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An Explanation for Recapitalization in Corporate Control Contests

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This paper examines the role of corporate financial policy in determining the equilibrium allocation of takeover gains in corporate control contests. The model justifies capital-structure changes in response to a takeover bid, and shows how recapitalization can be used as a strategic device to alter the price a bidding firm pays to acquire the target firm.

INTRODUCTION

Corporate control contests have recently been the subject of much attention. In such contests, the objectives of shareholders and managers are typically not coincident. This is particularly true when a firm is acquired by a tender offer rather than a negotiated merger. Tender offers are different from mergers because in such offers it is possible for a bidder to exclude target management from the negotiations and deal directly with target shareholders. In contrast, a merger is a negotiated process in which both managements are directly involved.

This paper provides an explanation of managerial resistance to tender offers in the form of corporate restructuring that is consistent with shareholder wealth maximization. Target managers act in shareholders' interests by resisting takeovers because the 'all-or-nothing' character of a tender offer limits shareholders' ability to negotiate directly with the bidder firm. In fact, the only possible shareholder response to an unfavorable offer is to retain their shares and wait for a better one. A counteroffer cannot be made by shareholders, nor can negotiations be carried out.

Takeover behavior has been modelled in a variety of environments. In their seminal paper, Grossman and Hart (1980) argue that atomistic shareholders do not have an incentive to tender their shares because they can fully participate in any post-merger benefits by free riding on the bidder's improvements. As a consequence, takeovers will fail unless exclusionary devices can be added to corporate charters that allow the bidder to extract part of the post-merger value of the company. In a related paper, Shleifer and Vishny (1986) show that the free-rider problem can be resolved if the bidder can establish a 'foothold' in the target company prior to revealing that it is a potential target. This leads to successful takeovers, because the bidder participates in the post-merger benefits through the gains it realizes on its initial investment in the target. Alternatively, Bagnoli and Lipman (1988) show that the free-rider problem can be overcome if the atomistic shareholder assumption is modified so that there exist a finite number of shareholders.

An alternative approach to explaining takeover behavior is to consider the effect of market inefficiencies such as asymmetric information. Papers by Fishman (1988), Giammarino and Heinkel (1986), Khanna (1985), Knez (1987), and P'ng (1985) argue that when bidders use pre-emptive bidding strategies managerial resistance can be employed to delay settlement and increase competition. Competition leads to higher bids, because outstanding bids reveal information about potential synergy gains to other potential buyers. A limitation of this type of takeover defense is that it is designed to make it harder for a potential acquisition to succeed regardless of whether another takeover attempt is forthcoming. A common feature of these models is that the target firm only negotiates indirectly with the bidder firm.[1]

It is in this context that a positive role for defensive recapitalizations emerge. A recapitalization defense requires the target firm to issue debt and pay out the proceeds as a dividend to target

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shareholders.[2] Such a strategy has two effects. First, the equity value of the target falls by the amount of the dividend payment. Second, recapitalizations create wealth redistributions between shareholders and bondholders in a takeover.[3] Recapitalizations provide target management with a means for proposing direct counteroffers, because these valuation effects increase the effective price implicit in an outstanding tender offer. Recapitalization is particularly useful in this regard because the dividend payment, which is financed with newly issued debt, leaves the target's original asset structure intact and the potential synergy gains unaffected.[4]

Using recapitalization to generate counteroffers differs from the role for capital structure proposed by Harris and Raviv (1988), who also examine the role of capital-structure changes in corporate takeovers. They argue that firms make capital-structure decisions that are based on a tradeoff between synergistic merger gains and the loss of personal benefits of control.

In a related paper, Stulz (1988) argues that recapitalization changes the distribution of voting rights when issue proceeds are used to repurchase shares from outside stockholders. Because share repurchase increases management's control of the voting rights it can potentially make a corporate acquisition more difficult. Stulz shows an optimal capital structure emerges as managers trade off the increased benefits of control against the greater probability of losing control through bankruptcy. Bagwell (1988) also examines how capital structure changes can be used to deter takeovers.

Recently, recapitalizations have become a common takeover defense. For example, Handa and Radhakrishnan (1989) document 42 such transactions since 1985. To illustrate how a recapitalization is implemented, consider the case of Harcourt, Brace and Jovanovich (HBJ). On 27 May 1987, HBJ's board rejected a $44-a-share tender offer from British Printing and Communication Corp. (BPCC) and responded with a recapitalization plan. Under this plan, which was financed with approximately $3 billion of debt, HBJ shareholders received a cash dividend of $40 a share and a share of newly issued preferred stock.[5] On the announcement date, the HBJ proposal reflected an estimated 15% to 20% premium over the outstanding offer. Following this announcement, there was additional speculation that the negotiations had not terminated. This is reflected in a statement by an analyst for one major institutional holder of HBJ who said 'I could see him [Robert Maxwell of BPCC] making a $55 or $56 cash offer just to top [the HBJ plan]'. Another analyst stated, 'If [Maxwell] is serious, he's got to come back with a tender offer. In the next couple of weeks, it's either put up or shut up.'[6]

