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The Mode of Acquisition in Takeovers: Taxes and Asymmetric Information

DAVID T. BROWN and MICHAEL D. RYNGAERT*

ABSTRACT

We develop a model in which the mode of acquisition conveys information concerning the value of the bidder. The model incorporates the possibility that offers containing both cash and stock can be made in a setting consistent with the U.S. tax code. We demonstrate that bidders with unfavorable private information about their equity value choose offers containing some stock to avoid the capital gains tax consequences of cash offers. The model yields a number of unique predictions about the construction of acquisition offers. We present evidence consistent with the model.

WHEN ONE FIRM ACQUIRES another it can pay for the acquisition with cash, stock, or a combination of the two. Recent studies find that announcement returns to bidding firms who make cash offers are higher than when stock offers are made.¹ Models consistent with this evidence note that, as in Myers and Majluf (1984), a bidder with private information about the value of its assets only offers stock when its shares are overvalued by target shareholders. Recognizing this adverse selection, target shareholders reduce their estimate of the bidder's value. Thus, without some benefit in stock over cash as a means of payment, a "lemons" problem arises for stock offers, and bidders only choose cash offers.

Our paper advances the use of stock in an offer through its tax advantages. In the United States, to realize the benefits available in "nontaxable" offers, an offer must contain at least fifty percent stock. Thus, when the bidder has private information about the value of its assets, stock offers can still occur because of their tax advantage. The intuition is as follows. Target holders can postpone the realization of capital gains when they receive stock in a takeover, so, other things equal, they demand higher prices in cash takeovers. While the offer of stock may have tax advantages, the shares swapped are valued by the target as if they were offered by the average bidder making a stock offer. Thus, a pool of higher private valuation bidder types choose cash offers in spite of the tax consequences. A pool of lower private valuation types

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¹See, for instance, Travlos (1987) and Franks, Harris, and Mayers (1987).

choose nontaxable offers containing at least fifty percent stock to avoid paying the higher cash price.

In previous work (e.g., Hansen (1987) and Fishman (1989)), a stock offer benefits the bidder when the target has private information about *its* assets. Since the target only accepts cash offers that exceed its private valuation, cash offers subject the bidder to adverse selection and result in overpayments to the target. Stock offers reduce overpayments, because target shareholders share in any subsequent decrease of the merged firm's stock if the bidder overpays. In Hansen (1987), when the target and bidder *both* have private information about their assets, high private valuation bidders offer cash to avoid issuing undervalued stock, and low private valuation bidders offer stock to avoid overpaying the target. Eckbo, Heinkel, and Giammarino (1987) extend Hansen's analysis to allow for mixed offers containing cash and stock. In their model the amount of cash in an offer reveals each bidder's type. Higher bidder types offer more cash.

In our model there is no asymmetric information about the value of the target. The bidder considers the target's valuation of any stock offered by the bidder and the tax consequences of the offer in choosing the mode of acquisition. The equilibrium is consistent with the observed returns to bidders in takeovers, but the model also makes predictions that distinguish it from models that consider only the informational role of the mode of acquisition. For example, since in our model stock is used only for its tax advantages, it should never be used in taxable mergers. Further, we predict that *all* nontaxable offers, mixed or all stock, reveal negative information about the bidder. Evidence consistent with both predictions is presented, and we conclude that the tax/information tradeoff modeled here is empirically relevant in the United States.

The paper proceeds as follows. Section I describes the relevant features of the U.S. tax code. The model is presented in Section II. Evidence consistent with the model is given in Section III. Section IV summarizes our conclusions and makes suggestions for future research.

I. Relevant Features of the U.S. Tax Code

In the United States, for an acquisition to be nontaxable, it must satisfy the "continuity of interests" requirement of the Internal Revenue Code: at least fifty percent of the target's shares must be exchanged for stock in the merged entity. The stock portion of offers satisfying this condition can be deemed taxable *or* nontaxable for personal tax purposes. All compensation is taxable if an offer contains less than fifty percent stock. If a shareholder receives taxable compensation, the shareholder must pay a tax on any capital gain it realizes in the acquisition. The taxation of the gain is deferred if the shareholder receives stock in a nontaxable offer.

The "continuity of interests" logic also applies to the corporate taxation of the transaction. In a nontaxable offer, the target firm's unused tax credits and loss carryovers can be deducted against the combined firm's future

taxable income, because target shareholders maintain substantial ownership. In a taxable offer, ownership rights are considered sold, and the bidder is allowed to step up the depreciation basis of the assets purchased. Step-ups enable the firm to reduce its future taxable income.²

The important point for our analysis is that stock is at worst tax neutral and at best an advantage. If a taxable merger is desirable, i.e., there are substantial asset step-ups available, stock or cash can be offered. An offer must contain at least fifty percent stock, however, if nontaxable status is desired.³

II. Model of the Choice of Acquisition Mode

A. Assumptions and Game Structure

The bidder and target are all equity firms. The bidder is able to finance a cash acquisition with internal funds or risk-free debt. Target firm shareholders and managers have uniform priors that the value of the bidder's assets in place (type), B , lies on the interval $[B_L, B_H]$. The bidder knows its type but cannot credibly convey it to the target. Thus, the bidder has superior information about the value of claims on a combined entity.

