

WHO'S CHEATING WHOM IN MERGERS AND ACQUISITIONS?

How Managerial Preferences Influence Attitude, Target Choice and Payoffs *

TYRONE CALLAHAN

University of Texas at Austin

THOMAS MOELLER

Rice University

Abstract

Most mergers and acquisitions involve at least four parties with competing interests – acquiring firm shareholders, acquiring firm management, target firm shareholders, and target firm management. We consider the choice between hostile and friendly takeovers in this context and offer an explanation for the prevalence of friendly mergers between large acquirers and small targets. Negotiated mergers, by virtue of the ability to make side payments to the target managers, allow the target manager to be better compensated for his loss of private benefits while simultaneously mitigating the agency conflict in the bidder firm. The direct cost of the side payment is borne by the target shareholders, but they benefit indirectly from the bidding manager having an increased incentive to investigate takeover targets. Target shareholders, therefore, accept the lower payoffs in a negotiated merger to increase the odds that a merger occurs. When the private benefits accruing to the bidding manager are correlated with size, bidder shareholders grant the manager relative autonomy in negotiating small mergers and monitor large mergers more closely. This induces the bidding manager to prefer to expend resources investigating small targets. The model generates specific predictions about the relation between principal-agent conflicts of both the bidder and the target firm and the division of gains from mergers.

FIRST DRAFT: JULY 2001

*We thank Andres Almazan, Jay Hartzell, Sheridan Titman and seminar participants at UT Austin for helpful comments. All errors are our own.

Correspondence to: Tyrone Callahan, McCombs School of Business, The University of Texas at Austin, Austin, TX 78712. email: tyrone.callahan@bus.utexas.edu. Thomas Moeller, Jesse H. Jones Graduate School of Management, Rice University, 6100 Main Street, Houston, TX 77005. email: moeller@rice.edu.

1 Introduction

Two of the more robust facts about corporate mergers are: (i) a large majority of mergers are negotiated on friendly terms between the management of the acquirer and target firms; and (ii) in most mergers the acquiring firm is significantly larger than the target firm.¹ Both of these facts are surprising. The friendliness of takeovers is surprising because target firm managers frequently lose their jobs in these transactions. Also, target shareholders should receive the highest price for their shares through competitive bidding in tender offers. The extreme size discrepancy is surprising because size plays no direct role in most theories of mergers and acquisitions.² The theory most directly related to firm size is empire building, as described in Jensen (1986), which, all else equal, implies a managerial preference for larger rather than smaller targets.³ This paper develops a model of negotiated mergers that fits the above facts and generates a number of additional empirical implications.

Consider a manager that has identified an attractive takeover target. Ignore for the moment whether the target is attractive to the manager because it offers large synergistic

¹A study by Loughran and Vihl (1997) classifies 85.7% of the transactions in their sample as friendly mergers and the remainder as tender offers. Schnitzer (1996) cites evidence that in the United States between 1985 and 1989 hostile takeovers accounted for only 18% (by volume) of all attempted mergers and acquisitions. In Maquieira, Megginson, and Nail's (1998) sample of stock-for-stock mergers the bidder firm is on average four times larger than the target.

²For example, theories based on managerial or operational inefficiencies would need to argue that small firms are systematically more prone to suffer such inefficiencies; theories based on undervalued targets would have to argue that small firms are systematically undervalued; etc.

³Agency problems associated with empire building will provide the link to size in our model, but in equilibrium this will induce a managerial preference for *smaller* targets.

gains or because it offers large private benefits. The bidding manager has a choice of negotiating the merger privately with the target manager, or bypassing the manager and making a public tender offer directly to target shareholders. We argue that these choices are not equivalent for two reasons. First, if friendly negotiations break down the bidding manager can still make a tender offer directly to the target shareholders. In contrast, if a tender offer is rejected the manager can not then begin friendly negotiations. Second, friendly mergers provide an opportunity for the acquirer to make side payments to the target manager. Such arrangements are not easily accommodated by tender offers. We show that these distinctions between friendly and hostile takeovers are sufficient for the managers of both firms to prefer friendly negotiations.

Now consider the role of bidding firm shareholders. Bidding firm shareholders also prefer negotiated mergers over hostile takeovers because negotiated mergers exploit to the bidding firm's advantage the principal-agent conflict in the target firm. Side payments are given to the target manager and in exchange the bidder receives a larger share of the synergistic gains. Even so, bidding firm shareholders will only be in favor of a merger if it is primarily motivated by the opportunity to capture synergistic gains, and not by the bidding manager's desire to capture private benefits. To ensure that only profitable mergers are pursued, shareholders must monitor the manager and intervene if the proposed merger is not in the shareholders' best interests. Monitoring is costly, however. It requires effort on the part of shareholders and it acts as a disincentive for the manager who must exert effort investigating potential targets. Shareholders therefore commit to a monitoring policy that monitors as little as possible while still sufficiently aligning managerial and shareholder interests. We show that, when private benefits are correlated with target size, the optimal

monitoring policy increases the level of monitoring as the target size increases. This in turn, provides an incentive to the manager to exert effort investigating small rather than large targets.

Finally, consider the target shareholders. Target shareholders must approve the negotiated merger. So long as it is relatively more costly for shareholders to block a merger than to approve it, mergers with positive side payments are feasible.⁴ Relative to tender offers, friendly mergers with side payments exploit target firm shareholders. Of course, the degree of exploitation is bounded by the cost of target shareholder intervention and the fiduciary obligations of target management. Even in the absence of such bounds, however, we show that in many cases target shareholders are better off under negotiated mergers. In other words, it would be value-decreasing for target shareholders to place an unconditional ban on negotiated mergers and/or managerial side payments. Doing so diminishes the incentives for potential acquirers to investigate the target firm and, as a consequence, eliminating negotiated mergers reduces the likelihood of receiving tender offers as well.

Our work is related to several lines of existing literature. The choice between hostile and friendly takeovers is studied by Berkovitch and Khanna (1991) and Schnitzer (1996). Berkovitch and Khanna assume, as we do, that the primary distinction between hostile and friendly takeovers is the public versus private nature of each.⁵ They model friendly mergers

⁴Blocking a merger generally requires that some subset of shareholders engage management in a proxy contest. For management, proxy contest expenses are paid by the corporation. Insurgents, on the other hand, bear their own proxy contest expenses. This is one way in which blocking a merger is more expensive to shareholders than approving it.

⁵An alternate view about the public versus private nature of mergers versus tender offers is provided by Herzel and Shepro (1990) who argue that there is actually a higher likelihood of a competing bidder

as a bargaining game and hostile takeovers as a competitive auction. They do not consider a bidder's ability to make side payments to target management in a friendly merger, nor do they consider bidding firm shareholder-manager agency conflicts. Berkovitch and Khanna show that the target firm can induce tender offers in equilibrium if and only if the target manager receives higher severance pay following a tender offer than following a merger. We, in contrast, focus on the role of the bidder's investigative effort and show that forcing tender offers may not be value-increasing for targets because of the negative effect it has on the bidder's investigative efforts.

