Department of Finance
Working Paper Series 1998

FIN-98-053

Toehold Strategies and Rival Bidders

S Abraham Ravid, Matthew Spiegel

October 19, 1997

This working paper series has been generously supported by a grant from

CDC Investment Management Corporation

Toehold Strategies and Rival Bidders

by

S.Abraham Ravid*

and

Matthew Spiegel**

Revised: October 19, 1997

* New York University, Stern School of Business and Rutgers University, Graduate School of Management.
** University of California at Berkeley, Haas School of Business, S545 Student Services Building #1900, Berkeley, CA 94720-1900. Telephone: 510-642-3421, E-mail: spiegel@haas.berkeley.edu.

Abstract

Prior to the announcement of a tender offer, the bidding firm is legally allowed to acquire shares in the open market, subject to some limitations. These pre-announcement purchases are known as toeholds. This paper presents a simple model that describes the bidder's optimal toehold acquisition strategy, within an environment that closely parallels the present legal institutions. The model shows that toeholds and bids interact in a complex manner even without the presence of asymmetric information. By examining a simple environment the paper provides a useful alternative hypothesis for tests of other, presumably more complex, models. One of the main implications of our model is that if no competing bidders are expected, no toeholds should be purchased. The paper demonstrates that the correct specification of an empirical model can be critical. For example, under some parameter values toehold purchases may exhibit a negative cross-sectional correlation with the pre-announcement run up in the stock price. This occurs even though prices are strictly increasing the size of the toehold. Several implications concerning various aspects of merger legislation are considered. We show that corporate charters that affect the number of shares necessary to complete a merger will have an impact only if competition among bidders is expected. ,The paper further shows that a rule similar to a "fair price" provision has the desirable property that a second bidder arrives and wins if and only if he places a higher value on the target than the initial bidder. Several additional comparative statics are derived as well.

A great deal of recent theoretical research has focused upon the motivations and consequences of mergers.[1] Several papers have discussed bidding strategies and techniques - notable examples include Fishman (1988) and Hirshleifer and Png (1989) who examine optimal strategies once a tender offer has been declared. However, relatively little attention has been paid to the strategies a potential bidder may use prior to announcing a tender offer. A commonly used method is the open market purchase of shares (toeholds) before the official announcement of the offer. There have been only a few models discussing these issues. Chowdhry and Jegadeesh(1994) model toehold selection as a signaling equilibrium. Freund and Easton (1979) offer a more general discussion. Burkart's (1995) model provides an analysis of strategic bidding given that bidders hold initial stake in the firm. His model predicts that overbidding will occur once a toehold is purchased. However, there is no derivation of an optimal toehold acquisition. Kyle and Vila (1991) suggest that a bidder may want to purchase a toehold in the presence of noise traders that will mask his actions, but multiple bidder contests are not considered. Most other papers, such as Shleifer and Vishny (1986) and Hirshleifer and Titman (1990) take the bidder's initial stake as given and then analyze the resulting game. Similarly, Singh (1995) discusses strategies for block-holders who have already purchased a toehold and the impact of such a situation on takeovers. In the present paper we provide a simple model that attempts to accurately capture the primary legal features of the takeover process. We then use the model to characterize the costs and benefits of toehold purchases. The model further explores how synergies and government regulations affect the number of shares purchased and the conditions under which second bidders contest the target.

One contribution of the current analysis is to provide a set of results that are based upon the institutional setting and the basic economic trade-off facing any potential acquirer. By eliminating asymmetric information and agency issues, the model allows one to draw a clear distinction between the empirical regularities that require a richer, and thus more complex model, and those that do not. Dewatripont (1993)discusses some of the trade-offs we consider within a different framework which envisions a contest between an initial raider and a potential

---

[1] See Jensen (1988), Shleifer and Vishny (1988) and Scherer (1988) for reviews and Roll (1986) for a different perspective.

White Knight, with different private benefits.

Our model demonstrates that well documented regularities in the data can be explained simply through the interaction of prevailing takeover laws. Bradley, Desai, and Kim (1988) find that over half the firms in their sample did not acquire any shares prior to making a tender offer. Similarly, Poulsen and Jarrell (1986) report that about 40% of the firms in their sample had no toeholds. Most of the firms in the sample collected by Jennings and Mazzeo (1993)did not purchase any toehold either (although they explicitly excluded firms that had an initial toehold of more than 50%). If bidders are acting rationally, then there must exist conditions which preclude open market purchases of the target's shares as an optimal response. Kyle and Vila (1991) delineate such circumstances, namely, the extent of noise trading and exogenous synergies. However, these conditions are harder to measure and an important element, i.e. competing bidders is not considered. In the model presented here, potential bidders do not attempt open market transactions when rival bidders are sparse. Only when a second raider seems likely to appear does a positive toehold form an optimal strategy for the initial bidder. These conclusions follow from the fact that while toehold purchases discourage other raiders, they also raise the stock's market price, which in turn increases a court mandated minimum tender price.[2]

The present analysis leads to several additional conclusions. First, and counter-intuitively, we demonstrate that larger toeholds are not unambiguously more effective at discouraging rival bidders. This may explain why many toeholds are often small. Secondly, we demonstrate that while toeholds allow the initial bidder to profit should a rival appear, winning is still always better than losing. In contrast, some newspaper articles and legal commentary have indicated that bidders may wish to purchase toeholds in the hope of losing and then selling out. Thirdly, because the legal institutions are part of the model, it is possible to explore the impact of changes in the prevailing laws. An explicit analysis of "fair price" provisions (which require the purchase of un-tendered shares at the highest price paid for any shares) indicates that such laws may provide some welfare

[2]This result, which conforms to the observed empirical regularities, differentiates our model from Chowdhry and Jegadeesh (1994). In their signaling equilibrium almost every type of bidder will purchase a positive toehold to signal his valuation.

benefits. In that sense, the analysis is similar in spirit to Bebchuk (1994), who concludes that the U.S. legal system (without the "fair price" provision) may facilitate inefficient transfers, whereas the Equal Opportunity rule (similar to Fair Price provision) does not enable inefficient transfers to go through. We also discuss the role of corporate charters and laws specifying different number of shares required to complete a merger.

Our analysis may also be consistent with some surprising empirical findings. Most of the comparative statics in our model do not yield linear outcomes. Empirical models that do not take these non-linearities into account can come up with seemingly counter-intuitive findings. Consider the simple problem of correlating toehold purchases with the pre-announcement run up in the stock price. Under some parameter values, a cross sectional analysis of this correlation will produce a *negative* relationship, even though the model assumes that stock prices are strictly increasing in the toehold purchase. Thus, we can provide a partial explanation as to why Betton and Eckbo (1995) find this very relationship.

The paper is organized as follows. Section 2 describes the legal environment. Section 3 presents the model and derives the conditions under which positive and zero toeholds are optimal. Section 4 contains an analysis of the empirical literature and suggestions for testing the model. Section 5 presents the conclusion. We present our results as propositions. Proposition 1 and 3 characterize the optimal toehold decision. Propositions 4-7 derive various comparative statics and propositions 2 8 and 9 discuss legislative issues.

1 The Legal Environment[3]

A tender offer goes through several phases, each of which is subject to different legal strictures. The initial phase is an acquisition period during which the bidding firm can employ open market purchases to obtain

[3]Much of the material in this section can be found in Gilson (1986) and Gilson and Kraakman (1987).

a toehold in the target. Legally, a firm may acquire up to five percent of another firm before it triggers a reporting requirement. Section 13(d) of the Securities Exchange Act of 1934 stipulates that once someone obtains five percent of a firm's stock, that person has 10 days to file a disclosure form describing his intentions. Importantly, during this ten day period the potential bidder can continue to make open market purchases. Hence, toehold purchases may be considerably larger than 5% of a target firm. Once the report is filed, no additional open market activities are permitted.

At this point the next phase of the acquisition begins, in which a tender offer is made via a 14D filing. A complete acquisition must offer compensation both for those who voluntarily relinquish their position, and for those who are forced out against their will. As such, a tender offer is necessarily divided into two parts, the second of which "cleans up" any shares not obtained in the first part.[4] This institutional feature drives many of our results.[5]

There are very few restrictions on the form of the first tier bid. The two primary limitations are that the bid must remain open for at least 20 days and that the tenders must be taken up on a pro rata basis. In other words, the bidder cannot discriminate among the target's shareholders.

