A Theory of Acquisition Markets: Mergers versus Tender Offers, and Golden Parachutes

Elazar Berkovitch
Naveen Khanna
The University of Michigan

We develop a model of the acquisition market in which the acquirer has a choice between two take-over mechanisms: mergers and tender offers. A merger is modeled as a bargaining game between the acquiring and target firms; whereas a tender offer is modeled as an auction in which bidders arrive sequentially and compete for the target. At any stage of the bargaining game the acquiring firm can stop negotiating and make a tender offer. In equilibrium, there is a unique level of synergy gains below which the acquiring firm makes only a merger attempt as it expects to lose in the competition resulting from a tender offer. For synergy gains above this level tender offers can occur. However, to get tender offers, target shareholders must give their managers golden parachutes that give higher payoffs in tender off' than in mergers.

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Mergers and tender offers are two of the more common mechanisms through which firms are acquired, and empirical evidence suggests that they yield different payoffs for the participants.[1] We contrast mergers and tender offers, examine why these alternative mechanisms exist, and identify conditions under which one is selected over the other. We also investigate how golden parachutes can determine which mechanism will be used.[2]

We start by modeling an important difference between tender offers and mergers. While tender offers are made through public bids, mergers are carried out in relative secrecy (in at least the initial stages) through private negotiations. Consequently, more information is released when a public tender offer is made than when merger negotiations occur.[3,4] To capture this effect, we assume that after a tender offer the target is "discovered" to be capable of generating synergies. The discovery leads to competition from other potential bidders. On the other hand, we assume that in a merger attempt the target is not discovered so that no competition develops? To formalize this intuition we model a tender offer as a game in which bidders arrive sequentially and, whenever competition develops, the payoffs are determined through an English auction [in this respect, the model is similar to Fishman (1988), Khanna (1986), and Shleifer and Vishny (1986a)]. A merger, however, is modeled as a bargaining process between the acquiring firm and the target manager, who negotiates for the target shareholders, with synergy gains divided on the basis of an extension of Rubinstein (1982).

We show that there exists a unique level of synergy gains, such that a bidder whose synergy gains are below this level does not attempt to take over the firm through a tender offer. If such a bidder were to

[1] See Jensen and Ruback (1983) for a review of existing empirical literature.

[2] Golden parachutes are written into the incentive contracts of some target managements, promising them additional compensation in the event they leave the firm after it is successfully acquired.

[3] Another difference is that a tender offer is made directly to target shareholders, whereas a merger offer IS made to the target manager. Therefore, in a tender offer, it is the target shareholders who respond to the offer. We assume that either there is only one target shareholder or that the shareholders collude so that the free-rider problem does not arise. For the implications of dealing with many Independent shareholders, see Grossman and Hart (1980), Dunn and Span (1984), Bradley, Desai, and Kim (1988), and Bagnoll and Lipman (1988).

[4] The assumption that less information is revealed through a merger drives most of the results. We are not aware of any other study that makes this distinction. However, casual observation suggests that this assumption is a reasonable one. For instance, in the case *Basic vs. Combustion Engineering,* the Supreme Court ruled that the point in time at which merger talks become material Information and must be revealed needs to be decided through a case-by-case review. This ruling was Interpreted as saying *(Wall Street Journal,* March 8, 1988) that the court "wasn't suggesting any change in companies' practice of silence or 'no comment' about the existence of merger talk" In other words, merger negotiations can be conducted in secrecy. See also Section 4.2.

[5] The analysis will not alter significantly if we permit some leakage of information. A more detailed discussion is given in Section 4.2,

make a tender offer, the resulting competition would give the target a higher payoff than the bidder's synergy gains. Consequently, any profitable bid by such a bidder would be rejected by the target. However, since a merger attempt does not necessarily lead to competition, a low synergy acquirer may succeed in acquiring the firm through a merger.

The choice of the final mechanism also depends on the action of the target manager which, in turn, depends on his contract. Since the target manager negotiates merger deals for the shareholders, the latter must ensure that the contract gives him the incentives to deal with the bidder as he would if he were a target shareholder.

We concentrate on time-consistent (renegotiation-proof implementable) contracts, which permit the manager to renegotiate his compensation if he so desires. We show that, for this set of contracts, tender offers occur only if the compensation received by the manager in a tender offer is positive and exceeds the amount he would have received in a merger.

Some of the empirical implications of our model are supported by existing work. Jensen and Ruback (1983) show that the average synergy is greater for tender offers than for mergers, and that targets do better under tender offers; Bradley, Desai, and Kim (1988) show that as competition increases, bidders do progressively worse in tender offers, whereas targets are better off. Although there exist no direct tests of our results for golden parachutes, casual observation indicates that some contracts condition the manager's payoffs on the mode of acquisition in the way we predict.[6]

In related work, Harris and Raviv (1988) describe two alternative acquisition mechanisms. They investigate the relationship between changes in the capital structure of the target and the occurrence of proxy fights or tender offers, but do not distinguish between tender offers and mergers. Our article is also related to Fishman (1988) and Khanna (1986), which argue that the optimal strategy for the first bidder is to bid preemptively in tender offers so as to prevent further competition. As in our tender offer game, Baron (1983) considers a model with sequential arrival of bidders, but concentrates on the release of information about management entrenchment through the amount of resistance.[7]

[6] We randomly analyzed a few golden parachute contracts offered between 1982 and 1984. Some of these conditioned the payoffs on whether the existing board of directors of the target approved of the acquisition. In most of these cases the contract was voided If the hoard approved. Since mergers requite a board's approval, it would appear that these contracts would compensate the manager only if the target was acquired through a tender offer. Some of the companies that offered such conditional contracts were Kysor Industries, Mesa Petroleum, National Can, National Steel, etc.

[7] For a more comprehensive survey of the literature, see Spatt (1989).

The article is organized as follows. In Section 1, we develop a model for the acquisition market, while in Section 2, we describe the game that takes place with a tender offer. In Section 3, we lay out a model of the "complete" game in which the acquirer can choose between a tender offer and a merger, and we also describe the role of golden parachutes. In Section 4, we extend the model to include leakage of information during mergers and the effect of reduced potential competition. This is followed by a conclusion and empirical implications.

1. The Market

We consider a market in which some firms (targets) can generate synergies once acquired by another firm. The source of this synergy may include management, economies of scale, technological matches, tax savings, etc. The ability of a firm to generate synergies is unknown both to the market and to the firm itself before a potential bidder investigates it. After the investigation, the amount of the synergy gains becomes known to the target and the investigating bidder. Conditional on a bidder finding synergy gains from taking over a potential target, the synergy gains that other bidders will be able to generate with this target are distributed uniformly over the interval [0, 1].[8]

We assume that while there exists a continuum of potential targets, only a finite number of firms are capable of identifying an unknown target.[9] However, if the investigating firm makes the target's identity public (say, through a tender offer), then any other firm can investigate the target and compete for it. It is also common knowledge that a proportion q of all potential targets can generate positive synergy.[10] During each period, an acquiring firm is able to investigate only one randomly selected potential target. If the investigation reveals no synergy gains, the two firms part, If synergies are revealed and the target is already involved in merger negotiations with another acquirer (an event with negligible probability), then competition results through tender offers. If the target is not involved in any negotiations,

[8] To be more precise, we assume that it is common knowledge that the amount of synergy generated has two components: a common value and a private value. For simplicity, assume that the common value component an be either zero with probability q, or a negative number smaller than -1, with probability $(1 - q)$. The private value component is distributed uniformly over the interval [0, 1]. Thus, conditional on the common value part being zero, the synergy gains are distributed uniformly over (0, 1] and conditional on the negative value, the total synergy is negative and the acquisition is not worthwhile.