Target shareholders are risk-neutral. They require R in nontaxable compensation plus a premium above R for the forced recognition of capital gains in a taxable offer. The premium required by each shareholder depends on his basis, tax rate, and how long the sale of stock can be postponed. Premia vary across shareholders, creating an upward sloping supply of target shares in a taxable offer.⁴ The premium for shareholder i is denoted $T(i)$. Shareholders are ordered $0 \leq i \leq 1$ such that $i > j$ when $T(i) \geq T(j)$. For convenience, we assume that there is one share of the target with a continuum of shareholders holding an equal fraction of that share. $T(i)$ is non-negative for all values of i and is assumed to be continuous and common knowledge.⁵

The target's value to the bidder is V in a nontaxable offer and $V + D$ in a taxable offer. D is the present value of corporate level tax benefits of a taxable offer less those of a nontaxable offer. When the gains to stepping up the tax basis of the target's assets exceed the gains from capturing credit and loss carryforwards in a nontaxable acquisition, D is positive. Otherwise D is negative. V and D are common knowledge.

²The 1986 Tax Act largely eliminates the benefits from stepping up the taxable basis of the target's assets. The increase in basis is now taxable. The new law also limits the amount of net operating losses that can be carried forward. Gilson (1986) discusses the tax consequences of acquisitions. The implications of the change in tax laws for this analysis is discussed in the conclusion.

³Crawford (1988) and Carleton, Guilkey, Harris, and Stewart (1983) provide evidence that the tax attributes of the target firm and its shareholders influence the mode of acquisition.

⁴Bagwell (1989) and Stulz (1988) also motivate and analyze the effects of upward sloped shareholder supply curves.

⁵ $T(i)$ can never be negative, because the tax deferral is an option that need not be exercised if a shareholder has a capital loss.

Bidders minimize their acquisition costs, given their type. Target (outside) shareholders and management (inside) shareholders maximize their expected after-tax wealth. However, having different tax positions, inside and outside shareholders do not necessarily have the same preferences over offers. Target management sets the corporate agenda in that it proposes offers to the bidder. Target shareholders influence the outcome when a plan presented to them comes to a vote.

The sequence of the game is as follows:

- (1) Target management presents a take-it-or-leave-it schedule of offers to the bidder. Each offer stipulates that j percent of the shares are to be acquired at a cash price per share of $C(j)$ with the other $(1 - j)$ percent to be acquired in exchange for $p(j)$ percent of the stock of the merged firm.
- (2) The bidder accepts one of target management's offers, makes an all cash tender offer directly to shareholders, or ends the game by rejecting all offers. The bidder cannot propose alternative offers containing stock.
- (3) If the bidder selects one of management's offers, it is voted on by target shareholders with n percent approval required ($n \geq 50\%$). In the event of a tender offer, if n percent of shareholders tender, all shares not tendered are purchased at the original cash offer price. If shareholders reject any offer, the firm's shares are worth R under current management.

An equilibrium consists of the target's offer schedule, a decision by each bidder type as to the offers it accepts or rejects, and a set of target beliefs about the type of bidder choosing each offer. In equilibrium, (1) the bidding firm, target shareholders, and target management have no incentive to deviate from their strategies, and (2) the target shareholders and manager's conjectures about what bidder types accept which offers are realized.

Assuming that offers containing stock are proposed by target management and the bidder can only counter target management's bid with an all cash offer is consistent with the observation that "hostile" takeovers are usually all cash offers due to (1) target management's ability to legally justify takeover defenses against two-tier takeovers and (2) delays in registering securities used in stock offers.⁶ Assuming the uninformed party (target) moves first with a take-it-or-leave-it offer also eliminates the problem of unstable equilibria which may occur when the informed party (bidder) moves first.⁷

Mergers are approved when n percent of target shareholders receive payments with an expected after-tax value of at least R per share. We

⁶On the first point, see Ryngaert (1988) and on the second point see Brown (1988b) and Crawford (1988).

⁷The instability of such equilibria is discussed in Cho and Kreps (1987). The assumption that the bidder can only make an all cash tender offer in the event it rejects target management's offer is also critical for stability.

assume that R per share is the maximum expected value the target can extract on the stock portion of a nontaxable offer. Given these constraints, in a nontaxable offer, target management sets the expected value of stock compensation at R per share. Thus, all rents from avoiding capital gains taxes go to the bidder. Our results only require that the bidder receive some of these rents so that it has an incentive to choose nontaxable offers.⁸ The analysis is much simpler, however, if the bidder gets all the rents.

The minimum all cash offer that n percent of shareholders will accept is $R + T(n)$. Since the bidder can make a cash tender offer at this price, target management can ask for no more than $R + T(n)$ in a cash offer. Given the choice between $R + T(n)$ in cash and R in nontaxable stock, shareholders $i < n$ prefer cash while shareholders $i > n$ prefer stock. We assume that target managers are shareholders and that they prefer nontaxable stock compensation. Since management receives less than R (after-tax) in a cash offer and R in a nontaxable offer, it selects an offer schedule that maximizes the probability that it receives nontaxable stock. This strategy maximizes its expected after tax wealth.

The managerial preference assumption motivates a target based demand for nontaxable offers when the target shareholders do not receive any of the rents from avoiding capital gains taxes.⁹ The assumption has intuitive appeal and empirical support. Generally, managers are in a higher tax bracket than the median shareholder and have held target shares for a longer time. In addition, Brown (1988a) finds that management is less likely than other shareholders to tender into a negotiated cash offer that is followed by a nontaxable stock offer.

Finally, we assume that $V + D > R + T(n)$ and that $B_L > 0$ and $V > R$. These assumptions assure that any bidder type profits from an all cash bid or a fairly valued all stock bid that shareholders will approve. In addition, we assume that target management does not propose bids that no bidder type would ever choose. This eliminates "redundant" equilibria that have identical outcomes but differ only by frivolous target proposals.¹⁰

B. Equilibrium Offer Schedule

Before discussing the nontaxable offers that management proposes to the bidder, we examine the set of potentially successful taxable offers. Considering only potentially successful offers places an important restriction on the types of mixed offers observed in equilibrium.

