

At the last stage, having processed the disclosure of the board, shareholders simultaneously decide whether to tender their shares in return for \( p \). Shareholders do not rely on the disclosure naively, and they are aware of the possibility that the board may distort the information it transmits to them in order to manipulate their beliefs and thereby affect their decisions. I denote by \( \phi(p, m) \in [0, 1] \) the probability that each shareholder tenders his share in equilibrium, given the board’s advice and the bidder’s offer.

Solution Concept

A Perfect Bayesian Equilibria in our analysis consists of three parts: the bidder’s offer \( p \), the board’s communication strategy \( \mu \), and shareholders tendering decision \( \phi \).\(^{16}\) In any equilibrium of the three stage game, the following must hold:

- For any \( p \) and \( m \), the tendering strategy \( \phi(p, m) \) maximizes the expected utility of each shareholder given that other shareholders are expected to follow the same decision rule

\(^{15}\)Target boards often back their recommendation with investment bankers’ opinions. In many cases, these "fair opinions" rubber-stamp the view of directors and contain no additional information. Kisgen et al (2008), for example, find evidence to support this view and argue that "fair opinions" are driven by legal factors.

\(^{16}\)Refining the analysis from P.B.E to sequential equilibria does not provide a finer set of equilibria in the present cheap talk framework.
\( \phi (p, m) \), taking into account the board’s communication strategy \( \mu (\cdot | p, v, q) \) and the public message \( m \) in order to update the prior of the distribution of \( (v, q) \).

- For any \( p \) and realization of \( (v, q) \), if \( m \) is in the support of \( \mu (\cdot | p, v, q) \), then \( m \) maximizes the expected utility of the board given shareholder’s anticipated (symmetric) tendering strategy \( \phi (p, \cdot) \).

- The offer \( p \) maximizes the bidder’s expected profit given the communication strategy of the board \( \mu (m | \cdot, v, q) \), and shareholder’s anticipated (symmetric) tendering strategy \( \phi (\cdot, m) \).

Like in any cheap talk model, there always exists an equilibrium in which shareholders ignore the board’s advice, and the board’s advice is uninformative. Indeed, if shareholders ignore the board’s advice, the board is totally indifferent between all possible messages and sending an uninformative message is indeed an equilibrium. In those equilibria, the outcome of the control contest is identical to the outcome of the no-communication benchmark as given by Proposition 1.\(^{17}\)

To study the effect of communication in control contests, the analysis focuses on responsive equilibria. An equilibrium is responsive if its outcome differs from the no-communication benchmark either by the size of takeover offer, or by the allocation of control.

**Definition** An equilibrium \((p, \mu, \phi)\) is responsive if and only if either \( p \neq E [v] \), or there exist \( m_1 \neq m_2 \) and \((v_1, q_1) \neq (v_2, q_2)\) such that \( \mu (m_1 | p, v_1, q_1) > 0 \), \( \mu (m_2 | p, v_2, q_2) > 0 \) and \( \phi (p, m_1) \neq \phi (p, m_2) \).

Note that when \( p \neq E [v] \), the equilibrium can be uninformative, yet responsive. Only when \( p = E [v] \) it is necessary that the board reveals information and shareholders condition their decision on the board’s message. When shareholders condition their decision on the board’s message (the second part of the definition), we say that shareholders follow the board’s advice. Either way, whenever the equilibrium is responsive, the board’s ability to advise it shareholders changes the outcome of the takeover at least in one dimension.\(^{18}\)

\(^{17}\)When shareholders ignore the board’s message, the board is indifferent. Hence, there may exist equilibria in which board reveals negligible information that is ignored by shareholders. Since it is a cheap talk game, the outcome of these equilibria is identical to the no-communication benchmark as well. Henceforth, it is assumed that when shareholders ignore the board’s advice in equilibrium, the board’s reveals no information.

\(^{18}\)The definition rules out an artifact of the cheap talk modeling in which no information is revealed by the board, but shareholders use the board’s message as a coordination device (i.e. sunspots equilibria).
2.2 Equilibrium Analysis - Does Communication Matter?

To find equilibria of the game, the model is solved backward.

Shareholders’ Tendering Decision

Consider first the tendering stage once \( m \) and \( p \) are public. In equilibrium, shareholders know the board’s communication strategy \( \mu \), and interpret the board’s announcement \( m \) accordingly. Abusing notation, let \( E [\cdot|p,m] \) be shareholders’ expectation with respect to the joint distribution of \( v \) and \( q \), given the bidder’s offer \( p \) and conditional on the board’s advice \( m \).\(^{19}\)

Interchanging everywhere the unconditional expectation \( E [v] \) with \( E [v|p,m] \), Lemma 1 from the benchmark analysis can be replicated (hence it is omitted).

To emphasize the interaction between coordination failure and communication, similar to the benchmark analysis, we will focus on the equilibrium with the highest probability of success at the tendering stage,

**Equilibrium Selection** Each shareholder’s equilibrium tendering strategy is given by,

\[
\phi(p,m) = \begin{cases} 
1 & \text{if } p > E [v|p,m] \\
\hat{\phi} & \text{if } p = E [v|p,m] \\
0 & \text{if } p < E [v|p,m]
\end{cases}
\]  \( (3) \)

where \( \hat{\phi} \in [\frac{1}{2}, 1] \).

Under this selection of equilibrium, shareholders are subject to free-riding and the pressure to tender. It also implies that shareholders’ tendering strategy is independent of their estimate of the target’s value under the incumbent management, \( E [q|p,m] \).\(^{20}\)

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\(^{19}\)The bidder has no private information relative to shareholders and hence \( p \) does not convey information about \( v \) or \( q \). Nevertheless, the board’s communication strategy may depend on the bidder’s offer. Therefore shareholders take \( p \) into account when forming their beliefs.

\(^{20}\)The present analysis is qualitatively unchanged if shareholders partly coordinate their collective action and reject offers below \( E [q|p,m] \). As long as the possibility that the takeover increases the target’s value cannot be ruled out, collective action (i.e. free-riding) remains a problem. In particular, it can be shown that information is not fully revealed by the unbiased board, but can be fully revealed by a biased board.
The Board’s Communication Strategy

Consider the board’s communication strategy given the bidder’s offer \( p \), and shareholders’ anticipated collective action as expressed by (3). The board can affect the outcome of the takeover only indirectly through sending shareholders a message \( m \) and communicating its private information on \( v \) and \( q \). Recall that by assumption the board maximizes shareholders’ total welfare. Therefore, the board’s objective is to advise shareholders to follow the first best tendering decision given the offer \( p \) and its private information on \( v \) and \( q \).

Let us denote the complete information (ex-post) first best tendering decision by \( \phi^* \). Note that \( \phi^* \equiv \arg \max_{\phi \in [0,1]} W(\phi, p, v, q) \), where \( W \) is given by (2). Specifically, when \( p > \max \{v, q\} \), the offer dominates the target’s value under either management, and hence it is optimal to tender all shares. When \( q > \max \{v, p\} \) shareholders get strictly less than \( q \) if the takeover succeeds. Therefore, the optimal decision is to reject the offer. Finally, when \( v > \max \{q, p\} \) shareholders collectively benefit from approving the takeover as long as they capture enough from the transaction’s surplus. In particular, if shareholders tender their shares with probability \( \phi \in \left[ \frac{1}{2}, 1 \right] \), the takeover succeeds with probability one and each shareholder gets on average \( \phi p + (1 - \phi) v \). Since \( v > p \), the optimal mixing strategy is the minimal probability that guarantees a successful takeover, i.e. the majority requirement \( \frac{1}{2} \). It follows that rejecting the offer is optimal only if \( \frac{p+v}{2} < q \). In all other circumstances, \( \phi^* = \frac{1}{2} \). To summarize,

Lemma 2  Shareholders’ complete information (ex-post) first best tendering strategy is given by,

\[
\phi^* = \begin{cases} 
1 & \text{if } p > \max \{v, q\} \\
0 & \text{if } p < \min \{q, 2q - v\} \\
\frac{1}{2} & \text{otherwise}
\end{cases}
\]  

(4)

By definition, \( \phi^* \) is the independent board’s most preferred tendering strategy. Hence, the board will choose its communication strategy such that target shareholders are advised to follow \( \phi^* \). In this light, a comparison between expressions (4) and (3) implies the even in the absence of a conflict of interests and asymmetric information, target shareholders and their independent board may disagree on the ex-post optimal tendering strategy. For example, according to (3) shareholders collectively reject the offer in equilibrium when the takeover increases value and \( p \in (q, v) \). By contrast, according to (4), the board prefers that shareholders accept the offer in those circumstances. More generally,
Lemma 3 Suppose $v$ and $q$ are common knowledge. Disagreement between shareholders and their independent board (i.e. $\phi^* \neq \phi$) occurs in the following scenarios:

(i) $\phi^* > \phi$ if and only if $v > q$ and $p \in (2q - v, v)$.

(ii) $\phi^* < \phi$ if and only if $v \leq q$ and $p \in (v, q)$.

The next result shows that the potential disagreement identified above limits the communication between the independent board and target shareholders in our setting,

Theorem 1 There is no equilibrium in which the independent board fully reveals its private information. In addition, the complete information (ex-post) first best is not obtained in any equilibrium.

Theorem 1 demonstrates that, because shareholders fail to coordinate their collective decision making, target boards have limitations on the amount of information they can communicate to them. The loss of information is not without consequences: shareholders cannot be persuaded to follow the first best tendering decision as defined by $\phi^*$.

This result is striking, since it shows that directors and managers may choose not to disclose information to shareholders even in absence of agency problems. Moreover, while complexity of the information or secrecy due to product market competition can explain why the management chooses not to reveal how value is created, they are not likely to explain what prevents the management from providing shareholders with point estimation of the target’s value. Interestingly, coordination failure among target shareholders can explain it.

To see why information is concealed by the board in equilibrium, suppose on the contrary that a fully revealing equilibrium exists. For any offer $p$ there is a positive probability that the takeover increases value and $p \in [q, v)$. Since no shareholder is pivotal for the outcome of the takeover, shareholders ignore the fact that by tendering their shares they increase the welfare of the non-tendering shareholders. Indeed, shareholders keep their shares in the hope that others will tender, and hence the offer $p$ is collectively rejected.\textsuperscript{21} By contrast, the board internalizes the positive externality of the tendering decision. According to Lemmas 2 and 3, the board prefers shareholders to accept the offer when $p \in [q, v)$. Realizing that in the presumed\textsuperscript{21} Collective action problems persist even if shareholders are pivotal with a positive probability smaller than one. Therefore, Theorem 1 holds even if there is a finite number of shareholders.
equilibrium shareholders accept the offer if and only if the board reveals that \( p \geq v \), the board has incentives to misreport that \( p \geq v \). This contradicts the assumption that information is truthfully revealed. Similarly, when the takeover decreases value and \( p \in (v, q) \), shareholders are pressured to tender their shares in an attempt to avoid being the owners of a less valuable firm, even if the offer is lower than the value of the target as an independent firm. Thus, shareholders collectively approve the takeover. By contrast, the board internalizes the negative externality of the tendering decision and prefers that shareholders reject the offer. Consequently, the board has incentives to misreport that \( p < v \). It follows that the board cannot credibly convey his private information in equilibrium.

The loss of information in the communication process does not necessarily imply that the board completely loses its ability to advise shareholders. The board could advise target shareholders by revealing only part of its private information. The next lemma specifies the circumstances under which shareholders follow the board’s advice given a takeover offer \( p \).

**Lemma 4** Suppose in equilibrium the bidder’s offer is given by \( p \). There is an equilibrium of the sub-game in which shareholders follow the board’s advice if and only if there exists \( s \in \left[ \frac{1}{2}, 1 \right] \) such that,

\[
E[v|q \leq sp + v(1 - s)] \leq p < E[v|q > sp + v(1 - s)]
\]

and the left hand side holds with equality when \( s < 1 \). When shareholders follow the board’s advice, the board advises shareholders either to reject the offer with probability 1 or to accept it with probability \( s \). Moreover, the takeover is approved if and only if \( q \leq sp + v(1 - s) \).

Lemma 4 implies that shareholders follow the board’s advice only if a recommendation to reject the offer conveys better news for the post-takeover value \( v \) than a recommendation to accept the offer. To see the logic behind Lemma 4, recall that according to Theorem 1 no responsive equilibrium obtains the first best. In particular, in any equilibrium in which shareholders follow the board’s advice, shareholders either reject the offer for sure or accept it with probability \( s \in \left[ \frac{1}{2}, 1 \right] \). Without the ability to implement the first best, the board prefers shareholders to accept the offer if and only if the expected benefit from tendering the share with probability \( s \), \( sp + v(1 - s) \), is greater than the value of the target as a stand-alone firm \( q \). According to (3), shareholders collectively accept the offer if and only if the offer is greater than their expectations of \( v \) conditional on the board’s advice, yielding condition (5).

Lemma 4 also implies that target shareholders follow their board’s advice only if the target’s
valuations as a stand-alone firm and under the bidder’s management are "positively interdependent". Recall that according to (3), shareholders exclusively compare the offer to the post-takeover value $v$. By contrast, according to Lemma 2, the board compares the offer to the pre-takeover value $q$ as well. Thus, the board and shareholders follow a relatively distinctive decision making process, and may disagree as was shown in Lemma 3. Unless the valuations $v$ and $q$ are statistically "close" to each other, the board cannot credibly convince shareholders that following its advice is in their best interest. For example, suppose that shareholders play pure strategies, i.e., $s = 1$. According to Lemma 4, the board advises shareholders to accept the offer if and only if $q \leq p$, and shareholders follow the board’s advice only if,

$$E[v|q \leq p] \leq p < E[v|q > p]$$

The board is faced with a take-it-or-leave-it offer, and hence advises shareholders to sell the target only if the pre-takeover value is low relative to the offer, i.e., $q \leq p$. When valuations are "negatively interdependent", shareholders infer from a ‘sell recommendation’ that the post-takeover value is high relative to the offer. Shareholders ignore the board’s advice since they are individually better off by keeping their shares in hope that others would tender. By contrast, if valuations are "positively interdependent", shareholders infer from the board’s ‘sell recommendation’ that the post-takeover value is also low relative to the offer, i.e. $v \leq p$. Therefore, shareholders follow the advice and sell their shares. It follows that bad news for $v$ must be bad news for $q$, and vice-a-versa. In this respect, target’s valuations must be "positively interdependent".