In Schnitzer (1996), raiders base their decision of whether to pursue a hostile or friendly takeover on the relative information advantage of target managers. Raiders choose between bargaining with an informationally-advantaged target manager, or with target shareholders who have no informational advantage. Friendly mergers benefit from having lower transaction costs and higher probabilities of success, but they are penalized by the need to pay information rents to the target manager. Our paper focuses on the role of manager-shareholder conflicts of interest. As such, we assume information symmetry between the bidding manager and target firm, and instead consider the effects of asymmetric information between the manager and shareholders of the bidding firm.

A second related line of literature examines situations in which shareholders optimally commit *ex ante* to limit their *ex post* payoffs in certain states. Grossman and Hart (1980) analyze the free-rider problem in takeover bids. They show that shareholders can increase

emerging during a merger because mergers take longer to consummate than tender offers. In practice this is mitigated by lock-up fees and break-up options. See, for example, details of the 2001 First Union-Wachovia merger [*Wall Street Journal* May 16 (C1), May 21 (A4), and May 31 (B14), 2001].

the value of their claim by creating exclusionary devices that allow successful raiders to dilute the value of any residual (i.e., non-tendering) minority claim. Banning raiders from diluting the claims of residual minority shareholders reduces the incentives for raiders to investigate targets. We show that in negotiated mergers, the same rationale can justify the allowance of side payments to target management at the expense of target shareholders.

Lastly, our paper is related to the literature examining principal-agent conflicts in the context of capital budgeting.⁶ Acquisitions certainly represent investment opportunities, but the setting is sufficiently distinct that existing models are not directly applicable. For example, in the capital budgeting literature projects are assumed to be scalable. Corporate acquisitions are not scalable in the same sense so capital allocation is an ineffective control mechanism. It is also common in the capital budgeting literature to assume that managers are endowed with information about their investment opportunities and managerial effort is exerted to manage the project following a capital investment. In our model managers are not endowed with project information. Managers must decide (i) which potential targets to investigate, and (ii) how much effort to exert investigating the targets. This two dimensional aspect of the moral hazard problem is pertinent to general capital budgeting problems but to our knowledge has not been addressed in the existing literature.

There are several empirical papers related to our work. Morck, Shleifer and Vishny (1990) present evidence that mergers which appear to be motivated by bidding manager private benefits produce systematically lower announcement period returns to bidding firms. Our model is consistent with these findings. In addition, our model generates testable hypothesis about the relationship between bidding manager objectives and target firm returns

⁶See, for example, Harris and Raviv (1996) and Bernardo, Cai, and Luo (2001).

and between target manager objectives and returns to bidders and targets.

Hartzell, Ofek and Yermack (2000) present evidence on the prevalence and significance of merger-related side payments received by target managers. They find that on average target company CEOs receive benefits roughly in line with the permanent income streams that they sacrifice when they agree to be acquired. Hartzell, Ofek and Yermack also present evidence that target shareholders receive lower takeover premia when the target CEO receives “extraordinary personal treatment.”

Naturally, our model does not encompass every factor that plays an important role in takeover activities. We ignore, for example, the impact of takeover defenses.⁷ In our model, defense mechanisms would likely increase the bargaining power of targets, but potentially decrease the number of feasible mergers and the effort bidding firms exert investigating targets. An optimal level of defense mechanisms would likely result. We also do not discuss method of payment. The method of payment can play an important role in models with asymmetric information and signaling between bidders and targets. For example, in Fishman (1989) cash serves to preempt competition by signaling high target valuation. Since we assume symmetric information between the bidder and target method of payment is irrelevant for our results. Lastly, we do not formally model the impact that potential competing bidders have on the choice of tender offer versus negotiated merger, or merger payoffs to shareholders. However, our bargaining model implicitly considers competing bidders and could easily accommodate an explicit extension along those lines.

The paper proceeds as follows. Section 2 presents the basic model demonstrating that

⁷Berkovitch and Khanna (1990) and Baron (1983) look at takeover defenses.

negotiated mergers with side payments are preferred to hostile takeovers. Section 3 adds managerial effort and asymmetric information to the model and derives optimal monitoring and intervention policies for shareholders. Section 4 summarizes the main empirical implications of the model and concludes.

2 The Basic Model

This section presents the basic takeover model with no asymmetric information or managerial effort. The basic model incorporates conflicts of interest between shareholders and managers and investigates the division of gains in friendly versus hostile takeovers. The ability of bidding firms to make side payments to target management leads to a preference for friendly mergers. The section begins with a description of the economic setting.

2.1 The Market for Corporate Control

There exist many firms that are financed solely with equity. Shareholders are assumed to be risk neutral with perfectly congruent objectives. Some firms will generate positive synergies if acquired by another firm. Whether a firm generates positive or negative synergies is unknown until a potential bidder investigates it. It is common knowledge that the proportion of firms that generate positive synergies is small enough that the expected gains from acquiring a target without first investigating are negative. If an investigation reveals positive synergies, the value of the synergistic gains, $\pi > 0$, becomes known to the bidder and the target.

Each firm is run by a risk-neutral manager. We assume only a limited number of

managers have the expertise to investigate and identify targets so that the probability of two bidders investigating the same target is negligible. Potential bidders are able to identify and attempt to acquire only one potential target. Terms of an acquisition can be negotiated privately between managers or determined publicly via a tender offer to target shareholders. We will refer to the first case as a *merger*, and to the second case as a *takeover*. A merger is meant to refer to a friendly acquisition that is supported by target management, while a takeover is meant to imply a hostile acquisition. Merger negotiations can precede a tender offer, but a tender offer precludes subsequent merger negotiations.

When bargaining, managers maximize a combination of their private and non-private benefits. We represent a manager's utility as

$$U_i = \beta_i + \omega_i \Pi_i, \quad i \in \{B, T\}$$

where B and T represent the bidder and target, respectively. β_n represents the manager's private benefits and Π_i represents the manager's non-private benefits. ω_i measures the degree to which manager and shareholder interests are aligned. The smaller is ω_i , the larger are the agency conflicts. We assume that a manager values his private benefits (dollar for dollar) at least as much as his non-private benefits.⁸ This implies $0 < \omega_i < 1$. A manager's private benefits might include consumption of perquisites, social prestige, or reputational contributions to human capital. Non-private benefits include a manager's concern for shareholder welfare as well as managerial shareholdings.⁹

⁸That is, managers are assumed to prefer a dollar increase in their compensation to a dollar increase in aggregate shareholder wealth.