[9] These assumptions are made to maintain stationarity in the game and simplify the value function. If the number of targets is finite, or only active searchers can bid, then some learning an rake place in the market and the game is no longer stationary. We do not believe that this effect is important in a large economy.

[10] We assume q is small enough that the expected gains from taking over a target without investigation are nonpositive.

then the acquiring firm can try to take it over either through a tender offer or through a merger attempt. In a tender offer, the acquiring firm makes a public offer; whereas in a merger, the target and bidding firms negotiate in relative secrecy. Thus, more information is released to the market in a tender offer.

We assume initially that no competition develops during the merger negotiating process (this assumption is later relaxed). Tender offers, on the other hand, lead to competition each period from one other bidder (referred to as bidder 2).[11] The bidder 2s are picked at random from the set of all firms. For simplicity, it is assumed that there is no limit on the number of targets for which a firm may bid.[12] Therefore,. if merger negotiations fast for more than one period, ‘the acquirer is not prevented from investigating additional targets and the only cost of continuing negotiations is the cost of delaying the final payoff. This cost is represented by a discount factor, δ.

2. Tender Offers

In this section, we describe the subgame in which an acquirer makes a tender offer. Tender offers may be made only through public bids and must statutorily remain open for some minimum period. Consequently, a tender offer reveals the target to the market as synergy-generating, and permits other firms time to investigate and bid.[13]

The sequence of events and decisions in period t is as follows. An acquiring firm, bidder 1, investigates a target and discovers synergy gains with the target of $a \in (0, 1]$. He then makes a tender offer bid of $w_t(a) \in (0, a]$, which remains open for one period, and the synergy becomes public information.[14] A second bidder, bidder 2, investigates the target and identifies its synergy gains $b \in (0, 1]$. There are three possible outcomes.

(i) $b < w_t(a)$. In this case bidder 2 does not compete. The target shareholders must then decide whether to tender their shares or to reject the offer of w,(u). If they tender, the game is over and bidder

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[11] The assumption that only one new bidder arrives per period is made for tractability. See also section 4.3.

[12] This assumption simplifies the value function by allowing us to ignore the choke between alternative acquisitions.

[13] Tender offers are usually made through public bids which remain open for at last 20 working days.

[14] We assume that the synergy gains become public information for simplicity. As shown in Berkovitch and Khanna (1988), this assumption an be relaxed so that only the management teams know the synergy gains, without changing any of the results. Further, Berkovitch and Narayanan (1990) show that, even with asymmetry of information between the two managements, similar results can be achieved by signaling through the medium of exchange.

1 acquires the target for his opening bid of $w_t(a)$. If they reject the offer, the game continues into the second period when a new bidder 2 competes with the old bidder 1.[15]

(ii) $w_t(a) \leq b \leq a$. In this case, bidder 1 raises his bid to w:(a) $\in (b, a]$, and bidder 2 leaves the auction permanently.[16] Target shareholders either accept or reject the revised bid.

(iii) $b > a$. Bidder 2 bids $w_t^2(b) \geq a$, and bidder 1 leaves the auction. Target shareholders again either accept or reject bidder 2's bid. If they reject it, then this bidder bids as the bidder 1 of the next period when a new bidder 2 enters and competes against him.

A detailed description of the game between a bidder 1 of type a and the target is given in Appendix A. Bidder 1 has to specify a bid for each possible history of the game, and target shareholders have to specify whether they accept or reject any possible final bid in any period. We define the equilibrium in the spirit of Selten's (1975) subgame perfection. The responses of the bidder and the target from any history are the best ones in that they constitute a Nash equilibrium for the game which starts from that history.[17] The equilibrium in the market is a collection of strategies that constitute an equilibrium for all possible games between the target and every possible type of bidder 1.

Before we turn to the formal analysis, it is important to understand the target's decision when faced with the final bid of a period. The target can either accept the bid, or reject it and wait. The expected discounted payoff for the target from waiting is determined by the actions the players will take in the future, and is anticipated by the target before its decision in this period. The target rejects the bid if the bid is below the anticipated value from waiting, and accepts otherwise. The bidder understands the target's response to his bid and, therefore, in equilibrium, will not bid above the target's value from waiting.

The value from waiting not only affects the players' actions, but is, in turn, affected by their future actions. This simultaneity results in

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[15] Because we have assumed collusive behavior (see note 3) we an use the notion of rejection/acceptance of tender offers by target shareholders as a group.

[16] In this case, since bidder 2 knows he cannot win, he is indifferent between bidding and not bidding. In fact, if he has some bidding costs, he will not bid. However, Berkovitch and Khanna (1990) show that with the use of discriminatory value-reducing defensive strategies, like lockups, the competitive bidding assumption an be defended.

[17] We restrict our analysis to semistationary strategies [see Rubinsteisn and Wolinsky (1985)] in that the bidder's strategy in a current tender offer is independent of the histories in any previous tender offer attempts with other targets [see Binmore and Herrero (1988)) This restrictions implies that we consider only the bidder's synergy value from acquiring the target under consideration and not his action in any previous tender offer he may have made. For a "proper" definition of a game. past behavior should also be Included. However, we believe that this will not change our results.

multiple Nash equilibria. For instance, the bidder can make the target accept a low bid in this period by threatening to make only bids of zeros in the future. Similarly, the target can get a high bid from the bidder in this period by threatening to reject any future bid. However, neither of these threats is credible, since the player making the threat does not have the incentive to carry it out when the time comes. Such equilibria are eliminated through the imposition of subgame perfectness, which requires that the players' actions be optimal at every decision point, including those that will not be reached in equilibrium. As shown in Appendix A, this requirement results in a unique equilibrium in which the players take the same actions (stationary strategies) over time. A description of this equilibrium is as follows.

With a stationary strategy, a bidder will make the same opening bid every period. Since the structure of the game is also stationary, if the target will accept a particular bid sometime in the future, it is better off accepting it right away.[18] Therefore, if an acceptable bid exists in equilibrium, it will be both made and accepted in the first period. However, to find such a bid, we must calculate the value from waiting as if this bid is rejected in the current period, but accepted, according to the target's strategy, in the subsequent period.