If the target’s valuations were independent, learning that $q \leq sp + v(1 - s)$ conveys either good news or no information for $v$. This property violates condition (5) which requires that a recommendation to accept the offer conveys bad news for $v$. For a similar reason, if the board has no superior information relative to shareholders about $v$ or $q$, shareholders would not find its advice meaningful for their decision making. Under those circumstances, shareholders ignore the board’s advice regardless of the takeover offer, and hence the only equilibrium outcome is the no communication benchmark. We conclude,

**Corollary 1** If the valuations $v$ and $q$ are independent, or if target shareholders and the incumbent board are equally informed about $v$, or equally informed about $q$, then all equilibria are non-responsive.
Bidder’s Strategy and Characterization of Responsive Equilibrium

Consider the bidder’s decision of how much to offer shareholders, taking into account the board’s communication strategy and shareholders’ anticipated collective action. The bidder realizes that if shareholders follow the board’s advice there is a positive probability that the takeover will fail. Moreover, because of the collective action problem, the takeover succeeds if only if the offer overvalues the target under the bidder’s management. For these reasons, if shareholders follow the board’s advice, the bidder’s expected profit is strictly less than $b$. By contrast, if the takeover offer is $E[v]$ and shareholders ignore the board’s advice, i.e., condition (5) is violated when $p = E[v]$, then the no-communication benchmark is realized. Proposition 1 implies that in this equilibrium the bidder’s expected profit is exactly $b$ and hence strictly higher. It follows that a responsive equilibrium exists only if shareholders follow the board advice when the bidder offers them $E[v]$. The next result indicates that this requirement is also sufficient, and characterizes the set of responsive equilibria.\(^{22,23}\)

**Proposition 2** When $b > 0$, a responsive equilibrium exists if and only if

$$E[v|q \leq E[v]] < E[v]$$  \hspace{1cm} (7)

If a responsive equilibrium exists, the probability that the takeover succeeds increases with $b$ and converges to 1 as $b \to \infty$. Moreover, the equilibrium offer converges to a price strictly greater than $E[v]$ as $b \to \infty$. In particular, there exist $b^* \geq 0$ and $b^{**} \geq b^*$ such that the responsive equilibrium, if it exists, has the following properties:

(i) If $b < b^*$ the target remains independent with probability 1.

(ii) If $b \in [b^*, b^{**})$ the target is acquired with strictly positive probability smaller than 1, shareholders follow the board’s advice, and $p^*$ satisfies condition (5).

(iii) If $b \geq b^{**}$ the target is acquired with probability 1, shareholders ignore the board’s advice, and $p^* > E[v]$.

\(^{22}\)When $b = 0$ the bidder’s highest expected payoff can always be guaranteed by simply not taking over the target. Therefore, while condition (7) remains sufficient, condition (5) rather than (7) is necessary for the existence of a responsive equilibrium. See the proof in appendix for more details.

\(^{23}\)Note that each of the intervals in Proposition 2 might be empty. However, under any circumstances, either $b^{**} > b^*$ or $\infty > b^* > 0$. 

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The first part of Proposition 2 shows that communication matters if and only if condition (7) holds. If condition (7) is violated, then a responsive equilibrium does not exist, and despite the board’s intention to maximize shareholders’ value, information is never revealed in any equilibrium.

Note that condition (7) is a special case of condition (5) when \( p = E[v] \) and \( s = 1 \). In particular, condition (7) is weaker than (5) since it requires that shareholders follow the board’s advice only if on the equilibrium path \( p^* = E[v] \), but not otherwise. The set of joint distributions that satisfy condition (7) is not empty. For example, it is shown in the appendix that if the target’s valuations are jointly normally distributed, then condition (7) holds if and only if the correlation coefficient is strictly positive. More generally, if the target’s valuations are statistically affiliated then condition (7) holds, but the opposite does not hold.\(^{24}\)

The second part of Proposition 2 demonstrates that the nature of responsive equilibrium, when it exists, crucially depends on the bidder’s private benefits from control \( b \). Intuitively, because of collective action problem, when information can be revealed by the board the bidder is exposed to a *lemons problem*: shareholders sell only when the board reveals that the bidder’s offer is higher than the value of the merged firm.\(^{25}\) Therefore, the bidder’s expected profit, as well as his incentives to take over the target, rely heavily on his private benefits of control. Not surprisingly, the probability that the takeover succeeds increases with \( b \). If bidders who are public firms derive higher private benefits from the acquisition, Proposition 2 is consistent with Bargeron et al. (2008), who find that takeover offers are more likely to be withdrawn if the acquirer is a private firm. (See more discussion in section 4.)

There are three kinds of responsive equilibria, depending on \( b \). First, when \( b \) is sufficiently small the bidder’s private benefits do not compensate him for the expected loss conditional on taking over. Therefore, the bidder refrains from making an offer to shareholders, and the target remains independent with probability one.

Second, when \( b \) is large, in order to eliminate the risk that the board recommends shareholders to reject the offer, the bidder makes an offer sufficiently attractive such that shareholders accept it regardless of the board’s advice. The bidder can convince shareholders to accept the

\(^{24}\)To see why affiliation implies condition (7) note that if \( v \) and \( q \) are affiliated, then \( E(v|q) \) is increasing in \( q \). By the law of iterated expectations, \( E(v|q \leq E(v)) = E(E(v|q)|q \leq E(v)) \) and \( E(v) = E(E(v|q)) \). Therefore, the monotonicity of \( E(v|q) \) implies condition (7).

\(^{25}\)In a different model of tender offers in which the board is absent but target shareholders are privately informed, Marquez and Yilmaz (2008) find that the bidder is subject to a similar adverse selection by shareholders. Baron (1983) shows that this adverse selection also exists when the board is informed and has the authority to reject or accept a takeover offer.
offer only if the price is sufficiently higher than the "fair value" \( E[v] \), and if the communication between shareholders and the board is imperfect. Interestingly, even though the board’s advice is uninformative, it induces the bidder to bid higher than he would in the no-communication benchmark. The threat that the informed board warns shareholders that the offer is inadequate is sufficient to deter the bidder from making one. The bidder finds it optimal to overpay for the target, since otherwise he cannot consume his significant private benefit from control. This property of the responsive equilibrium is of special interest, since even if ex-post the board’s recommendation to shareholders is uninformative and hence ignored, it does not imply that the board breached its fiduciary duty.

Finally, when \( b \) is intermediate the equilibrium outcome is the combination of the scenarios above. On the one hand, the bidder’s private benefit of control are not negligible, hence despite the lemon problem the bidder has incentives to takeover the target even if he has to overpay for it. On the other hand, the bidder’s private benefits from control are not significant either, and the bidder would not pay a premium which is too high. Therefore, the bidder submits an offer such that with probability smaller than one it can be accepted and rejected. In this equilibrium, the board’s advice is informative and shareholders follow the recommendation.

The above discussion implies that in any responsive equilibrium the bidder either strictly overpays for the target, or fails to take it over with a strictly positive probability. Either way, his expected profit is strictly lower than the \( b \), the expected payoff he would have earned in the absence of communication, as was shown in Proposition 1. Therefore, if the bidder could impede communication between target board and shareholders, it would be in his best interest.

**Corollary 2** If \( b > 0 \) then in any responsive equilibrium the bidder’s expected profit is strictly lower than \( b \).

### 2.3 Does The Board’s Advice Increase Shareholders’ Welfare?

This section addresses the implications of the board’s advice on target shareholders’ welfare from an ex-ante perspective. In particular, it compares shareholders’ expected welfare between responsive equilibria and the no-communication benchmark. Ex-ante, the bidder’s identity may be unknown to target shareholders. Let us add the assumption that before the bidder arrives, his private benefits from control are random, distributed with a full support over the non-negative real line, and independent of \( v \) and \( q \).

The next proposition demonstrates that the board can increase target shareholders’ welfare
by advising them. Intuitively, with the help of the incumbent board, target shareholders can extract more surplus from the bidder by rejecting inadequate offers, if such offers were given. Below it is demonstrated that this intuition is true only when the bidder’s private benefits from control are expected to be sufficiently large, but not necessarily otherwise.  

Proposition 3 Suppose ex-ante the bidder’s private benefits from control are uncertain. There exist $\tau \in (0, 1)$ and $\bar{b}, \underline{b} \in [b^*, b^{**}]$ such that compared to the no-communication benchmark,

(i) Shareholders’ welfare is higher in a responsive equilibrium if $\Pr [b > \bar{b}] > \tau$.

(ii) Shareholders’ welfare is lower in a responsive equilibrium if $\Pr [b < \underline{b}] > \tau$ and $E[v - q] > 0$.

Interestingly, shareholders can be worse off under the responsive equilibrium relative to the no-communication benchmark. By following the board’s advice, shareholders can end up with a lower value than what they could have obtained had they ignore it.

To see the intuition, recall that by advising target shareholders the board exposes the bidder to a lemons problem. Shareholders accept the offer only if the board reveals that the bidder pays shareholders more than the target’s expected value under his management. Unless the bidder’s private benefits from control are high enough to compensate him for the overpayment, the bidder is deterred from making the offer. Deterring the bidder is costly to shareholders if ex-ante the bidder is expected to increase the value of the target. Proposition 3 is consistent with Bargeron et al. (2008), who find that target shareholders receive higher premium when the acquirer is a public firm rather than a private firm.

In conclusion, shareholders can do better by coordinating a non-responsive equilibrium which always exists. Furthermore, realizing that its intention to maximize shareholders’ value results with the opposite outcome, the board would rather stay uninformed. If obtaining information on the takeover is costly, the board would not invest in acquiring this information.

3 Biased Board

When the target board is independent and there are no agency problems, recommendations are given, even if not always successfully, in order to increase the wealth of target shareholders.

\footnote{From a social welfare perspective, the takeover should succeed if and only if $b + v > q$ and regardless of the transaction price $p$. In most cases this allocation is not achieved. For example, when $b \notin (b^*, b^{**})$ the allocation of control is independent of $v$ and $q$.}
by guiding them through the optimal decision. However, a control contest can present the board, as well as senior management, with a conflict of interest. Following the discussion in the introduction, conflicts of interests between the target board and its shareholders can have a significant impact on its ability to advise shareholders during the takeover process.

To study the effect of agency problems on the board’s advisory role, the setting is modified as follows. The target board is biased and hence deviates from maximizing shareholders total welfare. Let us denote the board’s bias by parameter $\beta$. Thus, the board’s preferences are given by $W(\phi, p, v, q + \beta)$, where the function $W$ is given by (2). It is assumed that $\beta$ is common knowledge among all agents.\(^{27}\)

The bias $\beta$ captures the additional private benefits or costs that board members have from keeping the target independent. When $\beta > 0$ the board is biased against selling the target. Specifically, as long as the target remains independent, board members gain additional value that does not accrue to target shareholders. For example, board members keep their positions in the target company and hence maintain their prestige and compensation. Either way, once the bidder takes over, the directors and the CEO are removed from their positions and lose these private benefits. Therefore, when $\beta > 0$, the board may recommend rejecting an offer even if the offer benefits target shareholders. Alternatively, when $\beta < 0$ the board is biased for selling the target. In particular, board members incur a private cost if the target remains independent. Intuitively, board members receive large bonuses conditional on a completed transaction (e.g. golden parachute), or get a promise from the bidder to keep their positions in the merged firm. Either way, if $\beta < 0$, the board may recommend accepting an offer even if the offer does not benefit target shareholders. Finally, when $\beta = 0$ the board is unbiased and the analysis is reduced back to section 2.

**How Does the Board’s Bias Affect Communication?**

Seemingly, introducing a bias magnifies the conflict of interest with target shareholders. Therefore, the board’s advisory role would diminish and less information is revealed. Surprisingly, however, in the present model agency problems can enhance the communication between the board and target shareholders. To demonstrate this effect, let us assume from now on in this section that the target’s valuations follow a structure in which the synergy term is constant and known (also implying one dimensional uncertainty).

\(^{27}\) An equivalent representation of the board’s preferences is given by $W(\phi, p, v + \beta, q)$. The only difference is that $\beta > 0$ is interpreted as a bias for selling the target and $\beta < 0$ is interpreted as a bias against selling the firm.
**Assumption (\(\ast\))** The post-takeover value \(v\) is given by \(v \equiv q + \Delta\), where \(\Delta \neq 0\) is a constant commonly known by all agents.

The next lemma shows that if the board’s bias is not extreme, target shareholders ignore the board’s advice if the board is unbiased but would follow the advice if the board is biased.

**Lemma 5** Suppose the bidder offers shareholders \(p^*\) and shareholders ignore the unbiased board’s advice (i.e. condition (5) is violated under assumption (\(\ast\))). Then, there exists \(\underline{\beta} < \bar{\beta}\) such that shareholders follow the biased board’s advice if and only if \(\beta \in (\underline{\beta}, \bar{\beta})\) where \(\Delta \in (\underline{\beta}, \bar{\beta})\), \(\Delta < 0 \Rightarrow \bar{\beta} < 0\), and \(\Delta > 0 \Rightarrow \underline{\beta} > 0\).

Lemma 5 illustrates that the likelihood that target shareholders follow their board’s advice might be strictly higher when there are agency problems. Hence, a bias in the board’s preferences can facilitate revelation of information. The next theorem pushes this result one step further and shows that when the board is biased, by contrast with Theorem 1, full revelation of information becomes feasible in equilibrium.

**Theorem 2** There exists a responsive equilibrium with **full revelation** of information if and only if \(\beta = \Delta\).

Theorem 2 presents knife edge conditions under which full revelation of information is feasible in equilibrium. In particular, it requires that the board’s bias equals the value creation or destruction from the takeover. When \(\beta = \Delta\), the board’s preferences coincide with shareholders’ collective decision rule as represented by (3), and hence full revelation of information is feasible in equilibrium. Importantly, even if \(\Delta\) is stochastic, an equilibrium with full revelation of information exists as long as \(\beta = \Delta\) (i.e. \(\beta\) must be stochastic as well).

To see the intuition for Theorem 2, recall first the reasoning behind Theorem 1. The unbiased board recommends shareholders on actions that would maximize their total welfare, as given by Lemma 2. Shareholders, however, are "selfish", in the sense that each shareholder maximizes his own utility, ignoring how his tendering decision would affect the welfare of others. Given the collective action problem, shareholders’ individual optimal action in equilibrium is different from the collective optimum. Thus, externalities in shareholders’ collective action would lead to disagreement between each individual shareholder and the unbiased board. As was shown
by Theorem 1, this disagreement limits the board’s ability to communicate with shareholders.

By contrast, a biased board does not necessarily recommend shareholders on actions that maximize their total welfare. The board has self-serving reasons to keep the target independent, or to sell it. When the takeover increases value ($\Delta > 0$), shareholders reject the takeover too often compared to the collective optimum (see Lemma 3, part 1). If the board is biased against selling the target ($\beta > 0$), it has additional private benefits from keeping the target independent, and hence would recommend its shareholders rejecting the offer even if it benefits them as a group. When the takeover decreases value ($\Delta < 0$), shareholders are pressured to tender their shares even if the offer would hurt them collectively (see Lemma 3, part 2). If the board is biased for selling the target ($\beta < 0$), it would recommend shareholders to accept an offer even if it undervalues the firm. In either case, the biased board’s preferences are "closer" to shareholders’ individual objective, as opposed to their collective objective. Hence, as Theorems 2 and Lemma 5 indicate, more information can be communicated by a biased board.