⁹We do not consider optimal compensation contracts for managers. M&A activity is, arguably, not the primary duty of most managers and therefore not the primary determinant of a manager's optimal contract.

Following a merger or takeover only one manager will be needed to run the combined operation: manager B will run the combined operation and manager T will have to find a new job (or stay on in a diminished capacity, e.g., with less autonomy). Following an acquisition manager B 's private benefits increase by $g > 0$ while manager T 's private benefits decrease by $l > 0$.

Whether acquisition is via merger or takeover, divisions of gains are determined by the symmetric Nash Bargaining Solution (NBS).¹⁰ The NBS maximizes the product of the gains to the negotiating parties, where gains are defined relative to each party's disagreement point, i.e., what a party receives if no agreement is reached.¹¹

2.2 Tender Offers

In this section we describe the tender offer process and outcome. Because tender offers are public, once a tender offer is made the chance for private merger negotiations between

In any case, so long as the manager's compensation contract doesn't perfectly align his and shareholders' interests, ω_n can be viewed as a measure of the residual manager-shareholder conflict, net of compensation. Harris and Raviv (1996) and Bernardo et al (2001) study capital budgeting and optimal contracts in more general settings.

¹⁰There are other well-known bargaining solutions: in particular, the model of Rubinstein (1982). Our main qualitative results do not depend crucially on our use of the Nash Bargaining Solution. Osborne and Rubinstein (1990) and Muthoo (1999) discuss the relationship between the NBS and subgame perfect equilibrium solutions to bargaining games of alternating offers.

¹¹The disagreement point can incorporate the expected payoff from a merger with a potential competing bidder. Expected payoffs from competing bidders can be derived from a number of existing models. See, e.g., Fishman (1989), Hirshleifer and Png (1989), and Hirshleifer and Titman (1990).

managers is lost. Let δ_{TO} be the proportion of the synergistic gains, π , that accrue to the bidding firm following a tender offer. The payoffs (i.e., incremental gains) for the bidding manager and the target shareholders, respectively, will be:

$$P_{M_B} = g + \omega_B \delta_{TO} \pi$$

$$P_{S_T} = (1 - \delta_{TO}) \pi$$

The bidding manager gains private benefits g and a δ_{TO} share of the synergistic gains, while target shareholders simply get a $(1 - \delta_{TO})$ share of the synergistic gains. δ_{TO} is determined as the NBS where, without loss of generality, the disagreement payoffs for both parties are normalized to zero.¹² Therefore, the NBS satisfies:

$$\max_{\delta_{TO}} (g + \omega_B \delta_{TO} \pi)(1 - \delta_{TO}) \pi,$$

such that the division of gains in a tender offer is:

$$\delta_{TO} = \frac{1}{2\pi} \left(\pi - \frac{g}{\omega_B} \right). \quad (1)$$

¹²On the bidder side, this assumption ignores the costs of making a tender offer. However, because these costs are sunk, including them does not change the bargaining outcome. On the target side, this assumption ignores the possibility of competing bidders. There are two primary effects of extending the model to accommodate competing bidders. First, depending on specific modeling assumptions, tender offers may occur in equilibrium for some parameter values when competing bidders exist [See Berkovitch and Khanna (1991) and Schnitzer (1994) as two examples.]. We consider tender offers as an alternative to negotiated mergers, but we abstract away from the details of bidding contests such that, in our model's equilibrium, tender offers do not occur. The second effect of acknowledging the existence of competing bidders is a shift in the bargaining outcome (in tender offers and mergers) toward the target firm. The size of the shift depends on what model of competitive bidding in takeover contests one adopts.

The bidding firm's share of the gains is decreasing in the bidder manager's private benefits g and the extent to which he values his private benefits over his shared benefits, i.e., $1/\omega_B$. A large principal-agent conflict on the bidder side effectively weakens the bargaining power of the bidder manager because he is willing to give away more of the synergistic gains to ensure the acquisition goes through and he gets his private benefits.¹³ In all cases, δ_{TO} is less than one half and can even be negative if π is sufficiently small relative to g . Therefore, targets receive the majority of the synergistic gains and may even receive greater than 100% of the gains.

Plugging δ_{TO} into the bidding manager and target shareholder payoffs we have:

$$P_{M_B}^{TO} = \frac{\omega_B}{2} \left(\pi + \frac{g}{\omega_B} \right)$$

$$P_{S_T}^{TO} = \frac{1}{2} \left(\pi + \frac{g}{\omega_B} \right),$$

where the superscripts indicate that these payoffs correspond to a tender offer. Both the bidder manager and the target shareholders benefit from larger merger gains π . They also both benefit from larger private benefits g for the bidding manager. When g is large, allocation of the synergistic gains becomes less contentious because the bidding manager is more concerned with obtaining his private benefits and less concerned with keeping a large share of the synergistic gains. Most interesting, however, is that target shareholders benefit, and the bidding manager loses, the higher is the agency conflict in the bidding firm. A high level of agency conflict in the bidding firm (small ω_B) increases the relative bargaining power of the target shareholder: the bidding manager is increasingly willing to

¹³Technically, the outcome can be derived as an asymmetric NBS where (i) private benefits are excluded from the manager's payoff, and (ii) the coefficient of bargaining power for the manager is $(1 - g/\pi\omega_B)/2$, which is less than 1/2 for $g > 0$.

forego his share of the synergistic gains to ensure that the merger is consummated and he obtains his private benefits. Unfortunately for the bidding manager, his loss of bargaining power is not being compensated by higher private benefits, as happens when g increases. He is simply fighting harder for the same level of private benefits – the net effect being a decrease in his overall gains.

The target manager's payoff is:

$$\begin{aligned} P_{M_T}^{TO} &= \omega_T (1 - \delta_{TO}) \pi - l \\ &= \frac{\omega_T}{2} \left(\pi + \frac{g}{\omega_B} \right) - l. \end{aligned}$$

The target manager benefits from a larger agency conflict on the bidder side for the same reasons as the target shareholders. However, because he suffers a loss of private control benefits l , he may or may not be in overall favor of the acquisition.

The bidder shareholders' payoff is:

$$P_{S_B}^{TO} = \frac{1}{2} \left(\pi - \frac{g}{\omega_B} \right)$$

As expected, payoffs for the bidding shareholders increase with the synergistic gains but decrease in both g and $1/\omega_B$, the degree of principal-agent conflict in their firm. Later we will show that the principal-agent conflict in the bidding firm is mitigated if the bidder can make side payments to the target manager. First, we set the stage by solving for the division of gains in negotiated mergers when target shareholders have the right to block negotiated mergers and force a tender offer.