The eventual goal of the bid is the dissolution of the target company. Therefore, the acquiring firm must specify a price they will pay for shares not acquired in the first half of the tender offer, if indeed a sufficient number of shares are tendered to force a merger. It is at this point that the legal framework becomes critical. Imagine that the bidder has acquired fifty percent of the target company and that there is no legal protection for the minority shareholders. Then the bidder's optimal strategy is to "sell" the target's assets to the bidder at a price

[4]While recent "second generation" takeover statutes have affected some of the details involved in an acquisition, the basic two tier structure remains. See Karpoff and Malatesta (1990) for an extensive review and empirical analysis of this legislation.

One should further note that the analysis of this paper deals with cases in which the target is indeed dissolved as a corporate entity as opposed to cases in which the target is managed as a wholly owned subsidiary or is partially liquidated.

[5]Golbe and Schranz (1994) is another example of a model which makes extensive use of this institutional feature in another context.

of zero, and dissolve the target firm. Since the bidder has over fifty percent of the stock, approval of the agreement is guaranteed[6]. Thus, it is clear that any remuneration the remaining target shareholders may hope to receive must be imposed via the legal system or an appropriately structured corporate charter which cannot be revoked (as is the case in some European countries).

Every state has laws governing the treatment of target shares during the freezeout portion of the merger. Generally, shareholders are entitled to a minimum value which is determined via an appraisal proceeding. The Delaware statute is typical. In section 262 it states:

> ".... the Court shall appraise the shares, determining their fair value exclusively of any element of value arising from the accomplishment or expectation of the merger..."

While the wording is clear, and appears designed to give the target owners only the pre-merger value of their stock, the courts have taken some liberties with its meaning. (For example, see Weinberger v. UOP, Inc., Supreme Court of Del., 457 A.2d 701 (1983).) In practice, the legal methods used to determine a stock's pre-merger value are ones that most financial academics may not consider appropriate. For example, accounting values are used in addition to the pre-merger stock price. An important feature of this process is that attributes of the bidding firm do not enter the calculations, contrary to some models which implicitly assume such dependence. Only the target's attributes determine the second tier share price.

The procedures used by the courts to value shares that are not taken up in the tender offer are of course a matter of public record. Thus, in the absence of competition, the bidder can in principle formulate a simple strategy. First, he calculates the price the court will allow for the second phase of the tender offer. The initial offer will exceed that amount by a few pennies in order to compensate those who agree to tender early. If necessary, one can also offer to return the submitted shares if the offer fails. It is easy to verify that given this

---

[6]Clearly, this is an extreme case. Under most circumstances such extreme dilution is not possible according to state and corporate by laws. However, this strong statement highlights the importance of the second tier legislation.

type of bid tendering is at least a weakly dominant strategy, and so the offer should succeed.[7]

The next section analyzes a simple model which adheres closely to the institutional realities described above, and derives several empirical implications.

2 The Model

2.1 Game Tree

Our model describes a target and a set of potential bidders. Initially, one potential bidder becomes the first to discover that his valuation of the target (V_1) justifies a takeover attempt. At this time he may or may not purchase a toehold (t) in the open market. The number of outstanding shares is normalized to one, and thus t represents the fraction of shares purchased by the raider. The acquisition of the toehold occurs within a Kyle or a similar partially revealing market. As a result, toehold purchases increase the stock's price.[8] Let P denote the market price, and t the toehold purchase. For simplicity, assume that the reduced form price function below describes the stock market, where $k \geq 0$ is a constant.[9]

$$P = P_0 + kt \tag{1}$$

[7] In practice, the benefit from tendering early is often the ability to receive payment for the shares as quickly as possible. However, as long as there is a positive interest rate, tendering remains at least a weakly dominant strategy.

[8] Stulz (1988) and Stulz et al. (1990) among others provide a heterogeneous tax bracket justification for an upward sloping equilibrium price curve. Such models are also consistent with the present specification.

[9] Nonlinear price functions produce quantitatively similar results. Thus, we appeal to simplicity for the selection of this particular functional form.

Thus, if k=0 the toehold can be purchased without influencing the stock price, while higher values lead to greater price impacts. The model does not derive the price function via a specific microstructure model although it is consistent with many.

After the toehold purchase, the bidder must announce his intentions and make a formal tender offer. To accomplish these tasks, bidders must retain lawyers and sink other resources into designing strategies, arranging financing, and meeting various regulatory requirements. The model captures this set-up by assuming that a raider must pay c dollars in order to begin the bidding process.

Once the tender offer commences, the identity of the participants is revealed and the market can use this information as well as the required disclosure statements in order to learn about the potential value of the target to the bidder. Thus, the model assumes that at this stage V_1 becomes common knowledge. The tender offer specifies a first tier price, the number of shares the bidder wishes to acquire in the first tier of the offer ρ_1, and the second tier price per share b_1. As required by law, the offer states that shares will be taken up on a pro rata basis.[10]

After the public announcement, period two begins. Having observed V_1, a second firm updates its assessment of the target's value (see Fishman (1988) for a formal analysis focusing on that aspect of the merger game). This value assessment V_2 is taken from an ex-ante density function f. This density function is known to the first bidder at the start of the game.

If V_2 high enough, the second bidder may decide to enter the contest. If so, then, like the first bidder, the rival must also spend c dollars to initiate the bidding process and file the relevant documents. Again the model assumes that these documents are sufficiently detailed so that V_2 becomes common knowledge upon their filing. Having paid c to begin bidding, an auction for the target ensues. Of course, if a rival does not appear, the first

---

[10] While two tiered bids of some type must follow from the merger process itself, many models ignore this feature of the bidding mechanism. For example, models patterned after Grossman and Hart (1980) implicitly assume that un-tendered shares retain their share of the target firm's value after the merger. However, since a merger results in the legal dissolution of the target, this scenario is not very realistic.

bidder purchases the target at his initial offer price.[11]

Existing laws do not specify a particular bidding order. Furthermore, the contestants can revise any bids that they make. We thus model the bidding contest as an English Auction. The players submit ever higher bids, until one firm drops out. Note that this implies the first contestant may revise his initial bid in response to a second raider's arrival. For simplicity, we assume that revising a bid is costless, however, changing this assumption will not alter the model's qualitative results. Denote the final bid by the first contestant as B_1, and that of the second bidder as B_2.

In general, offers are conditioned on the bidder's ability to obtain financing, and other elements that depend upon both the bidder's actions and those of third parties. The model therefore assumes that a bidder cannot obtain financing for bids beyond his valuation[12]. If after winning the auction a bidder cannot obtain financing, the shareholders can tender to the second highest bidder at that bidder's last offer. If the shares are not tendered, the target remains independent.[13]

The minimum bid price for any shares that are not purchased in the first tier of the bid and left for the freezeout merger is determined by the courts only through attributes of the target, the first tier bid and the market price of shares prior to the initial toehold purchase.[14] Following the legal institutions one therefore requires a

---

[11]In the real world this corresponds to the passage of twenty days pass from the date of the initial tender offer without the appearance of another bidder.

[12] In contrast, Burkart's (1995) over-bidding strategies essentially assume that contestants can finance any bid.

[13]This assumption eliminates certain incredible bids. Consider a simple single period auction model where the seller places a zero value on the object. If the seller knows the buyer's reservation value, the seller can bid the buyer's reservation value minus a small amount. The buyer is then "forced" to bid his full value in order to receive the object. However, it is not really credible for the seller to "buy" the object since he actually places a zero value on it. In a dynamic game one would expect the seller, if he won, to immediately re-auction the object. Since everybody knows this, nobody will take the seller's bid seriously. By assuming that firms cannot obtain financing for bids above their valuation we eliminate this type of dynamic inconsistency.