⁸The division of rents in a takeover depends on a number of factors. For example, see Fishman (1989).

⁹A demand for nontaxable offers also occurs if (1) target shareholders receive some of the rents from avoiding the capital gains tax and (2) management acts on behalf of a majority of shareholders. If the target extracts an expected value of X per share on the stock portion of an offer, where $R < X < R + T(n)$, then management would again maximize the probability of a nontaxable offer.

¹⁰Since target management makes a take-it-or-leave-it offer, proposals that would never be accepted have no strategic value.

Target shareholders only accept a taxable offer if they expect that it is worth at least $R + T(n)$. Stock received in an offer is taxable when more than half of the total compensation to shareholders is cash. If the target constructs a taxable offer containing stock (where $0.5 < j < 1$) with an expected value of $R + T(n)$ conditional on some range of bidder types accepting the offer, bidder types above the mean of the range have their stock undervalued and pay the full tax penalty. These types make all cash offers. Conditional on these bidders choosing an all cash offer, the expected value of the taxable offer containing stock is less than $R + T(n)$. Since there is no tax advantage to stock in a taxable offer, a "lemons problem" arises, and the only taxable offers that are chosen by the bidder are all cash offers.

PROPOSITION 1: *Offers where more than fifty percent of the shares are purchased with cash ($0.5 < j < 1$) are never acceptable to both the bidder and target shareholders.*

Proposition 1 rules out successful offers with more than fifty but less than one hundred percent cash. This prediction does not obtain in models that consider only taxes or only asymmetric information. Models that consider only taxes predict when an offer will be taxable. Taxable offers, however, can contain any amount of stock. Models where only asymmetric information motivates the use of stock place no restrictions on the amount of stock in the offer.

Having established that taxable offers are all cash offers, we turn to the design of nontaxable offers. Recall that management's tax position leads it to present an offer schedule that maximizes the probability that it receives nontaxable stock compensation. Thus, mixed offers should (and typically do) allow target shareholders to choose between stock and cash compensation. This allows target shareholders (management) to choose the compensation with the highest after-tax value (stock).

Since management prefers nontaxable compensation, it designs nontaxable offers to attract the most possible bidder types. To accomplish this, if an offer specifies that the bidder purchase j percent of the target's shares with cash, the per share cash price, $C(j)$, is set to induce j percent of shareholders to choose cash. This implies that $C(j) = R + T(j)$. A higher cash price makes nontaxable offers more expensive and results in more bidders choosing all cash offers. A lower cash price results in the stock portion of the offer being oversubscribed with the majority electing stock receiving a prorated share of stock and cash with an expected after-tax value below R .

Given the above argument, we model a mixed offer as a cash offer made to j percent of shareholders at a price per share of $C(j) = R + T(j)$ and a stock offer of $p(j)$ percent of the combined entity made to the remaining $(1 - j)$ percent of shareholders. For the stock portion of the offer to have an expected value of R per share, $p(j)$ must equal $(1 - j)R$ divided by the post merger value of the firm,

$$p(j) = \frac{(1 - j)R}{E(B|j) + V - j[R + T(j)]} \quad (1)$$

where $E(B | j)$ is the expected value of the bidder given it chooses an offer with j percent cash. Shareholders $i < j$ prefer the cash offer while shareholders $i > j$ prefer stock.

At this point, we assume that the target allows the bidder to select between only one nontaxable offer and an all cash offer. Later, we prove that this is an optimal strategy. The target presents the choice of the all cash offer or a nontaxable offer with j percent cash. Types $B < B^*$ choose the nontaxable offer and types $B \geq B^*$ choose the cash offer. This implies that the expected equity value of bidders choosing the nontaxable offer is

$$E(B | j) = E(B | B < B^*) = 0.5(B^* + B_L). \quad (2)$$

If there are bidder types that prefer each type of offer, bidder type B^* is indifferent between choosing all cash or the nontaxable offer. If B^* chooses the nontaxable offer, the per share (private) value of the stock it offers will exceed R , because B^* is above the average of those types choosing the nontaxable offer. In addition, the per share price of the j shares acquired for cash exceeds R by $T(j)$. If B^* chooses the all cash offer, it pays R plus the personal tax penalty of a cash offer less the corporate tax advantage (or disadvantage) of a taxable offer, $T(n) - D$.

Formally, B^* 's indifference between the all cash offer and the nontaxable alternative implies

$$j[R + T(j)] + p(j)\{B^* + V - j[R + T(j)]\} = R + T(n) - D. \quad (3)$$

Substituting $p(j)$ from equation (1) and the definition of $E(B | j)$ from (2) into (3) and simplifying, we obtain

$$jT(j) + (1 - j)CS(B^*, j) = T(n) - D, \quad (4)$$

where

$$CS(B^*, j) = \frac{R(B^* - B_L)/2}{0.5(B^* + B_L) + V - j[R + T(j)]}. \quad (5)$$

The tax penalty from an all cash offer, $T(n) - D$, equals the per share tax penalty, $T(j)$, paid on j shares in a mixed offer plus the per share overpayment on the stock paid by type B^* , $CS(B^*, j)$, on the remaining $(1 - j)$ shares.