2.3 Negotiated Mergers

2.3.1 Without Side Payments

Bidder firms can choose whether to make an acquisition via a negotiated merger or a tender offer. Tender offers are made directly to shareholders while mergers are negotiated with management. Nevertheless, target managers need shareholder approval to consummate a merger. Approving a merger is costless to shareholders and blocking a merger (to force a tender offer) is relatively more expensive.¹⁴ We assume target shareholders can block a merger for a fixed cost c_T . In practice, c_T should be related to several firm characteristics. For example, firms with less dispersed ownership should have lower costs of intervention, as should firms with a greater proportion of outside directors.¹⁵

As presented in the last section, if a tender offer fails the merger is off and each participant obtains a payoff of zero. On the other hand, if a merger is blocked, the bidder is still able to make a tender offer. Therefore, the tender offer payoffs serve as the disagreement payoffs when negotiating a merger. If side payments to target management are prohibited, the following proposition is an immediate result.

Proposition 1 *When no side payments are allowed, merger negotiations produce the same*

¹⁴These costs may come from several sources. Examples include (i) communication and coordination expenses among shareholders, (ii) a decrease in share value following confirmation that management is not acting in shareholders' best interests, or (iii) the expected cost of breakup fees or options if the firm is ultimately acquired by another bidder.

¹⁵Burkart, Gromb and Panunzi (1997) focus specifically on the effects of outside ownership concentration on shareholder monitoring and firm value.

division of gains and payoffs as tender offers.

The proofs of all propositions are given in the appendix. An obvious corollary is:

Corollary 1 *When no side payments are allowed, all parties are indifferent between a merger and a tender offer. In particular, target shareholders have no incentive to block a negotiated merger.*

We have ignored potential costs incurred by the bidder in undertaking a merger versus a takeover. Any discrepancy in this respect would tilt the balance in favor of the cheaper alternative. The ability to make side payments to the target manager also breaks the stalemate. In the next section we show that side payments produce a preference for negotiated mergers.

2.3.2 With Side Payments

In the previous section we showed that in the absence of side payments bidders and targets are indifferent between friendly mergers and hostile takeovers. Bidder and target shareholders and the bidding manager are equally happy in either case. Target managers, on the other hand, may be equally unhappy in either case. After all, most chief executives who lose their jobs never find themselves in an executive position again. Target managers thus have an incentive to try to prevent their firm from being acquired.

Berkovitch and Khanna (1991) have argued that target managers can more effectively act as spoilers in a negotiated merger than in a tender offer and for this reason bidders should prefer tender offers when feasible. Schnitzer (1996) shows that if the target manager has

inside information about his firm, bidders may prefer to negotiate with target shareholders via a tender offer. We argue, on the other hand, that bidders and target managers may in fact prefer to negotiate. Negotiated mergers offer the opportunity to compensate the target manager, with side payments, for his loss of private benefits. Such side payments can take many forms. For example, many disposed CEOs are given short term subordinate positions in the merged firm with generous retirement packages. Alternatively, some target managers are given longer term high-compensation/low-responsibility positions (e.g., non-executive chairman of the board).¹⁶

We model the side payment as a lump sum payment of b , paid by the merged firm to the target manager for the successful completion of the merger. A side payment to the target manager exploits the agency conflict in the target firm to the advantage of the bidding firm. Compensating the target manager with private gains, thereby offsetting his private losses, increases the bidder's bargaining power with respect to the synergistic gains. This mitigates the agency conflict in the bidding firm at the expense of the target shareholders.

Target shareholders, of course, can still block a merger at a cost c_T and they will do so if their payoff under the merger agreement is sufficiently below what they can obtain in a tender offer. This bounds how large of a side payment is feasible. The following proposition characterizes the equilibrium when side payments are allowed.

Proposition 2 *When side payments are allowed, bidder and target managers prefer nego-*

¹⁶Hartzell, Ofek and Yermack (2000) assess the frequency, nature, and magnitude of side payments to target managers.

tiated mergers over tender offers. The equilibrium side payment is:

$$b = \frac{(1 + \omega_T)c_T}{2},$$

and the equilibrium payoffs are:

$$\begin{aligned} P_{M_B}^{SP} &= \frac{\omega_B}{2} \left(\pi + \frac{g}{\omega_B} + (1 - \omega_T)c_T \right) = P_{M_B}^{TO} + \omega_B \frac{1 - \omega_T}{2} c_T \\ P_{S_B}^{SP} &= \frac{1}{2} \left(\pi - \frac{g}{\omega_B} + (1 - \omega_T)c_T \right) = P_{S_B}^{TO} + \frac{1 - \omega_T}{2} c_T \\ P_{M_T}^{SP} &= \frac{\omega_T}{2} \left(\pi + \frac{g}{\omega_B} + \frac{(1 - \omega_T)}{\omega_T} c_T \right) - l = P_{M_T}^{TO} + \frac{1 - \omega_T}{2} c_T \\ P_{S_T}^{SP} &= \frac{1}{2} \left(\pi + \frac{g}{\omega_B} \right) - c_T = P_{S_T}^{TO} - c_T \end{aligned}$$

Side payments allow managers to Pareto-improve on the tender offer payoffs because it is more efficient for bidders to pay the target manager directly with private benefits than indirectly through shared benefits (i.e., via a larger share of the synergistic gains). Intuitively, the optimal side payment increases with c_T , the target shareholders cost of blocking the merger. Intervention costs are presumably high when shareholders have little influence on the firm's executives or its board of directors. Additionally, outside shareholders have less incentive to undertake costly intervention the smaller is their stake in the firm. Interestingly, the size of the side payment is negatively related to the target firm's principal-agent conflict. That is, an increase in ω_T (smaller agency conflict) leads to a larger side payment. This is because the more the target manager's interests are aligned with the shareholders', the bigger the bribe needed to persuade the manager to act against the shareholders' interests.

The last term of each payoff in Proposition 2 is the effect of being able to give the target manager a side payment. This is positive for both managers and the bidding shareholders, and negative for the target shareholders. The payoff to the bidding manager remains positive

even as π becomes negative. Thus bidding managers have an incentive to pursue even value destroying mergers and bidding shareholders, though better off with side payments than without, still risk being subjected to value destroying mergers when agency conflicts are large (low ω_B). In the next section we allow bidding shareholders to mitigate the agency conflict through monitoring and intervention. Note that although the size of the side payment increases in ω_T , the incremental gain to the bidding manager and shareholders and target manager is decreasing in ω_T . That is, the incremental gain to those parties increases as the agency conflict in the target firm increases, in line with intuition.

The side payment helps compensate the target manager for the utility loss l and may even turn the total merger payoff to the target manager positive. This mechanism provides for positive merger payoffs to target managers who are not large shareholders or optionholders in their firm. The target shareholders suffer a loss equal to their cost of blocking the merger, even though there is no intervention in equilibrium. Despite this loss, target shareholders will still gain in many mergers, in particular when: the efficiency gains π are high; the acquisition of the target leads to large private benefits for the bidder manager; or the bidder has a large principal-agent problem. Note that the target shareholders' payoff is independent of the level of the agency conflict within their own firm. Therefore, efforts by shareholders to better align the manager's incentives with their own will not help in this regard. In the extended model of the next section we consider c_T as a target shareholder choice variable and show that setting $c_T = 0$ will not necessarily maximize target shareholder payoffs.