[14] If the courts follow Delaware's statute to the letter, then clearly the second tier price is exogenous to any parameter in the model. Thus, we allow for institutions in which b is a constant. However, since the courts often refuse to rigidly follow their state laws the model is designed to handle other institutional settings. For

function b such that $\partial b/\partial P \geq 0$ and $\partial b/\partial B_w \geq 0$, where B_w represents the winning first tier bid. For simplicity, the model assumes that the courts set the second tier price to either a weighted average of the pre-merger price and the winning bid or the pre-merger price, whichever is higher:

$$b = \max\{[1-n]P + nB_w, P\} \tag{2}$$

where n is a nonnegative constant.[15] This functional form can be used to capture a wide range of legal behavior. Setting n equal to zero, implies that the court interprets literally statutes that compel winning bidders to take up shares in the clean up offer at the pre-merger value. The model assumes that the courts would not allow the second tier price to fall below the pre-offer announcement stock price.[16] At the other extreme, one can set n equal to 1, in which case bidders must pay the same amount for shares purchased in the back end of the offer as they do for those initially tendered. Thus, setting n equal to one replicates the conditions faced by a bidder operating under "fair price" provisions similar to those enacted by several legislative bodies.

While in principle each bid has three components, the game's structure implies that only B_i requires much analysis. First, setting b_i above the court mandated minimum level is sub-optimal since a raider only purchases

---

example, in the Delaware Supreme Court's decision regarding Smith v. Van Gorkom (1985. 488 A.2d 858), the court states that the stock price is at most a lower bound on which to base the firm's value. This implies that the courts will require bidders to pay an amount (say 10 percent) above the stock's price prior to the tender offer for the shares in the freeze out merger. Along a similar line the Delaware Court in Weinberger v. UOP, Inc. Del. Supr., 457 A.2d 701 (1983), discusses the "Delaware block" method for determining a firm's value in an appraisal proceeding. In this method,

> the elements of value, ie., assets, market price, earnings, etc., [are] assigned a particular weight and the resulting amounts added to determine the value per share. This procedure has been in use for decades.

Importantly, for the present model, these cases indicate that the stock price is not included in the court's calculation of the firm's value.

[15]For most of the paper's results, one can show that more general specifications produce qualitatively similar results.

[16]One can also add a third term to equation (2) that allows the courts to use P_0 in addition to P and B_w without changing the model's qualitative features.

the residual shares after he has already obtained control. Second, since b_i never exceeds B_i, an optimal strategy must minimize the number of shares purchased at the higher first tier price.[17] Thus, each firm sets ρ_i to the lowest value sufficient to obtain control of the firm. Since the number of shares required to complete a takeover varies by state, assume that the bidder can only complete the acquisition if he controls at least a fraction α of the firm's shares. Thus, in equilibrium each bidder will set ρ_i to its smallest possible value which will equal α for the new bidder, and α-t for the first bidder.

Faced with bids from both raiders, shareholders must decide to whom they will tender. In a rational expectations model, there exist equilibria in which $B_i > B_j$ and yet firm i does not receive any shares. This can happen if i's offer is conditional upon winning, and shareholders believe i will lose. In this case each stockholder correctly thinks that if he tenders to j, he will receive B_j in the offer's first tier and b_j in the second tier. Conversely, tendering to i results in the return of the owner's shares, which are then taken up in j's (lower) second tier for b_j dollars. As a result, all shareholders tender to j. Not only does this equilibrium seem implausible, but several equilibrium refinements can be used to eliminate it.[18] We therefore assume that if $B_i > B_j$ (firm i offers a higher initial bid than firm j) firm i receives at least ρ_i shares. This structure simplifies the decision problem of shareholders to tender shares to the highest first tier bidder.

The following outline summarizes the game's structure:

Period 0: A firm (labeled 1) privately discovers that its valuation of the target (V_1) is large enough to warrant a takeover attempt.

Firm 1 may purchase a toehold in the open market.

Period 1: Firm 1 pays c, and then submits a tender offer for the target shares, specifying how much it will pay for the target. Firm 1's value V_1 becomes common knowledge.

---

[17]Prior to the late 1980's, no state required second tier bids to even equal first tier bids (i.e. $b_i < B_i$). Since then several states have added the requirement, (via "fair price" regulations) that the second tier bid not fall below the first tier bid. In this case the raider's cost minimizing strategy requires him to set $B_i = b_i$. Later on we explicitly analyze the impact of fair price provisions.

[18]For a discussion regarding refinements that rule out these outcomes see Grossman and Hart (1987).

Period 2: Upon seeing the first bidder's actions a second bidder draws a valuation (V_2) from the density function f.

The game can now branch off in one of two directions A, or B.

Period 3A: V_2 is low enough that the rival bidder does not contest the target. Firm 1 completes the acquisition at the initial bid. The game now ends.

Period 3B: V_2 is large enough and a bidding contest ensues. Firm 2 pays a cost c to enter the contest. Both firms then submit simultaneous bids, an auction ensues where bids can be revised. B_2 and B_1 respectively are determined.

Period 4B:Share-holders tender to the highest bidder. If the winning bidder cannot obtain financing[19], the target shareholders can tender to the losing bidder at his latest bid price.

Period 5B: If a bidder completes the purchase, it dissolves the target as a legal entity. Otherwise the target remains independent. The game ends.

In order to draw out the factors that influence the bidder's strategy the paper considers two special cases prior to analyzing the full model. Section 2.2 examines the bidder's problem when a rival never appears. This case is of particular interest when considering a takeover where the bidder-target match involves synergies unique to the pair. Section 2.3.2 then examines the model under the assumption that the toehold purchase does not influence the probability a rival will appear. In this case, the toehold acts simply to force up the rivals equilibrium bid and not to discourage competition. Finally, section 2.3.3 considers the full model.

2.2 Equilibrium When a Rival Never Appears

Absent a rival the first bidder will earn

$$\pi_W^1 = V_1 - [\alpha - t]B_1 - [1 - \alpha]b - tP - c, \tag{3}$$

where π_w^1 signifies the profits received by firm 1 given it has won the target. The bidder receives V_1 but must pay

[19]We should emphasize again that bidding above your valuation and not obtaining financing is an out of equilibrium move in this game- in other words, it will not occur in equilibrium.

a total of $[\alpha\text{-}t]B_1$ for the shares purchased in the first tier, and $[1\text{-}\alpha]b$ for those shares purchased when the target is dissolved as a corporate entity.

If the initial bidder has no competition he will set a price equal to (or marginally higher than) the court mandated second tier price. Denote by $b_0=b(P,b_0)$, the lowest possible second tier bid given that a rival does not appear. Based upon equation (2) one can find a closed form solution by setting both B_1 and b equal to b_0 and then solving for b_0. This calculation and equation (3) above, lead to the following observations:

Proposition 1: If no rival is expected to appear, then:

a) The initial bidder will not purchase any toehold,

b) the bid price will equal the current market price, and

c) the initial bidder's profits and strategy will not depend on the number of shares required to complete the acquisition (α).

Proof: Given that V_1 does not depend upon t, and P increases in t, the firm's profit maximizing strategy must be to set t=0, and earn a profit of V_1-P_0. This proves part a. Since t=0, a calculation based upon equation (2) easily proves part b.

$$b_0 = P. \tag{4}$$

From equation (4) the cost to the bidding firm for both tiers of the offer equals P. Thus, when a rival firm never appears the firm's total profits can be written as V_1-P. Finally, note that equation (4) also implies that, in a single bidder contest, the bidder's profits and strategy do not depend upon the legislature's requirement that it acquire at least α shares prior to completing the acquisition. This proves part c. Q.E.D.

Thus, when a bidder does not face any competition, the first and second tier prices are equal to the stock price. This result implies that, absent agency problems and asymmetric information, bidders use two tiered offers only as a strategic weapon when bidding against other players. The empirical implication is that offers where the second tier price is different from the initial bid price, are less likely to be observed in single bidder situations (unless perhaps there are severe informational asymmetries, and then another model may apply) and somewhat more prevalent in multiple bidder takeovers.[20]

The intuition for our result is that a firm secure in the notion that it is the only bidder, does not derive any benefit from a toehold position. Worse, to the degree that a toehold drives up the stock price, and thereby increases the target's value in the eyes of the court system, a toehold purchase may actually hurt the bidding firm. These results seem to be in line with the empirical finding that a considerable percentage of firms never purchase a toehold in the open market. They are also consistent with papers such as Schwert (1996) and Comment and Schwert (1995) who find that a much higher premium is paid to target shareholders in contested bids than in single bidder takeovers. Finally, note that equation (4) also implies that, in a single bidder contest, the bidder's profits and strategy do not depend upon the legislature's requirement that it acquire at least α shares prior to completing the acquisition. Thus, if α is used as a device for social policy, it will primarily alter the outcome of potentially contested takeovers.