For some bidder types to prefer each offer type, (i.e., to have B^* lie strictly between B_L and B_H), $T(n) - D$ must be positive but not too large. If $T(n) - D$ is negative, all bidder types choose cash, because there is no tax advantage to a nontaxable offer. If $T(n) - D$ is too large, all bidder types choose the nontaxable offer to avoid the large tax penalty of a cash offer. In particular, if we set $B^* = B_H$, and the left hand side of equation (4) is less than $T(n) - D$ for any value of $j < 0.5$, then no bidder would choose a taxable offer, because a nontaxable pooling outcome is cheaper for all bidder types. Thus, when $T(n) - D$ is negative an all cash pooling equilibrium

occurs, while when $T(n) - D$ is very large, a nontaxable pooling equilibrium occurs.¹¹

In the case where $T(n) - D$ is neither too large or negative, a unique B^* exists for any $j \leq 0.5$ since the cost of stock, $CS(B^*, j)$, for type B^* increases in B^* . The combinations of j and B^* that satisfy equation (4) implicitly define the function $B^*(j)$. From (4), we see that an increase in j decreases the costs of a nontaxable offer for bidder type $B^*(j)$ if the per share cost of cash, $T(j)$, is lower than its per share cost of stock, $CS(B^*, j)$. Increasing j substitutes cheap cash for expensive stock. To maintain (4), $CS(B^*, j)$ must increase, which requires that B^* increase. This increases the set of bidder types choosing a nontaxable offer.

Management maximizes the probability that the bidder chooses the nontaxable alternative. Thus, the optimal nontaxable offer that management places in its offer schedule contains j^* percent cash, where j^* maximizes $B^*(j)$. Totally differentiating the equilibrium condition of equation (4), we obtain

$$\partial B^*(j)/\partial j = \frac{[CS(B^*, j) - T(j) - j\partial T(j)/\partial j - (1 - j)\partial CS(B^*, j)/\partial j]}{(1 - j)(\partial CS(B^*, j)/\partial B^*)}. \quad (6)$$

When $\partial B^*(j)/\partial j$ is positive, increasing j induces more nontaxable offers. Since the partial derivatives $\partial CS(B^*, j)/\partial B^*$, $\partial T(j)/\partial j$, and $\partial CS(B^*, j)/\partial j$ are all positive, the sign of equation (6) is largely determined by the sign and magnitude of $CS(B^*, j) - T(j)$. Substituting the equilibrium condition (4) into (6) yields

$$\partial B^*(j)/\partial j = \frac{\frac{\{T(n) - D - T(j)\}}{(1 - j)} - j\partial T(j)/\partial j - (1 - j)\partial CS(B^*, j)/\partial j}{(1 - j)\partial CS(B^*, j)/\partial B^*}. \quad (7)$$

Equation (7) shows that nontaxable offers are likely to contain more cash when $T(n)$ is large, D is small (or negative), and a clientele of shareholders with small tax liabilities exists. When $T(n) - D$ is large, taxable offers are expensive and more bidder types prefer nontaxable offers. If more types choose nontaxable offers, the undervaluation of $B^*(j)$'s stock, $CS(B^*, j)$, is larger, and substituting cash for stock in a nontaxable offer is desirable. This substitution is more desirable when the tax cost of cash, $T(j)$, is small.

The possible shapes of the function $B^*(j)$ are shown in Figure 1. If $T(0) \geq T(n) - D$, $B^*(j)$ is always decreasing in j and the optimal nontaxable offer is all stock (Figure 1(a)). This occurs when corporate tax advantages to taxable offers make D positive and close to $T(n)$. If $T(0) \ll T(n) - D$ and $T(0.5) \leq T(n) - D$, a mixed offer with less than fifty percent cash is the

¹¹Management is indifferent between nontaxable pooling equilibria with different levels of j . The most plausible equilibrium might be an all stock offer because this reduces the average cost across bidder types.