Suppose that the final bid of a period is made by bidder 1 with value *a*, according to his equilibrium strategy. Suppose, also, that the target makes an off-equilibrium move and rejects this bid. Then the game moves to the next period in which this bidder will open with the same opening bid $w(a)$, and the target will accept this bid if it also becomes the final bid. Therefore, the target's undiscounted expected payoff from waiting, $V_T(a)$, is

$$V_T(a) = \int_a^1 \max\{a, w(s)\}\,ds + [w(a)]^2 + \int_{w(a)}^a s\,ds. \qquad (1)$$

The first element of the right-hand side (RHS) represents the target's expected payoff in the event the synergy gain of bidder 2 of the next period, b, is greater than a. In this case, the target gets the maximum of the value of bidder 1 (which is the outcome of the English auction between a and b) and $w(b)$ that bidder 2 will bid as a first bidder. This is so because, for $b > a$, the target can assure itself the value $w(b)$ by rejecting a lower bid and waiting. The second element is the target's expected payoff whenever $b < w(a)$, which occurs with probability $w(a)$ under the uniform distribution. Similarly, the third element is the expected payoff whenever $w(a) < b < a$. In this case,

[18] Because of stationarity, the value from waiting is the same in any period in the future. Therefore, if the bid above the value from waiting in some future period, it must also be above the value from rejecting the bid of this period and waiting one period.

bidder 1 with synergy a has to bid the value of the second bidder, even though it is above his prescribed bid.

Equation (1) can be rewritten as follows:

$$V_T(a) = \int_a^1 \max\{a, w(s)\}\,ds + \frac{1}{2}[w(a)]^2 + \frac{1}{2}a^2. \qquad (2)$$

Using (2), we can describe the equilibrium properties of the game. $\delta V_T(a)$ is the discounted value of the payoff that target shareholders expect ‘to receive in the next period if they reject an outstanding tender offer in this period. Since $V_T(a)$ is strictly positive, target shareholders always have positive payoff from discovery. Also, the higher the opening bid, $w(a)$, the greater is the expected payoff to target shareholders upon rejecting the bid. Given this expected payoff, they reject any bid that is less than the discounted value from waiting one period [i.e., they accept only those bids that are greater than or equal to $\delta V_T(a)$]. Given this response by the shareholders, bidder l’s optimal opening bid $w^*(a)$ must satisfy

$$w^*(a) = \delta V_T(a). \qquad (3)$$

As $V_T(a)$ depends on $w^*(a)$, (3) describes an implicit solution for w^*. This solution, if it exists, together with the target’s strategy of accepting any bid greater than δV_T, constitutes an equilibrium. Substituting (3) into (2) yields

$$V_T(a) = \int_a^1 \max\{a, \delta V_T(s)\}\,ds + \frac{\delta^2}{2}(V_T(a))^2 + \frac{1}{2}a^2. \qquad (4)$$

Equation (4) gives an implicit solution for $\delta V_T(a)$. In Appendix A, we show that for $a = 0$, $\delta V_T(a)$ is strictly positive, since a tender offer leads to competition. Also, $\delta V_T(a)$ is increasing in a at a rate less than 1, and at $a = 1$ is smaller than 6. Therefore, by continuity, there exists an a^* such that $a \geq \delta V_T=(a)$ only if $a \geq a^*$. Thus, only bidders with synergy gains greater than a^* will take positive profits by making a tender offer bid of $w^*(a) = \delta V_T(a)$. For these values of a, $w^*(a)$ is the unique equilibrium bid as shown in the following theorem.[19]

[19] If a bidder with value less than a^* uses the constant-bid strategy, the target shareholders reject any bid that is profitable for this bidder. With zero cost of bidding, he is indifferent between bidding a profitable bid, which will be rejected, or not bidding at all and thus preventing the target from being discovered. However, not bidding seems to be more plausible, as it is the limit of equilibria in games with bidding costs, when bidding costs approach zero. Thus, we assume that not bidding will be the outcome.

Theorem 1. *There exists a synergy level $a^* \in (0, 1)$, such that the unique equilibrium for a bidder with synergy gains $a \geq a^*$ is to bid $w^*(a) = \delta V_T(a)$. The target accepts any bid greater than or equal to $\delta VT(a)$.*

Proof: Follows from Theorems 1A and 2A in Appendix A.

3. Merger Negotiations and Golden Parachutes

In the previous section we have characterized the subgame that takes place whenever bidder 1 decides to make a tender offer. In the "complete" game, bidder 1 can choose between making a tender offer and entering into merger negotiations. Therefore, in order to complete the analysis, we analyze the game in which both mergers and tender offers can occur. Note, however, that once the acquirer makes a tender offer, he eliminates the possibility of subsequent merger negotiations.

3.1 The merger game

Merger bids are not made publicly like tender offers; instead, the target and bidder negotiate in relative secrecy. Moreover, whereas tender offers are made directly to target shareholders, merger negotiations are conducted through the manager of the target. This introduces the manager of the target as an additional player in the game.

We model a merger as a sequential bargaining game in which the manager of the target can either accept or reject a merger offer made by the acquiring firm. If the manager rejects the merger offer, he may submit in the next period a counteroffer of his own merger terms. The acquirer must either accept or reject this counteroffer. If he rejects the counteroffer, then he can make a new merger offer in the following period, and so on. Thus, rejecting an existing offer to make a counteroffer causes a delay of one period. However, the acquirer can terminate the merger attempt and make a tender offer in any period.

Before we identify the payoffs from the merger game, it is necessary to discuss the contracting problem between the target management and shareholders. Suppose that the manager does not share in the gains captured by the target, but suffers some loss in income after a successful acquisition. Although the manager cannot prevent a tender offer from succeeding, he can reject a merger offer, submit an unacceptable counteroffer, and thus delay his own loss. Faced with this response at the beginning of the second period, the acquirer's best action then is to make a tender offer if his synergy gains exceed a^*, since any new offer for a merger will again be rejected, causing further delay. If the acquirer's synergy gains are less than a^*, no acquisition will occur, since the manager is able to resist all merger attempts. Consequently, If the target shareholders do not compensate their managers appropriately, they will observe a tender offer when the synergy gains are higher than a^*, but will not be acquired otherwise.[20]

In order to be acquired even when the synergy gains of the bidder are less than a^*, target shareholders must design the compensation of their manager so that he will not reject such merger attempts. Moreover, the contract must also provide the manager with an incentive to get the best possible merger bid for the shareholders. In order to analyze these issues, assume that the manager's expected loss from earlier dismissal is very small when compared to the synergy gains, and denoted by $\epsilon > 0$.[21] Then, the target shareholders can try to capture most of the synergy gains through the following contract.[22]

Contract 1. If a merger occurs with a bidder with synergy gains a, the manager receives ε if the merger bid is a, and nothing otherwise.

Contract 1 gives the manager the minimum amount needed for him to accept a merger offer, while forcing the bidder to pay out all of the synergy gains. Therefore, if the acquirer's synergy gains exceed a^*, he will do better by making a tender offer directly to the target shareholders instead of negotiating a merger deal with the manager of the target, since $w^*(a) < a$ If $a > a^*$.