The focus of this paper is to examine how, under asymmetric information, recapitalization can be used to achieve an equilibrium allocation of the takeover gain. It is a mechanism by which target management can transform an offer to buy into a bilateral bargaining game. Using the concept of a subgame-perfect equilibrium, the allocation of the takeover gain is formally treated as a two-period nonco-operative bargaining game.[7] In the first period the bidder makes a tender offer for all the shares of the target, which the target firm may accept or reject. If the target rejects the proposal, the target makes a counteroffer, through a recapitalization, which the bidder may accept or reject. The intuition underlying an alternating offer strategy is that the information implicit in rejecting an offer can be used to reduce the degree of informational asymmetry to the point where an agreement is reached.

The model analyzed in this paper is most similar to that of Giammarino and Heinkel (1986). This framework is appealing because it is simple yet sufficient to illustrate the intuitive role that recapitalization plays in generating counteroffers. Whether a firm uses a recapitalization defense depends on the size of the potential takeover gains and their relative probabilities of occurrence. For example, if the probability of realizing a low-value takeover gain is high and the bidder bids low, the target is likely to accept the offer. Alternatively, if the probability of realizing a high-value takeover gain is high and the bidder bids low, the target is likely to propose a counteroffer.

There is empirical evidence supporting the notion that recapitalizations are consistent with shareholder wealth maximization. Handa and Radhakrishnan (1989) document that shareholders realized abnormal returns of 1.19% (t-statistic of 3.45) and 2.16% (t-statistic of 6.27) on days -1 and 0 relative to the recapitalization announcement date for a sample of 31 active target firms. They also provide direct evidence that target managers use recapitalization to negotiate a higher bid price. In their study, nine of the 31 firms that proposed a recapitalization subsequently abandoned their plans upon receipt of a higher bid. For these cases,

none of the final bids were lower than the initial one and, on average, the revised bids exceeded the prior bids by 18.7%. These revised bids arrived an average of 46.1 days after the plan was announced (the median was 18 days).

Our model also predicts that recapitalization will lead to failed takeovers. In the event that the bidder withdraws its offer, the market price of the target firm's equity should decrease to adjust for the appreciation realized on the recap announcement date, and possibly some of the appreciation realized on the takeover announcement date. This second price decrease would occur if a portion of the potential takeover gain is bidder-specific. HR provide evidence of such a price decline. Over a 60-day event window, their sample of 31 active target firms, which includes successful and unsuccessful takeovers, earns a cumulative excess return of −6.67%.

The paper proceeds as follows. The next section demonstrates how capital-structure changes can be used to alter the terms of a tender offer. The third section describes the equilibrium bidding strategy for allocating the takeover gains. The final section discusses the implications of the model and provides some concluding comments.

TAKEOVER GAINS AND RECAPITALIZATION

Because the empirical evidence indicates that takeovers are value-increasing events, it is assumed there exists an exogenous takeover gain. For example, Mikkelson and Ruback (1985) document that target and bidder shareholders realized average abnormal returns of 21.10% and 1.07%, respectively, on the announcement of successful tender offers. The source of this gain is not of immediate concern. One can view such gains as the replacement of inefficient management, economies of scale, tax effects or some other synergistic benefit. This gain implies

$$V^{C} \geq V^{B} + V^{T}$$

where V^{C}, V^{B} and V^{T} are the value of the combined, bidder and target firms, respectively.

When the target recapitalizes, it issues debt and pays the proceeds as a dividend.[8] For a recapitalization to be successful, it is necessary to distribute the proceeds from the debt issue. Otherwise, in the event of a successful takeover, target shareholders lose access to the newly raised capital.

The total takeover gain for the target shareholders (G^{T}) is composed of the offer price (P) plus any dividends received if the target recapitalizes (DIV^{T}) net of the target's initial equity value (E_0^{T}). This is denoted as:

$$G^{T}(P,F) = P + DIV^{T}(F) - E_0^{T} \qquad (1)$$

where F is the incremental promised bond payment issued by the target if it recapitalizes.

The total takeover gain for the bidder shareholders (G^{B}) is composed of the equity value of the combined firm (E^{C}) less the offer price and the initial equity value of the bidder firm (E_0^{B}). This is denoted as:

$$G^{B}(P,F) = E^{C}(F) - P - E_0^{B} \qquad (2)$$

To see the role that debt financing plays, consider how a recapitalization affects the target- and bidder-gain functions in the absence of asymmetric information (the takeover gain is common knowledge). When the target recapitalizes, the issue proceeds are paid out as a dividend to target shareholders. Since the offer price is fixed, this dividend payment increases the target's share of the total takeover gain and causes the equity value of the combined firm to decrease. Thus, the target can use recapitalization to increase its share of the takeover gain and thereby bargain with the bidder.