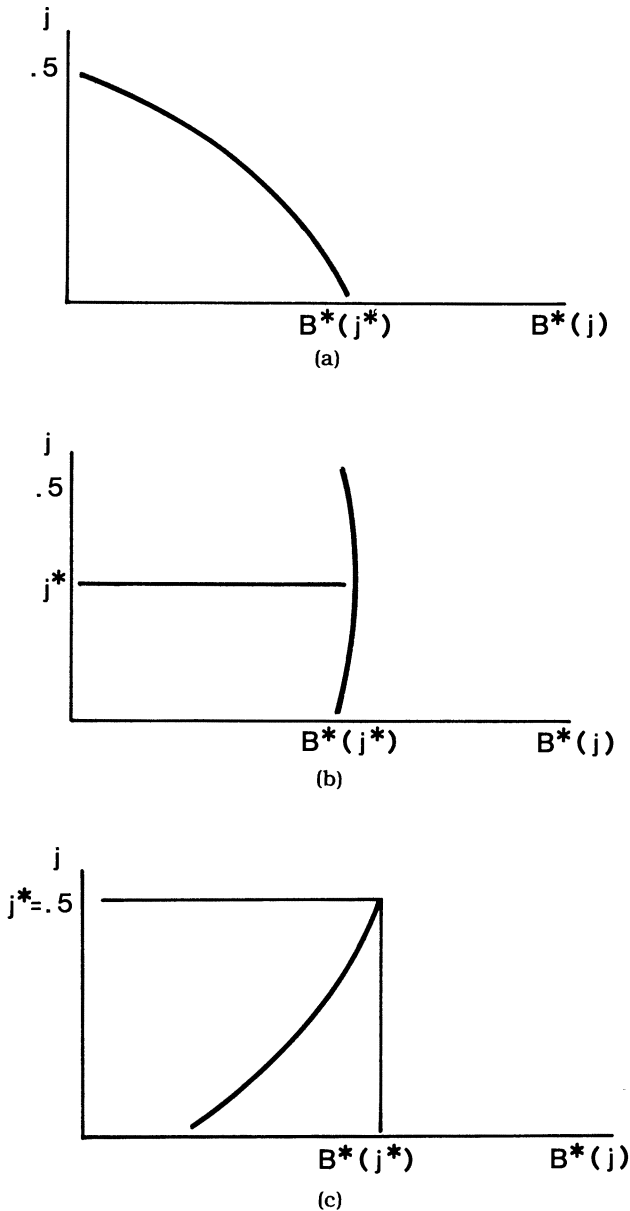


Figure 1. (a) The All Stock Nontaxable Offer Equilibrium Case, $j^* = 0$. The potential combinations of the percent cash in the nontaxable offer, j , and the bidder type indifferent between the nontaxable offer and the all cash offer, $B^*(j)$. The target chooses j to maximize $B^*(j)$. In this case, the optimal offer sets $j^* = 0$ so the optimal nontaxable offer contains all stock. **(b) The Mixed Nontaxable Offer Equilibrium Case, $0 < j^* < 0.5$.** In this case, the optimal nontaxable offer contains some but less than fifty percent cash. **(c) The Mixed Nontaxable Offer Corner Solution Equilibrium Case, $j^* = 0.5$.** In this case, the optimal nontaxable offer contains fifty percent cash, the maximum allowable under the U.S. tax code.

optimal nontaxable offer (Figure 1(b)). If $T(0.5) \ll T(n) - D$, then the optimal nontaxable offer is fifty percent cash (Figure 1(c)). For this to occur, the target must have supermajority merger approval requirements ($n > 0.5$), and/or the corporate tax treatment of the acquisition must favor a nontaxable offer ($D < 0$).

THEOREM 1: *If $T(n) - D > 0$ and $T(n) - D < (1 - j)CS(B_H, j) + jT(j)$ for all $j < 0.5$, then the target agrees to be acquired in an all cash offer, $C = R + T(n)$, or in a nontaxable offer of j^* shares in cash at a per share price of $C(j^*) = R + T(j^*)$ and the remaining $(1 - j^*)$ shares for a percentage, $p = R(1 - j^*) / \{E(B | B < B^*) + V - j^*[R + T(j^*)]\}$, of the post merger firm. Bidder types $B < B^*$ choose the nontaxable offer and types $B \geq B^*$ accept the all cash offer. B^* and j^* are determined by the choice of j that maximizes the function $B^*(j)$, implicitly defined by equation (4) in the range $0 \leq j \leq 0.5$. Shareholders approve either offer.*

Proof: See Appendix A.

Theorem 1 is straightforward given that target management offers only one nontaxable alternative. This strategy is optimal because taxes are a dissipative signal. Separating bidder types with more than one nontaxable offer (with increasing amounts of cash) is costly (to higher types) because low types have a large incentive to mimic when the offer contains over half stock since any misevaluation of the shares by the target implies a misevaluation of a large proportion of the value of the offer. Consequently, for the higher types choosing a nontaxable offer when more than one nontaxable offer is presented, pooling with all the types choosing a single nontaxable alternative is cheaper. Thus, offering more choices (in the limit a fully revealing schedule of offers) reduces the range of bidder types that find nontaxable offers cheaper than the all cash alternative.¹²

The analysis of the construction of mixed offers yields two central results. First, stock is only used in nontaxable offers and the choice of how much stock is used in a nontaxable offer is a tradeoff between the additional capital gain tax penalties of cash and the underpricing of the marginal bidder's (B^* 's) stock. For certain plausible tax parameter values, tax induced corner solutions occur where the optimal nontaxable offer is either fifty or one hundred percent stock. The observed distribution of nontaxable offer types, therefore, may exhibit a concentration of offers at the fifty and one hundred percent stock levels. In models that consider only the informational aspects of an offer, this sort of offer clustering (especially at the fifty percent cash mark) is not likely.

Second, since low types choose the nontaxable alternative, when a bidder chooses any nontaxable offer, mixed or all stock, it reveals to the market that its asset value is lower than the types choosing an all cash offer. Conditional upon having made an offer, choosing a mixed offer results in a negative

¹²The result is somewhat dependent on the choice of statistical distribution of the bidder's type. The proof in Appendix A requires the probability density of bidder types to be nondecreasing in the region (B_L, B^*) .

reevaluation of the bidder's assets. In contrast, models that consider only the informational aspects of an offer yield fully revealing equilibria where the asset value of the bidder revealed by its choice of offer is an increasing function of the amount of cash in the offer. Hence, conditional on observing an offer, the *direction* of the revaluation of the bidder choosing a mixed offer is unclear.

The analysis also suggests that mixed offers are more likely (than all stock offers) when $T(n) - D$ is large relative to $T(j)$ for some clientele of shareholders, $0 < j < 0.5$. Thus, nontaxable offers are more likely to be mixed offers when targets have (1) supermajority merger approval requirements because the amendments increase n and hence $T(n)$, (2) loss carryforwards or few asset step-ups because D is lower, and (3) large institutional holdings because these firms have a potentially large clientele of shareholders where $T(j) = 0$ at $j < 0.5$. Consistent with this last prediction, Niden (1988) finds that mixed offers are more likely than stock offers when the institutional holdings of a target are larger.

While the equilibrium in Theorem 1 is unique, the game structure is restrictive. In particular, the target designs the offer schedule, and the bidder is only allowed to accept one of these offers or make an all cash offer. If the bidder were allowed to construct offers and present them to the target, multiple sequentially rational Nash equilibria (including this one) are possible, depending on the assumptions made about the target's beliefs about bidders that make out-of-equilibrium offers (for instance, those choosing an offer not anticipated by the target are assumed to be type B_L).