Contract 1, if it can be enforced, appears to be the best contract for target shareholders. It enables them to extract virtually all the synergy in the case of a merger, while still obtaining a tender offer bid when $a > a^*$. It is also the cheapest contract, since the target manager is compensated by the least amount necessary in the case of a successful merger, and not at all for a successful tender offer. However, it may be time inconsistent. Suppose that a bidder of type a makes a merger bid $X \in (\delta(a - \epsilon) + \epsilon, \ a)$. Then, holding the manager's compensation constant at e, target shareholders would be better off if the manager accepts this bid instead of rejecting it (as he would under contract 1). Rejecting the bid yields $\delta(a - \epsilon)$, whereas accepting it yields $X - e > \delta(a - \epsilon)$. Therefore, the contract requires a commitment from target shareholders that they will stick with it.[23] Since, a priori, we do not know the extent to which such a commit-

[20] This assumes that target shareholders cannot, by themselves, get the target discovered. See Section 4 for further discussion of this Issue.

[21] Thus, we an ignore situation with $a < \epsilon$.

[22] We wish to thank an anonymous referee for suggesting this contract and this line of argument.

[23] This problem has already been recognized in the finance literature. For example, Ross (1977) presented a model in which shareholders write a contract to the manager that supports a signaling equilibrium by penalizing the manager in case the firm goes bankrupt. Bhattacharya (1980) criticized this contract by claiming that It is intertemporally inconsistent, and that shareholders have incentive "to make disguised side payments to the managers to signal falsely. . . ."

ment is possible, we complete the analysis by identifying the conditions necessary for tender offers to occur under contracts that are time consistent.

3.2 The solution to the merger game

A natural way to resolve the conflict of interest between the manager and shareholders is to give the manager a contract that will make him act as if he were a target shareholder. This can be done by giving the manager a proportion, cc, of the gains captured by the target in a merger. In addition, since acquirers can also make tender offers, the contract must specify a payoff function, t(a), for tender offers. Under such a contract, whenever $a < a^*$, the target's manager and the bidder will face a bilateral bargaining situation because the bidder will not make a tender offer. Since we have assumed a bargaining process with alternating offers, we can use the Rubinstein solution, which gives payoffs of γa to the first mover (bidder) and $\delta\gamma a$ to the second mover (target shareholders and manager), where $\gamma = \delta/(1 + \delta)$.[24] However, when the acquirer can also make a tender offer (i.e., when $a > a^*$), the above solution holds only if the payoff from making a tender offer is less than that from continuing with the merger negotiations. If, upon the rejection of a merger offer, making a tender offer yields a higher payoff (to the acquirer) over persisting with merger negotiations, the option of the tender offer affects the outcome of the game. The next theorem formalizes this intuition.

Theorem 2. *Given that $a \leq a^*$, and that V_B is the expected payoff to bidder 1 in the case of a tender offer, the following holds.*

(i) If $\delta V_B(a) \leq \delta\gamma a$ and $t(a) \leq \delta\alpha[a - V_B(a)]$, the unique subgame perfect equilibrium (SPE) is a merger, and the acquirer's payoff is $\delta a/(1 + \delta)$.

(ii) If $\delta VB(a) \leq \delta\gamma a$ and $t(a) > \delta\alpha[a - V_B(a)]$, then there exist SPEs in which the acquirer always makes a tender offer and gets a payoff of $\delta V_B(a)$.

(iii) If $\delta V_B(a) \geq \delta\gamma a$ and $t(u) \geq da(a - VB(a))$, the unique SPE is a tender offer from every node, with payoff $\delta V_B(a)$ to the acquirer.

(iv) If $\delta V_B(a) \geq \delta\gamma a$ and $t(a) \leq \delta\alpha[a - V_B(a)]$, the unique SPE is a merger in the first period with payoff $\delta[a - \delta a + \delta V_B(a)]$ to the acquirer.

Proof. Given in Appendix B.

[24] This can be seen by solving (B1) and (B2) of Appendix B.

Part (i) of the theorem says that if the target manager's payoff and the bidder's gains from a successful tender offer are "low," then only a merger will occur. Part (ii) shows that when the bidder's payoff from a tender offer is "low," while the manager's payoff is "high," then a tender offer can be supported as an equilibrium.[25] Part (iii) implies that, when both the bidder and the target manager receive "high" payoffs from a tender offer, the only outcome is an immediate tender offer. The last part looks at what will happen when the bidder gets "high," while the manager gets "low," gains from tender offers. This scenario results in a merger in which the acquirer will actually pay less to the target than under the Rubinstein solution. This is because the acquirer can exploit the low payoff to the target manager from a successful tender offer by making a low merger bid which the manager will accept.

3.3 A time-consistent golden parachute contract

Theorem 2 shows that target shareholders can influence whether a merger or a tender offer will occur for a given value of a, by their choice of $t(a)$, the payoff to the manager in the case of a tender offer. We now use the theorem to identify which mechanism will be preferred by the target and which by the acquirer. Corollary 1 shows that the combined payoffs to the target shareholders and manager are higher in the case of a tender offer, whereas the acquirer is better off with a merger.[26]

Corollary 1. *(i) The payoff to the acquirer from a merger is higher than the payoff from a tender offer.*

(ii) The combined payoff to the target shareholders and manager is higher from a tender offer than from a merger.

Proof. Given in Appendix B.

It follows from the corollary that, for relatively small payments to the manager, target shareholders will prefer tender offers. However, their ability to obtain tender offers will depend on the nature of the contract of their manager. Therefore, we next examine the properties of time-consistent contracts that permit tender offers to occur.

To define time-consistency rigorously, we use the notion of renegotiation-proof implementability, in which the communication (renegotiation) between the manager and the shareholders is explicitly

[25] It can be that, for this case, a merger can also be supported as an SPE.

[26] The strong result of the corollary is dependent on the specific arrival process assumed in our model (i.e., one additional bidder arrives per period). See further discussion of this point In Section 43.

described.[27] We concentrate on renegotiation-proof implementable contracts under which the manager does not do better by renegotiating. To allow for contract renegotiation, we extend the previous game so that the following stages take place in every period.

Stage 1. The bidder makes a merger bid to the manager.

Stage 2. The manager can respond with one of three actions: accept the merger bid, reject the bid, or renegotiate with the target shareholders. If the manager accepts the bid, the game ends with this bid as the outcome. If he rejects the bid, the bidder can make an immediate tender offer bid in the same period. If he starts renegotiating, the game moves to stage 3.

Stage 3. The manager makes a "take it or leave it" offer to the shareholders that specifies a change in his contract, conditional on his accepting/rejecting the merger bid.

Stage 4. The shareholders accept or reject the manager's proposed changes in the contract. If they accept, the manager's payoff is determined by his proposal. If they reject, the manager's contract remains unchanged.

Stage 5. The manager now decides whether to accept or reject the merger offer. If he accepts, the game ends. If he rejects, the game moves to the next period.-

A contract *is* said to be *renegotiation-proof implementable* if the payoff it prescribes to the manager can be the equilibrium outcome of the above game. In other words, a merger bid that will enable the manager to propose a change in his existing contract, which will not only raise his payoff but will also be acceptable to the shareholders, cannot be an equilibrium bid under a renegotiation-proof implementable contract.