Because both parties are fully informed there is a free-rider problem. As a result, the only possible equilibrium is one in which the entire takeover gain is allocated to the target. In this equilibrium (assuming that a bidder is willing to make bids when it is indifferent between bidding and no action), the bidder always submits an acceptable initial bid because it recognizes that, regardless of the bidder's actions, the target can recapitalize to achieve the equilibrium allocation.

A CAPITAL STRUCTURE EQUILIBRIUM UNDER ASYMMETRIC INFORMATION

Under asymmetric information, neither the bidder nor the target is fully informed. The bidder, who possesses potentially superior information about the takeover gain, realizes that the initial bid is a signal to the target firm. Hence, the bidder chooses a bidding strategy that simultaneously protects its

informational advantage and recognizes the possibility of a recapitalization. Under asymmetric information, recapitalizations are used to increase the effective price implicit in a tender offer in a manner analogous to the perfect-information setting. In fact, the intuition is the same. The primary difference between perfect and asymmetric information is that under perfect information recapitalization only serves as a credible deterrent to unacceptable bids and is never used. In contrast, under asymmetric information, recapitalizations are actually implemented. Another difference is that asymmetric information mitigates the free-rider problem and allows the bidder to make bids in which it expects to earn positive profits. This follows because when the bidder is not completely informed, the bidder cannot make a bid that unambiguously allocates the entire gain to the target and allows it to break even. The target realizes this and is willing to accept a lower bid than it would under perfect information.

The remainder of this section establishes that an equilibrium exists in which the target firm uses recapitalization as a takeover defense. There are two subsections. One describes the formal bidding model and the other derives the equilibrium bidding strategies.

The Bid Model

We model the negotiating process using a two-period setting that is structured along the lines of GH. Firms are assumed to be risk-neutral value-maximizers who apply a zero discount rate to future cash flows. Cash flows are realized at the end of period 2. The bidder (B) and target (T) recognize that firm value is enhanced by a takeover and that the set of synergy gains is $\{V_1, V_3\} = \{10\,000, 20\,000\}$. It is common knowledge that the firm is worth V_1 or V_3 with probabilities p_1+p_2 and p_3+p_4, respectively.

The bidder receives a signal that provides incomplete information regarding the possible takeover gain. It is known that B receives a signal, Y, from the set $\{1, 2, 3\}$. Signal $Y=1$ is received with probability p_1 and informs B that the synergy gain is worth V_1. Signal $Y=3$ is received with probability p_4 and informs B that the synergy gain is worth V_3. Signal $Y=2$ is received with probability p_2+p_3. If $Y=2$ is received it informs B that V_1 is received with probability

$$\phi = p_2/(p_2+p_3)$$

and V_3 is received with probability $1-\phi$. This implies that the expected value of the synergy gain is $V_2 = \phi V_1 + (1-\phi)V_3$ when a signal $Y=2$ is received. To summarize, the set of possible states of nature $\{S\} = \{1, 2, 3, 4\}$ are as follows:

$S=1$ then Value $=10\,000$, $Y=1$

$S=2$ then Value $=10\,000$, $Y=2$

$S=3$ then Value $=20\,000$, $Y=2$

$S=4$ then Value $=20\,000$, $Y=3$

The following sequential structure is imposed on the bidding process:

(1) B submits a bid from the set $\{P_1, P_2, P_3\}$ at time zero.
(2) T accepts the bid or proposes a counteroffer by recapitalizing at time 1. A recapitalization requires T to issue debt with a promised bond payment of either $F_2(P_1)$ or $F_3(P_1)$ if an initial offer of P_1 is received or $F_3(P_2)$ if an initial offer of P_2 is received. It is assumed that debt is riskless.[9] The issue proceeds are paid as a dividend, $DIV^T(F)$. Throughout the remainder of the paper such an action is referred to as a 'recapitalization of F'. Acceptance ends the game.
(3) If T submits a counteroffer, B accepts or rejects at time 2 and the game ends.

Let $G_Y^B(P, F, S)$ and $G_Y^T(P, F, S)$ denote the takeover gains for B and T in state S given an initial bid of P and a recapitalization of F, respectively. The payoffs from the game for the target and bidder are:

(1) T receives $G_Y^T(P, O, S)$ if it accepts B's initial bid, $G_Y^T(P, F, S)$ if T's counteroffer is accepted, and zero otherwise.
(2) B receives $G_Y^B(P, 0, S)$ if the initial bid is accepted, $G_Y^B(P, F, S)$ if T's counteroffer is accepted, and zero otherwise.