Can Target Shareholders Benefit From a Biased Board?

The present analysis illustrates that target shareholders could benefit from having a biased board. The bias serves as a commitment device by the board to provide shareholders with more information about the takeover. If the revelation of information is valuable for shareholders, as the next results shows, shareholders’ ex-ante total welfare is higher when the board is biased.\(^{28}\)

**Proposition 4** Suppose ex-ante the bidder’s private benefits from control are uncertain and a responsive equilibrium does not exist when the board is unbiased (i.e. condition (7) is not satisfied). Then, there exist $\tau \in (0,1)$ and $\bar{b}, \underline{b} > 0$ such that if either $\Pr[b > \bar{b}] > \tau$ or $\Pr[b < \underline{b}] > \tau$ and $E[v - q] > 0$, shareholders’ expected welfare under the management of a biased board ($\beta \neq 0$) is higher than under the management of an unbiased board ($\beta = 0$).

The conditions in Proposition 4 are sufficient but not necessary. In particular, they ensure that more information is revealed by the biased board, and that the revelation of information is indeed valuable for shareholders. Altogether, the proposition demonstrates that agency

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\(^{28}\)Proposition 3 demonstrates that being uninformed about the takeover can benefit target shareholders because of the lemons problem. In this respect, if the biased board has less incentives to communicate its private information to shareholders, the bias is a commitment device for shareholders to remain uninformed, and hence it is beneficial.
problems can increase target shareholders’ welfare in light of collective action problems.\textsuperscript{29}

Similar to the intuition behind Proposition 3, when the bidder motives to acquire the target are expected to be strong, shareholders benefit from the information provided by the board since with more information they can extract surplus from the bidder. Indeed, faced with the risk that target shareholders follow the board’s advice and reject the takeover offer, the motivated bidder raises the tender offer sufficiently high such that shareholders accept it with high likelihood. This scenario is consistent with Bango and Mazzeo (2004), who find that the takeover premium is higher for targets with non independent boards, and that the likelihood that the takeover succeeds, as well as shareholders’ welfare, are higher if the CEO of the target also holds a board chair. In either case, the board is more likely to be aligned with the management rather than with shareholders, and hence is potentially biased.

Alternatively, a biased board can enhance shareholders’ welfare if the takeover decreases value and potential bidders are not self motivated. Intuitively, when the takeover is expected to decrease the target’s value, shareholders are worried that without more information they would be pressured to tender their shares even if the offer is inadequate. As was mentioned in the the discussion that follows Proposition 3, revelation of information by the board creates adverse selection and lemons problem. Hence informed advice can deter value decreasing bidders from taking over the target if their private benefits from control are small. Overall, in those circumstances shareholders are better off under the management of the biased incumbent board.

In conclusion, the analysis above proposes that in light of collective action problems, agency problems can benefit shareholders by increasing the amount of information that is revealed by the board’s advice. Obviously, agency problems also impose costs on shareholders.\textsuperscript{30} For example, a biased board may exploit its authority and approve investments in negative NPV projects, thereby extracting value from target shareholders. Hence, the overall effect of agency problems on shareholders’ welfare becomes ambiguous and potentially negative. In practice, shareholders may have little or no effect on the nature of agency problems in their company. However, if shareholders have any effect, for example, by designing compensation contracts or corporate charters, shareholders would benefit from biasing the board away from maximizing their total welfare whenever solving collective actions problems (in the context of takeovers and in general) is sufficiently important.

\textsuperscript{29}The appendix contains an example which illustrates that the conditions in Proposition 4 are not vacuous. 

\textsuperscript{30}In a different version of this paper it is shown that the results of this section hold even if the bias is modeled as a transfer and therefore imposes direct costs on shareholders.
4 Empirical Predictions

A central theme of the present analysis is identifying factors that could explain the cross-sectional variation of the likelihood that target shareholders follow their board’s recommendations. This section discusses how insights from this analysis could be translated into novel empirical predictions.

Recommendations are often observed directly through the filing of schedule 14d-9 by the target board. Shareholders’ response, however, is observed directly when the takeover is approved but not when the takeover fails. A takeover could fail for reasons which are orthogonal to shareholders’ response. For example, regulatory restriction, bidder’s financial constraints, and anti-takeover defense taken by the target’s CEO. Hence, collecting direct evidence on the reasons behind a failure would alleviate concerns that the inference from a failed transaction is invalid. Once overcoming this hurdle, all else equal, shareholders are more likely to follow the board’s advice when the observed recommendation (accept or reject) and the outcome of the transaction (success or failure) match. Since shareholders follow the board’s recommendation only if it is informative, this conjecture could be verified in the data if the likelihood of a "match" is higher when significant abnormal returns of target’s stock prices around the announcement date are observed.

The first factor that should explain the likelihood of a "match" is the bidder’s private benefit from control $b$. Proposition 2 indicates that the likelihood that shareholders follow the board’s recommendation largely depends on $b$. In particular, larger $b$ implies lower probability that shareholders follow the board’s recommendation.\(^{31}\) The ownership structure of the bidder could proxy for the bidder’s private benefit of control. For example, managers of public bidding firms derive private benefits from the acquisitions and are willing to pay excessively relative to the premiums paid by private bidders. In particular, because of agency problems, managers of a public firms might engage in acquisition activity in order to gain prestige from managing larger firms, to increase consumption of perks, to achieve better compensation, or to reduce the probability of a hostile takeover (see, e.g., Grinstein and Hribar (2004) and Harford and Li (2007)). Altogether, it follows,

Prediction 1  When the acquirer is a public firm (compared to private firm), the likelihood that the board’s recommendation and the outcome of the takeover match is lower.

\(^{31}\)Recall that for low $b$, the bidder does not submit an offer in the first place and hence these cases are not observed.
According to Lemma 4 and Proposition 2, shareholders follow the board’s advice only if target’s valuations are positively interdependent. While valuations $v$ and $q$ are not directly observed, the nature of interdependency could be observed indirectly as follows.

When the motive for the takeover is creating a synergy, the value of the target under the bidder’s management would be incremental to its value as an independent firm (e.g., $v = q + \Delta$). Therefore, valuations $v$ and $q$ are likely to be positively interdependent. At the same time, the combination of the two companies, as well as the continuation of the incumbent management’s employment, are essential for realizing the synergistic gains. Thus, all else equal, when the motive for the takeover is a synergy, the acquirer is more likely to be strategic (e.g., competitors, clients and suppliers) and the incumbent management is more likely to remain in the combined firm.

By contrast, when the motive for a takeover is replacing an inefficient management, the target’s valuations are determined by managerial ability. The bidder’s and the incumbent’s managerial ability are independent of each other, or even negatively interdependent (the bidder’s management is efficient if and only if the incumbent management is inefficient). Therefore, valuations $v$ and $q$ are not likely to be positively interdependent. At the same time, the actual merger of the two firms is not essential, it is only the most effective way to change control and with it the target’s operating strategy. Thus, when the motive for the takeover is disciplinary, the acquirer is more likely to be financial (e.g., private equity firms and hedge funds), and senior management would be removed shortly after the completion of the transaction. To conclude,

**Prediction 2**  The likelihood that the board’s recommendation and the outcome of the takeover match is higher when the acquirer is strategic (rather than financial) and when target’s senior management remains within the combined firm.

All else equal, according to Corollary 1, target shareholders are more likely to follow the board’s recommendation when the board has superior information about both $v$ and $q$. The extent of information asymmetry about target’s valuations could be measured by the proportion of institutional holdings, price volatility, debt rating, and analyst coverage. Also, targets that operate in environment that requires complexity, secrecy, and innovative technology (e.g., high-tech, bio-technology, etc.), are also more likely to be informationally opaque. Finally, the board’s decision to form a special committee to review the takeover offer could also indicate that the board has superior information. To conclude,
Prediction 3 The likelihood that the board’s recommendation and the outcome of the takeover match increases with the level information asymmetry on the fundamental value of the target.

Finally, Theorem 2 and Lemma 5 indicate that the likelihood that shareholders follow their board’s advice, as well as the amount of information that is revealed by the recommendation, are non-monotonic in the board’s bias and follow an inverted U-shape. A plausible proxy for the board’s bias can be, for example, the fraction of non-independent directors in the target board.

Prediction 4 The likelihood that the board’s recommendation and the outcome of the takeover match, as well as the magnitude of abnormal returns of target’s stock prices around the announcement date, are non-monotonic (inverted U-shape) in the fraction of non-independent directors in the target board.

5 Shareholder Activism in Takeovers

Institutional and activist investors can have private information about the prospects of a takeover. Hence, if they believe that the buyout offer treats target shareholders unfairly, they may try to communicate their opinion to small shareholders, swaying them toward a particular action.\textsuperscript{32} To study the possibility of communication between shareholders as a form of shareholder activism in takeovers, I reinterpret the model by assuming that instead of the incumbent board, there exists a privately informed blockholder who advises small shareholders about the tender offer.

Under the above interpretation, the following sequence of events takes place. First, the bidder submits the offer $p$. Second, the blockholder posts a recommendation $m$ to small shareholders. Finally, small shareholders and the blockholder simultaneously decide whether to tender their shares. Importantly, the blockholder cannot commit to a particular tendering strategy in advance, and the target board plays no role in the takeover. In addition, it is assumed that the blockholder maximizes the value of his holdings $\alpha$ in the target, the blockholder is allowed to tender any fraction of his holdings, and the blockholder does not control the target. All other properties of the model are unchanged.

\textsuperscript{32}For some evidence on shareholders activism in takeovers see "Investor Activism Against Mergers on the Rise" https://www.sharkrepellent.net/pub/rs_20070308.html
At the benchmark case, the privately informed blockholder does not communicate with small shareholders, but can tender his shares. To keep the analysis comparable with section 2, in the absence of communication small shareholders are assumed to accept the offer when they are indifferent.\footnote{When the informed blockholder does not communicate with shareholders, there might exist equilibria in which small shareholders play a mixed strategy and the blockholder is pivotal for the outcome of the contest. In those equilibria, small shareholders condition their tendering decision on the information that must be true when the takeover succeeds. The assumption on pure strategies is meant to emphasize the revelation of information through the communication channel. The analysis of the responsive equilibrium, however, considers mixed strategies. Thus, there is no concern that more information could be revealed through communication if small shareholders were allowed to play mixed strategies.} Under these modifications, the outcome of the no-communication benchmark of the model in this section coincides with Proposition 1.

The main deviation of this setup from the analysis in the previous sections is the ability of the blockholder to act against his own recommendation. Similar to small shareholders, if the blockholder expects that the takeover succeeds, he has incentives to keep as many of his shares as possible (subject to the approval of the takeover) if and only if \( p < v \). By contrast, if small shareholders follow the blockholder’s recommendation, the blockholder has incentives to recommend them to tender their shares if and only if \( q < \max \{ p, v \} \). The gap between what the blockholder recommends small shareholders and what he eventually ends up doing stems from free-riding of the blockholder on small shareholders. In particular, in order to facilitate the takeover, the blockholder recommends small shareholders to tender their shares. At the same time, in order to enjoy the full benefit of the takeover, the blockholder keeps his share and becomes the minority shareholder of the merged firm. Shareholders anticipate this opportunistic behavior and limit the extent to which they follow the blockholder’s advice.

The next result shows that the blockholder’s advisory role is weaker than the board’s advisory role that was studied in section 2. However, if the blockholder is concerned about ruining his reputation by acting against his own advice, the board’s and the blockholder’s advisory roles are the same.

**Proposition 5** There is no equilibrium in which the blockholder fully reveals his private information. Moreover, when \( b > 0 \) a responsive equilibrium exists if and only if,

\[
E[v|q \leq \max \{ v, E[v] \}] < E[v] \tag{8}
\]

where condition (8) is sufficient but not necessary for condition (7). If it is too costly for the blockholder to act against his own advice, a responsive equilibrium exists if and only if condition...
Interestingly, going back to the interpretation of the target board as an advisor to shareholders, Proposition 5 implies that if the board is allowed to participate in the tender offer but is constrained to "put its money where its mouth is", the analysis is unchanged compared to sections 2 and 3.

Note that for very similar reasons to those given in section 3, Theorem 2 holds in this setting even when the blockholder is not concerned about its reputation (see the appendix). Therefore, a conflict of interests between a blockholder and small shareholders can improve the communication and the effectiveness of shareholder activism in takeovers.

6 Application To Debt Restructuring

This section discusses at an intuitive level the analogy between tender offers and debt restructuring, and demonstrates that the main insights of the paper can be applied to study communication in this context as well.

Consider a financially distressed firm. The firm cannot service its outstanding liabilities as they come due. To avoid liquidation (or alternatively Chapter 11), the firm has offered its existing lenders to convert their debt holding to equity. For simplicity, suppose that the reorganization plan is taken as given and that existing shareholders lose their entire holdings in the reorganized firm. The reorganization plan succeeds if and only if the majority of lenders agree to restructure their claims. In this case, the firm survives and its long term value is realized. Otherwise, the firm defaults and the proceeds from its liquidation are distributed according to the absolute priority rule of the existing claims.

The analogy between debt restructuring and tender offers is the following. First, in tender offers the collective action problem hinges upon the decision of the dispersed shareholders of the target company to sell their holding to the bidder. Similarly, during debt restructuring, the collective action problem is the result of the decision of multiple lenders to substitute equity for their debt holding. Second, the firm’s liquidation value during debt restructuring is the analogous to the pre-takeover target value in tender offers. Both valuations are realized if and only if the status quo is unchanged. Third, the long term value of the reorganized firm plays the role of the takeover offer. In tender offers, tendering shareholders receive the offer conditional on the approval of the takeover. During debt restructuring, lenders who agree to convert their
holdings obtain the long term value of the firm if and only if the firm is successfully reorganized. Finally, if the tender offer succeeds, the non-tendering shareholders hold on to their share and become the minority shareholders of the acquired firm. Hence, non-tendering shareholders obtain the post-takeover value. The corresponding term in debt restructuring is the face value of debt. Lenders who choose to remain debt-holders, receive the face value of their claim if the firm is successfully reorganized.34

Given the above analogy, it is apparent that debt restructuring exhibits externalities among lenders. Similar to tender offers, regardless of the long term value of the reorganized firm, there always exists an equilibrium in which lenders reject the reorganization plan and the firm is liquidated. The reorganization plan can succeed in equilibrium only if lenders expect that the firm’s long term value would exceed the face value of debt. Otherwise, lenders are individually better off by remaining debtholders if they anticipate that the reorganization plan would succeed.35 Overall, similar to tender offers, collective action problems among lenders can lead to inefficient outcomes (inefficient liquidation and reorganization).

Credit rating agencies, regulators, and large institutional creditors are examples of market participants who may have relevant private information about the liquidation value of the firm’s assets and the prospects of the reorganization plan. These agents may also be in the position to advise lenders during debt restructuring. By communicating their private information, they can affect lenders’ collective action, and thereby the outcome of the reorganization.