2.3 Toehold Strategies when a Rival May Appear

2.3.1 Equilibrium Bidding Strategies

So far the paper has explored the first firm's behavior when management knows that no other bidders will arrive. When a rival may appear, the potential profits that the initial bidder can obtain by either winning or losing the auction take on primary importance. Equation (3) provides the profits obtained when firm 1 wins with a bid of B_1. However, management must also consider the value that can be obtained from losing the auction and selling out the toehold. In this case firm 1 receives

---

[20] This does not imply that all multiple bidder takeovers will produce two tiered offers. If the courts impose fair price provisions on the bidders (thus setting n=1 in the model), then this will force all bidders to use single price strategies. Even if the legislature has not mandated a fair price rule, the courts often give the target's management greater leeway to ward off a two-tiered offer. This can effectively create an implicit fair price rule.

$$\pi_L^1 = [(1-\alpha)b + \alpha B_2]t - tP - c. \tag{5}$$

Should the first bidder lose the auction, he earns B_2 on a fraction α of the toehold shares (t) in the first tier of the offer, and b on a fraction $1-\alpha$ of the toehold. The final two terms arise from the fact that the toehold cost firm 1 tP in the open market, and that the firm spent c dollars to initiate the takeover bid. Thus, π_L^1 represents the profits firm 1 expects to earn for losing the auction.

In equilibrium firm 1 should stop bidding when its profits from losing just equal its profits from winning.[21] Below this level the first raider can slightly increase its bid and earn a strictly greater profit. Bids above this point are simply not credible since the first bidder will back out of the offer in order to sell out to the second bidder. Setting $\pi_W^1 = \pi_L^1$, and $B_1 = B_2$ and then solving for B_2 shows that the rival firm will win the auction at a bid of

$$B_2^* = \frac{V_1 - (1-\alpha)(1-n)(1+t)P}{1-(1-\alpha)(1-n)(1+t)} \tag{6}$$

where the "*" indicates the value of B_2 at which firm 2 wins the auction. Notice that B_2^* does not depend upon V_2. Firm 2 only needs to bid enough so that firm 1 finds it unprofitable to win the target.[22]

Another comparative static that arises from (6) concerns the influence of α.

Proposition 2: Holding all else constant (including the value of t) an increase in α will cause a decline in B_2^*.

---

[21]One can easily show that π_W^1 is declining in B_1 and that π_L^1 is increasing in B_2. Thus, there will be a unique point at which firm 1 no longer wishes to outbid firm 2.

[22]As noted earlier, the courts cannot observe V_2 so they cannot use its value in their calculation of b. These two features of the problem imply that the amount firm 2 must bid to win the auction can only depend upon firm 1's valuation, and the transaction prices observable by the court.

Proof: Simply take the partial derivative of B_2^* with respect to α to obtain Q.E.D.

Since b increases in B_2^*, one comes to the conclusion that an increase in α will reduce the equilibrium bids for a target company, for any given toehold. Still, one needs to be careful in drawing empirical implications at this point since the toehold decision itself also depends upon α.

Having worked out the equilibrium bids, one can now determine when rival bidders will try to bid for the target firm. Upon the realization of V_2 there is no uncertainty remaining in the game. Thus, for each value of V_2 both raiders can determine the winner if an auction takes place. Since bidding is costly, the second raider does not enter if he knows that he will lose. Thus there exists a value V_2^* such that if the realized value of V_2 is above that level the second raider enters and wins.[23]

We now calculate that realized value. An offer is worthwhile if B_2^*, the lowest bid that will enable him to win, provides a positive profit, i.e.

$$V_2 - \alpha B_2^* - (1-\alpha)b - c \geq 0. \quad (8)$$

Using equation (2) to eliminate b, and then solving for V_2 shows that a rival bidder can profitably enter if

$$V_2 \geq \frac{[1-(1-\alpha)(1-n)]V_1 - t(1-\alpha)(1-n)P}{1-(1-\alpha)(1-n)(1+t)} + c. \quad (9)$$

Let V_2^* represent the value of V_2 for which equation (8) holds with equality. Then for any $V_2 \geq V_2^*$ the rival bidder will enter the contest. Equation (8) demonstrates that larger toeholds do not unambiguously discourage rival bidders. An increase in t, decreases both the numerator and the denominator. The denominator reflects the fact

[23] This does not mean that we will not observe much interest in a target that is "in play" . However, in the model, as is the case in many real life situations, you are not going to spend a large amount of money on constructing a bid if there is not much of a chance of winning.

that larger toeholds allow the initial bidder to concentrate his funds on a smaller number of shares in a bidding contest. However, the numerator reflects the firm's incentive to profit by losing the auction and selling the toehold to the second bidder. For some parameter values, the second influence can dominate the first with larger toeholds leading to an increased probability of entry.

Equations (6) and (8) also demonstrate that the institutional parameters α and n have identical influences on the takeover process since they always appear in the combination $(1-\alpha)(1-n)$. This implies that increasing the minimum number of shares that must be purchased in the first stage of the offer (α) has approximately the same impact as an increase in the weight assigned to the first tier bid in calculating the clean-up price. Actually, the weighting scheme offers considerably more flexibility. Logically, α cannot be set below .5, while n can take on any value between 0 and 1. Thus, within this model, one can leave the equilibrium unchanged by replacing any supermajority rule with a simple majority rule and then adjusting n to keep $(1-\alpha)(1-n)$ constant.

Having solved for the second raider's entry condition, and the equilibrium bids with and without the rival bidder, it now becomes possible to calculate the first raider's optimal toehold strategy. The following two sections compute optimal strategies in contested bids and draw empirical implications.

2.3.2 Equilibrium Implications When the Toehold Does Not Affect the Rival's Entry Decision

We first consider the case where the rival draws a value of V_2 below V_2^* with probability F for all relevant values of t. This simplifies the analysis and allows us to separate out the toehold's use as a strategic device to discourage competition from its use as "insurance" in case a rival appears.

After some minor algebra, the expected profits firm 1 earns by beginning a takeover (π) can be written as

$$\pi = \left[V_1 - c - P\right]F + \left[\frac{[1-(1-\alpha)(1-n)](V_1-P)}{1-(1-\alpha)(1-n)(1+t)}t - c\right](1-F). \tag{10}$$

The first term on the right hand side of (9) represents the first raider's profit if a rival never appears, while the second term is the value obtained if another bidder does appear.

Differentiating (9) with respect to t, produces the first order equation

$$\frac{\partial\pi}{\partial t} = -kF + \left[\frac{(V_1-P)[1-(1-\alpha)(1-n)]^2}{[1-(1-\alpha)(1-n)(1+t)]^2} - \frac{kt[1-(1-\alpha)(1-n)]}{1-(1-\alpha)(1-n)(1+t)}\right](1-F). \qquad (11)$$

To determine whether or not the optimal toehold involves an interior solution one can examine the second order condition

$$\frac{\partial^2\pi}{\partial t^2} = \frac{2[1-(1-\alpha)(1-n)]^2[(V_1-P_0)(1-\alpha)(1-n)-k[1-(1-\alpha)(1-n)]]}{[(1-\alpha)(1-n)(1+t)-1]^3}(1-F). \qquad (12)$$

Since t cannot exceed α, and n lies between 0 and 1, the denominator of (11) must be negative. Notice that this implies that the sign of (11) depends only upon the second term in the numerator, and this term does not depend upon t. Thus, the optimal toehold will only lie in the interior if (11)'s value is less than zero for all relevant t.

Equations (10) and (11) combine to produce the following characterization of the optimal toehold

Proposition 3: The following conditions characterize the optimal toehold decision.