Following GH, B's offers are restricted to $\{P_1, P_2, P_3\}$ where P_Y is defined as the offer such that B's expected takeover gain conditional on Y is zero. Intuitively, P_Y is the bid that the bidder would make if the target could observe the signal Y. This restriction requires P_Y to satisfy:

$$G_1^B(P_1, 0, 1) = 0$$

$$\phi G_2^B(P_2, 0, 2) + (1-\phi) G_2^B(P_2, 0, 3) = 0$$

$$G_3^B(P_3, 0, 4) = 0$$

A similar restriction is imposed on the set of counteroffers. Since T does not observe Y, it is assumed that T makes counteroffers such that B's takeover gain conditional on the true signal being Y and an offer price P equals zero. This restriction requires F to satisfy:

$$\phi G_2^B(P_1, F_2(P_1), 2) + (1-\phi) G_2^B(P_1, F_2(P_1), 3) = 0$$
$$G_3^B(P_1, F_3(P_1), 4) = 0$$
$$G_3^B(P_2, F_3(P_2), 4) = 0$$

A strategy for B is a probability measure on the set $\{Y\}$. The notation $b_i^j = \text{prob (B bids } p_i \mid Y=j)$ denotes the probability that B bids P_i given that signal j has been received. Player B chooses b_1^1, b_2^1, b_1^2, b_2^2, b_1^3, b_2^3, with[10]

$$b_3^1 = 1 - b_1^1 - b_2^1$$
$$b_3^2 = 1 - b_1^2 - b_2^2$$
$$b_3^3 = 1 - b_1^3 - b_2^3$$

A strategy for T is a probability measure on the bid space $\{P_i\}$. The notation $a(P_i, F(P_i))$ denotes the probability that T makes a recapitalization of $F(P_i)$ given an initial offer P_i. $a(P_i, 0)$ denotes the probability that T accepts B's initial offer. Player T chooses $a(P_1, 0)$, $a(P_1, F_2(P_1))$ and $a(P_2, 0)$ with

$$a(P_1, F_3(P_1)) = 1 - a(P_1, 0) - a(P_1, F_2(P_1))$$
$$a(P_2, F_3(P_2)) = 1 - a(P_2, 0)$$
$$a(P_3, 0) = 1$$

In order for T to determine its optimal strategy, T revises its beliefs about the true state based on the bid. Letting $Q_S^i = \text{prob}(S \mid \text{B bids } P_i)$ denote the Bayesian revised state probabilities, these probabilities can be expressed as:

$$Q_1^i = b_i^1 p_1 / \Delta_i$$
$$Q_2^i = b_i^2 p_2 / \Delta_i$$
$$Q_3^i = b_i^2 p_3 / \Delta_i$$
$$Q_4^i = b_i^3 p_4 / \Delta_i$$

where

$$\Delta_i = b_i^1 p_1 + b_i^2 (p_2 + p_3) + b_i^3 p_4$$

The Equilibrium Bidding Strategy

Using a subgame-perfect equilibrium concept, the bidder and target firms take optimal actions that anticipate the optimal strategy of the other party. This equilibrium refinement has the intuitive property that noncredible threats are ruled out. In deriving the equilibria, three additional assumptions are made about the prior beliefs:

Assumption (A1): $p_2 = p_3$
Assumption (A2): $p_4 > 1/2$
Assumption (A3): $3(p_2 + p_3) > p_4$

These assumptions represent a set of sufficient conditions for a recapitalization equilibrium. They are made for simplicity and are used to illustrate the qualitative role that recapitalization plays in the resulting equilibria. Assumption (A1) implies that a signal of $Y=2$ is uninformative ($\phi = 0.5$). Assumption (A2) implies that the probability of a high-value synergy gain is greater than the probability of a low-value one. The second assumption is sufficient to rule out a pure-strategy equilibrium in which the target always recapitalizes to the greatest extent possible. (A3) implies that there is a relatively high probability that the bidder receives an uninformative signal. If either assumption (A2) or (A3) is reversed, different equilibria will emerge. The different types of equilibria are discussed in more detail at the end of this section.

Given (A1), (A2) and (A3), the recapitalization equilibrium is defined as follows:

The Recapitalization Equilibrium (RC): The strategies that characterize a sequentially rational Nash equilibrium are summarized in Tables 1 and 2, where λ_γ equals one if $\gamma < 1$ and zero if $\gamma = 1$. γ denotes the probability the initial bid is b_1^2

A description of the derivation of this equilibrium is located in the Appendix.