The net effect on the sum of the payoffs is:

$$\left(\frac{\omega_B}{2} - \omega_T\right) c_T.$$

The following corollary summarizes the additional implications of Proposition 2.

Corollary 2 *When side payments are allowed:*

- *Bidder firm principal-agent conflicts tend to decrease the social benefits of mergers.*
- *Target firm principal-agent conflicts tend to increase the social benefits of mergers.*
- *Total bidder firm payoffs are higher in negotiated mergers.*
- *Total target firm payoffs are higher in tender offers.*

In the next section we extend the model to allow for bidding manager effort and bidding shareholder monitoring and intervention.

3 Bidder Shareholder Monitoring and Managerial Incentives

So far we have assumed that identifying profitable targets is effortless and costless for the bidding manager. In this section we relax this assumption. We introduce bidder manager effort and explore the effectiveness of shareholder monitoring and intervention in managing the principal-agent conflict in the bidder firm.¹⁷ Specifically, we assume that firms are categorized by a set of verifiable attributes like size, industry, and geographic location. These characteristics are related to each firm's potential synergy gains and private benefits. At

¹⁷As previously stated, examining the role of compensation contracts in mitigating manager-shareholder conflicts of interest is outside the scope of our paper. Of some comfort in this regard is Burkart, Gromb and Panunzi's (1997) assertion that monetary incentives do not generally render monitoring redundant.

date 1, the manager chooses which type of firms to investigate based on the type characteristics, and decides how much effort to exert investigating potential targets. If the manager exerts a nonverifiable effort $e \in [0, 1]$ to investigate targets of a specific type, with probability e he will find a target with positive synergistic gains. The effort costs the bidder manager $\gamma e^2/2$, where $\gamma > 0$ is the manager's effort-aversion parameter.¹⁸

If the manager is successful in his investigation, he may negotiate terms for the merger and, at date 2, propose the merger to the bidding firm shareholders. Along with the merger proposal the manager reports values of the target's synergistic gains and private benefits to the shareholders. The bidding shareholders can costlessly observe the target firm characteristics (e.g., size and industry), but can not costlessly verify the synergy gains and private benefits reported by the manager. Based on the target firm characteristics and the values reported by the manager, the shareholders choose how much effort to exert verifying the target information. Exerting nonverifiable effort $\epsilon \in [0, 1]$ at a cost $\epsilon^2/2$ will yield the information with probability ϵ . Based on their information, bidding shareholders can intervene to block the merger at a fixed cost c_B . We assume that intervention by the shareholders is in some way costly to the bidding manager. It may, for example, damage his reputation or cause higher levels of shareholder monitoring in the future. If the shareholders intervene the bidding manager suffers a utility loss L .

Thus, in our setting, managers and shareholders each have two dimensions of choice in their actions. Managers choose the focus and magnitude of their effort. Shareholders choose how much to monitor and when to intervene. We solve the model with the following

¹⁸For ease of exposition and to focus on the most interesting cases, we will assume γ is such that the manager chooses $e < 1$ in equilibrium.

additional variable definitions and distributional assumptions:

- Define $X = \pi + (1 - \omega_T)c_T$ and $Y = g/\omega_B$ so that the payoffs to the bidding manager and bidding shareholders, respectively, from a negotiated merger are $\omega_B(X + Y)/2$ and $(X - Y)/2$. (Recall the payoffs in Proposition 2.)
- There are two types of firms, characterized by a single attribute $s \in \{s_1, s_2\}$, where $s_1 < s_2$.
- The majority of firms of each type offer negative synergistic gains. However, conditional on having positive synergistic gains, all targets share the same $X = x$, independent of type.
- Conditional on $X = x$, firms of type s_i have Y distributed uniformly over the interval $[0, s_i]$. Therefore, private benefits are correlated with the firm attribute. It is natural to think of the firm attribute as some measure of firm size (e.g., market capitalization, book value of assets, etc.) with firms categorized as small ($s = s_1$) or large ($s = s_2$). The presumption that private benefits are positively correlated with firm size is well established.
- We assume $x + c_B < s_i$ for $i \in \{1, 2\}$ so that a potential conflict of interest exists between the bidding manager and shareholders for target firms of either type.

Before describing the optimal bidder shareholder policy and equilibrium payoffs, we present the managerial effort and payoffs that result when (i) shareholders never monitor, and (ii) shareholders always monitor. Understanding these two cases helps in understanding the intuition behind the optimal monitoring policy. Based on the Revelation Principle,

we determine the intensity of shareholder monitoring as whatever is necessary to get the manager to truthfully report his information. If bidding shareholders never monitor (nor intervene)¹⁹:

$$e^{(\text{never monitor})} = \frac{\omega_B}{4\gamma}(2x + s) \quad (2a)$$

$$\epsilon^{(\text{never monitor})} = 0 \quad (2b)$$

$$E[P_{M_B}^{(\text{never monitor})}] = \frac{1}{2\gamma} \left[\frac{\omega_B}{4}(2x + s) \right]^2 \quad (2c)$$

$$E[P_{S_B}^{(\text{never monitor})}] = \frac{\omega_B}{16\gamma}(4x^2 - s^2). \quad (2d)$$

These equations highlight the two dimensions of shareholder-manager conflicts in the bidder firm. First, manager payoffs (2c) are increasing in s while shareholder payoffs (2d) are decreasing in s . Therefore the manager and shareholders disagree about which type of firms the manager should investigate as potential targets. Second, independent of firm type, shareholders always prefer for the manager to exert the maximum effort investigating targets but the manager will (generally) exert less than maximum effort. In particular, the manager will exert less effort investigating small targets (2a). Shareholders must choose a monitoring and intervention policy to optimally manage these conflicts of interest.

¹⁹These results are shown in the proof of Proposition 3 in the appendix.