If we allow the bidder to present offers without restrictive assumptions about out-of-equilibrium beliefs, potential equilibria (including ours) will tend to "unravel." To see this, consider the incentives of types just below B^* in the equilibrium described in Theorem 1. These types are willing to be pooled with lower types only because their alternative is an all cash offer. If these types could convince the target that they have incentives to make out of equilibrium offers, they would present an offer with more cash in order to separate themselves from the lower types. Any equilibrium to the game that allows the bidder to fashion offers will be vulnerable to such defections.

Our assumptions and game structure yield a unique equilibrium that is the solution to a constrained maximization problem for target management. Thus, the model has intuitive appeal. Of equal importance, it generates a number of testable implications. It is also worth noting that equilibria derived through alternative game structures and assumptions retain many of the characteristics of our equilibrium. In particular, stock is never observed in taxable offers (because it has no tax benefit), and cash offers should signal that a bidder is a high type. We now turn to see how well the evidence squares with our predictions.

III. Empirical Evidence

The major testable predictions of the model are that (1) taxable offers do not use any stock as a means of payment and (2) conditional on observing an

offer, *both* all stock and mixed offers decrease the market's perception of the bidder's value.

A. Types of Offers Made

Our model predicts that offers in the U.S. should be (1) all cash, (2) nontaxable all stock, or (3) mixed mode where less than half the shares are purchased with cash. The tax benefits of stock emphasized here and the ability of stock to overcome target adverse selection problems emphasized in other work are (1) not mutually exclusive and (2) independent of bidder type in both classes of models. Thus, if target adverse selection is important empirically, one would expect to find stock as part of taxable offers.¹³ To test this hypothesis, we collected a sample of acquisitions from firms that were dropped from the CRSP tape during the period 1981–1986. Acquisitions were excluded when (1) the target or acquirer was a not U.S. exchange listed corporation or (2) the acquirer had majority control of the target prior to any merger agreement.

The percentage of stock offered in the remaining 342 mergers (211 taxable and 131 nontaxable) is shown in Table 1.¹⁴ Consistent with the idea that stock is only used for its tax advantages, only seven taxable offers contain common stock. Similarly, only 12 other taxable offers consisted of any security that could be converted into common of the acquirer (three offers with convertible preferred, seven with convertible debentures, and two with warrants).¹⁵ Taxable offers contingent on the equity value of the bidding firm are rare in the United States during this period.

Of the 131 nontaxable offers, 86 were all stock (79 all common and 7 preferred or a mix of common and preferred) and 45 were mixed offers of cash and stock. Of the mixed offers, in 34 cases over forty percent (in 27 over forty-five percent) of the shares were purchased with cash. Thus, mixed offers concentrate near the important fifty percent cash mark, as firms use the maximum (or near maximum) cash permissible while retaining tax-free status. This concentration also suggests that an offer's tax status is an important factor in the choice of acquisition mode in the United States.¹⁶

¹³Taken to its logical extreme, it is optimal to offer cash to uninformed target shareholders and stock with restricted sales rights to target management when the bidder is faced with target adverse selection. This conserves on the use of stock and gives target management a leveraged stake in the new firm.

¹⁴The tax status of the offers was obtained from the *Commerce Clearing House Capital Changes Reporter*.

¹⁵Cash tender offers for all shares of the target followed by noncash compensation are considered all-cash offers. An additional 16 firms offered straight debt or preferred stock in their offer and six firms offered compensation based on the contingent performance of the target company. In most cases, noncash compensation was a small fraction of total compensation.

¹⁶Our model, applied to Canada, predicts that there should be no mixed offers. In Canada, only all-stock offers are nontaxable. Mixed offers make up thirty-two percent of a sample collected by Eckbo, Heinkel, and Giammarino (1987). This may indicate the importance of (1) stock when the target has private information and/or (2) the capital structure that results from an acquisition.

Table I
Frequency Distribution of Offers by Percent of Target Stock
Acquired Using Bidder Stock or Convertible Preferred

Percent of target's stock purchased with stock or convertible preferred in a sample of 211 fully taxable and 131 nontaxable offers completed in the period 1981-1986. The column Percentage Securities is the percent of target equity swapped for bidder securities. The columns Taxable Offers and Nontaxable Offers provide the number of offers in each category.

Percentage Securities ^a	Taxable Offers ^b	Nontaxable Offers
100%	0	86
60% to 99%	2	11
50% to 59% ^c	1	34
1% to 49%	7	0
0%	201	0
Totals	211	131

^aMany of the offers swap convertible preferred issued by the bidder for target stock. In the taxable offers containing fifty percent to fifty-nine percent securities, one offer was convertible preferred; and in the taxable offers containing one to forty-nine percent securities, two offers were convertible preferred. In the nontaxable offers containing one hundred percent securities, seven were convertible preferred; in the nontaxable offers containing sixty to ninety-nine percent securities, five were convertible preferred; and in the nontaxable offers containing fifty to fifty-nine percent securities, nine were convertible preferred.

^bAll data on the taxability of offers was collected from the *Commerce Clearing House Capital Changes Reporter*.

^cThis grouping includes seven mixed nontaxable offers with slightly less stock than fifty percent. Any such offer needs IRS approval given its technical violation of the "continuity of interests" principle. Some of these offers, however, might have satisfied the fifty percent rule when purchases of exercised stock options of corporate executives are included.

B. Bidder Announcement Effects

Our model predicts that bidder stock returns on the announcement of a merger are higher in cash offers than in stock or mixed offers. Since pure-stock offers and mixed offers are not observed in the same equilibria, we make no predictions about the difference in abnormal returns across the two types of offers. In models where stock is used to avoid overpaying the target, fully revealing equilibria exist where higher bidder types offer more cash. Given that most of our mixed offers contain substantial amounts of cash, these models predict that abnormal returns to bidders should be highest in all-cash offers, lower in mixed offers, and lower yet in all-stock offers.