For tractability, we restrict the analysis to contracts that specify the same payoff for the same realizations in different periods (i.e., constant contracts), so that the payoff to the manager if he accepts a merger bid of X can be written as $m(a, X)$. Similarly, the tender offer payoff is denoted by $t(a)$.

[27] For a description and usage of the concept of renegotiation-proof implementability, see, among others, Green and Laffont (1987), Moore and Repulio (1988), and Hart and Tirole (1988).

[28] For simplicity, we describe in detail only the renegotiation that takes place after the bidder's bid. In even periods, when the manager makes a merger bid, the game starts at stage 2 except that the manager has only two choices either to make a merger offer or a renegotiation proposal. Then the game continues as in stages 3-5.

[29] It may be argued that even without the renegotiation part, the extended game is richer than the original game, as it enables the bidder to start off with a merger bid and to immediately make a tender offer when this bid is rejected (by the manager). However, the two games are equivalent in that they admit the same set of equilibria. With renegotiation, however, a more precise structure is needed, and that is what we have attempted in the extensive form of the game.

Theorem 3. *(i) Suppose $a < a^*$. Then the Rubinstein solution is the unique merger outcome that can be supported as a renegotiation-proof outcome.*[30]

(ii) Suppose $a > a^*$. Then a tender offer can occur under a renegotiation-proof implementable contract if and only if

$$t(a) \geq (1/(1-\delta))[a - \delta V_T(a) - V_B(a)] > 0, \tag{5}$$

and

$$t(a) > m(a, X), \qquad \forall\, X \leq V_T(a). \tag{6}$$

Proof. Given in Appendix C.

The theorem states that in order to get tender offers, the manager must be promised a larger payoff from a tender offer than from a merger. In addition, the payoff must be large enough so that the manager cannot gain by renegotiating his contract and then accepting a merger bid. A high "golden parachute" payment is necessary to eliminate any possible gains from renegotiation, which would otherwise exist because of the ability of the manager to delay the outcome. The theorem also shows that the merger outcome of Section 3.2 is the unique supportable outcome.[31]

The manager's payoff in the event of a tender offer, given by (5), may be quite high.[32] Thus, for some parameters, this contract may result in a lower payoff to target shareholders from a tender offer than they can get from a merger. In these cases, the shareholders will either not try to get a tender offer or will design a contract that involves some ex ante transfers between the manager and the shareholders.[33] However, this problem does not arise for at least the synergy gains just above a^*. This is because at a^*, $\delta V_T(a^*) = a^*$ and $V_B(a^*) = 0$.

[30] As an be seen from Theorem 2, one way of obtaining the Rubinstein solution is by giving the manager a proportion, α, of the target's payoff.

[31] Note that the manager gets different payoffs from mergers and tender offers because he performs different roles. In the case of tender offers, the manager has no further role after the bid has been made. However, in mergers, the manager himself determines the outcome through his negotiations with the bidder. Consequently, the manager needs a more "sensitive" contract in a merger (e.g., a fraction of the target's payoff), as compared to $t(a)$ in (5).

[32] However, min $t(a) < V_T(a)$, since

$$\min t(a) - V_T(a) = [1/(1-\delta)][a - V_T(a) - V_B(a)] < 0$$

by (ii) of Corollary 1.

[33] Since the combined proofs to the target ate higher in the case of a tender offer, the manager and shareholders can enter Into a contract in which ex ante the manager compensates the shareholders for the possible high payment in the event of a tender offer. For example, the manager may accept a lower current wage in anticipation of a future golden parachute. We do not deal with such contracts in this article.

Thus, the LHS of (5) is zero at a^* and, by continuity, is very small for synergy gains just above a^*. Therefore, the difference between the tender offer bid and the merger offer is higher than the minimum t(a), and shareholders are better off paying the necessary golden parachute to obtain a tender offer.[34]

The results of the theorem can be empirically tested either by investigating the contracts given to target managers, or by looking at the actual payoffs the managers receive in mergers and tender offers. According to the theorem, contracts should either explicitly specify a higher payment to managers for tender offers than for mergers, or should indirectly achieve the same payoff structure. One such indirect way is through stock options that result in a higher payoff to the target manager in a tender offer because of a larger price increase in this event.[35]

The implications of the theorem for the actual payments received by the targets' managers must be interpreted with more care. Since tender offers occur for $a > a^*$ and mergers for $a < a^*$, and since the theorem does not directly compare the payoffs for these cases, a precise prediction about differences in compensation is not possible. However, the theorem does imply that the manager's payoff in a tender offer should be quite large, whereas that in a merger need be no larger than the manager's loss from a successful merger. If this loss is small when compared to the average size of the synergy gains, then the average payments to the target managers will be higher in tender offers.

4. Leakage of Information, Level of Competition, and Other Issues

In the preceding sections we have assumed that discovery takes place only through tender offers which are made by bidders with high synergy gains. However, there are other ways through which discovery can be effected. For instance, either information about merger negotiations can be leaked out or mechanisms such as greenmail and lockup can be used. To illustrate this, we define the value to the target of being "discovered" when the bidder has synergy gains of less than a^*.

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[34] For a synergy gain of a^*, the difference between a tender offer bid and a merger offer by a bidder is

$$a^* - \frac{\delta}{1+\delta}a^* = \frac{a^*}{1+\delta} > \frac{a^*}{2}.$$

[35] See Weston, Chung, and Hoag (1990, p. 490) for further discussion.

4.1 Leakage of information in merger negotiations

Suppose information about the target is leaked to the market when the existing bidder has value less than a^*. This bidder cannot buy the target through a tender offer as any bid that is profitable for him will be rejected. However, since the target is now discovered, one new bidder will come per period. If the new bidder has synergy gains above a^*, he will bid as in Theorem 1; however, if his value is also below a^*, he will not bid. Therefore, the target's value from being discovered through a bidder whose value is less than a^* is

$$V_T^D = \int_{a^*}^{1} \delta V_T(s)\,ds + \delta a^* V_T^D. \tag{7}$$

By rearranging Equation (7) we get

$$V_T^D = \frac{1}{1-\delta a^*}\int_{a^*}^{1} \delta V_T(s)\,ds. \tag{8}$$

The following theorem will be useful for the rest of the analysis.

Theorem 4. $\delta V_T^D < a^* \le \delta V_T(a)$, *for* $a > a^*$.

Proof: See Appendix C.

The value to the target from discovery, δV_T^D, is smaller because when discovery takes place through a bidder with synergy gains above a^*, he still bids his optimal opening bid in the resultant tender offer next period. However, a bidder with value less than a^* drops out and reduces competition in subsequent periods.