In the RC equilibrium, the bidder will offer either P_1 or P_2. If the initial bid is P_1, the bidder may be following either a pure or mixed strategy. Such a distinction is unimportant to the target because it recapitalizes in either case since under assumption (A2), the probability of a high-value takeover is high. As a consequence, T is willing to risk rejection

Table 1. Probability that B bids P_i Given a Signal S_j: b_i^j

Initial offer (P_i)	Signal (S_j) 1	2	3
P_1	1	γ, $\gamma \in [\gamma]$	β, $\beta \in [\beta]$
P_2	0	$1-\gamma$	$1-\beta$
P_3	0	0	0

Table 2. Probability of T's Action Given a Bid of P_i

T's action	B's bid P_1	P_2	P_3
Accept	0	λ_γ	1
Recapitalization of $F_2(P_i)$	1	n.a.	n.a.
Recapitalization of $F_3(P_i)$	0	$1-\lambda_\gamma$	n.a.

and the consequent loss of the low-value gain to possibly participate in a high-value takeover. If, however, the initial bid is P_2, the target realizes that B is following a mixed strategy and immediately accepts the offer. In either case, the expected payoffs for target and the bidder are the same:

$$E(V^T)=15\,000(p_1+p_2+p_3) \text{ and } E(V^B)=5000\,p_4$$

While assumption (A1) through (A3) result in the use of recapitalization, such an implication is mainly determined by the probability distribution for synergy gains. For example, when the probability of a high-value takeover is low (both assumptions (A1) and (A2) are reversed), a pure-strategy equilibrium results in which the bidder will bid P_1 and the target will accept this offer.

CONCLUSION

This paper has examined how a target firm can use recapitalization as a strategic response to a tender offer. The main implications of the analysis are (1) takeover contests involve sequential bidding, (2) there are situations in which the target will optimally use recapitalization as a takeover defense, and (3) the market values of the target and bidder correspond to their conditional expected values.[11]

A direction for future research is to examine how managers select takeover defenses. Since managers can use a number of different takeover defenses, this raises a number of interesting questions. When should the target deter a tender offer and look for a 'white knight'? When are recapitalizations preferred to deterrence? Should a recapitalization be implemented with the intent to sell assets in the future?

While the model does not consider these issues, the results suggest that recapitalizations will have a role in more general models. For example, the type of resistance strategy is likely to depend on the target's prior beliefs regarding the size of the bidder's synergy gain (synergistic benefits depend on a number of factors that include the bidder's planned use for the assets and the ability level of management). For instance, if the target believes that the bidder has a low-value synergy gain, it may reject an outstanding tender offer and accept the uncertain prospect that a higher-value bidder will arrive and make a better offer. Alternatively, suppose the initial bidder has a large synergy gain and the potential competition from third parties is relatively low. Under these circumstances the target may prefer to deal directly with the current bidder since the opportunity cost of deterrence is high. Hence, a recapitalization defense could be preferable to a white knight defense. This suggests that the more competition that third parties can induce, the more likely it is that a white knight defense will be used. In situations where the synergy gains for third parties are relatively low, a recapitalization may dominate.

Finally, in this model, a recapitalization defense is implemented in response to an outstanding tender offer. In reality, many recapitalizations are initiated before a formal tender offer is made. This model can also accommodate these so-called 'preemptive' recapitalizations. For the results to hold in this context, it is only necessary to assume that the target has prior knowledge of a potential takeover, and that it uses this information to form an expectation for the offer price. Given the frequency with which the popular press describes the nature and tone of informal negotiations prior to a formal announcement, this assumption does not appear to be overly restrictive. The one qualitative difference between this approach and the model is that, in the former, unsuccessful recapitalizations deter takeovers, while in the latter they lead to the outright rejection of a tender offer.

APPENDIX

The equilibrium bidding strategy is derived as follows. First, the expected payoffs for B and T are derived. These payoffs are contingent upon the actions of both parties and any signals received by B. Next, we search for strategies and beliefs consistent with these strategies such that both parties do not have an incentive to defect from the equilibrium. Subgame perfection requires the bidder to accept all counteroffers in which $G^B(.)>0$. It is assumed that B also accepts offers to which it is indifferent ($G^B(.)=0$).

The payoffs from the game for the target and bidder are:

(1) T receives $G_Y^T(P,0,S)$ if it accepts B's initial bid, $G_Y^T(P,F,S)$ if T's counteroffer is accepted, and zero otherwise.
(2) B receives $G_Y^B(P,0,S)$ if the initial bid is accepted, $G_Y^B(P,F,S)$ if T's counteroffer is accepted, and zero otherwise.

These payoffs are summarized in Table A1.