Consider one of the above market participants as an advisor to lenders. Before lenders decide whether to accept or reject the reorganization plan, the advisor can post a public recommendation based on his private information. Let us assume that the advisor’s objective is to maximize the total value of lenders’ holding. Similar to Theorem 1, truthful revelation of information is infeasible in equilibrium, as long as there is a positive probability firms’ long term value is greater than its liquidation value but smaller than the face value of its liabilities. In those circumstances, because of the collective action problem, lenders’ collective objective departs from their individual objective. Lenders refuse to make concessions by converting their debt

34The analogy between our model of tender offers and debt restructuring embeds, however, two main differences. First, the face value of debt is known to be deterministic while in our model the post-takeover value of the target is uncertain. Second, the takeover offer in our model is deterministic but endogenous, whereas the long term value of reorganized firm’s assets can be stochastic, but exogenous. In an alternative setting, the long term value of the reorganized firm is endogenous if existing shareholders offer lenders a reorganization plan that restructures the operation of the firm, as well as its capital structure.

35It is implicitly assumed that lenders are not pivotal. Moreover, if lenders are indifferent, they always agree to convert their debt holding to equity. Therefore, when the firm is reorganized and becomes unleveraged, an individual lender faced with no credit risk.
to equity, and the firm is inefficiently liquidated. In order to prevent the inefficient liquidation, the advisor would need to falsely claim that the long term value of the firm is higher than the face value of its liabilities. Overall, information can not be truthfully revealed by the advisor.\footnote{36}

Similar to the intuition behind Theorem 2, communication might be enhanced if the advisor is biased in favor of the firm’s liquidation. For example, if the advisor is a regulator who is concerned with its reputation for protecting creditors’ rights, the regulator might prefer liquidating a viable firm in order to deter opportunistic behavior (e.g. strategic default) by other companies. A privately informed institutional creditor could be biased if it has incentives to signal rigidity when bargaining with insolvent portfolio companies. Alternatively, the institutional creditor may be subject to private liquidity shock, and hence would rather liquidate a viable firm in order to address its own financial constraints. In all of these cases, communication between the advisor and lenders might be enhanced relative to the case of unbiased advisor.

Interestingly, if the advisor’s objective is to maximize the firm’s value rather than its lenders’ value, misreporting arises also when the firm’s long term value is smaller than its liquidation value but greater than the face value of its liabilities. In these cases, lenders approve the reorganization plan despite its inefficiency. In order to persuade lenders to reject the plan, the advisor would falsely report that the firm’s long term value is lower than the expected proceeds of debt holders under liquidation. Hence, information cannot be fully revealed. Again, communication might be enhanced if the advisor is biased in favor of the firm’s survival. For example, a credit rating agency (or even a large creditor) could be biased against the firm’s liquidation if it anticipates future business with the incumbent management, or in order to justify its previous optimistic credit rating of the firm.

### 7 Extensions

This section discusses the robustness of the main results in sections 2 and 3 to alternative specifications of the model.

\footnote{36}Recall that unlike our model of tender offers in which the offer is endogenous, the reorganization plan is given exogenously. Hence, the collective action problem does not create adverse selection when information is revealed. Therefore, lenders are always better off when more information is revealed by an unbiased advisor. \footnote{35}
7.1 Bidder’s Private Information

Our model assumed that the target board has better information than the bidder about the takeover. The bidder, however, may have private information about his ability to manage the merged firm. In this case, the no-communication benchmark would coincide with Shleifer and Vishny’s (1986) model of takeovers. When communication is introduced, the interaction between the bidder’s signaling and the board’s cheap talk can lead to multiple equilibria at the bidding stage. Among these equilibria, however, there exists an equilibrium with similar properties to that in section 2. In particular, in the appendix I show that the conditions under which a responsive equilibrium exists are very similar to condition (5) in Lemma 4. For example, if \( v \) and \( q \) are independent, no information is revealed by the unbiased board in any equilibrium in this setup as well. The main difference in the analysis stems from the information that is embedded in the bidder’s decision to take over the target, which is taken into account by the board, as well as by shareholders.

Importantly, when the conditions of Theorem 2 are met, full revelation of information by a biased board is feasible for any given offer and joint density (see remark on Theorem 2 in the appendix). Thus, Theorem 2 holds even when the bidder has private information, and therefore the board’s bias may improve communication in the current setup as well. Finally, similar to Proposition 3, because of the collective action problem, shareholders could be worse off in responsive equilibrium even when the bidder has private information on \( v \) and the incumbent board is unbiased.

7.2 "Sweetened" Bid

In practice, bidders may revise their takeover offer once the target board post a recommendation to its shareholders. For example, bidders often sweeten the initial bid if the target board recommends its shareholders to reject the offer. To account for this possibly, the model is modified by assuming that once the target board’s recommendation is made public, but before shareholders make their tendering decision, the bidder has the option to revise his initial bid, possibly at a cost.

Unlike the case of full commitment, the board may try to manipulate its recommendation in different ways in order to inflate the price shareholders receive. This additional motive further limits the board’s advisory role, and as is shown in the appendix, a responsive equilibrium is less likely to exist. To see the intuition, suppose revising the offer is costless. The initial offer
is effectively irrelevant since the bidder always finds it optimal to revise it to the updated value of the target $E[v|m]$. Therefore, the bidder acquires the target for sure and pays $E[v|m]$. If there is an equilibrium where $m$ conveys information, the board sends the message that leads to the highest inference possible, regardless of its private information. Therefore, no information is revealed in equilibrium and the no-communication benchmark is realized. Note that in this case the additional motive to inflate the price limits effective communication even if the board is biased and $\beta = \Delta$. However, when the cost of revision is sufficiently high, revising the bid is too costly to be credible by the bidder, and similar to the full commitment case (when the cost of revision is infinite), a responsive equilibrium may exist under a similar conditions. Moreover, full revelation of information is feasible in equilibrium if and only if $\beta = \Delta$.

Interestingly, more information can be revealed by the board when the bidder’s commitment power is high. Following the intuition of Corollary 2, the bidder could be better off with less commitment power not to revise the initial bid.

### 7.3 Freezeout Merger

Similar to Grossman and Hart’s (1980) framework, the present analysis assumes that non-tendering target shareholders can de facto hold on to their shares, thus becoming minority shareholders in the surviving firm. In practice, however, the winning bidder might decide to take the target private in what is known as a “freezeout merger”. In a freezeout merger non-tendering shareholders are forced to be cashed out in return for a valuation which could be lower than the post-takeover value of the target $v$.

At the extreme, if the freezeout is exactly on the same term as the preceding tender offer $p$ with probability one, similar to a voting mechanism, the outcome of the contest applies to all shareholders regardless of their actual individual decision. In these circumstances, collective action problems (e.g., free-riding or the pressure to tender) are absent and shareholders’ individual objective would coincide with their collective optimum. Therefore, information can be fully revealed by an unbiased advisor.

Shareholders, however, are granted with an appraisal right and hence hold some bargaining power in freezeout mergers.\footnote{Consistent with this view, Bates et al (2006) find that minority shareholders receive more than their pro rata share of the deal surplus in freeze-out offers. See also Muller and Panunzi (2004) sections IV and V for a useful discussion of the legal environment of the tender offers in the US.} Importantly, as long as non-tendering shareholders are expected to capture a fraction of the surplus $v - p$, even if the fraction is arbitrarily small, collective
action problems continue to persist and all the results of the paper go through.

8 Concluding Remarks

This paper has explored the communication between target board and its shareholders in the context of a takeover attempt. The main results show that collective action problems among target shareholders limit the target board’s ability to properly advise shareholders whether accepting a buyout offer is in their best interest, even in the absence of agency problems. Surprisingly, a conflict of interest between the board and its shareholders could enhance revelation of information and increase shareholders’ welfare. The analysis provides a novel set of predictions that relate the incidence that target shareholders follow their board recommendations to observable characteristics of the bidder, the target, and the transaction. Below I conclude with several remarks and suggestions for future research.

In the US, especially where Delaware jurisdiction applies, target boards may retain a formal or informal veto power on the approval of a takeover. The present study suggests that even when the board is independent, the question of optimal delegation of veto power involves a tradeoff for shareholders. On the one hand, a delegation of a veto power to the informed board could lead to a more informed decision. On the other hand, if shareholders choose not to delegate this authority, they commit to remaining relatively uninformed and being subject to collective action problems. As was demonstrated in the analysis of this paper, shareholders can benefit from these implicit forms of commitment power. The optimal delegation of veto power in the context of takeovers could be an interesting topic for future research.

The analysis of this paper suggests that the mode of the takeover can affect the quality of communication between target shareholders and their advisor. For example, freezing out non-tendering shareholders exactly on the same term as the preceding tender offer, could facilitate revelation of information by an unbiased board. While bidders often find freezeout mergers ex-post desirable, the anticipation of a subsequent freezeout merger may force the bidder to offer target shareholders a higher premium in order to win the contest. Hence, freezeout mergers have an ambiguous effect on the bidder’s profits. In this light, it would be interesting to explore the bidder’s ex-ante decision of how to acquire the target and its consequences on the quality of communication between target’s shareholders and their advisor.

Finally, the main result of the paper that an expert’s bias could be valuable, has a broader flavor. Key to the result is agents’ inability to coordinate their collective action when it exhibits
externalities. Developing the insights from the present analysis to study other applications could be fruitful area for future research. Examples of such applications could be central banks’ disclosure policy when externalities among financial institutions have macro-economic consequences, the communication of leader’s superior knowledge to subordinates when team work within the organization is subject to free-riding or herding, and public announcements by regulators in an attempt to prevent bank runs.

In the context of bank runs, for example, the regulator’s recommendation to the bank’s depositors would not have the desirable impact if the regulator’s objective is to maximize depositors’ social welfare or to preserve the stability of the banking system by rescuing non-viable banks. The reasoning hinges upon the collective action problem that depositors are faced with. As was first argued by Diamond and Dybvig (1983), depositors might collectively withdraw their money from the bank despite the social loss. The analysis of this paper suggests the regulator’s reliability might improve if depositors believe that the regulator has incentives to deter opportunistic behavior in the financial system by letting a particular bank to collapse despite its economic vitality. Foreseeing these incentives, depositors would find the regulator’s recommendation not to withdraw their deposits more credible, and hence would follow it more often. Future research in this direction might shed more light on the role of regulators’ public announcements in coordinating and preventing bank runs.
References


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[40] "Voting Integrity - Practices for Investors and the Global Proxy Advisory Industry" 2009 Millstein Center for Corporate Governance and Performance, Yale School of Management, Policy briefing no. 3.

Appendix I - Proofs of Sections 1-5

Table 1 - Notation

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
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<tbody>
<tr>
<td>$k$</td>
<td>Majority requirement (half in the main text)</td>
</tr>
<tr>
<td>$v$</td>
<td>Target’s post-takeover value</td>
</tr>
<tr>
<td>$q$</td>
<td>Target’s pre-takeover value</td>
</tr>
<tr>
<td>$\Delta$</td>
<td>$\Delta \equiv v - q$</td>
</tr>
<tr>
<td>$f$</td>
<td>Joint P.D.F of $v$ and $q$</td>
</tr>
<tr>
<td>$[l, h]$</td>
<td>The support of $v$ and $q$</td>
</tr>
<tr>
<td>$p$</td>
<td>The tender offer</td>
</tr>
<tr>
<td>$b$</td>
<td>Bidder’s private benefit of control</td>
</tr>
<tr>
<td>$\phi$</td>
<td>Shareholders’ tendering strategy</td>
</tr>
<tr>
<td>$\phi^*$</td>
<td>Ex-post optimal tendering strategy</td>
</tr>
<tr>
<td>$\Pi$</td>
<td>Bidder’s expected profit</td>
</tr>
<tr>
<td>$W$</td>
<td>Shareholders’ expected total welfare</td>
</tr>
<tr>
<td>$m$</td>
<td>Target board message</td>
</tr>
<tr>
<td>$\mu$</td>
<td>Target board’s communication strategy</td>
</tr>
<tr>
<td>$\beta$</td>
<td>The board’s bias</td>
</tr>
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</table>

Proof of Lemma 1. I prove Lemma 1 for the general case in section 2 (that is, once $m$ becomes public and given the board’s equilibrium communication strategy $\mu$). Suppose in equilibrium $\phi < k$. Since no individual shareholder is pivotal, by a version of the strong law of large numbers the takeover fails. Since the offer is conditional on the success of the transaction, each shareholder is indifferent between tendering and keeping his share, and thus $\phi < k$ is an equilibrium for any $p$ and $m$. Suppose $p \geq E[v|m,p]$, then if $\phi \geq k$, by a version of the strong law of large number each shareholder expects the firm to be acquired with probability one. Hence, each shareholder tenders his share $\leftrightarrow p \geq E[v|m,p]$. If $p > E[v|m,p]$ then each shareholders strictly prefer to tender his share, and hence the only equilibrium is $\phi = 1$. If $p = E[v|m,p]$ then each shareholder is indifferent and hence may play any $1 > \phi \geq k$ as well.

Proof of Lemma 2. By a version of the strong law of larger numbers, a takeover is always successful with probability either one or zero. In particular, the takeover succeeds $\leftrightarrow \phi > k$. 43
It follows, any strategy \( \phi \in (k, 1) \) is strictly inferior to \( k \) and hence \( \phi^* \in \{0, 1, k\} \). For the ease of the exposition let \( W(\phi) = W(\phi, p, v, q) \). According to (2), \( \phi^* = 1 \Leftrightarrow W(1) > \max \{W(0), W(k)\} \Leftrightarrow p > \max \{v, q\} \). Similarly, \( \phi^* = 0 \Leftrightarrow W(0) > \max \{W(1), W(k)\} \Leftrightarrow p < \min \{q, \frac{q-v(1-k)}{k}\} \). In all other cases \( \phi^* = k \). Rearranging terms yields (4).

**Proof of Lemma 3.** I argue that \( \phi^* \neq \phi \Leftrightarrow \) either \( v > q \) and \( p \in \left(\frac{q-v(1-k)}{k}, v\right) \), or \( v \leq q \) and \( p \in (v, q) \). The combination of the following cases completes the proof:

1. If \( v > q \) then \( \min \left\{ q, \frac{q-v(1-k)}{k} \right\} = \frac{q-v(1-k)}{k} < v \). According to the proof of Lemma 2, \( v > q \Rightarrow \phi^* = 1 = \phi \), \( p < \frac{q-v(1-k)}{k} \Rightarrow \phi^* = 0 = \phi \), and \( p \in \left(\frac{q-v(1-k)}{k}, v\right) \Rightarrow \phi^* = k > 0 = \phi \).