A)*Zero toehold* : The first bidder will select a zero toehold if: $V_1-P_0+k>(V_1-P_0)/F$ and $V_1-P_0+k<k/(1-\alpha)(1-n)$ or if (10) is negative for all values of t between 0 and α . The intuition is as follows: if F is large, there is a low probability of a rival's arrival,and if k is large, there is low liquidity in the market. In the former case deterrence is not that important, and in the latter case, it may be too costly to purchase a toehold. Also,V_1-P_0 plays a role which will be discussed later.

B)*Small toeholds* : The first bidder will select a toehold between 0 and α if $V_1-P_0+k<(V_1-P_0)/F$, $V_1-P_0+k<k/(1-\alpha)(1-n)$ and (10) equals zero for some t between 0 and α.

C)*Maximum toehold*: The first bidder will select a toehold equal to α if $V_1-P_0+k<(V_1-P_0)/F$ and $V_1-P_0+k>k/(1-$

α)(1-n) or if the first two conditions for B hold but (10) does not equal zero for any t between 0 and α. Intuition - the conditions here are likely to occur if F is low and if k is low i.e.toehold purchases are likely if they help and are not expensive to purchase. B) is an interim case.

Proof: Equation (10) shows that the bidder's first order condition will be strictly negative at t=0 if the first condition in A holds and it will be strictly positive if the inequality is reversed. The sign of the second order condition (equation (11)) will be negative when the second condition in A holds and positive when the inequality is reversed. The conditions leading to A, B and C then follow from basic optimization principles. QED

The intuition discussed in the proposition is discussed further below:

Corollary 1: Increasing k reduces the optimal toehold. If k=0, then the optimal strategy is for the bidder to purchase a toehold sufficient to control the firm, t=α.

Proof: If k=0, then one can see that the first order condition is always positive. One never purchases a toehold greater than α because the second tier price is less or equal to the first tier price. QED.

This result is similar in some sense to Kyle and Vila (1991) who demonstrate that purchasing a toehold will occur only if (because of noise trading) the price of shares will not increase much. However, in our case there is a different motivation for the toehold purchase in the first place.

Another result that follows immediately from the conditions listed in Proposition 3 concerns the impact V_1 and P have on the optimal toehold. The formal conclusion is stated in the following corollary. The proof is again, by observation of the first order conditions.

Corollary 2: If V_1 is not much greater than P_0 the firm does not purchase a toehold.

The corollary is somewhat counterintuitive. Off hand, one might conjecture that if V_1 is small, the first bidder's best profit opportunity will come from purchasing a toehold and losing the auction. There is some truth to this, since the probability of a rival's appearance (1-F) does show up in the denominator of the first condition for part A. However, this intuition fails for a sufficiently low value of V_1, since a low V_1 makes it impossible for the first bidder to drive up the winning bid. Rather, the auction stalls out at a relatively low level since the second bidder knows the target is not worth very much to the first bidder. Thus, when V_1 is small, purchasing a toehold acts mainly as a device to drive up the price of the target which then makes the clean up offer more expensive.

In the previous section of the paper we have demonstrated that if a rival never appears the first bidder will not purchase a toehold. Thus, if it pays the initial bidder to purchase a toehold, the incentive to do so must arise from the second term in equation (9)which represents the profit when a rival does appear. This leads almost immediately to the conclusion that an exogenous decrease in F (which increases the chances that a rival will appear) will induce the initial bidder to increase his toehold.

Proposition 4: Assume that for a given value of F, the first bidder's optimal strategy is to attempt a takeover, and purchase a toehold. Then decreasing F, increases the optimal value of t.

Proof: Since the first term in (9) is strictly decreasing in t, the optimal toehold must set the derivative of the second term to a strictly positive value. Decreasing F will initially produce a positive first derivative. To restore optimization, we must increase t. QED

The above proposition highlights the role of toeholds as a defensive device. When rivals are more likely to appear, the first bidder takes a larger position. It is not surprising from the point of view of this model that many toeholds are small or that no toeholds are purchased prior to a bid for a target company. After all, many takeover attempts draw no other bidders (1055 out of 1353 takeover attempts in the Betton and Eckbo (1995) database drew no rival bidders). Indeed, in Stulz et al. (1990), the average toehold is only 10.3%. Another implication of this proposition is that large toeholds should be associated with more competition. This agrees with Bretton and Eckbo (1995), Asquith (1990) and Jennings and Mazzeo (1993).

Another comparative static concerns the bidder's valuation of the target.

Proposition 5: With F fixed, the higher the initial bidder's valuation (V_1) the greater the toehold.

Proof: We use the first order condition on t, equation (10) to prove the proposition. Q.E.D.

The intuition is as follows: since the probability that a rival should appear is held constant in this section, the toehold only acts to insure the bidder's profits should another firm appear. In a sense then, the more a firm values the target the more it values the protection offered by the toehold.

2.3.3 Equilibrium Implications When the Toehold Impacts the Rival's Entry Decision

The previous section of the paper took the probability of a rival's entry to be independent of the toehold decision. However, the toehold alters the cutoff value for V_2 at which profitable entry occurs (V_2^*) and therefore will in general influence the probability that a rival will appear. This section of the paper takes the ex-ante distribution of v_2 as given, hence, the larger the required value of V_2, the less likely it is a rival will appear.

Allowing the probability of entry to depend upon V_2^* changes the toehold decision through the first order condition. Let π_F' represent the first order condition holding the probability of a rival's entry (1-F) fixed (equation 21). Then the first order conditions when F depends upon V_2^* can be written as

$$\frac{\partial \pi}{\partial t} = \pi_F' + \frac{[\alpha - t + n(1-\alpha)](V_1 - P) f}{1-(1-\alpha)(1-n)(1+t)} \frac{\partial V_2^*}{\partial t} \tag{13}$$

where

$$\frac{\partial V_2^*}{\partial t} = \frac{(1-\alpha)(1-n)\left[(V_1-P)[1-(1-\alpha)(1-n)] - kt[1-(1-\alpha)(1-n)(1+t)]\right]}{[1-(1-\alpha)(1-n)(1+t)]^2}, \tag{14}$$

which derives from equation (8). From equations (12) and (13) one can show that allowing entry to depend upon V_2^* increases the optimal toehold.

<u>**Proposition 6**</u>: Making entry by the rival more sensitive to V_2^* increases the optimal toehold. Formally, an increase in f at V_2^* increases the optimal toehold.

<u>Proof</u>: To prove the proposition one needs to show that the term multiplying f in (12) is positive. From equation (9) V_1-P>0, or the first bidder will earn an expected loss. Since the first bidder can always stay out of the contest expected losses cannot occur. Thus, the term multiplying $\partial V_2^*/\partial t$ must be positive. To complete the proof

one now needs to show that $\partial V_2^*/\partial t$ is also positive. The expression in (13) will be positive if the term $(V_1-P)[1-(1-\alpha)(1-n)]-kt[1-(1-\alpha)(1-n)(1+t)$ from the numerator is positive. Call this term x. Then one can write the first order conditions as

$$\frac{\partial\pi}{\partial t} = -kF + \frac{x[1-(1-\alpha)(1-n)(1+t)][1-F]}{[1-(1-\alpha)(1-n)(1+t)]^2} + \frac{x(1-\alpha)^2(1-n)^2 f}{[1-(1-\alpha)(1-n)(1+t)]^4} \tag{15}$$

Since all of the terms multiplying x are positive, if $x<0$ then t cannot satisfy the first order condition (unless $t=0$). Therefore $x>0$. If $x>0$ then so is $\partial V_2^*/\partial t$. Q.E.D.

Proposition 6 has the following intuitive interpretation: if the first bidder knows that a small change in the toehold will cause a large decrease in the probability of rivals entering the picture, he will purchase a large toehold to keep potential rivals away. The proposition documents how this property can arise from the very basic elements of the acquisition decision, and that complex agency or informational problems are not needed to generate this result.

The foregoing analysis seems to be consistent with media contentions asserting that toeholds are a good strategy against bidding contests. Either you complete the acquisition at a considerable gain, or else you are amply compensated by a better rival. This has led some people in the media to contend that some bidders have feigned a takeover in the hopes of losing, and thereby profiting from their toehold position. While this may be true for contests involving more than three bidders, the next proposition shows it is not true if there are only two potential bidders. This is particularly relevant given how infrequently two rivals appear let alone three or more.[24] While toeholds do provide insurance, it is incomplete, and bidders still prefer winning to losing. As a result, the initial bidders' profits are reduced by an increase in the probability that a rival appears.