Table A1. Bidder and Target Contingent Payoffs

$(P, F^T(P))$	P	$F^T(P)$	$G_Y^B(.)$	$G_Y^T(.)$
	$Y=1, S=1$			
$(P_1, 0)$	20 000	0	0	10 000
$(P_1, F_2^T(P_1))$	20 000	5 000	−5 000	15 000
$(P_1, F_3^T(P_1))$	20 000	10 000	−10 000	20 000
	$Y=2, S=2$			
$(P_1, 0)$	20 000	0	0	10 000
$(P_2, 0)$	25 000	0	−5 000	15 000
$(P_1, F_2^T(P_1))$	20 000	5 000	−5 000	15 000
$(P_1, F_3^T(P_1))$	20 000	10 000	−10 000	20 000
$(P_2, F_3^T(P_2))$	25 000	5 000	−10 000	20 000
	$Y=2, S=3$			
$(P_1, 0)$	20 000	0	10 000	10 000
$(P_2, 0)$	25 000	0	5 000	15 000
$(P_1, F_2^T(P_1))$	20 000	5 000	5 000	15 000
$(P_1, F_3^T(P_1))$	20 000	10 000	0	20 000
$(P_2, F_3^T, (P_2))$	25 000	5 000	0	20 000
	$Y=3, S=4$			
$(P_1, 0)$	20 000	0	10 000	10 000
$(P_2, 0)$	25 000	0	5 000	15 000
$(P_3, 0)$	30 000	0	0	20 000
$(P_1, F_2^T(P_1))$	20 000	5 000	5 000	15 000
$(P_1, F_3^T(P_1))$	20 000	10 000	0	20 000
$(P_2, F_3^T(P_2))$	25 000	5 000	0	20 000

The target firm's expected payoffs are contingent upon B's initial offer, T's response and finally B's response in the event that T implements a recapitalization (see Table A2). Using these, the expected payoffs to T, contingent upon B's initial offer, are:

$$V_1^T = a(P_1,0)(10\,000) + a(P_1, F_2(P_1))(15\,000) \times (Q_2^1 + Q_3^1 + Q_4^1) + (1 - a(P_1,0) - a(P_1, F_2(P_1)))(20\,000)Q_4^1 \quad \text{(A1)}$$

$$V_2^T = a(P_2,0)(15\,000) + (1 - a(P_2,0)) \times (20\,000)Q_4^2 \quad \text{(A2)}$$

$$V_3^T = a(P_3,0)(20\,000) \quad \text{(A3)}$$

where V_i^T denotes the expected payoff to T contingent upon receiving a bid P_i.

The bidder's expected payoffs, contingent upon receiving signal Y, are (see Table A3):

$$V_1^B = b_1^1(0) + b_2^1 a(P_2,0)(-5000) + (1 - b_1^1 - b_2^1)a(P_3,0)(-10\,000) \quad \text{(A4)}$$

$$V_2^B = b_1^2[a(P_1,0)(5000) + a(P_1, F_2(P_1))(0)] + b_2^2(0) + (1 - b_1^2 - b_2^2) \times a(P_3,0)(-5000) \quad \text{(A5)}$$

$$V_3^B = b_1^3[a(P_1,0)(10\,000) + a(P_1, F_2(P_1))(5000)] + b_2^3 a(P_2,0)(5000) + (1 - b_1^3 - b_2^3)(0) \quad \text{(A6)}$$

where V_Y^B is B's expected payoff given that Y has been received.

The recapitalization equilibrium is derived by searching for potential negotiating strategies that are consistent with the first-order conditions to Eqns

Table A2. The Target's Contingent Expected Payoffs

B's bid	T's move	Prob.	Expected payoff
P_1	Accept	$a(P_1, 0)$	$\sum_{S=2}^{4} G_Y^T(P_1,0,S)Q_S^1 = G_Y^T(P_1, 0, 1)$
	Recapitalization of $F_1^T(P_2)$	$a(P_1, F_2^T(P_1))$	$\sum_{S=2}^{4} G_2^T(P_1, F_2^T(P_1), S)Q_S^1$
	Recapitalization of $F_1^T(P_3)$	$a(P_1, F_3^T(P_1))$	$G_3^T(P_1, F_3^T(P_1), 4)Q_4^1$
P_2	Accept	$a(P_2, 0)$	$\sum_{S=1}^{4} G_Y^T(P_2,0,S)Q_S^1 = G_Y^T(P_2,0,1)$
	Recapitalization of $F_2^T(P_3)$	$a(P_2, F_3^T(P_2))$	$G_3^T(P_1, F_3^T(P_2), 4)Q_4^2$
P_3	Accept	$a(P_3, 0)$	$G_3^T(P_3, 0, 4)$

(A1) through (A6). This is accomplished by systematically examining the target's potential bidding strategies. Figure A1 indicates the order in which this is carried out. In Fig. A1 the first and third columns characterize the target's bidding strategy if a bid of P_1 is received. The second column is the bidding strategy if P_2 is received. The approach to obtaining the equilibrium is to begin with (I) and examine the different possibilities implied by (I.1.1) and (I.1.2). Then, all the possible equilibria for (II) and (III) are examined in an analogous manner. This results in the recapitalization equilibrium in the third section of this paper. A detailed proof of this is available from the author upon request.