2. If \( v < q \) then \( \min \left\{ q, \frac{q-v(1-k)}{k} \right\} = q > v \). According to the proof of Lemma 2, \( p \geq q \Rightarrow \phi^* = 1 = \phi \), \( p < v \Rightarrow \phi^* = 0 = \phi \), and \( p \in (v, q) \Rightarrow \phi^* = 0 < 1 = \phi \).

**Proof of Theorem 1.** Suppose by the way of contradiction that the board fully reveals its private information in equilibrium. Since the possibility that the takeover is value increasing can never be ruled out (and \( v \) is unbounded from above), given the assumptions on \( f \), there is a strictly positive probability that \( p^* \in (q, v) \) for any \( l \leq p^* < \infty \). In which case, \( \phi^* > 0 \) (Lemma 2). But, if the board truthfully reveals \( v \), shareholders play \( \phi = 0 \) (expression (3)). Therefore, the board has strict incentives to misreport that \( p^* \geq v \), a contradiction.

Next, before proving that the first best is not obtained, denote by \( \Phi(p^*) \subseteq [0, 1] \) the set of actions (tendering probabilities) that are implemented with a strictly positive probability in equilibrium given offer \( p^* \). We use the notation \( \phi^{-1}(x) \subseteq [0, 1] \) to denote the set of messages that in equilibrium trigger \( \phi = x \in \Phi(p^*) \). We show that \( \Phi(p^*) \supseteq \{0, 1, k\} \) for any \( p^* \) and hence the first best is not implementable. Suppose by the way of contradiction that there exists \( p^* \) such that \( \Phi(p^*) \supseteq \{0, 1, k\} \). According to Lemma 3, \( \phi^* = k \Leftrightarrow v \in V_k \equiv \{v : v > q \land p^* \in \left[ v - \frac{v-q}{k}, v \right]\} \). Thus, if \( \Phi(p^*) \supseteq \{0, 1, k\} \), all types of boards with \( v \in V_k \) strictly prefer to send message \( m \in \phi^{-1}(k) \) over \( m \notin \phi^{-1}(k) \). By definition of \( V_k \), if \( v \notin V_k \) then the board strictly prefer \( m \in \phi^{-1}(1) \) or \( m \in \phi^{-1}(0) \) over \( m \in \phi^{-1}(k) \). Since \( \Phi(p^*) \supseteq \{0, 1, k\} \) then \( \phi^{-1}(0) \) and \( \phi^{-1}(1) \) are not empty. Hence, conditional on observing message \( m \in \phi^{-1}(k) \), shareholders conclude that \( v \in V_k \Rightarrow p^* < v \Rightarrow E[v|m \in \phi^{-1}(k), p^*] > p^* \). Therefore, \( \phi(m \in \phi^{-1}(k), p^*) = 0 \) (expression (3)). This contradicts the assumption that \( \phi(m \in \phi^{-1}(k), p^*) = k \).
Proof of Lemma 4. Since any tendering strategy below \( k \) is equivalent to rejecting the offer, without the loss of generality I restrict attention to \( \Phi(p^*) \subseteq \{0\} \cup [k, 1] \). I argue that \( \Phi(p^*) \subseteq \{0, s\} \) for some \( s \in [k, 1] \). The proof has several steps. First, note that in any equilibrium \( \Phi(p^*) \subseteq \{0, 1, s\} \) where \( s \in [k, 1] \). The reason is that when \( \phi \in [k, 1] \) shareholders get \( sp + (1 - s)v \). Hence the optimal decision must be a corner solution: either tendering with probability one or tendering with the lowest probability subject to a successful takeover, i.e. \( \min \Phi(p^*) \cap [k, 1] \). Any other offer, is strictly suboptimal. Second, repeating the argument that the first best is not implementable in the proof of Theorem 1 leads to \( \Phi(p^*) \supseteq \{0, 1, s\} \). Finally, note that \( \Phi(p^*) \neq \{1, s\} \). Otherwise, according to (2) \( m \in \phi^{-1}(s) \iff (1 - s)v + sp^* > p^* \iff v > p^* \). Thus, \( m \in \phi^{-1}(s) \Rightarrow v > p^* \Rightarrow E[v|m \in \phi^{-1}(s), p^*] > p \) and \( \phi(m \in \phi^{-1}(s), p^*) = 0 \neq s \) a contradiction. We established that \( \Phi(p^*) \subseteq \{0, s\} \).

According to (2), the board prefers sending a message that triggers a rejection, \( m \in \phi^{-1}(0) \), over a message that leads to an approval, \( m \in \phi^{-1}(s) \iff (1 - s)v + sp^* \geq q \). According to (3), shareholders accept the offer \( \iff E[v|m, p] \leq p \). To see the "if" direction of the statement note that if there exists \( s \in [k, 1] \) such that (5) is satisfied, there is an equilibrium in which the board sends only two messages: \( m_0 \) and \( m_s \). The board sends \( m_s \) when \( (1 - s)v + sp^* \geq q \) and otherwise it sends \( m_0 \). All other messages are ignored. Since (5) is satisfied, shareholders would follow the board’s advice as reflected by the message. To see the "only if" direction, suppose there is an equilibrium in which shareholders follow the board advice. Then, it must be that \( \Phi(p^*) = \{0, s\} \) for some \( s \in [k, 1] \). Otherwise, in any equilibrium shareholders take the same action regardless of the board’s message. Recall that shareholders tender with probability \( s \in [k, 1] \) when \( m \in \phi^{-1}(s) \) only if \( E[v|m \in \phi^{-1}(s), p^*] \leq p^* \). By integrating over all messages \( m \in \phi^{-1}(s) \) it must be that \( E[v|q \leq \phi p^* + v(1 - \phi)] \leq p^* \). Similarly, by integrating all messages \( m \in \phi^{-1}(0) \) it must be that \( E[v|q > sp^* + v(1 - s)] > p^* \). Finally, when \( s < 1 \) shareholders play mixed strategy and hence must be indifferent. Therefore, the left hand side of (5) must hold with equality. We conclude, condition (5) holds as required.

Proof of Corollary 1. When \( v \) and \( q \) are independent, point by point, \( E[v|v \geq \frac{q - sp^*}{1 - s}, q] \geq E[v|v < \frac{q - sp^*}{1 - s}, q] \) implying that \( E[v|v \geq \frac{q - sp^*}{1 - s}] \geq E[v|v < \frac{q - sp^*}{1 - s}] \) and therefore contradicting condition (5). To see the second part of the corollary, suppose that the board and shareholders are equally informed about \( v \). Thus, shareholders cannot learn from the board on \( v \) information that they do not already know. Since according to (3) shareholders’ decision depends on their estimation of \( v \) but is independent of \( q \), shareholders would ignore the board’s advice regardless of the offer, even if the board’s recommendation convey information on \( q \). Alternatively, suppose the board has no superior information about \( q \) compared to shareholders. Denote by \( I_q \) the public information on \( q \). If by the way of contraction a responsive equilibrium exists, the
board recommends shareholders to reject the offer \( \Leftrightarrow E[q|I_q] \leq sp^* + v(1 - s) \). It follows that
\[
E \left[ v | v \geq \frac{E[q|I_q] - sp^*}{1-s} \right] > E \left[ v | v < \frac{E[q|I_q] - sp^*}{1-s} \right]
\]
and hence with respect to \( I_q \), condition (5) is violated. We conclude that the only equilibrium is non-responsive. \( \blacksquare \)

**Proof of Proposition 2.** I first prove that when \( b > 0 \) a responsive equilibrium exists \( \Leftrightarrow (7) \) holds. Suppose \( p^* = E[v] \). I argue that shareholders follow the board’s advice \( \Leftrightarrow (7) \) holds. According to Lemma 4, when \( s < 1 \) and \( p^* = E[v] \) shareholders follow the board’s advice \( \Leftrightarrow 
\[
E[v|q \leq sE[v] + v(1 - s)] = E[v] < E[v|q > sE[v] + v(1 - s)]
\]
However, \( E[v|q \leq sE[v] + v(1 - s)] = E[v] \) implies that \( E[v|q > sE[v] + v(1 - s)] = E[v] \) as well, and hence condition (5) is violated. Therefore, \( s = 1 \). When \( p^* = E[v] \) shareholders follow the board’s advice \( \Leftrightarrow 
\[
E[v|q \leq E[v]] < E[v] < E[v|q > E[v]] \Leftrightarrow E[v|q \leq E[v]] < E[v]
\]
Next, if condition (7) holds then a responsive equilibrium exists: either \( p^* \neq E[v] \) or \( p^* = E[v] \) and shareholders follow the board’s advice. Suppose a responsive equilibrium holds, and condition (7) is not satisfied. Since (7) is violated, when the bidder offers \( p^* = E[v] \) shareholders ignore the board’s advice and accept the offer. The no-communication benchmark is realized and the bidder’s expected profit is \( b > 0 \). If the bidder offers \( p^* \neq E[v] \) there are two cases. First, shareholders ignore the board’s advice and hence the bidder’s expected profit is \( 1_{(p^* > E[v])} (b + E[v|p^*]) \). Second, shareholders follow the board’s advice and hence condition (5) is satisfied. In that case he target remains independent with a positive probability, and the target is acquired \( \Leftrightarrow p^* \geq E[v|m \in \phi^{-1}(s), p^*] \). Either way, the bidder’s expected profit is strictly less than \( b \). Therefore, the bidder has strict incentives to offer \( p^* = E[v] \), and the equilibrium is non-responsive, a contradiction.\(^{38}\)

Consider the second part of the theorem. Define by \( \Lambda \) the set of prices that satisfy condition (5), and note that condition (7) \( \Rightarrow E[v] \in \Lambda \) and hence \( \Lambda \) is not empty. Let the bidder’s expected profit conditional on making an offer \( p \in \Lambda \) be \( \Pi(b,p) \). If \( p \) satisfies (5) with \( s = 1 \) then \( \Pi(b,p) = \text{Pr}[q \leq p](E[v|q \leq p] - p + b) \). Else, \( \Pi(b,p) = b\text{Pr}[q \leq sp + v(1 - s)] \) for some \( s \in [k,1) \). No assumption is made on the selection of equilibria if more than one \( s \in [k,1] \) satisfies condition (5) given \( p \). Let \( p(b) \in \text{arg max}_{p \in \Lambda} \Pi(b,p) \). I argue that there exists \( b_\Lambda \in \)

\(^{38}\)When \( b = 0 \) the bidder can not gain more than zero because of free riding, and hence can guarantee the maximal expected payoff by not taking over the target. Thus, the bidder is indifferent among all prices that satisfies (5) with equality on the the left hand side. It follows that condition (7) is only sufficient but not necessary. Instead condition (5) is necessary when \( b = 0 \).
\([0, \infty)\) such that \(\Pi(b, p(b)) \geq 0 \Leftrightarrow b \geq b_\Lambda\). To see why, note that \(\Pi(0, p(0)) \leq 0\) by definition of \(\Lambda\), and \(\Pi(b, p(b)) > 0\) for all \(b \geq l - \inf \Lambda\). To complete the argument note that \(\Pi(b, p)\) strictly increases in \(b\), and hence \(\Pi(b, p(b))\) strictly increases in \(b\) as well.

Next, define \(\Gamma \equiv \{p : p > E[v] \wedge p \notin \Lambda\}\) and note that if \(p \in \Gamma\) then shareholders ignore the board’s message and the target is taken over with probability 1. If \(p \notin \Lambda \cup \Gamma\) then the target remains independent with probability 1. If \(\Gamma\) is not empty, then \(\inf \Gamma < \infty\). From the continuity of \(f\), if condition (7) holds then there exists small \(\delta > 0\) such that condition (5) holds for \(E[v] + \delta\) as well. Hence \(\inf \Gamma > E[v]\). Subject to \(p \in \Gamma\) the target is taken over with probability one regardless of the price, and hence the bidder chooses \(p = \inf \Gamma\) and earns \(E[v] - \inf \Gamma + b\). It is immediate to see that the bidder’s profit is strictly positive \(\Leftrightarrow b > b_\Gamma \equiv \inf \Gamma - E[v] > 0\). If \(\Gamma\) is empty then \(\inf \Gamma = \infty\) and for notational convenience let \(b_\Gamma = \infty\).

Let \(b^* \equiv \min \{b_\Gamma, b_\Lambda\} \geq 0\) and note that the bidder makes an offer \(\Leftrightarrow b \geq b^*\). I argue that the probability of success weakly increases in \(b\) when \(b \geq b^*\). Suppose it is not. Then, there exist \(b'' > b' \geq b^*\) where \(\varphi'' \equiv \Pr[q \leq s''p'' + v(1 - s'')] < \Pr[q \leq s'p' + v(1 - s')] \equiv \varphi'\) and \(p(b') = p', p(b'') = p''\). Hence, if \(\varphi' < 1\) then

\[
\Pi(p'', b'') = \Pi(b', p'') + (b'' - b') \varphi'' \\
\leq \Pi(b', p') + (b'' - b') \varphi'' \\
< \Pi(b', p') + (b'' - b') \varphi' = \Pi(b'', p')
\]

which contradicts the optimality of \(p''\) with respect to \(b''\). In the first inequality we use the optimality of \(p'\) with respect to \(b'\), and in the second inequality we use \(\varphi'' < \varphi'\) and \(b'' > b'\). Note that this argument holds even if \(\varphi' = 1\) and \(p' \in \Gamma\). In that case we replace \(\Pi(b', p')\) with \(E[v] - \inf \Gamma + b\) and since type \(b'\) optimally choose \(p' \in \Gamma\) over \(p'' \in \Lambda\), it can be verified that everything goes through. If the probability of success increases in \(b\) when \(b \geq b^*\), then there exists \(\infty \geq b^{**} \geq b^*\) such that \(p^* \in \Lambda \Leftrightarrow b \in [b^*, b^{**})\) and \(p^* \in \Gamma \Leftrightarrow b \geq b^{**}\).

Note that either \(b_\Gamma > b_\Lambda\) in which case it must be that \(b^{**} > b^*\), or \(b_\Gamma \leq b_\Lambda\) in which case \(\infty > b^* > 0\). To see the former note that if \(b_\Lambda < b_\Gamma\) and \(b \in (b_\Lambda, b_\Gamma)\) then the bidder makes a strictly positive payoff if and only if \(p \in \Lambda\) and therefore the region \((b^*, b^{**})\) cannot be empty. To see the latter, recall that \(b_\Gamma > 0\) and hence if \(0 \leq b < b_\Gamma \leq b_\Lambda\) then the bidder is better offer by not taking over the target and \(b^* = b_\Gamma > 0\). Since \(b_\Gamma \leq b_\Lambda\) and \(b_\Lambda < \infty\) it follows that \(b^* < \infty\) as well.