We now incorporate leakage of information into the model. Assume that, at each stage of merger negotiations, information is leaked out with some probability, $r < 1$. A leak results in the target getting discovered and the game then proceeds as a tender offer. Thus, the target's expected payoff from leakage when $a < a^*$ is

$$\begin{aligned} V(\text{leakage}) &= r\delta V_T^D + r(1-r)\delta^2 V_T^D + r(1-r)^2\delta^3 V_T^D + \cdots \\ &= \beta\delta V_T^D, \end{aligned} \tag{9}$$

where $\beta = r/[1-\delta(1-r)]$. Also, for $a > a^*$, the target's payoff is $\beta\delta V_T(a)$, since the bidder participates as bidder 1 in the resulting tender offer and the target's expected payoff upon revelation is $\delta V_T(a)$ instead of δV_T^D. When there is the possibility of leakage, the target will not accept a merger bid below $\beta\delta V_T^D$ if a is below a^*, and will not accept any bid below $\beta\delta V_T(a)$ for $a > a^*$. Thus, with a possibility of leakage, no mergers will occur when the synergy gains of the opening bidder are less than $\beta\delta V_T^D$. For higher values, the merger solution will be the maximum of the bargaining solutions and the expected value to the target with the possibilty of leakage [see Berkovitch and Khanna (1988)].

4.2 More on the differences between tender offers and mergers

As shown in Section 4.1, the results of this article hold even when there is the possibility of leakage during merger negotiations. In fact, it is sufficient for our analysis that tender offers reveal the information earlier. In order to do so, they must be able to transmit the information faster and in a credible fashion. We believe that this is true for tender offers since they are made through public bids which are immediately observable and costly to withdraw. For mergers to convey the same information, the target manager must be able to reveal details about the negotiations credibly and immediately. Clearly, he has the incentive to do so. On the other hand, the bidder has an incentive to deny the existence of such talks. This raises a credibility problem. If, in equilibrium, the market believes that the target managers are telling the truth, then every potential target has the incentive to claim that it, too, is negotiating a merger. Therefore, such beliefs cannot exist in equilibrium. Although a more rigorous analysis is not attempted here, we believe that any equilibrium in which the target can reveal the merger negotiations will involve either delay or some other costs.

Another distinction between tender offers and mergers (not connected with the informational issue) is the efficiency issue. Whenever the synergy gains of the acquirer are less than δV_T^D, then a Pareto superior outcome can be obtained by getting the low synergy acquirer to reveal the information about the target being synergy generating. In order to do so, the bidder must be compensated and the information revealed through a credible signal, such that a noninvestigated target does not find it profitable to mimic. Since the gains to an uninvestigated target from being discovered are $q\delta V_T^D$, the synergy-generating target can credibly signal this information by bearing a cost of at least $q\delta V_T^D$. This cost can take several forms, such as greenmail or lockups.[36]

4.3 Degree of competition

The result of the previous section is obviously strengthened if more bidders arrive each period. To investigate what happens under reduced competition, we assume (as before), that only one second bidder

[36] A low synergy acquirer may also find it profitable to bid if he an secretly accumulate a large shareholding in the target firm. (In practice, he can buy up to 5 percent of the outstanding target stock before informing the SEC.) This is similar to Shleifer and Vishny (1986b) in which a large shareholder solves the free-rider problem.

arrives per period, except that now he arrives with a probability, $p < 1$. Extending the analysis of Section 2, the optimal bid is

$$w^*(a) = p\delta V_T(a) + (1 - p)\delta w^*(a), \tag{10}$$

where $V_T(a)$ is as given by Equation (2). Whenever the second bidder arrives, the game is similar to the one in Section 2 and, therefore, the value for the target is $\delta V_T(a)$. [Note that the $V_T(a)$ in Equation (10) is different from the $V_T(a)$ of Equation (2), since the optimal opening bid is now different.] Whenever no bidder arrives, the target gets only $w^*(a)$.

The RHS of (10) is decreasing in p and in the limit; as p goes to zero, $w^*(a)$ also approaches zero. Thus, the value to the target from the tender offer game is decreasing in p, and at some point will be below the value from the merger game. Consequently, as the probability of a competing bidder goes to zero, the tender offer subgame becomes essentially a bargaining game in which one side gets to make all the offers. Obviously, in such an environment, the target prefers mergers over tender offers.

5. Conclusion

We solve for conditions under which an acquisition is made either through a tender offer or through a merger. Tender offers are possible only when the synergy generated by the opening bidder is above a unique level in the range of possible synergy gains. Below this level he will make only merger attempts. Target managers' compensation contracts can determine both the mode of acquisition and the target's payoffs in a merger.

There are several empirical implications of our article. The average synergy gains observed in the case of a tender offer should be higher than in the case of a merger, since tender offers take place only for high realizations. Average target returns from tender offers should also be higher than those from mergers, and should increase with potential competition. On the other hand, bidders' abnormal returns should decrease with competition. Also, golden parachute payments should be higher for tender offers than for mergers.

Appendix A

In this appendix we describe the tender offer game. The game starts when a tender offer is made and ends whenever a tender offer is accepted by the target. Using Equations (1)-(3), we can write

$$w(a) = \delta \int_a^1 \max\{a, \delta V(s)\}ds + \delta[w(a)]^2 + \delta \int_{w(a)}^a s\, ds. \quad \text{(A1)}$$

Equation (A1) is meaningful only as long as the resulting *w(a)* is less than *a,* the value of bidder 1. Otherwise, *w(a)* is as follows:

$$w(a) = \delta \int_a^1 \max(w(a), \delta V(s))ds + \delta[w(a)]^2. \quad \text{(A2)}$$

The first expression means that the target gets the higher of the opening bid, *w(a),* and *V(b)* whenever *b* is above w(u). Otherwise, the target gets *w* with probability *w(a).* Note that the opening bid is independent of *a*.

Whenever the solution for *w(a)* is below *a,* a bidder with value *a* can make profits by bidding *w(a)* as in (A1), which is also shown to be the equilibrium bid in Theorem 2A. This gives us the following lemma.

Lemma 1. *(i) For any a ∈ (0, 1], there exists a unique w*(a), which is given by either (A1) or (A2).*

(ii) There exists an a ∈ (0, 1), such that for any a ≥ a*, w*(a) ≤ a and is given by (Al), and for any a < a*, w(a) is greater than a and is given by (A2).*

Proof. To show that there exists a solution for *w(a),* note that both (A1) and (A2) are continuous, and at *a* = *w(a),* the RHS of (A1) equals the RHS of (A2). Therefore, w(u), which is the max of (A1) and (A2), is continuous. Now, using (A1), at *a* = 1,

$$w(1) = \frac{\delta}{2}(w(1))^2 + \frac{\delta}{2} \rightarrow w(1) = \frac{1}{\delta} - \left[\frac{1}{\delta^2} - 1\right]^{1/2} < 1.$$

Also, at *a* = 0, *w*(0) > 0 [from (A2)]. Therefore, by the intermediate value theorem, there exists a solution for *w(u).*