---

[24]Recall that the Betton and Eckbo (1995) find that only 22% of their sample involves multiple bidders.

Proposition 7: Increasing the probability a rival arrives reduces the initial bidder's expected profits. Formally, $\partial\pi/\partial F>0$.

Proof: Differentiate (9) with respect to F to yield

$$\frac{\partial\pi}{\partial F} = \left[1-\frac{[1-(1-\alpha)(1-n)]t}{1-(1-\alpha)(1-n)(1+t)}\right](V_1-P) \qquad (16)$$

From earlier arguments V_1-P>0. An examination of the second term in the square brackets shows that it is less than one. Thus, $\partial\pi/\partial F>0$. Q.E.D.

Proposition 7 implies that single bidder contests should be more profitable to acquirers. This is broadly supported by empirical studies. One of the better known examples is Bradley Desai and Kim (1988) who demonstrate that in each sub-period of their sample single bidder takeovers yielded higher returns to successful acquirers than multiple bidder contests. These are also the findings of Comment and Schwert (1995) and Schwert (1996).

Another view of Proposition 7 can be found in the derivation of Proposition 6. Proposition 6's proof shows that at the optimal toehold level, the derivative of V_2^* with respect to t is positive. Thus, it never pays to drive the toehold past a point where rivals are encouraged to enter. Basically, all else equal, the first bidder prefers to see the rival stay out which is precisely what Proposition 7 shows.

At this point one can also inquire how various policy changes may impact the welfare of the game's participants. The model contains two parameters representing constraints imposed by the legal system: α which represents the minimum acquisition required to proceed with the clean up offer, and n which determines the minimum payment allowed by the courts for any shares taken up in the clean up offer. The next proposition shows that the welfare of the first bidder declines in α.

Proposition 8: If there is a positive probability that a rival firm should appear, then an increase in α decreases the initial bidder' expected profit, and thus increases the minimum value of V_1 needed to begin the acquisition process.

Proof: Differentiate (9) with respect to α. Some minor algebra shows that $\partial\pi/\partial\alpha$ has the opposite sign as V_1-P. From our earlier arguments V_1-P>0, so $\partial\pi/\partial\alpha<0$. Q.E.D.

Proposition 8 implies that supermajority takeover laws act to thwart profitable takeovers when the initial bidder finds it optimal to purchase a toehold. While such rules may occasionally produce higher bids for the target shareholders, they will have an overall negative impact by discouraging profitable bids. Also note that the optimal toehold equals zero when the first bidder knows he will not face any competition. Thus, increasing α discourages takeovers when one might expect them to provide the greatest economic benefit.

Another important case arises when b is set by the courts very close to the winning bid. Offers in which B is set much larger than b are considered coercive by the judicial system, leaving the bidder vulnerable if a lawsuit is filed. Evidence of this phenomena can be found in the Unocal Corporation v. Mesa Petroleum Co., Del.Supr., 493 A.2d 946 (1985) decision. This case involved a large difference between B and b, which the court then used to legitimize extreme actions taken by the target management to block the acquisition.[25] The judicial requirement that B=b is often known as a "fair price" provision. To duplicate this requirement simply set n=1 in the model. Under these conditions, equation (6) reduces to $\mathbf{B}_2^*=V_1$. In other words, a second bidder will enter if his synergies are larger than those of the first bidder. Thus, we have proven the following proposition.

Proposition 9: Fair price provisions ensure that rivals enter the bidding contest and win whenever their valuation

[25] While this judicial viewpoint is crucial in the case of two bidders, it is relatively unimportant when there is only one acquirer. A single bidder can simply set B a small amount over the minimum value of b and proceed. However, when there are two bidders each firm wants to set the first tier bid far above the second tier bid. In this case the constraint that B remain close to b (known as a "fair price" rule) becomes significant. It is also important to recognize that even when courts set the dollar value of B equal to b this still acts like a two tier offer and breaks the free rider problem. The reason is that those who tender early will receive their payment sooner. So long as the interest rate is positive, tendering remains a dominant strategy, and no free rider problem exists.

of the target exceeds that of the first bidder.[26]

Proposition 9 implies that fair price provisions may be socially efficient, not because of any "fairness" features, but because of efficiency considerations.[27] The rule allows any rival with higher synergies (up to transactions or bidding costs) to win the auction, thereby placing the target with the company assigning it the highest value.

3 Empirical Implications

There has been limited empirical work on toeholds so far. The only study that has addressed the issue directly is Betton and Eckbo (1995). In earlier studies, Walkling and Long (1984) and Freeman (1990) reached opposite conclusions regarding the empirical regularities. The primary difference between the two studies is that Freeman (1990) disentangles toeholds that are the result of lock up and similar agreements while Walkling and Long do not. Thus, a direct empirical test of either our work or that of Jagedeesh and Chowdhry (1994) has yet to be performed. Keeping these caveats in mind, we can compare several of our results to the empirical findings in the above studies and in the mergers literature at large.

Let us re-cap the main empirical implications of our model. We find that toeholds should be used as defensive devices- in other words, if no rival is expected, no toehold should be purchased. In such uncontested takeovers, the bid price is expected to be close to the market price. Of course, the bidder's profits in uncontested takeovers should on average be higher, which, as we have noted, is broadly consistent with existing empirical evidence(see

[26] If we were to re-introduce costly bidding, the proposition would read "whenever their valuation + the cost of bidding exceed the valuation of the first bidder. Since in that case bidding does involve real social costs, our conclusions, concerning ex-post efficiency are not affected.

[27] Bebchuck (1994) concludes that Equal Opportunity Rule, akin in spirit to the "fair price" provisions, does not enable inefficient transfers of control to go through (however, in his framework, efficient transfers may be blocked in an EOR environment). Bebchuk (1994) uses private benefits as a wedge between total value and security value. However, the policy implications are similar.

for example, Comment and Schwert (1995) or Schwert (1996)). We also showed that if we increase either the probability that bidders will come, or the initial bidder's valuation, toeholds should increase in size.

We delineated conditions for optimality of different levels of toeholds, and found that often they could be rather small.

A possible additional conclusion, under some restrictive assumptions, is that a higher alpha should cause bids to decline. This of course requires international comparisons which are hard to perform. In a more general context we have shown that if a rival is not expected to appear, alpha (shares to be purchased in the first tier offer) plays no role. However, in contested takeovers, alpha does have an important role.

Finally, fair price provisions are found to be efficient, in the sense that the better rival wins.

Naturally, it is difficult to test empirically legislative features as in the latter propositions. However, we can compare some of the features of the model to the few empirical studies of toeholds that have been performed so far.

As noted earlier, in our model bidders purchase toeholds when they fear entry by a rival, and do not purchase a toehold when another firm is unlikely to appear. Another proposition establishes that as we increase the probability of competition, toeholds increase. These features appear frequently in the data. In the Betton and Eckbo (1995) study zero toeholds were held by 44.2% of the firms involved in single bidder contests but only by 27.3% of those engaged in multiple bidder contests. Asquith (1990) found that zero toehold bids are less likely to be contested than bids with positive toeholds. Jennings and Mazzeo (1993)also find that the probability of competing offers is somewhat lower in the sub-sample without prior ownership (13% vs. 16%). Thus there is broad empirical support to the link between toeholds and competition among bidders which is the thrust of our paper.

Another prediction which contrasts this paper with the signaling hypothesis of Chowdhry and Jegadeesh (1994), is the expected prevalence of zero toeholds. Proposition 3, delineates reasonable conditions under which optimal toeholds will be small or zero. As noted, this is widely supported by empirical evidence. Stultz, et al. (1990) find that toeholds average 10% (median of 2.3%) in their sample. It is difficult, however, to relate their results directly to our model since their definition of a successful tender offer includes bidders who purchased some shares (but did not necessarily take over the target). Our work applies to completed takeovers. Jennings and Mazzeo (1993) also find small and infrequent toeholds - the average toehold in their data was only 3% and 546 firms out of their sample of 647 purchased no toehold at all. As noted, Bradley, Desai, and Kim (1988) found that over half the firms in their sample had not acquired any shares prior to making a tender offer. Similarly, Poulsen and Jarrell (1986) reported that about 40% of the firms in their sample had no toeholds.