If bidding shareholders always monitor:

$$e^{(\text{always monitor})} = \frac{\omega_B (x + c_B)(3x + c_B)}{4\gamma s} \quad (3a)$$

$$\epsilon^{(\text{always monitor})} = \frac{\omega_B(x + s)}{\omega_B(x + s) + 2L} \quad (3b)$$

$$E[P_{M_B}^{(\text{always monitor})}] = \frac{1}{2\gamma} \left[\frac{\omega_B (x + c_B)(3x + c_B)}{4s} \right]^2 \quad (3c)$$

$$E[P_{S_B}^{(\text{always monitor})}] = \frac{\omega_B (x + c_B)^2(3x + c_B)}{16\gamma s^2} [(x - c_B) - \epsilon^2]. \quad (3d)$$

The equations above show how shareholder monitoring influences managerial behavior and payoffs. First, consider equation (3b), which shows how much shareholders monitor. To induce truth-telling the monitoring policy must increase monitoring intensity as the incentive to lie increases. Because g is positively correlated with s , as s increases the scope for deception and hence the incentives to lie increase. Monitoring intensity must therefore increase in s . The level of monitoring increases in ω_B for the same reason, even though agency-conflicts *decrease* in ω_B . Recall that the bidding manager's payoff increases in ω_B because the manager bargains more effectively. Therefore, all else equal, the manager has a larger incentive to deceive shareholders as ω_B increases, and shareholders respond by monitoring more intensely. Lastly, shareholders monitor less as L increases. A larger L increases the cost to the manager of being caught lying. Therefore the probability of being caught can decrease while maintaining the same expected penalty.

Equation (3c) shows that the manager's payoff is now decreasing in size – shareholder monitoring effectively encourages the manager to investigate small rather than large targets. In addition, (3a) shows that the manager will exert more effort investigating small targets than he would spend were he to investigate large targets. The downside is that,

relative to (2a), the manager exerts strictly less effort investigating than he did when not being monitored.²⁰ In addition, shareholders bear the direct cost of monitoring. The optimal monitoring policy derived in the next section balances the benefits of better aligned managerial focus with the indirect costs of decreased managerial effort and the direct cost of shareholder monitoring.

3.1 Optimal Bidder Monitoring and Intervention Policy

In the previous section we demonstrated that if managers know that shareholders will never verify the profitability of proposed mergers, managers will investigate targets that have the highest expected managerial payoffs, not the highest expected shareholder payoffs (i.e., large targets). The mergers proposed by managers may or may not be profitable for shareholders. On the other hand, if shareholders always try to verify the profitability of a proposed merger, managers will investigate targets that have the highest expected shareholder payoffs (i.e., small targets) and managers will only propose a merger if it is profitable for the shareholders. The downside is that managers don't exert much effort investigating targets if they are being monitored. The following proposition shows that shareholders should always monitor large merger proposals, but they should only monitor small merger proposals if the potential private benefits to the manager are sufficiently large. When the private benefits offered by small targets is not too large, shareholders will commit to not monitor small targets. In equilibrium managers will always investigate small targets and truthfully reveal when a merger is not profitable for the shareholders. Nevertheless, because it is costly for shareholders to intervene and block a merger, some

²⁰The manager's payoff is also strictly less when he is always monitored.

unprofitable mergers will be consummated. Accepting some unprofitable mergers is the price shareholders pay for managers to exert more effort investigating targets. In fact, it is not generally optimal for shareholders to reduce to zero their cost of blocking a merger.

Proposition 3 *If $s_1 < s^*$ (defined in the appendix), then shareholders will commit to not monitor any proposed merger with a small firm and will monitor any proposed merger with a large firm. If $s_1 > s^*$, shareholders will monitor all proposed mergers. In either case, the bidding manager will only investigate small firms as potential takeover targets.*

Specifically, let X and Y be the synergistic gains and private benefits reported by the manager to the shareholders with a merger proposal. Let X^ and Y^* be the true synergistic gains and private benefits. In equilibrium $X = X^*$ and $Y = Y^*$ and the optimal bidder shareholder monitoring policy is:*

$$\epsilon(s, X, Y) = \begin{cases} 0 & \text{if } X - Y < -c_B \text{ or } s = s_1 < s^*, \\ \frac{\omega_B(x+s)}{\omega_B(x+s)+2L} & \text{otherwise.} \end{cases}$$

The bidder shareholder will optimally intervene if:

- (i) $X - Y < -c_B$, or
- (ii) Monitoring reveals $(X, Y) \neq (X^*, Y^*)$.

There is no shareholder intervention in equilibrium.

Intuitively, shareholders will intervene without exerting monitoring effort whenever an unprofitable merger is proposed (i.e., $X - Y < -c_B$). They will also intervene and block the merger whenever the manager is caught lying. In equilibrium, the manager will neither lie

nor propose unprofitable mergers so shareholders will never block a merger. It is sufficient for shareholders to be able to credibly threaten to block unprofitable or mis-represented mergers.

As is usual in the literature, we assume shareholders can commit to the optimal monitoring policy, even though the ex ante optimal policy may not be ex post efficient. For example, because the manager truthfully reveals his information in equilibrium, shareholders have an ex post incentive not to monitor. The commitment to monitor in this case is often presumed to come from reputational considerations. In our context, it is also important for shareholders to be able to credibly commit to not monitor in some cases. One way shareholders commit to not monitor small targets is through the corporate charter. Shareholders of companies incorporated in Delaware, for example, relinquish the right to vote on any merger requiring an issuance of stock in an amount less than 20% of the currently outstanding stock.

The cost of bidding shareholder intervention, c_B , also influences the takeover outcome. The percentage of mergers that are unprofitable for the bidding shareholders increases in c_B . c_B can, to a degree, be considered a choice variable of the firm. For example, the cost of intervention is likely to decrease with the percentage of outside directors and size of outside blockholdings. If the cost of shareholder intervention can be driven to zero, there will be no unprofitable mergers. Managerial effort, however, is strictly increasing in c_B such that it is not in the shareholders' best interest to minimize their cost of intervention. The following proposition confirms that there is an optimal positive cost of bidding shareholder intervention.

Proposition 4 *Bidding shareholder expected payoffs are concave in the bidding sharehold-*

ers' cost of intervention, c_B . Setting cost of intervention to zero does not maximize bidding shareholders' expected payoff.

3.2 Optimal Target Intervention

Finally, we return to the target shareholder problem. Target shareholders may want to restrict their manager's ability to enter into negotiated mergers with side payments to mitigate potential losses from side payments. Equivalently, it may be in target shareholders' interests to reduce as much as possible their cost of intervening to block negotiated mergers. This is not an unambiguous result, however. Target shareholders face much the same trade-off as bidding shareholders with respect to minimizing their cost of intervention. Setting $c_T = 0$ reduces the effort bidders exert investigating potential targets. Therefore, setting $c_T = 0$ to eliminate negotiated mergers decreases the likelihood of tender offers as well. The following proposition gives conditions under which target shareholders will optimally choose $c_T > 0$.