While numerous studies document bidder abnormal returns in cash versus stock offers, only Travlos (1987) and Asquith, Bruner, and Mullins (1987), examine the returns to mixed offers. For a sample of six firms, Travlos finds negative returns to bidders making offers.¹⁷ We examine the abnormal

¹⁷Interestingly, Eckbo, Heinkel, and Giammarino (1988) find that bidders making mixed offers have higher returns than those offering stock or cash in Canada. However, there are substantial differences between U.S. and Canadian tax laws.

returns for a larger and different sample of mixed offers to determine if the information revealed by mixed offers differs from all-stock and all-cash offers.

We classify our sample of offers into three groups: taxable cash offers, nontaxable stock offers and nontaxable mixed offers. Cash offers include any taxable offers that do not contain stock. All-stock offers are excluded when it is unclear which firm was the target (e.g., mergers of equals where both firms get equal representation on the board of the merged firm). Mergers involving two financial institutions (banks and savings and loans) were also excluded since there are regulatory constraints on the form of allowable compensation in the offer.

For each remaining acquisition, we identify the date of its first announcement in the *Wall Street Journal*. The first report must include some mention of the terms of the offer: cash, stock, or mixed. In a few cases, the final offer deviated from the original offer. In these cases, the offer is classified by its original terms since the market capitalizes the original offer terms at the initial announcement. The market model is used to estimate abnormal stock returns to bidders around the announcement of a merger. The market model is estimated for the period 300 days before the event (event date: $t = 0$) through 51 days before the event data. The prediction error (abnormal return) for security i on date t is

$$PE_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (7)$$

where R_{it} is the return to firm i on date t , R_{mt} is the return to the CRSP equal weighted market portfolio on date t , and α_i and β_i are the ordinary least squares estimates of firm i 's market model parameters.

The cumulative prediction error for days $t = 0$ and $t = -1$ and the variance of the error are estimated for each bidder. For each classification, an average two-day prediction error is estimated using ordinary least squares and weighted least squares estimation. Differences between average prediction errors for each classification are also calculated.

Table II indicates that abnormal returns are negative for stock and mixed offers. The returns for cash offers are essentially zero and significantly higher than the returns for all stock or mixed offers. This is consistent with our model's predictions. The evidence is not consistent with bidders signalling higher asset values with greater amounts of cash in nontaxable offers. Bidder returns in mixed offers are not significantly different from returns in all stock offers.

IV. Summary and Conclusion

In our model, low valuation bidders choose an offer including at least fifty percent stock and high valuation bidders make cash offers. High valuation bidders offer cash to avoid issuing undervalued stock, and low valuation bidders offer stock to avoid the capital gains tax penalty. The model places restrictions on the construction of observed merger offers and provides a

Table II
Bidder Abnormal Returns Around the Announcement of an Acquisition by Mode of Acquisition

Mean cumulative abnormal prediction errors (CAPE) from a market model for the returns to ultimately successful bidding firms on the day of and day before the first announcement of 166 taxable cash takeover offers, 40 nontaxable mixed mode offers, and 62 nontaxable all-stock takeover offers in the period 1981-1986.^a

	Weighted Least Squares Mean Estimate of CAPE(-1, 0)	Ordinary Least Squares ^b Mean Estimate of CAPE(-1, 0)
Cash (<i>n</i> = 166) (taxable)	-0.36% (-0.99) ^c	-0.06% (-0.14)
Mixed Mode (<i>n</i> = 40) (nontaxable)	-2.55% (-3.32)	-2.48% (-3.32)
All Stock (<i>n</i> = 62) (nontaxable)	-2.20% (-3.98)	-2.73% (-4.49)
Differences between mean CAPE by offer type		
Cash-Stock	1.84% (2.78)	2.67% (3.62)
Cash-Mixed	2.19% (2.58)	2.42% (2.83)
Mixed-Stock	-0.35% (-0.37)	0.25% (0.26)

^aOrdinary least squares mean estimates weight each acquisition equally. The standard errors used for statistical tests are the cross-sectional sample standard errors.

^bWeighted least squares mean estimates use the inverse of the estimated variance of each firm's CAPE as weights for calculating a weighted average mean CAPE.

^c*t*-statistics in parentheses.

tax/information based rationale for the use of mixed offers. Evidence from a large sample of acquisitions is consistent with the model's predictions.

In closing, we note that our model has implications for further cross-sectional tests of bidder returns in mergers. The information revealed by a bidder's choice of cash versus stock depends on the tax cost differential between a taxable and nontaxable offer. Thus, the bidder's announcement returns should depend on tax parameters. For example, when there are large tax disincentives to cash offers, the market's priors are that a nontaxable offer is most probable. Consequently, a bidder making a cash offer should experience a large positive revaluation while those choosing stock should experience a relatively small negative revaluation. The choice of acquisition mode and resulting bidder revaluations are also affected by changes in the tax code. For example, the Tax Reform Act of 1986 reduces the tax benefits of cash offers. Thus, we predict that stock offers should be more likely after 1986 and should result in smaller negative price reactions. Previous models of the choice of acquisition mode offer no insight on the cross-sectional variation in returns for bidders choosing the same means of payment. This implication of the model holds promise for future research.