To show uniqueness and the existence of *a**, it remains to be shown that, for *w(a)* < *a, w(a)* is strictly increasing in *a,* but with a slope less than 1. Since *w(a).* < 1 at *a* = 1, by continuity there exists an ε > 0, such that *w(a)* < *a* whenever *a* > 1 – ε. Thus, the solution for (Al) is the appropriate solution for *w,* and is also the solution for

$$w^2 - \frac{2}{\delta} w + 2A + a^2 = 0, \qquad A = \int_a^1 \max\{a, \delta V(s)\}ds. \quad \text{(A3)}$$

The solution for (A3) is given by

$$w(a) = 1/\delta - [1/\delta^2 - 2A - a^2]^{½}. \quad \text{(A4)}$$

There are two cases: (i) for every $s \in (a, 1]$, $\max\{a, \delta V(s)\} = a$, and (ii) there exists $s^* \in (0, 1)$ s.t. $\max\{a, \delta V(s)\} = \delta V(s)$, for every $s \geq s^*$. The analysis of the first case follows directly from the analysis of the second case. Therefore, we analyze the case where such an s^* exists. In this case we can write

$$A = \int_a^{s^*} a\,ds + \int_{s^*}^1 \delta V(s)\,ds, \qquad s^* = V^{-1}\left(\frac{a}{\delta}\right). \tag{A5}$$

Substituting (A5) into (A1) and rearranging, gives us

$$w(a) = \delta s^* a - \frac{\delta}{2} a^2 + \delta \int_{s^*}^1 \delta V(s)\,ds + \frac{\delta}{2} w(a)^2. \tag{A6}$$

Using the implicit function theorem on (A6). we obtain

$$\frac{\partial w}{\partial a} = \frac{\delta s^* + \delta a\,\partial s^*/\partial a - \delta a - \delta^2 V(s^*)\partial s^*/\partial a}{1 - \delta w}. \tag{A7}$$

Now, $a = \delta V(s^*)$ and, therefore, $\delta a\,\partial s^*/\partial a = \delta^2 V(s^*)\partial s^*/\partial a$. Thus, (A7) reduces to

$$\frac{\partial w}{\partial a} = \frac{\delta(s^* - a)}{1 - \delta w}. \tag{A8}$$

Since $a = \delta V(s^*) < s^*$, $\delta w/\delta a > 0$. It can also be seen from (A8) that, since, by assumption, $a > w$, then $\delta w/\delta z < 1$. Therefore, whenever $a > w$, $0 < \delta w/\delta a < 1$. Thus, if we can now show that there exists an a^* for which $w(a^*) = a^*$, we are done. If such an a^* exists, then $w(a) < a$, for any $a > a^*$ (i.e., w increases "slower" than a), and for any $a < a^*$, $w(a) = w(a^*) > a$. From (A2) it can be seen that, whenever $w > a$, w equals some constant $C \in (0, 1)$. Let $a^* = C$. Now a^* satisfies both (A1) and (A2). It thus follows that for any $a > C$, $a > w(a)$, and uniqueness is established. Q.E.D.

Theorem 1A. *The unique constant strategies equilibrium is for a bidder with $a \geq a^*$ to bid $w^*(a)$ as given by (A1), and for the target shareholders to accept any bid greater than or equal to $w^*(a)$. In equilibrium, V_T bas a unique solution among the set of differentiable and strictly increasing functions over the interval $[a^*, 1]$.*

Proof. Given any strategy by bidder 1, the shareholders' best response at time t, assuming bidder 1 is still one of the competitors, is to tender only if $w_t \geq \delta V_{T,t}(a)$. (The subscript t is used here to emphasize that this argument is general and holds also for nonstationary strategies.) Given this response by the target shareholders, the acquiring firm will not bid $w_t > \delta V_{T,t}(a)$. Thus, to show that to start with $w(a) =$

$\delta V_T(a)$ is an equilibrium, it remains to be shown that the bid may not be below $\delta V_{T,t}(a)$ If bidder 1 bids below $\delta V_{T,t}(a)$, then, with a positive probability, bidder 2 has synergy gains below this bid and does not enter. In this case, bidder l's opening bid, which is also the final bid, will be rejected, causing delay. Therefore, he is better off starting with a bid of $\delta V_{T,t}(a)$. This argument is correct as long as there exists a unique V_T that satisfies $\delta V_T(a) < a$. As shown in Lemma 1, this occurs for $a \geq a^*$.

To establish uniqueness, note that it follows from Lemma 1 that for any continuously differentiable function V, there exists a unique solution for $w(a)$ which Is continuous and differentiable for $1 \geq a \geq a^*$. Now, if $w(a)$ is replaced by $\delta V_T(a)$ in (A1) and (A2), this implies a unique solution for $\delta V_T(a)$ for every arbitrary V, and, in particular, for $V_T(\bullet)$. This function, which is the unique fixed point for (Al), satisfies continuity and differentiability and thus is the unique solution. Q.E.D.

Theorem 2A. *The constant bid strategy by bidder 1, together with target shareholder acceptance of every bid above δV_T, and bidder 2's bid of $\max\{a, \delta V_T(b)\}$, constitutes the unique equilibrium.*

Proof: A detailed proof is given in Berkovitch and Khanna (1988). Here we describe the main features of the proof.

It is obvious that the equilibrium response of the target is to accept. any bid equal to or above $\delta V_T(a)$. Therefore, in equilibrium, bidder 1 does not bid above $\delta V_T(a)$. Also, bidder 2's best response is to bid $\delta V_T(b)$ whenever it is above a so as to prevent rejection (otherwise it has to bid a). It remains to be shown that, in equilibrium, bidder 1 does not gain by threatening to make lower bids in the future in order to reduce $\delta V_T(a)$ today. In Berkovitch and Khanna (1988)) we show that this threat is not subgame perfect. Q.E.D.

Appendix B

Proof of Theorem 2

The Rubinstein solution, ignoring the possibility of tender offers, is the solution for the following equation:[37]

$$X = \delta Y, \tag{B1}$$
$$Y = a - \delta(a - X), \tag{B2}$$

[37] See Sutton (1986) for a similar presentation of the solution. He also deals with the alternative of an outside option somewhat similar to the render offer option.

where X is the acquirer's merger offer to the target and Y is the offer that the target makes, in terms of what it gets, when it is the target's turn to move. The first mover always makes a bid that gives the respondent the discounted expected value of what he will be able to capture (in equilibrium) when it is his turn to make the bid next period. The solution to the above equation is $X = \delta a/(1 + \delta)$ and represents what the target gets at the end of the first period [i.e., the present value to the target is $\delta^2 a/(1 + \delta)$]. The bidder's discounted payoff is

$$\delta(a - X) = \delta a/(1 + \delta).$$

Case (i). Since the Rubinstein solution's payoffs are higher to both parties than what they can get under tender offers, tender offers will not be used even as a threat. Therefore, the unique solution is as above.

Case (ii). It can be seen that the previous equilibrium is still a subgame perfect equilibrium (SPE). However, there is also an SPE that involves an immediate tender offer. The manager's strategy of rejecting any merger attempt below $t(a)/\alpha > \delta(a - V_B(a))$ and countering with an unacceptable merger offer in his turn, and for the bidder to make a tender offer from every node, is an SPE. This is because the manager knows that, given the above strategy, he will get a tender offer upon rejecting a merger attempt. Since he prefers a tender offer, and the acquirer would rather make a tender offer than a merger bid of $t(a)/a$, this is also an SPE.