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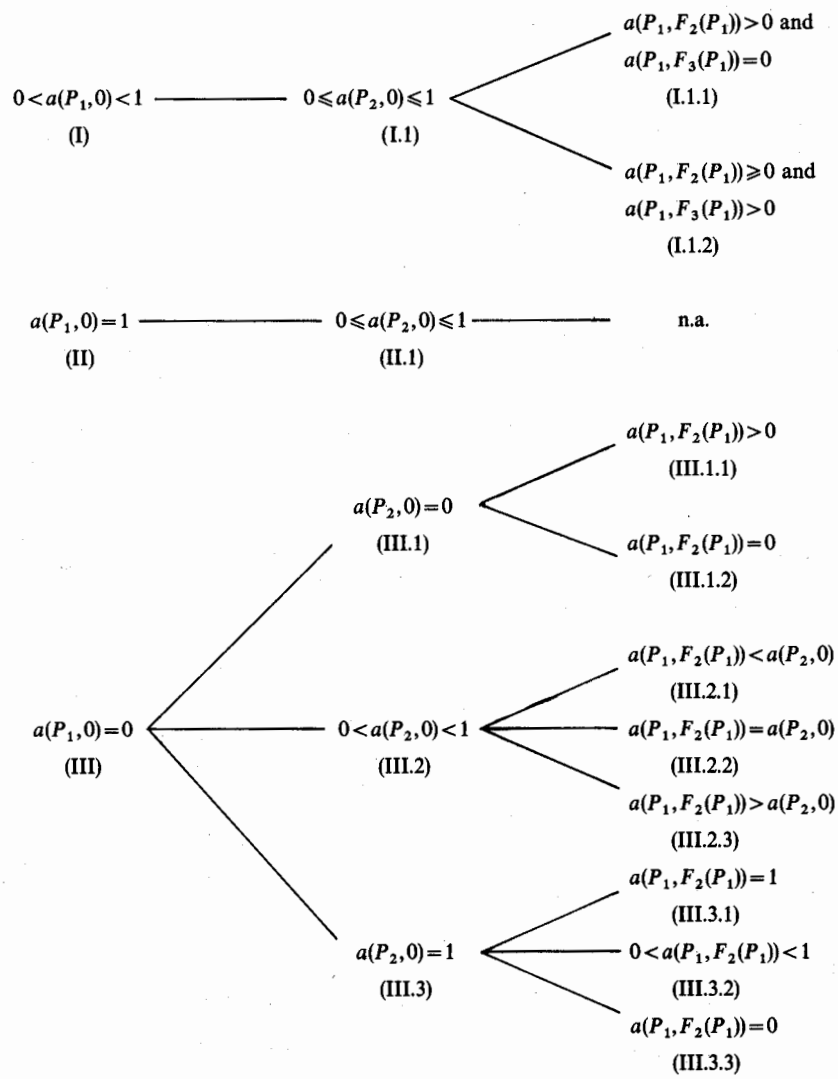

Figure A1. Potential Target-Firm Negotiating Strategies

Table A3. The Bidder's Contingent Expected Payoffs

Signal	Bid	Probability of bid	Expected payoff if T accepts	Expected payoff if T recapitalizes with $F_2^T(P)$	Expected payoff if T recapitalizes with $F_3^T(P)$
$Y=1$	P_1	b_1^1	$a(P_1,0)G_1^B(P_1,0,1)=0$[a]	$a(P_1,P_2)G_1^B(P_1,F_2^T(P_1),1)<0$	$a(P_1,P_3)G_1^B(P_1,F_3^T(P_1),1)<0$
	P_2	b_2^1	$a(P_2,0)G_1^B(P_2,0,1)<0$	n.a.	$a(P_2,P_3)G_1^B(P_2,F_3^T(P_2),1)<0$
	P_3	b_3^1	$a(P_3,0)G_1^B(P_3,0,1)<0$	n.a.	n.a.
$Y=2$	P_1	b_1^2	$a(P_1,0)[\phi G_2^B(P_1,0,2)+(1-\phi)G_2^B(P_1,0,3)]>0$	$a(P_1,P_2)[\phi G_2^B(P_1,F_2^T(P_1),2)+(1-\phi)G_2^B(P_1,F_2^T(P_1),3)]=0$[b]	$a(P_1,P_3)[\phi G_2^B(P_1,F_3^T(P_1),2)+(1-\phi)G_2^B(P_1,F_3^T(P_1),3)]<0$
	P_2	b_2^2	$a(P_2,0)[\phi G_2^B(P_2,0,2)+(1-\phi)G_2^B(P_2,0,3)]=0$[a]	n.a.	$a(P_2,P_3)[\phi G_2^B(P_2,F_3^T(P_2),2)+(1-\phi)G_2^B(P_2,F_3^T(P_2),3)]<0$
	P_3	b_3^2	$a(P_3,0)[\phi G_2^B(P_3,0,2)+(1-\phi)G_2^B(P_2,0,3)]<0$	n.a.	n.a.
$Y=3$	P_1	b_1^3	$a(P_1,0)G_3^B(P_1,0,4)>0$	$a(P_1,P_2)G_3^B(P_1,F_2^T(P_1),4)>0$	$a(P_1,P_3)G_3^B(P_1,F_3^T(P_1),4)=0$[b]
	P_2	b_2^3	$a(P_2,0)G_3^B(P_2,0,4)>0$	n.a.	$a(P_2,P_3)G_3^B(P_2,F_3^T(p_2),4)=0$[b]
	P_3	b_3^3	$a(P_3,0)G_3^B(P_3,0,4)=0$[a]	n.a.	n.a.