Proposition 5 *Target shareholder expected payoffs are strictly concave in the target shareholders' cost of intervention, c_T . Shareholders of small targets maximize their expected payoff by minimizing their cost of intervention. Shareholders of large targets prefer positive intervention costs if:*

$$\frac{g}{\omega_B} > \frac{\omega_T}{1 - \omega_T} \pi.$$

Proposition 5 says that shareholders of the smallest firms have the greatest incentive to reduce their costs of intervention. This is consistent, for example, with venture capitalists insistence on significant voting rights and seats on the board of companies they invest

in. Larger firms, on the other hand, can benefit from encouraging negotiated mergers. In particular, if the firm has significant agency conflicts (small ω_T) or offers high private benefits relative to synergistic gains. This arises because once c_T is established, the cost to target shareholders of friendly versus hostile mergers is fixed. The benefits of negotiated mergers to the bidding firm, however, are not fixed. They increase with the agency conflict in the target firm. (Recall the results of Proposition 2.) In addition, all else equal, bidding managers exert more effort investigating targets offering large private benefits. Therefore, as the level of agency conflict in the target firm increases, or the ratio of private to non-private benefits, the cost to the target shareholders remains fixed, but the benefits increase.

4 Conclusion

This paper provides a theoretical rationale for the prevalence of negotiated mergers between larger acquirers and small targets. We show that negotiated mergers, by virtue of the ability to make side payments to the target managers, allow the target manager to be better compensated for his loss of private benefits while simultaneously mitigating the agency conflict in the bidder firm. The direct cost of the side payment is borne by the target shareholders, but they benefit indirectly from the bidding manager having an increased incentive to investigate takeover targets. Target shareholders, therefore, accept the lower payoffs in a negotiated merger to increase the odds that a merger occurs. When the private benefits accruing to the bidding manager are correlated with size, bidder shareholders commit to monitor proposed acquisitions of small firms less and proposed acquisitions of large firms more. This induces the bidding manager to prefer to expend resources investigating small targets.

The model generates several novel empirical implications. Specifically, the model generates specific predictions regarding how principal-agent conflicts of both the bidder and the target firm impact shareholders' merger payoffs and the relationship between target manager side payments and shareholder payoffs. Gains to target shareholders are higher when the bidding firm has a large agency conflict, but are relatively insensitive to changes in the level of agency conflict in the target firm. Target shareholder payoffs should be negatively related to target manager side payments. This relation is driven by the cost of target shareholder intervention, *not* the level of target firm agency conflicts. Gains to bidder shareholders should be positively related to the size of target manager side payments and target firm conflicts of interest.

References

- [1] David P. Baron. Tender offers and management resistance. *Journal of Finance*, 38:331–343, 1983.
- [2] Elazar Berkovitch and Naveen Khanna. How target shareholders benefit from value reducing defensive strategies in takeovers. *Journal of Finance*, 45:137–156, 1990.
- [3] Elazar Berkovitch and Naveen Khanna. A theory of acquisition markets: Mergers versus tender offers, and golden parachutes. *Review of Financial Studies*, 4:149–174, 1991.
- [4] Antonio E. Bernardo, Hongbin Cai, and Jaing Luo. Capital budgeting and compensation with asymmetric information and moral hazard. *Journal of Financial Economics*, 61:311–344, 2001.
- [5] Mike Burkart, Denis Gromb, and Fausto Panunzi. Large shareholders, monitoring, and the value of the firm. *The Quarterly Journal of Economics*, 112:693–728, 1997.
- [6] Michael J. Fishman. Preemptive bidding and the role of the medium of exchange in acquisitions. *Journal of Finance*, 44:41–57, 1989.
- [7] Sanford J. Grossman and Oliver Hart. Takeover bids, the free-rider problem and the theory of the corporation. *Bell Journal of Economics*, 11:42–64, 1980.
- [8] Milton Harris and Artur Raviv. The capital budgeting process: Incentives and information. *Journal of Finance*, 51:1139–1174, 1996.
- [9] L. Herzel and R. W. Shepro. *Bidders and Targets: Mergers and Acquisitions in the U.S.* Oxford: Basil Blackwell, 1990.

- [10] Michael C. Jensen. Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, 76:323–329, 1986.
- [11] Tim Loughran and Anand M. Vijh. Do long-term shareholders benefit from corporate acquisitions? *Journal of Finance*, 52:1765–1790, 1997.
- [12] Carlos P. Maqueira, William L. Megginson, and Lance Nail. Wealth creation versus wealth redistributions in pure stock-for-stock mergers. *Journal of Financial Economics*, 48:3–33, 1998.
- [13] Randall Morck, Andrei Shleifer, and Robert W. Vishny. Do managerial objectives drive bad acquisitions? *Journal of Finance*, 45:31–48, 1990.
- [14] Abhinav Muthoo. *Bargaining Theory with Applications*. Cambridge University Press, 1999.
- [15] M. Osborne and A. Rubinstein. *Bargaining and Markets*. Academic Press, San Diego, California, 1990.
- [16] Ariel Rubinstein. Perfect equilibrium in a bargaining model. *Econometrica*, 50:97–110, 1982.
- [17] Monica Schnitzer. Hostile versus friendly takeovers. *Economica*, 63:37–55, 1996.

A Proofs of Propositions

A.1 Proposition 1

The tender offer NBS is Pareto efficient. Therefore, for negotiated merger payoffs to differ from tender offer payoffs there needs to be a Pareto-improving division of gains among the managers (relative to the tender offer division of gains). However, because there are no additional gains to be divided, any change in the allocation of gains must leave one of the managers strictly worse off relative to the tender offer payoffs. Therefore, the NBS for merger negotiations will correspond with the disagreement point.

A.2 Proposition 2

Ensuring that target shareholders do not intervene to block the merger requires that δ_{SP} satisfy:

$$F_{S_T}^{SP} \geq F_{S_T}^{TO} - c_T, \text{ or}$$
$$\alpha_T (1 - \delta_{SP}) (\pi - b) \geq \frac{\alpha_T}{2} \left(\pi + \frac{g}{\omega_B} \right) - c_T.$$

Therefore:

$$\delta_{SP} \leq \frac{1}{\pi - b} \left[\frac{1}{2} \left(\pi - \frac{g}{\omega_B} \right) - b + \frac{c_T}{\alpha_T} \right] \quad (4)$$

In equilibrium, so long as the target manager values a dollar in his pocket at least as much as a dollar in the blockholder's pocket ($\omega_T < 1$), (4) is satisfied with equality.

Since δ_{SP} is determined by the tender offer payoffs and cost of target shareholder intervention, negotiations between the bidder and target managers focus on the size of the side payment b . The disagreement point for negotiations is still the tender offer outcome. The

NBS satisfies the following maximization:

$$\begin{aligned}
& \max_b [P_{M_B}^{SP} - P_{M_B}^{TO}] \times [P_{M_T}^{SP} - P_{M_T}^{TO}] \\
& \Leftrightarrow \max_b \left[g + \omega_B \delta_{SP} (\pi - b) - \frac{\omega_B}{2} \left(\pi + \frac{g}{\omega_B} \right) \right] \\
& \quad \times \left[\omega_T (1 - \delta_{SP}) (\pi - b) + b - l - \left(\frac{\omega_T}{2} \left(\pi + \frac{g}{\omega_B} \right) - l \right) \right] \\
& \Leftrightarrow \max_b \left(\frac{c_T}{\alpha_T} - b \right) \left(b - \omega_T \frac{c_T}{\alpha_T} \right)
\end{aligned}$$

The negotiated side payment is:

$$b = \frac{(1 + \omega_T)c_T}{2},$$

and the equilibrium payoffs follow after substitution.