Case (iii). Since both the bidder and the target manager prefer the outcome of a tender offer over the Rubinstein solution, the proof is similar to that of the second SPE of case (ii).

Case (iv) In this case, too, the Rubinstein solution is not an SPE since, upon rejection by the manager of a merger offer, the bidder is better off making a tender offer. This is because, by persisting with his merger attempt, the bidder gets $\delta^2 a/(1 + \delta)$ as a counteroffer from the manager. This is less than what he gets from making a tender offer. However, the outcome in the next period will not be a tender offer because the target manager prefers to submit a merger attempt, which gives the acquirer a higher payoff than from a tender offer. Therefore, the manager's resulting payoff in the second period is $\delta\alpha(a - V_B)$ and the acquirer's merger offer in the first period will provide the manager the discounted value of this payoff [i.e., $\delta^2\alpha(a - V_B)$]. Thus, the acquirer's payoff is $\delta(a - \delta a + \delta V_B)$. It can be noted that the acquirer does not have an incentive to deviate from this strategy as he is doing better than what he would under either Rubinstein's solution or a tender offer. Accordingly, target shareholders will be worse off. Q.E.D.

Proof of Corollary 1
The (expected payoff from a tender offer to bidder 1 is

$$\text{(i)}\quad V_B(a) = w(a)[a - w(a)] + \int_{w(a)}^{a} (a - s)\,ds$$

$$= \frac{1}{2}[a^2 - w^2(a)].$$

Hence

$$\frac{\delta a}{1+\delta} - \delta V_B(a) = \delta a\left[\frac{1}{1+\delta} - \frac{a}{2}\right] + \frac{\delta}{2}w^2(a) > 0;$$

the inequality follows from the fact that $a \leq 1$ and $\delta < 1$.

(ii) It can be seen that $V_T(a) \leq a - V_B(a)$. Using part (i),

$$V_T(a) > a - \frac{a}{1+\delta} = \frac{\delta a}{1+\delta} \Rightarrow \delta V_T(a) > \frac{\delta^2 a}{1+\delta}.$$

Clearly, in all other cases of merger, the target prefers a tender offer. Q.E.D.

Appendix C

Proof of Theorem 3
(i) To show that the Rubinstein solution is the unique implementable payoff, we show that any renegotiation-proof implementable contract must satisfy (B1) and (B2) in Appendix B. Indeed, suppose that the equilibrium outcome of the merger yields $X' < \delta Y' = a - \delta(a - X')$. Given a merger bid of X', the manager can make the following acceptable proposal to the shareholders: reject this merger bid and get, next period, a payoff of $[m(a, X')/X']Y'$ upon a successful merger. This will increase the payoff of both the manager and the shareholders. Now suppose that $X' > \delta Y'$, and consider a merger bid of $X'' = \delta Y' + \frac{1}{2}(X' - \delta Y')$. The manager can make an acceptable (and profitable) renegotation offer to the shareholders [e.g., he will accept the offer if his payoff is $m(a, X') + \frac{1}{4}(X' - \delta Y')$]. Therefore, this outcome cannot be supported via a renegotiation-proof contract.

(ii) Suppose $a > a^*$, and that an equilibrium in which the bidder makes a tender offer exists (by our stationarity assumption, this means his strategy prescribes a tender offer bid next period). First, note that a tender offer is not possible if inequality (6) does not hold for some $X < V_t(a)$, because if such an X exists, then the bidder will make a merger bid of X which the manager will accept. For tender offers to be part of an equilibrium, the bidder should not be able to make a profitable merger bid that will finally be accepted as an equilibrium in the renegotiation game. Now, a merger offer, X, which yields a higher payoff to the bidder, while being acceptable to both the manager and the shareholders, must satisfy

$$m(a, X) > t(a), \tag{C1}$$
$$X - m(a, X) > \delta[V_T(a) - t(a)], \tag{C2}$$
$$a - X > V_B(a). \tag{C3}$$

Inequality (Cl) states that the manager prefers the negotiated payoff over the tender offer payoff (which he receives in equilibrium). Inequality (C2) states that the shareholders prefer the renegotiated outcome, $X - m(a, X)$, over the outcome they get by rejecting and creating a delay (i.e., receiving the payoff of a tender offer next period). The last inequality states that the bidder prefers making the merger bid over making a tender offer.

Adding the LHS of inequalities (C1)-(C3) yields a. Therefore, a necessary condition for renegotiation to go through is that the sum of the RHS of (C1)-(C3) is below a. In other words, a sufficient condition for renegotiation ***not*** to go through is

$$t(a) + \delta[V_T(a) - t(a)] + V_B(a) \geq a. \tag{C4}$$

By rearranging (C4) we obtain

$$t(a) \geq (1/(1 - \delta))[a - \delta V_T(a) - V_B(a)]. \tag{C5}$$

From part (i) of the proof of Corollary 1, the RHS of (C5) is strictly positive, and thus the proof has been completed in one direction.

To see that the above conditions are necessary for renegotiation not to occur, assume that the inequality is reversed, that is,

$$t(a) + \delta[V_T(a) - t(a)] + V_B(a) < a.$$

It is easy to see that, in this case, there exist X and $m(a, X)$, such that (C1)-(C3) hold: simply set $X = \delta V_T(a) + \varepsilon/2$, and $m(a, X) = t(a) + \varepsilon/2$, where $\varepsilon < a - t(a) - \delta[V_T(a) - t(a)] - V_B(a)$. It is an equilibrium for the bidder to propose X, for the manager to propose accepting X with the new payoff $m(a\ X)$, and for the shareholders to accept the manager's renegotiation proposal. Thus, a tender offer will not be made. Q.E.D.

Proof of Theorem 4
We have

$$V_T(a) = \int_a^1 \max\{a, \delta V_T(s)\} ds + [\delta V_T(a)]^2 + \int_{\delta V_T(a)}^{a} s\, ds. \quad \text{(C6)}$$

As is shown in Lemma 1, $\delta V_T(a) < a$. Therefore,

$$[\delta V_T(a)]^2 + \int_{\delta V_T(a)}^{a} s\, ds < [\delta V_T(a)]^2 + \int_{\delta V_T(a)}^{a} \delta V_T(a) ds = a\delta V_T(a). \quad \text{(C7)}$$

Substituting (C7) into (C6), we obtain

$$V_T(a) > \int_a^1 \max\{a, \delta V_T(s)\} ds + a\delta V_T(a). \quad \text{(C8)}$$

Since $V_T(a)$ is increasing in a, we need only show that the proposition holds for $a = a^*$. Rearranging (C8) at a = a^* yields

$$V_T(a^*) > \frac{1}{1 - \delta a^*} \int_{a^*}^1 \max\{a, \delta V_T(s)\} ds = V_T^D. \quad \text{Q.E.D.}$$

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