[a] Holds by definition of P_Y.
[b] Holds by definition of $F^T(P)$.

NOTES

1. These models differ in the way informational asymmetries are modelled. Fishman (1988), Khanna (1985), and Knez (1987) assume that there exists bidder-specific synergistic benefits. In contrast, Giammarino and Heinkel (1986) assume, in the context of a two-bidder model, that while bidders share a common synergistic benefit, only one bidder is informed. P'ng (1985) assumes that synergistic benefits exist consisting of common and firm-specific components.
2. Most recapitalizations also include payouts other than cash, such as subordinated debentures and convertible preferred stock. Since the results do not depend on the form of payment, it is assumed that the payment is all cash. Another form of recapitalization has the firm repurchase stock with debt proceeds. This type of restructuring is discussed in detail below.
3. See Galai and Masulis (1976) and Kim and McConnell (1977).
4. In practice, many recapitalizations are also accompanied by asset sales (partial liquidations). A recapitalization differs from a partial-liquidation strategy in that it represents a reorganization of the capital structure rather than a change in the underlying assets. Partial liquidations are not modelled because the paper's main point is to show how target management can transform the tender-offer process into a bilateral bargaining game. By focusing strictly on financial recapitalizations, we can examine a bargaining game in which the operating decisions of the firm are held constant. This approach is useful because it avoids additional strategic considerations that obscure the role that target managers play in the bargaining process. Bradley *et al.* (1988) discuss the use of liquidating dividends as a takeover defense.
5. Examples of other recapitalization plans include Holiday Corp., Interco, and Kroger. The Holiday Corp plan was designed to resist an anticipated tender offer by Donald Trump. Holiday Corp. proposed a $2.8 billion recap that included a $65/share special cash dividend at time when the stock was selling for $76. The dividend and the refinancing of $1.1 billion in existing debt was financed by $500 million subordinated debentures, $600 million mortgage debt, and $500 million in other debt. The remainder of the required cash was derived from asset sales. Interco implemented a recapitalization plan that paid shareholders $38 in cash, $23 in subordinated discount debentures, and $5 in preferred stock, leaving a 'stub-equity' valued at $10 in response to a tender offer from a group led by the Rales brothers for $74 a share. The plan was financed by issuing debt and selling assets (Ethan Allen stores) valued at approximately $1 billion. The Kroger recapitalization plan followed a Kholberg, Kravis and Roberts tender offer for $58 a share. Kroger shareholders received $40 in cash, $8 in junior subordinated debentures, and a stub equity. The plan was financed by $3.6 billion of debt to be serviced through asset sales.
6. C. Krauss and J. Marcom Jr (1987). Harcourt's shares surge amid praise of debt plan, forecasts of higher bid. *The Wall Street Journal*, 28 May.
7. In a subgame-perfect equilibrium the bargaining strategies followed by both parties must be a best response to any belief, including beliefs that will not

emerge in equilibrium. There are other refinements of the sequential equilibrium concept such as the Cho and Kreps (1987) criterion.

8. The firm can also repurchase shares in the market. We do not model repurchases to abstract from the issues related to management's control of voting rights.
9. The assumption that debt is riskless is made for tractability and is without loss of generality for our recapitalization results. Qualitatively similar equilibria obtain when debt is risky.
10. Since B is a value maximizer, $b_2^1 = b_3^1 = b_3^2 = 0$.
11. For example, the target has a positive stock price reaction if it receives a bid of P_1. Given a bid of P_1, the equilibrium response is for the target to recapitalize. Depending on the bidder's reaction, one of two things can happen. If the bidder accepts the counteroffer, the target realizes an additional positive price reaction. If the bidder rejects the offer, the entire synergy gain dissipates. The bidder also realizes an initial positive price reaction to P_1. If the bidder rejects the target's counteroffer, the entire gain dissipates. Rejection only occurs if the signal is $Y=1$. If the bidder's signal is $Y=2$, it accepts the counteroffer. The stock price reaction depends on the state of nature (S). If $S=2$, the bidder discovers it has overbid and there is a negative stock price reaction that exceeds the initial capital gain. If $S=3$, the bidder realizes an additional positive return. Finally, if the bidder's signal is $Y=3$, the bidder realizes an additional positive return.

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