Since the size of the optimal toehold depends on a wide range of factors, the model may be able explain one of the more puzzling findings in Betton and Eckbo (1995). They find that larger toeholds are associated with smaller returns during the period prior to the takeover announcement. This seems surprising since larger purchases by the bidding firm, even if done secretly, should drive up the stock price. However, in the present model larger values of k (the slope of the price function for open market stock purchases) produce smaller toeholds. Below we provide the results of two simulations that demonstrate how potentially complex the relationship between the optimal toehold and the stock price can be. Consider a set of situations similar in all respects except for the stock price reaction to open market purchases parameter(k). While an increase in k discourages toehold purchases, by increasing the stock price for a given purchase, it also raises the observed price for any particular toehold. Thus, while a larger k may reduce the optimal toehold, it may still result in a higher pre-tender offer price increase. This will tend to occur when toeholds are particularly insensitive to the stock price. Recall, that the primary purpose of a toehold is to discourage rivals from entering. If firm 1 believes that the rival's valuation of the target falls in a relatively narrow range, then the optimal toehold purchase will be relatively insensitive to k since there will exist one particular toehold that stops most entry. These assumptions may be typical. If so ,then the phenomenon displayed in **Figure 1** may be pervasive.

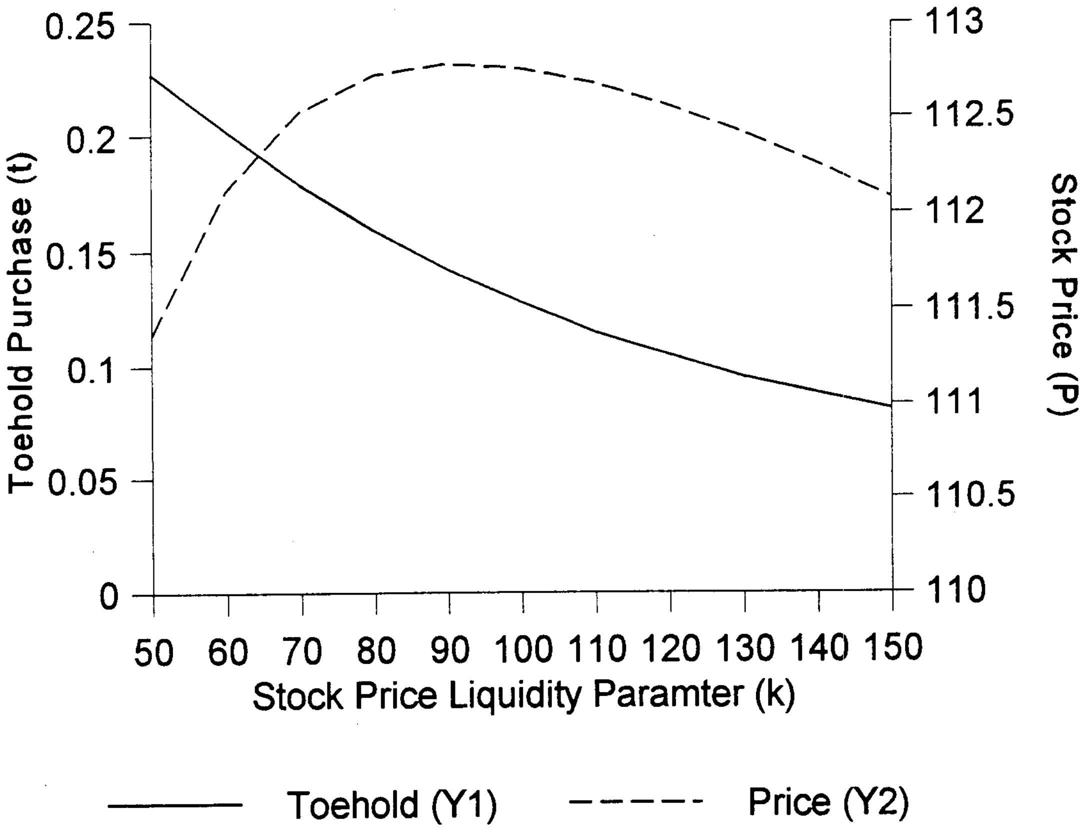

Figure 1: V_2 - normally distributed with a mean of 145 and variance of 1, c = 4, P_0 = 100, (1-n)(1-α)=.2.

Depending upon the liquidity parameter, the toehold may display a negative or a positive correlation with the stock price. To obtain some intuition as to what k's value may be in practice, note that when k=50 a 10% toehold will raise the price by 5%. At k=100 a 10% toehold raises the stock price by 10%.

Even when the initial bidder has very little information about potential rivals, the toehold may still display a negative correlation with the pre-offer price run up. Recall from the propositions in Section 2.3.2 that under these scenarios, smaller values of F, and larger values of V_1, should lead to larger toehold purchases. Thus, if either small values of F or large values of V_1 are associated with large values of k, it is a simple matter to produce examples where large toehold purchases appear to "cause" low abnormal returns in the period prior to the takeover. An example of this correlation is displayed in **Figure 2**.

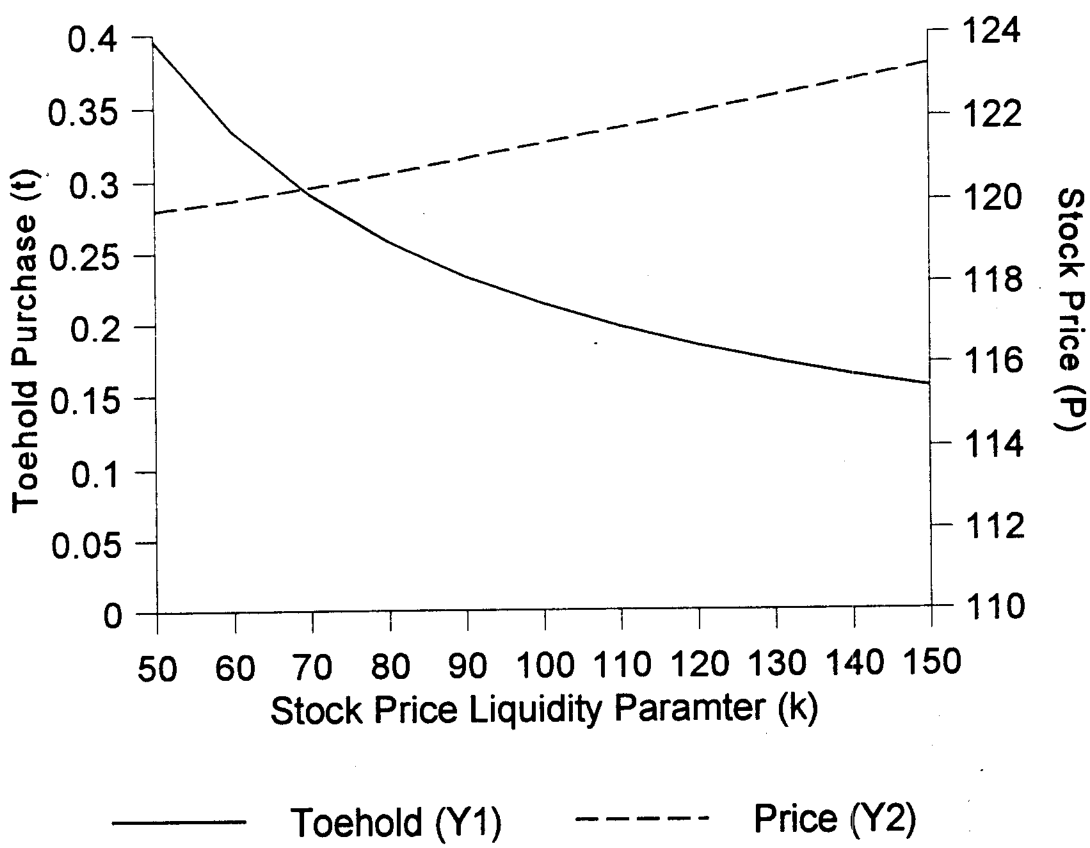

Figure 2: Probability of no rival (F) set to .3, c = 4, P_0 = 100, (1-n)(1-α)=.2, V_1=130+.5k.