Next, I show that when \(b \to \infty\) the probability of success converges to one. If \(b^{**} < \infty\) then \(p^* \in \Gamma\) for large \(b\) and this property holds by the definition of \(\Gamma\). If \(b^{**} = \infty\) then either \(\Gamma\) is empty or it is never optimal to bid in \(\Gamma\). Suppose by the way of contradiction that the probability of success is bounded away from one, and let this upper bound be \(\bar{\varphi} \in (0, 1)\). It
follows, the bidders’ profit is bounded from above by $\varphi b$. Consider the following alternative bidding strategy. If $\Gamma$ is empty then $h = \infty$ and $\Lambda \supset [E[v], \infty)$. Hence a sequence where $\hat{p}_b = \gamma b$ for some $\varphi < \gamma < 1$ is in $\Lambda$ and satisfies $\hat{p}_b \to \infty$. If $\Gamma$ is not empty let $\hat{p}_b = \inf \Gamma$. Either way, the probability of success converges to 1 and $E[v|q \leq s_b \hat{p}_b + v (1 - s_b)]$ converges to $E[v]$. Subject to the alternative strategy $\hat{p}_b$, the bidder’s profit converges to $\infty$ at a rate greater than $\gamma$, which is strictly higher than $\varphi$. Hence, for large $b$ it is optimal to deviate and offer $\hat{p}_b$. Therefore $\varphi < 1$ could not exist.

Last, I argue that the takeover offer converges to a level strictly higher than $E[v]$. If $b^* < \infty$ then $p^* = \inf \Gamma > E[v]$ for $b > b^*$. Suppose by the way of contradiction that this property does not hold when $b^* = \infty$. Thus, there exists a sequence of $(p_b, s_b)$ in $\Lambda$ where $p_b \to p_\infty \leq E[v]$ and $s_b \to s_\infty \in [k, 1]$. Recall that the probability of success converges to 1. Hence, if $s_\infty = 1$ then it implies that $\Pr[q \leq p_\infty] = 1$ which contradicts the assumption that $q$ has full support on $[l, h]$. If $s_\infty < 1$ then $\Pr[q \leq s_\infty p_\infty + v (1 - s_\infty)] = 1$. Recall our assumption that there exists small $\varepsilon \in (0, \frac{h - E[v]}{2})$ such that $\Pr[v - q > \varepsilon | q] > 0$ for any $q \in [l, h - \varepsilon]$. Hence, there is a strictly positive probability that $h - \varepsilon > q \geq h - \varepsilon - \delta$ and $h \geq v > q + \varepsilon$ for some arbitrarily small $\delta > 0$. But if $q \leq s_\infty p_\infty + v (1 - s_\infty)$ holds for any $v$ and $q$ in the above intervals, it implies that $h - \varepsilon - \delta \leq s_\infty p_\infty + h (1 - s_\infty) \Leftrightarrow h - \frac{\varepsilon + \delta}{s_\infty} \leq p_\infty$. Since $s_\infty \geq \frac{1}{2}$ then $h - \frac{\varepsilon + \delta}{s_\infty} > h - 2 (\varepsilon + \delta)$. Therefore, for $\varepsilon$ and $\delta$ sufficiently small $p_\infty > E[v]$ which contradicts the assumption that $p_\infty \leq E[v]$. ■

**Calculation of condition (7) for the normal distribution.** Suppose $q \sim N(\beta, \eta^2)$ and $v \sim N(\mu, \sigma^2)$. Also let $f$ and $F$ be the standard normal p.d.f and c.d.f, respectively. First note that

$$E[q|q > x] = \frac{\int_x^\infty \frac{q}{\eta^2} f \left( \frac{q - \beta}{\eta} \right) dq}{1 - F \left( \frac{x - \beta}{\eta} \right)} = \frac{\int_x^\infty \frac{q - \beta + \beta}{\eta} f \left( \frac{q - \beta}{\eta} \right) dq}{1 - F \left( \frac{x - \beta}{\eta} \right)} = \beta + \frac{\int_x^\infty \frac{q - \beta}{\eta} f \left( \frac{q - \beta}{\eta} \right) dq}{1 - F \left( \frac{x - \beta}{\eta} \right)}$$

$$= \beta + \frac{\int_x^\infty q f \left( \frac{q}{\eta} \right) dq}{1 - F \left( \frac{x - \beta}{\eta} \right)} = \beta + \frac{f \left( \frac{x - \beta}{\eta} \right)}{1 - F \left( \frac{x - \beta}{\eta} \right)}$$

where the last equality follows from the fact that $\int_x^\infty q f \left( \frac{q}{\eta} \right) dq = f \left( \frac{x - \beta}{\eta} \right)$. Second, since $E[v|q] = \mu + \rho \frac{\sigma}{\eta} (q - \beta)$ then

$$E[v|q > x] = E[E[v|q] | q > x] = \mu + \rho \frac{\sigma}{\eta} (E[q|q > x] - \beta) = \mu + \rho \frac{\sigma}{\eta} \frac{f \left( \frac{x - \beta}{\eta} \right)}{1 - F \left( \frac{x - \beta}{\eta} \right)}$$
Finally,

\[ E[v \mid q < x] = \frac{\mu - \left(1 - F\left(\frac{x-\beta}{\eta}\right)\right)}{F\left(\frac{x-\beta}{\eta}\right)} E[v \mid q > x] = \mu - \rho \sigma \frac{f\left(\frac{x-\beta}{\eta}\right)}{F\left(\frac{x-\beta}{\eta}\right)} \]

Hence \( E[v \mid q < \mu] - \mu = -\rho \sigma \frac{f\left(\frac{\mu-\beta}{\eta}\right)}{F\left(\frac{\mu-\beta}{\eta}\right)} \) and condition (7) holds \( \Leftrightarrow \rho > 0. \) \]

**Proof of Corollary 2.** Suppose the bidder offers shareholders \( p \) and the board sends message \( m. \) If \( p < E[v|m,p] \) then according to Lemma 1 the takeover fails w.p.1 and the bidder makes zero profit. Else, if \( p \geq E[v|m,p] \) there exists an equilibrium in which \( \phi(m,p) \geq k \) and the takeover succeeds w.p.1. For those messages \( m \) that the takeover succeeds, the bidder earns on expectations \( b + \phi(m,p) (E[v|m,p] - p) \leq b. \) Suppose \( b > 0. \) According to Proposition 2, when the equilibrium is responsive either \( \Pr[\phi(m,p) > k] < 1 \) or \( \Pr[\phi(m,p) > k] = 1 \) and \( p > E[v]. \) In either case, the bidder either strictly overpays for the target or does not take it over with probability one. Hence, the profit is strictly lower than \( b. \) \]

**Proof of Proposition 3.** According to Proposition 1, shareholders gain \( E[v] \) in the no-communication benchmark. Denote by \( G \) be the c.d.f of \( b \) over the non-negative support. According to Proposition 2, \( \lim_{b \to \infty} p^* = E[v] \) and the probability of success converges to one. Therefore, there exists \( b \in [b^*, b^{**}] \) such that if \( G(b) \) is sufficiently small, shareholders’ expected welfare is strictly higher than \( E[v]. \) This completes the first part of the proposition. To see the second part, note that according to Proposition 2, ex-ante, shareholders’ welfare is given by

\[ EW = E[q] G(b^*) + p^{**} (1 - G(b^{**})) + \int_{b^*}^{b^{**}} E[v \mid \max\{q, s^* p^* (b) + v (1 - s^*)\}] dG(b) \]

where \( p^{**} = \inf \Gamma > E[v]. \) Shareholders’ expected welfare is \( E[q] \) when \( b < b^* = b^*. \) Therefore, there exist \( b \in [b^*, b^{**}] \) such that if \( G(b) \) is sufficiently high, then shareholders expected welfare is smaller than \( E[v] \) provided that \( E[v - q] > 0. \) \]

**Proof of Lemma 5.** When \( \beta \neq 0, \) the only deviation from the analysis in section 2 is the replacement everywhere of \( q \) with \( q + \beta \) and \( v \) with \( q + \Delta. \) Condition (5) from Lemma 4 can be rewritten as follows,

\[ V_A(\beta,p^*,\Delta,s) \equiv E[v \mid v \leq p^* + \frac{\Delta - \beta}{s}] \leq p < V_R(\beta,p^*,\Delta,s) \equiv E[v \mid v > p^* + \frac{\Delta - \beta}{s}] \] \((5')\)

and shareholders follow the board’s advice \( \Leftrightarrow \) condition \((5')\) is satisfied for some \( s \in [k,1], \) and the \( V_A(\beta,p,\Delta,s) = p \) if \( s < 1. \) Note that \( V_R(\beta,p^*,\Delta,s) \) and \( V_A(\beta,p^*,\Delta,s) \) are decreasing
and continuous in $\beta$ (continuity is guaranteed by the continuity of the density function of $q$). Suppose condition $(5')$ is not satisfied for the offer $p^*$ when $\beta = 0$. There are two cases to consider.

First, suppose $\Delta < 0$ and note that if $\Delta < 0$ then $V_A(0, p^*, \Delta, 1) < p^*$ for any $p^*$. Hence, if condition $(5)$ is violated then it must be that $p^* \geq V_R(0, p^*, \Delta, 1)$ which implies $p^* > E[v]$. Since $V_R$ is decreasing in $\beta$ and $\Delta < 0$, then $p^* < V_R(\beta, p^*, \Delta, s)$ only if $\beta < 0$. Moreover, from the continuity and the monotonicity of $V_R$ and $V_A$, there exists $\beta_R < 0$ and $\beta_A$ such that $p^* < V_R(\beta, p^*, \Delta, 1) \Leftrightarrow \beta < \beta_R$ and $V_A(\beta, p^*, \Delta, 1) < p^* \Leftrightarrow \beta > \beta_A$. Since $V_A(\Delta, p^*, \Delta, 1) < p^* < V_R(\Delta, p^*, \Delta, 1)$ (i.e. when $\beta = \Delta$) then it must be that $\beta_A < \beta_R$ and hence $V_A(\beta, p^*, \Delta, 1) < p^* < V_R(\beta, p^*, \Delta, 1)$ if and only if $\beta \in (\beta_A, \beta_R)$. It remains to inspect cases where $s \in [k, 1]$.

Note that when $\beta < \beta_A < \Delta$ then $V_R$ and $V_A$ are decreasing in $s$ when $s \in [k, 1]$. Since $V_A(\beta_A, p^*, \Delta, 1) = p^*$ by the definition of $\beta_A$, then any $(\beta, s)$ such that $\beta < \beta_A$ and $s < 1$ satisfy $V_A(\beta, p^*, \Delta, s) > p^*$ and hence violate condition $(5')$. Suppose there exists $\hat{s} < 1$ and $\hat{\beta} > \beta_R$ that satisfy $(5')$, then $V_A(\beta, p^*, \Delta, s) = p^* < V_R(\beta, p^*, \Delta, s)$. In addition, recall from the definition of $\beta_R$ that $V_A(\beta_R, p^*, \Delta, 1) < p^* = V_R(\beta_R, p^*, \Delta, 1)$. It follows from the definition of $V_A$ and $V_R$ and the above statements that $\Delta s^{-2} > \Delta - \beta_R > \Delta - \beta$ . This implies that $1 > s^{\Delta - 2} = s^{\Delta - 2} = s^{\Delta - 2}$. Hence, for any $\beta \in (\beta_R, \hat{\beta})$ there exists $s = \hat{s}^{\Delta - 2} \Delta - 2$ such that $\Delta s^{-2} = \Delta - 2$. Note that $\beta > \beta \Rightarrow \Delta s^{-2} > 1$ and hence $\hat{s} \geq k \Rightarrow s^{\Delta - 2} \geq k$. Therefore, condition $(5')$ holds for any $\beta \in (\beta_R, \hat{\beta})$ and $\hat{s} = s^{\Delta - 2}$. Overall, there exists $0 > \beta > \Delta > \beta = \beta_A$ where condition $(5')$ is satisfied if and only if $\beta \in (\beta, \beta)$.

Second, suppose $\Delta > 0$ and note that if $\Delta > 0$ then $V_R(0, p, \Delta, s) > p^*$ for any $p$ and $s$. Hence, if condition $(5)$ is violated then it must be that $p^* < V_A(0, p^*, \Delta, s)$ for any $s \in [k, 1]$. Note that it can not be that $V_A(0, p, \Delta, s) < p$ when $s < 1$. If it was, then since $p^* < V_A(0, p^*, \Delta, 1)$ and from continuity of $V_A$ in $s$, there exists $s \in (k, 1)$ such that $V_A(0, p^*, \Delta, s) = p^*$. Since $V_R(0, p^*, \Delta, s) > p^*$ for any $s \in [k, 1]$, condition $(5)$ is satisfied in contrast to the presumption. Note also that $p^* < V_A(0, p^*, \Delta, s) < p^* \leq E[v]$ and hence for any $s$ and $\beta$, $p^* < V_R(\beta, p^*, \Delta, s)$. Next, since $V_A$ is decreasing in $\beta$ and $\Delta > 0$, it follows that $V_A(\beta, p^*, \Delta, s) \leq p^* \Rightarrow \beta > 0$. Moreover, from the continuity and the monotonicity of $V_A$, there exists $\beta_A > 0$ such that $V_A(\beta, p^*, \Delta, 1) < p^* \Leftrightarrow \beta > \beta_A$. Since $V_A(\Delta, p^*, \Delta, 1) < p^* < V_R(\Delta, p^*, \Delta, 1)$ (i.e. when $\beta = \Delta$) then it must be that $\beta_A < \Delta$. Note that when $\Delta > \beta_A > \beta$ then $V_A(\beta, p^*, \Delta, s)$ is decreasing in $s$ when $s \in [k, 1]$. Since $V_A(\beta_A, p^*, \Delta, 1) = p^*$ then any $(\beta, s)$ such that $\beta < \beta_A$ and $s < 1$ satisfy $V_A(\beta, p^*, \Delta, 1) > p^*$ and hence violate condition $(5')$. Overall, there exists $\beta > \Delta > \beta = \beta_A > 0$ where condition $(5')$ is satisfied if and only if $\beta \in (\beta, \beta)$.
Proof of Theorem 2. Since \( q \in [l, h] \), without the loss of generality we assume that \( p - \Delta \in [l, h] \). That is, the bidder never offers more than the upper bound of the support of \( v \), or less than its lower bound. The board’s preferences can be rewritten by replacing \( q \) with \( q + \beta \) and \( v \) with \( q + \Delta \) in (2). Let \( \phi (\beta) \) be the board’s most preferred action for a given a bias \( \beta \). Using similar arguments to those behind the proof of Lemma 2, and the fact that \( v = q + \Delta \), we get

\[
\phi (\beta) = \begin{cases} 
1 & \text{if } p > q + \max \{\beta, \Delta\} \\
0 & \text{if } p < q + \min \{\beta, \Delta + \frac{\beta - \Delta}{k}\} \\
k & \text{otherwise}
\end{cases} \quad (A.1)
\]

Since the bias does not affect shareholders directly, shareholders’ collective action can be expressed by (3). That is, shareholders accept the offer \( \Leftrightarrow \) the offer is greater than their expectation of \( v = q + \Delta \). If \( \beta \neq \Delta \) a fully revealing equilibrium does not exists. To see why, suppose by the way of contradiction that it exists. Note that if \( \Delta < \beta \) then \( \Pr [q < p - \Delta < q + \beta - \Delta] > 0 \) for any \( p - \Delta \in [l, h] \). If the board reports truthfully, according to (3), shareholders accept the offer. However, according to (A.1), the board is strictly better off if shareholders reject the offer. Therefore, the board has incentives to misreport that \( q > p - \Delta \), thereby persuading shareholders to reject the offer. If \( \Delta > \beta \) then \( \Pr [q + \frac{\beta - \Delta}{k} < p - \Delta < q] > 0 \) for any \( p - \Delta \in [l, h] \). If the board reports truthfully, according to (3), shareholders reject the offer. However, according to (A.1), the board is strictly better off if shareholders accept the offer. Therefore, the board has incentives to misreport that \( p - \Delta > q \), thereby persuading shareholders to accept the offer. Overall, if \( \beta \neq \Delta \) a responsive equilibrium does not exist.