A.3 Proposition 3

We first derive equation set (2). If the shareholders never monitor, the manager's problem is:

$$\max_e e \frac{\omega_B}{2} (x + \mathbb{E}[Y]) - \frac{\gamma e^2}{2} \quad (5)$$

Therefore,

$$\begin{aligned}
e &= \frac{\omega_B}{2\gamma} (x + \mathbb{E}[Y]) \\
&= \frac{\omega_B}{4\gamma} (2x + s)
\end{aligned}$$

Plugging this back into (5) gives the manager's expected payoff. The shareholders' expected payoff is:

$$\begin{aligned}
\mathbb{E}[P_{S_B}(\text{never monitor})] &= e \frac{1}{2} (x - \mathbb{E}[Y]) \\
&= \frac{\omega_B}{16\gamma} (4x^2 - s^2).
\end{aligned}$$

We now derive equation set (3). First we determine how much shareholders need to monitor to get the manager to truthfully report Y^* . Suppose the manager reports $Y > x + c_B$. Then shareholders will intervene without monitoring and the managers payoff will be $-L < 0$ with certainty. Therefore the manager will never propose a merger (i.e., report) $Y > x + c_B$. If the manager reports $Y < x + c_B$, the shareholders will monitor. Suppose $Y^* < x + c_B$. If the manager lies and reports $Y \neq Y^*$, his expected payoff is:

$$-\epsilon(Y)L + [1 - \epsilon(Y)]\omega_B(x + Y^*)/2$$

which is strictly less than $\omega_B(x + Y^*)/2$, so the manager will always tell the truth if $Y^* < x + c_B$. Suppose $Y^* > x + c_B$ and the manager reports $Y < x + c_B$. Shareholder monitoring must be sufficient that this is not a profitable strategy for the manager. It must be that:

$$-\epsilon(Y)L + [1 - \epsilon(Y)]\omega_B(x + Y^*)/2 \leq 0$$

for all $Y \neq Y^*$. Therefore

$$\epsilon = \frac{\omega_B(x + s)}{\omega_B(x + s) + 2L}$$

because $Y^* \leq s$.

Given ϵ , the managers problem is:

$$\max_e e \frac{\omega_B}{2} \Pr(Y < x + c_B)(x + \mathbb{E}[Y|Y < x + c_B]) - \frac{\gamma e^2}{2} \quad (6)$$

Therefore,

$$\begin{aligned} e &= \frac{\omega_B}{2\gamma} \Pr(Y < x + c_B)(x + \mathbb{E}[Y|Y < x + c_B]) \\ &= \frac{\omega_B(x + c_B)(3x + c_B)}{4\gamma s} \end{aligned}$$

Plugging this back into (6) gives the manager's expected payoff. The shareholders' expected payoff is:

$$\begin{aligned} \mathbb{E}[P_{S_B}(\text{always monitor})] &= e\Pr(Y < x + c_B) \frac{1}{2} [(x - \mathbb{E}[Y|Y < x + c_B]) - \epsilon^2] \\ &= \frac{\omega_B}{16\gamma} \frac{(x + c_B)^2(3x + c_B)}{s^2} [(x - c_B) - 2\epsilon^2]. \end{aligned}$$

We now show that there exists $s^* > x + c_B$ such that

$$\mathbb{E}[P_{S_B}(\text{never monitor})] > \mathbb{E}[P_{S_B}(\text{always monitor})]$$

if and only if $s < s^*$. First, both $\mathbb{E}[P_{S_B}(\text{never monitor})]$ and $\mathbb{E}[P_{S_B}(\text{always monitor})]$ are strictly downward sloping in s . Furthermore $\mathbb{E}[P_{S_B}(\text{never monitor})]$ approaches negative infinity as s approaches infinity, while $\mathbb{E}[P_{S_B}(\text{always monitor})]$ approaches zero as s approaches infinity. Therefore, to establish a single crossing at $s^* > x + c_B$ it is sufficient to show that $\mathbb{E}[P_{S_B}(\text{never monitor})] > \mathbb{E}[P_{S_B}(\text{always monitor})]$ at $s = x + c_B$:

$$\begin{aligned} \mathbb{E}[P_{S_B}(\text{never monitor})] &> \mathbb{E}[P_{S_B}(\text{always monitor})] \text{ at } s = x + c_B \\ \Leftrightarrow (3x + c_B)(x - c_B) &> (3x + c_B) [(x - c_B) - 2\epsilon^2] \\ \Leftrightarrow 0 &> -2\epsilon^2 \end{aligned}$$

A.4 Proposition 4

Bidding shareholders wish to maximize their expected payoff. If bidding shareholders optimally don't monitor, then their payoff is independent of c_B . When they do monitor, their payoff is a strictly concave function of c_B :

$$\mathbb{E}[P_{S_B}] = \frac{\omega_B}{16\gamma} \frac{(x + c_B)^2(3x + c_B)}{s^2} [(x - c_B) - \epsilon^2]$$

where ϵ does not depend on c_B . It is easy to show that expected shareholder payoff is maximized at $c_B = (\sqrt{2} - 1)x > 0$.

A.5 Proposition 5

In equilibrium, only firms of type s_1 are potential targets. When $s_1 > s^*$:

$$\begin{aligned} E[P_{S_T}] &= \frac{\omega_B(\sqrt{2} + 1)x^2}{4\gamma s_1}(\pi + g/\omega_B - 2c_T) \\ &= \frac{\omega_B(\sqrt{2} + 1)}{4\gamma s_1}[\pi + (1 - \omega_T)c_T]^2(\pi + g/\omega_B - 2c_T) \end{aligned}$$

which is strictly concave in c_T . The optimal c_T is positive if:

$$\frac{g}{\omega_B} > \frac{\omega_T \pi}{1 - \omega_T}$$

When $s_1 < s^*$:

$$\begin{aligned} E[P_{S_T}] &= \frac{\omega_B}{8\gamma}(2x + s_1)(\pi + g/\omega_B - 2c_T) \\ &= \frac{\omega_B}{8\gamma}[2\pi + s_1 + 2(1 - \omega_T)c_T](\pi + g/\omega_B - 2c_T) \end{aligned}$$

which is strictly concave in c_T . The optimal c_T is positive iff:

$$\frac{g}{\omega_B} > \frac{s_1 + (1 + \omega_T)\pi}{1 - \omega_T}$$

which is never true since the LHS is less than or equal to s_1 and the RHS is greater than or equal to s_1 .