Appendix A

Proof of Theorem 1. It is easy to show that the bidder's choice is optimal, that the offer is approved, and that stock valuation is accurate. To prove that target management prefers an offer schedule with one nontaxable offer, consider a schedule with two nontaxable offers where bidder types (B', B^*) offer j' in cash, those below B' offer i in cash, and $0 < i < j' < 0.50$. For B' to be indifferent between the offers, we need

$$iC(i) + p(i)\{B' + V - iC(i)\} = j'C(j') + p(j')\{B' + V - j'C(j')\} \quad A.1$$

For any value of j , from our conditions for an efficient mixed offer

$$p(j) = (1 - j)R/[E(B|j) + V - j(R + T(j))], \quad \text{and} \\ C(j) = R + T(j).$$

In this case, $E(B|i) = 0.5(B' + B_L)$ and $E(B|j') = 0.5(B' + B^*)$. Making these substitutions into A.1 and simplifying we obtain

$$iT(i) + \frac{(1 - i)R(0.5)(B' - B_L)}{0.5(B' + B_L) + V - i(R + T(i))} \\ = j'T(j') + \frac{(1 - j')R(0.5)(B' - B^*)}{0.5(B' + B^*) + V - j'[R + T(j')]} \quad A.2$$

The sum of the tax penalty and misvaluation of shares must be the same for type B' .

Alternatively, consider one offer of i in cash made by types (B_L, B^*) . Let the stock portion of the offer, $p(i)$, again satisfy equation (1). Types $B < B'$ prefer this offer because it pays the same amount of cash and less stock. Types (B', B^*) prefer pooling with types $B < B'$ if costs are lower in a separating schedule. This is the case for type B^* if equation A.3 holds:

$$iT(i) + \frac{(1 - i)R[B^* - 0.5(B^* + B_L)]}{0.5(B^*) + B_L + V - i[R + T(i)]} \\ \leq j'T(j') + \frac{(1 - j')R[B^* - 0.5(B^* + B')]}{0.5(B' + B^*) + V - j'[R + T(j')]} \quad A.3$$

Substituting A.2 into A.3 and simplifying we get

$$\frac{(1 - i)R(0.5)(B^* - B_L)}{0.5(B^* + B_L) + V - i[R + T(i)]} \geq \frac{(1 - i)R(0.5)(B' - B_L)}{0.5(B^* + B_L) + V - i[R + T(i)]} \\ + \frac{(1 - j')R(B^* - B')}{0.5(B' + B_L) + V - j'[R + T(j')]} \quad A.4$$

For any levels of i and j' there is a unique B' if a separating schedule exists. Here, it is sufficient to show that *any* B' in the feasible range satisfies the inequality of A.4. Since $0 < i < j' < 0.5$, it is obvious that A.4 is satisfied

when $B' = B^*$ or $B' = B_L$ and that the RHS of equation (14) is larger when $B' = B_L$ than when $B' = B^*$. Thus, if the derivative of the RHS with respect to B' is (1) negative for all values of B' or (2) positive when $B' = B_L$ but turns negative and remains negative at some higher value of B' , then equation A.4 holds. This function has these properties.¹⁸

The cost of the highest type, B^* , is lower with one offer. The proof generalizes. Any schedule with two nontaxable offers is dominated by an alternative schedule with one nontaxable offer.¹⁹ Lowering the cost to the highest bidder type means that more types choose nontaxable offers (as management prefers) that cost less than $R + T(n) - D$. Q.E.D.

¹⁸Proof of this property will be provided upon request.

¹⁹A similar proof showing that fully revealing offer schedules are also dominated by pooling schedules is available upon request.

REFERENCES

- Asquith, P., R. Bruner, and D. Mullins, 1987, Merger returns and the form of financing, Working paper, Harvard Business School.
- Bagwell, L., 1989, Share repurchase and takeover deterrence, Working paper, Northwestern University.
- Brown, D., 1988a, The construction of tender offers: Capital gains taxes and the free rider problem, *Journal of Business* 61, 183-196.
- , 1988b, Personal taxes and the market for corporate control: Antitakeover amendments and hostile offers, Working paper, University of Florida.
- Carleton, W., D. Guilkey, R. Harris, and J. Stewart, 1983, An empirical analysis of the role of the medium of exchange in mergers, *Journal of Finance* 38, 813-827.
- Cho, I., and D. Kreps, 1987, Signaling games and stable equilibria, *Quarterly Journal of Economics* 102, 179-221.
- Commerce Clearing House Capital Changes Reporter, 1988 (Prentice Hall, New York).
- Crawford, D., 1988, The structure of corporate mergers: Accounting, tax, and forms-of-payment choices, Unpublished Ph.D. dissertation, University of Rochester.
- Eckbo, B. E., R. Heinkel, and R. Giammarino, 1987, Asymmetric information and the medium of exchange in takeovers: Theory and evidence, Working paper, University of British Columbia.
- Fishman, M., 1989, Preemptive bidding and the role of the medium of exchange in acquisitions, *Journal of Finance* 44, 41-58.
- Franks, J., R. Harris, and C. Mayers, 1987, Means of payment in takeovers: Results for the U.K. and U.S., Working paper, University of North Carolina.
- Gilson, R., 1986, *The Law and Finance of Corporate Acquisitions* (The Foundation Press, Mineola, NY).
- Hansen, R., 1987, A theory of the medium of exchange in mergers and acquisitions, *Journal of Business* 60, 75-96.
- Myers, S., and N. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-222.
- Niden, C., 1988, The role of taxes in corporate acquisitions: Effects on premium and type of consideration, Unpublished Ph.D. dissertation, University of Chicago.
- Ryngaert, M., 1988, The effect of poison pill securities on shareholder wealth, *Journal of Financial Economics* 20, 377-417.
- Stulz, R., 1988, Managerial control of voting rights, *Journal of Financial Economics* 20, 139-183.
- Travlos, N., 1987, Corporate takeover bids, means of payment, and bidding firms' stock returns, *Journal of Finance* 42, 943-964.