By contrast, if \( \beta = \Delta \) then it follows immediately from (A.1) that from the board’s point of view the value of the target under either management is identical and equals \( v \). Therefore, since it is a take-it-or-leave-it offer, \( p \geq v \Rightarrow \phi (\beta) = 1 \) and \( p < v \Rightarrow \phi (\beta) = 0 \). Therefore, the board’s decision rule coincides with shareholders’ collective action as expressed by (3), and hence the board does not have incentives to misreport about \( q \) for any \( p \).

Remark on Theorem 2. When the conditions in theorem are satisfied, for any \( p \) even off-equilibrium path, there exists an equilibrium of communication sub-game in which the board fully reveals its private information. When the bidder is uninformed and information is fully revealed by the board, there always exists a responsive equilibrium in which the bidder offers shareholders \( p^* \in \arg \max_p \{\Pr [v \leq p] (E [v|v \leq p] - p + b)\} \), and shareholders accept the offer if and only if the board reveals that \( v \leq p^* \).

Proof of Proposition 4. When condition (7) is violated, according to Proposition 2, no
information is revealed by the unbiased board and according to Proposition 1, shareholders’ expected welfare is \( E[v] \) w.p.1. By contrast, according to Theorem 2, when \( \beta = \Delta \) there exists an equilibrium with full revelation of information by the board. When information is fully revealed, shareholders accept the offer if and only if the board reveals that \( p \geq v \), and a bidder with private benefits \( b \) offers shareholders \( p^* (b) = \arg \max_p \Pi^* (b, p) \) where \( \Pi^* (b, p) = \Pr [p \geq v] (E[v|p \geq v] - p + b) \).

I argue that \( \lim_{b \to \infty} p^* (b) = h + \Delta \). Suppose by the way of contradiction that \( \lim_{b \to \infty} p^* (b) = \hat{p} < h + \Delta \). Then, for large \( b \) the bidder’s profit is \( \Pi^* (b, p^* (b)) \approx \Pr [\hat{p} \geq v] (E[v|\hat{p} \geq v] - \hat{p} + b) \) where \( \Pr [\hat{p} \geq v] < 1 \) and \( E[v|\hat{p} \geq v] < E[v] \). Suppose \( h < \infty \). If the bidder offers \( p = h + \Delta \) his profit is given by \( E[v] - h - \Delta + b \). Thus, for large \( b \), \( \Pi^* (b, h + \Delta) > \Pi^* (b, \hat{p}) \) \( \iff b > \frac{\Pr[\hat{p} \geq v] [E[v|\hat{p} \geq v] - \hat{p} - (E[v] - h - \Delta)]}{\Pr[\hat{p} < v]} \) which contradicts the optimality of \( \lim_{b \to \infty} p^* (b) < h + \Delta \).

Suppose \( h = \infty \) and consider the bidding strategy \( \gamma b \) where \( \gamma \in (0, \Pr [\hat{p} \geq v]) \subset (0, 1) \). Note that \( \Pi^* (b, \gamma b) \approx E[v] + (1 - \gamma) b \), and hence for large \( b \), \( \Pi^* (b, \gamma b) > \Pi^* (b, p) \) \( \iff b > \frac{\Pr[p \geq v] [E[v|p \geq v] - p] - E[v]}{1 - \gamma - \Pr[p \geq v]} \) which also contradicts the optimality of \( \lim_{b \to \infty} p^* (b) < h + \Delta \).

Overall, for large \( b \) the \( p^* (b) \) is sufficiently close to \( h + \Delta \) and hence the target is taken over with probability arbitrarily close to one. Shareholders expected welfare converges to \( h + \Delta \) as \( b \to \infty \), which is strictly higher than \( E[v] \). Thus, there exist \( \tau \in (0, 1) \) and \( \hat{b} > 0 \) such that if \( \Pr [b > \hat{b}] > \tau \) shareholders expected welfare is higher when the board is biased with \( \beta = \Delta \) rather than unbiased as required. Overall, shareholders are better off with a biased board.

Alternatively, suppose \( E[q - v] > 0 \) and \( \beta = \Delta \). Note that \( \Pi^* (b, p) \) strictly increases in \( b \) and hence, \( \Pi^* (b, p^* (b)) \) increases in \( b \) as well. Also note that for any \( p \geq l \), \( \Pi^* (0, p) < 0 \). It follows that there exists \( \hat{b} > 0 \) such that \( \Pi^* (b, p^* (b)) > 0 \iff b > \hat{b} \), and hence if \( b < \hat{b} \) then the target remains independent w.p.1 and shareholders retain \( E[q] > E[v] \). Therefore, there exist \( \tau \in (0, 1) \) and \( \hat{b} > 0 \) such that if \( \Pr [b < \hat{b}] > \tau \) shareholders expected welfare is higher when the board is biased with \( \beta = \Delta \) rather than unbiased as required. Finally, let \( \tau = \max \{ \tau, \tau \} \) which completes the proof.

**Example - Proposition 4.** Suppose \( v = q + \Delta, \Delta > 0, \) and \( v \sim U [0, 1] \). First I show that when \( \beta = 0 \) there is no responsive equilibrium (i.e. condition (7) is violated). To see why, note that condition (7) holds \( \iff E[v | v \leq E[v] + \Delta] < E[v] \). If \( \Delta > 1/2 \) then \( E[v] + \Delta > 1 \) and hence when the bidder offers shareholders \( p = E[v] \), regardless of \( v \) and \( q \), the board always recommends shareholders to accept the offer. Therefore, no information is revealed in this equilibrium, shareholders ignore the board’s recommendation, and accept the offer w.p.1. Thus, when the board is unbiased the equilibrium is non-responsive and shareholders’ expected welfare is \( E[v] > 0 \), and independent of \( b \). Theorem 2 implies that if \( \beta = \Delta \) then full revelation of information is feasible. The bidder understands that the target is taken over \( \iff v \leq p \).
Hence, his profit for any \( p \in [0, 1] \) is given by \( \Pi = F(p) E[v - p + b \mid v \leq p] \). Using the uniform distribution, it is immediate to see that for sufficiently large \( b \) the bidder is better off by bidding \( p = 1 \) and taking over the target w.p.1. Shareholders expected welfare is \( 1 > E[v] = \frac{1}{2} \) and hence are better off with the biased board. ■

**Proof of Proposition 5.** Let \( \alpha \in (0, 1 - k) \) be the blockholder’s holding. Hence, the blockholder (henceforth \( BH \)) has no veto power. BH’s preferences over small shareholders’ tendering strategy are given by,

\[
\phi_{BH} = \begin{cases} 
\text{any } \phi < \frac{k}{1 - \alpha} & \text{if } q > \max\{p, v\} \\
\text{any } \phi \geq \frac{k - \alpha}{1 - \alpha} & \text{if } q < \max\{p, v\} = p \\
\text{any } \phi \geq \frac{k}{1 - \alpha} & \text{if } q < \max\{p, v\} = v 
\end{cases} \tag{A.2}
\]

That is, BH prefers that the takeover succeeds \( \Leftrightarrow q < \max\{p, v\} \). If \( q < \max\{p, v\} = p \) \( (q < \max\{p, v\} = v) \) and the takeover succeeds, BH tenders (keeps) his shares and gets \( p \) (v), more than he would get if the takeover fails. Note that \( BH \) is pivotal \( \Leftrightarrow \frac{k - \alpha}{1 - \alpha} < \phi < \frac{k}{1 - \alpha} \).

The proof has several steps. First, suppose by the way of contradiction that there exists a fully revealing equilibrium. Recall that \( 1 - \alpha \geq k \). Hence, if BH truthfully reveals information, following the same selection of equilibrium as in (3), small shareholders would tender \( \Leftrightarrow p \geq v \). Since for any \( p \) there is a strictly positive probability that \( p \in (q, v) \), according to (A.2) the BH has incentives to misreport that \( p \geq v \) in order to induce small shareholders to tender their shares, a contradiction.

Second, I argue that bidder’s expected payoff when the equilibrium is responsive is strictly less than \( b \). If small shareholders ignore \( m \) and the equilibrium is responsive then either the target remains independent and the bidder makes zero, or the bidder pays strictly more than \( E[v] \) for a target whose value is \( E[v] \) (no information is revealed when \( m \) is ignored). If small shareholders condition their decision on \( m \), the target remains independent with strictly positive probability and the bidder gains zero. If the takeover succeeds it must be that \( \phi \geq \frac{k - \alpha}{1 - \alpha} > 0 \). That is, small shareholders on aggregate must tender at least \( k - \alpha \) shares. Otherwise, even if BH tenders his shares, the bidder does not gain enough voting rights. According to (3), shareholders tender \( \Leftrightarrow \) they believe that the bidder overpays for the target. Hence, conditional on taking over, the bidder must overpay. This completes the argument.

Third, I show that when \( p^* = E[v] \) shareholders follow \( m \Leftrightarrow \) condition (8) holds. In particular, I show that if \( p^* = E[v] \) and a responsive equilibrium exists, the takeover either succeeds or fail with probability one, and BH is never pivotal. That is, there are only two kind of messages: messages that induce \( \phi < \frac{k - \alpha}{1 - \alpha} \) and messages that induce \( \phi > \frac{k}{1 - \alpha} \). Moreover,
there are messages that induce pure strategies $\phi = 0$ and $\phi = 1$. To see why, first note that BH always chooses the message with "lowest pivotal burden". That is, at the tendering stage given the anticipated $\phi$, BH always strictly prefers either tendering his entire holding, or not tendering at all (thus, playing mixed strategies at the tendering stage would be immaterial to the analysis). Therefore, by being pivotal BH is constrained in this respect. Next, since $p^* = E[v]$, all messages that induce $\phi \in (0,1)$ must generate beliefs of $E[v]$ (small shareholders must be indifferent). Thus, it must be that both $\phi = 0$ and $\phi = 1$ are induced in equilibrium, since otherwise it can be shown that all messages lead to the same beliefs $E[v]$, and hence the equilibrium is non-responsive. It follows that if $p^* = E[v]$ then BH never chooses a message the makes him pivotal. Finally, recall from (A.2) that BH has incentives to approve the takeover $\iff \max \{p, v\} \geq q$, and from (3) shareholders would tender $\iff p \geq E[v|p, m]$. Therefore, when $p^* = E[v]$ shareholders follow $m \iff$ condition (8) holds (more precisely, one can repeat the argument in Proposition 2 that proves the same conjecture with respect to condition (7)).

Forth, I show that a responsive equilibrium exists $\implies$ (8) holds. Suppose condition (8) does not hold. Since the bidder’s payoff is strictly higher when the equilibrium is non-responsive, he offers shareholders $p^* = E[v]$, and since (8) does not hold, shareholders do not follow $m$ and the equilibrium is non-responsive (i.e. the no-communication benchmark is realized), a contradiction.

Fifth, I show that (8) holds $\implies$ a responsive equilibrium exists. If (8) holds then either $p^* \neq E[v]$ or $p^* = E[v]$ but then according to (8), shareholders follow $m$ and hence the equilibrium is responsive either way.

Sixth, I argue that (8) $\implies$ (7). Note that,

$$E[v|q \leq \max \{v, E[v]\}] = Pr\left[q \leq E[v]\right] E[v|q \leq E[v]] + Pr\left[q > E[v]\right] E[v|E[v] < q < v]$$

(A.3)

Since (8) holds then the LHS of (A.3) is smaller than $E[v]$. Note that $E[v|E[v] < q < v] > E[v]$ and hence it must be that $E[v|q \leq E[v]] < E[v]$ (i.e. condition (7)) since otherwise the RHS is strictly greater than $E[v]$.

Seventh, to show that (8) $\neq$ (7), suppose $v = q (1 + \Delta)$, $\Delta \in (0,1)$ and $v \sim U[0,1]$. First note that $\Delta < 1 \Rightarrow E[v|q \leq E[v]] < E[v]$ and hence condition (7) holds. Second, note that $E[v|q \leq \max \{v, E[v]\}] = E[v|v \leq \max \{v (1 + \Delta), \frac{1+\Delta}{2}\}]$. Since $\Delta > 0$ then the conditioning event is always satisfied. It follows that $E[v|q \leq \max \{v, E[v]\}] = E[v]$ which violates condition (8).

Finally, note that if BH cannot act against his own recommendation, it means that if in equilibrium sending message $m$ leads to action $\phi$, the blockholder must also tender a fraction $\phi$ of his holding. Therefore, the utility of the blockholder is proportional to shareholders’ utility.
as a group, and the analysis is reduced to that of section 2 (in particular, Proposition 2).

**Remark - Section 5.** The proof of Theorem 2 can be replicated under the assumptions of section 5. Suppose assumption (*) holds, and let \( \beta = \Delta \) be BH’s bias. If the target remains independent, the BH receives \( \alpha(q + \beta) \) which equals to \( \alpha(q + \Delta) = \alpha v \). Hence, the target’s value from BH’s point of view is the same under either management. Therefore, BH would like to sell his holding if and only if \( p > v \). This is exactly the same decision rule that shareholders would follow if \( v \) (and hence \( q \)) was common knowledge. Therefore, full revelation of information is feasible.

**Appendix II - Bidder’s Private Information**

Suppose the bidder has private information on \( v \), the board perfectly observes \( q \), and target shareholders are uninformed about \( v \) and \( q \). The bidder can be better or less informed about \( v \) than the board (the board may have private information on \( v \) as well). However, even if the bidder has superior information on \( v \), he does not observe the noise in the board’s information. Hence, for any given offer, the bidder is faced with the risk that the board recommends shareholders to reject the offer. Let us denote by \( I_B \) the bidder’s information set, and for simplicity, maintain the assumption that \( b \) is common knowledge.