Figure 2 creates a correlation between V_1 and k by simply assuming that V_1=130+.5k. In contrast to the results in **Figure 1**, the price appears to decrease in the toehold for all values of the liquidity parameter k. This can happen over a wider range of values for k because the larger values of V_1 encourage larger toehold purchases thereby offsetting k's retarding influence. The example in **Figure 2** necessarily leads to the question of whether high values of V_1 will generally correspond to high values for k. Absent an empirical study of the issue, it seems reasonable to suppose that this may be the case. If a firm has a high valuation for the target, rumors to that effect may increase the sensitivity of the market price to stock purchases. At the very least, it seems worthwhile to control for the above set of influences when trying to estimate the impact toeholds have on the target's stock price.

These two examples demonstrate that a simple, flexible model which corresonds to the institutional realities may be sufficient to produce various patterns of stock price responses to toehold purchases.

4 Conclusion

This paper shows that a classical model based upon the legal institutions confronting a profit maximizing firm in a situation involving no asymmetric information can yield many of the major patterns found in analyses of the currently available toehold data.

In particular, we analyze toeholds in an environment where rival bidders can attempt to purchase the same target. If no rival bidders are expected, no toehold will be purchased. Otherwise, toeholds provide two separate benefits for the initial bidder. First, even if a toehold cannot discourage rival bidders, it does at least provide some insurance should entry occur. In addition, up to a point, the larger the toehold the more the second bidder will be forced to pay for the target. Somewhat surprisingly, however, sometimes too large a toehold can *reduce* the amount a rival must pay for the target. While a large toehold allows the first bidder to concentrate his funds on a smaller number of shares, it also encourages him to sell out. Second, toeholds also act to simply discourage entry by making bidding more costly . The model also reaches two important conclusions regarding welfare. First, super-majority rules discourage firms from embarking on a takeover process, but only if a rival firm might contest the offer. Intuition would seem to indicate that these are exactly the cases when one would want to encourage takeovers, since they are likely to generate the greatest economic gains. Second, fair price provisions ensure that rival bidders that place a higher value on the target (net of their transactions costs) than the initial bidder will enter the contest. This at least offers a possibility of a social welfare improvement. One can conclude then, that from the perspective of this model, supermajority clauses are unambiguously poor policy, while fair price provisions may not be.

Empirical evidence seems to support many implications of our theory.

Bibliography

Asquith, D. "An Examination of Initial Shareholdings in Tender Offer Bids," working paper UCLA, December 1990.

Bebchuk, L.A. "Efficient and Inefficient Sales of Corporate Control" Quarterly Journal of Economics, November 1994, pp. 957 -994.

Betton, Sandra, and B. Espen Eckbo. "Toeholds, Competition, and State-Contingent Payoffs in Tender Offers," working paper Concordia University, July 1995.

Bradley, M., A. Desai, and E. Kim "Synergistic Gains from Corporate Acquisitions and their Division Between the Stockholders of Target and Acquiring Firms" Journal of Financial Economics, 21(1), May 1988, pp. 3-40.

Burkart, Mike " Overbidding in Takeover Contests" Journal of Finance, December 1995, pp.1491-1515.

Chowdhry, B. and N. Jegadeesh "Pre-Tender Offer Share Acquisition Strategy in Takeovers," Journal of Financial and Quantitative Analysis, March 1994, Vol 29, #1, pp. 117-130.

Comment, R. And G.W. Schwert "Poison or Placebo? Evidence of the Deterrence and Wealth Effects of Modern Anti-takeover Measures" Journal of Financial Economics, 39, 1995, pp.3-43.

Dewatripont, M. "The 'Leading Shareholder' Strategy, Takeover Contests and Stock Price Dynamics" European Economic Review,
Eas37 (1993) pp.983-1004.

Easterbrook, and Fischel, "The Proper Role of a Target's Management in Responding to a Tender Offer," Harvard Law Review, 94, 1981, pp. 1161-1204.

Easterbrook, and Fischel, "Auctions and Sunk Costs in Tender Offers," Stanford Law Review, 35, 1982, pp. 1-21

Fishman, M. "A Theory of Preemptive Takeover Bidding," The Rand Journal of Economics, 19(1), 1988, pp. 88-101

Freeman, B., "Friendly vs. Hostile: The Foothold Stake as a Signal of the Bidder's Intentions," working paper UCLA, July 12, 1990.

Freund and Easton, "The Three-Piece Suitor: An alternative Approach to Negotiated Corporate Acquisitions," Business Law, 34, 1979, pp. 1680-1695

Gilson, R., "A Structural Approach to Corporations: The Case Against Defensive Tactics in Tender Offers," Stanford Law Review, 33, 1981, pp.

Gilson, R., The Law and Finance of Corporate Acquisitions, The Foundation Press, Mineola, NY, 1986

Gilson, R. and R. Kraakman, The Law and Finance of Corporate Acquisitions: 1989 Supplement, Foundation Press, Mineola, NY, 1986

Golbe, D. And M. Schranz:" Bidder Incentives for Informed Trading before Hostile Takeover Announcements" Financial Management, Winter 1994, pp. 57-68.

Grossman, S. and O. Hart, "One Share-One Vote and the Market for Corporate Control," Journal of Financial Economics, 20, January/March 1988, pp. 175-202

Harris, M. and A. Raviv "Corporate Governance: Voting Rights and Majority Rules," Journal of Financial Economics, 20, January/March 1988, pp. 203-235

Hirshleifer, D. and I.P.L. Png "Facilitation of Competing Bids and the Price of a Takeover Target," The Review of Financial Studies, 2(4), pp. 587-606

Hirshleifer, D. and S. Titman, "Share Tendering Strategies and the Success of Hostile Takeover Bids," Journal of Political Economy, 98, March 1990, pp. 295-324.

Jennings, R.H. and M.A. Mazzeo:" Competing Bids, Target Management Resistance and the Structure of Takeover Bids" Review of Financial Studies, Vol. 6, Winter 1993, pp. 883-910.

Jensen, M. "Takeovers: Their Causes and Consequences," The Journal of Economic Perspectives, 2, Winter 1988, pp. 21-48.

Karpoff, J. and Paul Malatesta, "The Wealth Effects of Second Generation State Takeover Legislation," Journal of Financial Economics, 25(2), December 1989, pp. 291-322.

Kyle, A., 1985, "Continuous Auctions and Insider Trading", Econometrica, 53(6), pp. 1315-1335.

Kyle, A. And J.L. Vila "Noise Trading and Takeovers" Rand Journal of Economics, vol. 22 #1, Spring 1991

Roll, R. "The Hubris Hypothesis of Corporate Takeovers," Journal of Business, 59, April 1986, pp. 197-216

Scherer, F.M., "Corporate Takeovers: The Efficiency Arguments," The Journal of Economic Perspectives, 2(1), Winter 1988, pp. 69-82

Shleifer, A. and Vishny, R. "Large Shareholders and Corporate Control," Journal of Political Economy, 94, June 1986, pp. 461-488

Shleifer, A. and Vishny, R. "Value Maximization and the Acquisition Process," The Journal of Economic Perspectives, 2, Winter 1988, pp. 7-20

Schwert, G.W. "Markup Pricing in Mergers and Acquisitions" Journal of Financial Economics, June 1996, pp. 153-192.

Singh,R. "Takeover Bidding with Toeholds: the Case of the Owner's Curse" working paper, Washington

University, 1995.

Stulz, R., "Managerial Control of Voting Rights: Financing Policies and the Market for Corporate Control," Journal of Financial Economics, 20, January/March 1988, pp. 25-54

Stulz, R., Walkling, R., and M. H. Song "The Distribution of Target Ownership and the Division of Gains in Successful Takeovers" Journal of Finance, July 1990, pp. 817-834.

Walkling, Ralph and Michael Long, "Agency Theory, Managerial Welfare, and Takeover Bid Resistance," The Rand Journal of Economics, 15(1), Spring 1984, pp. 54-68