As a benchmark, suppose the board is uninformed or absent. Following Shleifer and Vishny (1986), let us assume that when shareholders are indifferent they tender their shares with probability 1.\(^{39}\) In equilibrium, there is at most one price that shareholders accept. Otherwise, regardless of his private information on \( v \), the bidder offers the minimal price that is accepted by shareholders. Thus, shareholders tender their shares if and only if there exists \( p^* \) that satisfies,

\[
p^* \geq E[v|E[v|I_B]] \geq p^* - b
\]

(A.4)

If such \( p^* \) exists, the bidder acquires the target if and only if \( E[v|I_B] \geq p^* - b \). Otherwise, the target is never acquired in equilibrium. Intuitively, when the bidder is privately informed about \( v \), target shareholders infer from the bidder’s decision to take over the target that he is relatively optimistic about \( v \). Because of free-riding, shareholders tender their shares only if the price reflects this optimism. Note that by contrast to section 1, in the absence of communication the bidder’s profit could be smaller or greater than \( b \), depending on the bidder’s private information about \( v \).

\(^{39}\)If shareholders are allowed to play mixed strategies, more equilibria arise. Nevertheless, in the proofs in the appendix I consider responsive equilibria with shareholders playing mixed strategy.
When the board can communicate with shareholders, consider the subset of equilibria in which the bidder either does not take over the target, or takes it over with strictly positive probability by paying a unique price $p^\ast$. The equilibrium is sustainable if off equilibrium shareholders believe that $p \neq p^\ast \Rightarrow p < v$ and hence they reject the offer for sure. Among this subset, the equilibrium is responsive if and only if shareholders condition their decision on the board’s advice. Otherwise, $p^\ast$ must satisfy (A.4) and the outcome coincides with Shleifer and Vishny’s (1986) predictions. The result below provides conditions under which a pure strategies responsive equilibrium exists, and characterizes its welfare implications.

**Proposition 6** Suppose the unbiased board is fully informed about $q$ and the bidder has private information on $v$. There exists a pure strategies responsive equilibrium if and only if there exists $p^\ast$ such that,

$$E^\ast[v|q \leq p^\ast] \leq p^\ast < E^\ast[v|q > p^\ast]$$

(A.5)

where $E^\ast[\cdot] = E[\cdot|b + E[v|p^\ast \geq q, I_B] \geq p^\ast]$. Moreover, when $b > E[v]$ shareholders’ welfare in a pure strategies responsive equilibrium is lower relative to the no-communication benchmark if $E[v - q] > E^\ast[\max\{p^\ast - q, 0\}]$.

**Proof.** We first prove that condition (A.5) is necessary and sufficient for the existence of a responsive equilibrium. If a responsive equilibrium exists then shareholders must follow the board’s advice, hence conditional on offer $p$ there must be (residual) information asymmetry between the board and shareholders. Otherwise, shareholders would ignore the board’s advice. Following similar arguments as in the proof of Lemma 4, it can be shown that if shareholders follow the board’s advice for a given offer, the set of actions that are taken with positive probability must be $\Phi(p^\ast) \subset \{0, s\}$, where $s \in [k, 1]$. Since in this setting a responsive equilibrium exists only if information is revealed it must be that $\Phi(p^\ast) = \{0, s\}$.

To account for the possibility that the board learns about $v$ from the bidder’s offer, let $x^\ast_v$ be the board’s best estimate of $v$ conditional on $p^\ast$ and on its private information. Given $p^\ast$, the board sends message $m \in \phi^{-1}(s) \Leftrightarrow p^\ast \geq p(p^\ast, s) \equiv [q - x^\ast_v (1 - s)]/s$. Let $y^\ast_v \equiv E[v|p^\ast \geq p(p^\ast, s), I_B]$ be the bidder’s expected value of the target conditional on taking over the target by paying $p^\ast$. In equilibrium, the bidder understands that $\Phi(p^\ast) = \{0, s\}$, and he chooses between not taking over and gaining zero, to paying $p^\ast$ and gaining $b + s[y^\ast_v - p^\ast]$ with positive probability smaller than one. The bidder submits $p^\ast \Leftrightarrow y^\ast_v \geq p^\ast - \frac{b}{s}$. Conditional on observing offer $p^\ast$, shareholders and the board infer that $y^\ast_v \geq p^\ast - \frac{b}{s}$. Note that if $s < 1$ then $y^\ast_v$ depends on $x^\ast_v$ which in turn depends on $y^\ast_v$. There may not be a solution to this fixed point problem in general. However, as long as $s = 1$ (i.e. pure strategy equilibrium), $y^\ast_v$ is independent of $x^\ast_v$ and hence solution is well defined. I argue, shareholders follow the board’s
recommendation \Leftrightarrow
\begin{align*}
E [v|y_v^{**} \geq p^{**} - b/s, \ p^{**} \geq p(p^{**}, s)] \leq p^{**} < E [v|y_v^{**} \geq p^{**} - b/s, \ p^{**} < p(p^{**}, s)] \quad (A.6)
\end{align*}
and if \( s < 1 \) the LHS must hold with equality. When the board sends \( m \in \phi^{-1}(s) \) shareholders follow its advice only if conditional on all available information, the expected value of \( v \) equals \( p^{**} \) when \( s < 1 \), or smaller than \( p^{**} \) when \( s = 1 \). What is seemingly missing from (A.6) is the conditioning on \( m \). To see why it is not needed, consider first the LHS inequality. If the LHS of (A.6) is violated for \( p^{**} \) but there exists a message \( m \in \phi^{-1}(s) \) that conditional on that message, the inequalities in (A.6) are satisfied, then all types of boards such that \( p^{**} \geq p(p^{**}, s) \) would send this message. Thus, shareholders cannot learn additional information from \( m \) that could change their decision making. A similar reasoning would apply to the RHS. Therefore, condition (A.6) is necessary. Condition (A.6) is also sufficient. Suppose it is satisfied for some \( p^{**} \). There exists an equilibrium where \( \phi^{-1}(0) = \{m_0\} \) and \( \phi^{-1}(s) = \{m_s\} \) and \( m = m_0 \Leftrightarrow p^{**} < p(p^{**}, s) \). Since (A.6) is satisfied, shareholders follow the board’s recommendation and the equilibrium is responsive. If \( s = 1 \) then \( p(p^{**}, s = 1) = q \) for any \( x_v^{**} \) and condition (A.6) becomes (A.5).

To see the second part, recall, an informed bidder is exposed to adverse selection even when the equilibrium is non-responsive. Hence, bidder’s private benefits of control play a role not only in the responsive equilibrium, but also in non-responsive equilibrium. The comparison of welfare between these equilibria, must account for this effect which was absent in section 2. Note that assuming \( b \geq E[v] \) guarantees that there exists a non-responsive equilibrium in which the bidder offers shareholders \( p^* = E[v] \) and takes over the target w.p.1. When \( b > E[v] \) the offer \( p^* = E[v] \) satisfies (A.4) and in the benchmark shareholders receive \( E[v] \) w.p.1. When \( s = 1 \), shareholders’ expected welfare in the responsive equilibrium is,
\begin{align*}
W &= \Pr [p^{**} \in [q, y_v^{**} + b]] p^{**} + \Pr [p^{**} \notin [q, y_v^{**} + b]] E [q|p^{**} \notin [q, y_v^{**} + b]] \\
&= \Pr [y_v^{**} + b < p^{**}] E [q|y_v^{**} + b < p^{**}] + \Pr [y_v^{**} + b > p^{**}] E^{**} [\max \{p^{**}, q\}] \\
&= E[q] + \Pr [y_v^{**} + b > p^{**}] E^{**} [\max \{p^{**} - q, 0\}] \\
\end{align*}
Thus, \( E^{**} [\max \{p^{**} - q, 0\}] < E[v - q] \Rightarrow E[v] > W \) and shareholders are worse off when the equilibrium is responsive.

**Appendix III - Sweetened Bid**

Suppose that once recommendation \( m \) becomes public, but before shareholders make their tendering decision, the bidder decides whether to revise his initial offer \( p_1 \) to \( p_2 \), at cost \( c \geq 0 \).
Then,

**Proposition 7**  
A responsive equilibrium exists if and only if $c > b$ and either

$$E[v] - c < E[v | q < E[v]] < E[v]$$  \hspace{1cm} (A.7)

or there exists $x^*$ such that

$$E[v | q \leq x^*] = x^* \leq E[v] - c$$  \hspace{1cm} (A.8)

The bidder never revises his initial offer in equilibrium.

**Proof.** Let $E[v | p_1, m]$ be the posterior belief of $v$ conditional on the boards’ recommendation $m$. Regardless of $c$, if the bidder decides to revise the initial offer, it is always optimal to offer shareholders $p_2 = E[v | p_1, m]$ (given the revision costs are sunk, the bidder earns at least $b \geq 0$ by taking over the target). We assume that shareholders accept the offer $E[v | p_1, m]$ w.p.1. Otherwise, the bidder can make an offer arbitrarily close from above to $E[v | p_1, m]$, and shareholders would tender w.p.1 in equilibrium.$^{40}$

First, suppose $c = 0$. The bidder revises any offer that does not maximize his profits conditional on $m$. Therefore, the initial offer $p_1$ can be ignored. Since $p_2 = E[v | m]$ for any $m$, and the target is acquired w.p.1, board’s payoff is $E[v | m]$. The board has incentives to inflate price as much as possible. Because of that, no information is revealed in equilibrium.

Second, suppose $c \in (0, b]$. For any $m$, the bidder revises the initial offer $p_1 \Leftrightarrow E[v | p_1, m] \notin [p_1 - c, p_1]$. To see why, note that by revising the offer the bidder makes a profit of $b - c \geq 0$. If $p_1 < E[v | p_1, m]$, shareholders reject the offer unless it is revisited, and hence it is always in the best interest of the bidder to revise it. If $p_1 \geq E[v | p_1, m]$, shareholders accept the offer even if it is not revisited, in which case the bidder makes a profit of $E[v | p_1, m] - p_1 + b \leq b$. Thus, when $p_1 \geq E[v | p_1, m]$, the bidder revises the offer $\Leftrightarrow$

$$b - c > E[v | p_1, m] - p_1 + b \Leftrightarrow E[v | p_1, m] < p_1 - c$$

$^{40}$When $p = E[v | m]$ shareholders can tender with probability $\phi \in [k, 1]$ and the takeover will succeed. Given $m$ and as long as $\phi \in [k, 1]$, the bidder is indifferent with respect to $\phi$. Therefore relaxing this assumption (as well as allowing the bidder to offer equity to shareholders), could lead to revelation of information by the board. However, it is not robust if the bidder’s offer arbitrarily trembles above $E[v | m]$.  

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which completes the argument. Given the initial offer \( p_1 \) and message \( m \), the board’s payoff is,

\[
W = \begin{cases} 
  p_1 & \text{if } E[v|p_1, m] \in [p_1 - c, p_1) \\
  E[v|p_1, m] & \text{else} 
\end{cases}
\]

If \( E[v|p_1, m] \notin [p_1 - c, p_1) \), the board always sends the message with the highest \( E[v|p_1, m] \). Hence, there is at most one message in this range. For all messages where \( E[v|p_1, m] \in (p_1 - c, p_1) \), the payoff of the board is independent of \( m \) and \( v \), and hence the board is indifferent among all of them. We conclude that in equilibrium there can be at most two (meaningful) messages. But, since neither payoff depends on the board’s private information, any decision that is optimal for one type, is also optimal for the other type, no information is revealed in equilibrium.

Third, suppose \( c > b \). Conditional on revising the offer, the bidder earns on expectations \( b - c < 0 \). If \( p_1 < E[v|p_1, m] \) shareholders reject the offer, and the bidder gets zero. Therefore, the bidder will not revise the offer. If \( p_1 \geq E[v|p_1, m] \) shareholders accept the initial offer and the bidder gets \( E[v|p_1, m] - p_1 + b \). The bidder revises the offer \( \Leftrightarrow E[v|p_1, m] - p_1 + b < b - c \Leftrightarrow E[v|p_1, m] < p_1 - c \). The board anticipates the bidder’s revision strategy, and hence his expected payoff for given \( p_1 \) and \( m \) is,

\[
W = \begin{cases} 
  q & \text{if } E[v|p_1, m] \geq p_1 \\
  p_1 & \text{if } E[v|p_1, m] \in (p_1 - c, p_1) \\
  E[v|p_1, m] & \text{if } E[v|p_1, m] \leq p_1 - c 
\end{cases}
\]

Suppose for any of the above three ranges, there exists in equilibrium at least one message that is sent with a positive probability by the board. Then, the board never posts \( E[v|p_1, m] \leq p_1 - c \), since by sending \( E[v|p_1, m] \in (p_1 - c, p_1) \) the board can guarantee to his shareholders \( p_1 > E[v|p_1, m] \). It follows that in any equilibrium, either \( E[v|p_1, m] > p_1 - c \) or \( E[v|p_1, m] \notin (p_1 - c, p_1) \), or no information is revealed. Suppose first that \( E[v|p_1, m] \notin (p_1 - c, p_1) \), then there is at most one message that satisfies \( E[v|p_1, m] \leq p_1 - c \). If there was more than one message, then it is always optimal to pick the message with the highest \( E[v|p_1, m] \). Let this message be \( \hat{m} \). The board prefers sending a message \( m \) where \( E[v|p_1, m] \geq p_1 \) and getting \( q \), over sending \( \hat{m} \) where \( E[v|p_1, \hat{m}] \leq p_1 - c \) and getting \( E[v|p_1, \hat{m}] \), if and only if \( q > E[v|p_1, \hat{m}] \). This equilibrium in the communication sub-game exists \( \Leftrightarrow \) there exists \( x^* \) such that,

\[
x^* = E[v|q \leq x^*] \leq p_1 - c < p_1 < E[v|q > x^*]
\]
The bidder makes a profit of \( \Pr [q \leq x^{*}] (b - c) < 0 \) and hence is always better off by not taking over the target than initially offering \( p_1 \). Hence if this condition is violated for \( p_1 = E[v] \), a responsive equilibrium exits. This leads to condition \( (A.8) \). Alternatively, suppose \( E[v \mid p_1, m] > p_1 - c \). The board chooses \( m \) such that \( E[v \mid p_1, m] \in (p_1 - c, p_1) \) over \( m \) such that \( E[v \mid p_1, m] \geq p_1 \Leftrightarrow p_1 > q \). Therefore, in such equilibrium it must be that

\[
p_1 - c < E[v \mid q < p_1] < p_1 < E[v \mid q > p_1]
\]

Hence if this condition is violated for \( p_1 = E[v] \), a responsive equilibrium exits. This leads to condition \( (A.7) \) 

**Remark Proof of Proposition 7.** Note that when \( b \leq c \) the target is taken over w.p.1 and hence regardless of the board’s bias, information is not revealed in equilibrium. However, when \( b > c \), similar to Theorem 2, it can be verified from \( (A.9) \) that full revelation information is an equilibrium when \( \beta = \Delta \), and otherwise some information is always lost. ■