"THE TOEHOLD PROBLEM": NOTES

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T his notes are meant as background for devising whether an acquisition of a target firm might lead the acquiring player in a position from which it can significantly foreclose the market to new entrants. In particular, the economic literature has shown that, whenever a firm attempts to launch a takeover bid over a target company in which it already has an ownership stake (a 'toehold'), other potential bidders may suffer from a competitive disadvantage in contesting the takeover. This would shield the incumbent from the competitive pressure of potential entrants, and would yield a situation in which new entrants are discouraged from entering the market. As Bulow, Huang and Klemperer (1999) conclude, "a controlling minority shareholder may therefore be effectively immune to outside offers".

In what follows, I summarize the findings of the mainstream economic literature on the so-called 'toehold problem'. Section 1 introduces the general issue of almost-common value auctions, in which slight asymmetries between the bidders determine a vicious circle, which ultimately results in the advantaged player always winning the auction (at a low price). Section 2 describes the specific case of toeholds, i.e. the case in which one bidder in an auction has an ownership stake in the property being sold. I draw mostly on two papers, which are by far the most relevant for the purpose of this memorandum: Klemperer (1997) and Bulow, Huang and Klemperer (1999)[1]. Section 3 briefly confronts the conclusions emerging from these two papers with the empirical surveys on toehold strategies carried out by several authors in the field of corporate finance. Section 4 concludes by describing the example of the proposed merger between Manchester United and BSkyB.

1 INTRODUCTION: ALMOST-COMMON VALUE AUCTIONS

The literature on toeholds considers takeovers as simple ascending (English) auctions, and draws on the literature on **almost-common value auctions**. The latter are auctions in which one of the bidders enjoys a small advantage over the others. Such advantage can take many forms, e.g. a reputational advantage, an installed customer base, a slight

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[1] Hereinafter, Bulow et al. (1999).

private value, an informational advantage, or an ownership stake in the target company. The latter case is usually described as 'the toehold problem', as described below, in Section 2.

Mainstream economic literature on auction theory shows that when one player has a small advantage over the others in a setting that is close to a pure common-value auction[2], that player will bid a little more aggressively relative to its opponents. This magnifies the opponents' winner's curse, thus leading them to bid more conservatively. This in turn reduces the advantaged player's winner's curse and leads her to bid even more aggressively. Such a vicious circle ultimately leads the advantaged player to win the auction at a low price.

Klemperer (1997) describes this loop in almost-common value auctions by referring to the so-called 'wallet game'. Assume each of two players privately know what they have in their wallet. Now, announce that you will auction a prize equal to the combined content of the two wallets, using an English auction. The prize will then be continuously raised until one of the players quits. At this stage, the winner gets the combined content of the wallets in return for the final price.

As a result, since the two players follow symmetric strategies, it is an equilibrium for each player to stay in the bidding until the price equals the double of her wallet. This is the unique symmetric equilibrium. But such a pure-common value game also has many asymmetric equilibria, as first noted by Milgrom in 1981. The hint provided by Klemperer (1997) is that almost-common value auctions often have unique equilibria which are very close to asymmetric equilibria observed in the wallet game.

Assume now that one of the players, A, has a small advantage – e.g., she earns €1 by winning the auction. Then such advantaged player will bid €1 more aggressively than in the pure common value case, for any given behavior of the opponent B. In other words, A bids as if her private signal was €1 higher than before. This magnifies the B's winner's curse: indeed, if B wins, she will find €1 less money in A's wallet. Thus, B will

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[2] In the pure common value auction, the actual value is the same for all players, but each player has a different private information about what that value actually is. Therefore, in an English auction, players change their estimate of the value at each stage, by observing the other players' bidding behavior and learning about their private signals.

bid as if her signal was €1 lower, i.e. will bid €1 more conservatively. This, in turn, reduces A's winner's curse, which leads her to bid €2 more aggressively. In equilibrium, B will bid so conservatively that she will remain in the bidding only up to the value of her own wallet, and will immediately quit the game when the price overcomes that value. For this reason, almost-common value auctions might yield very low revenues for the seller, because they discourage non-advantaged players and lead them to bid in an extremely conservative way.

Klemperer (1997) applies the almost-common value problem to Glaxo's £9 billion takeover bid for the Wellcome drugs company, in presence of non-trivial bidding costs. The setting was close to a common value auction, and some 12 potential bidders allegedly valued Wellcome in a broadly similar way. However, Glaxo exhibited slightly higher synergies with Wellcome than other potential bidders, and those synergies were perceived as a small advantage for Glaxo. Indeed, after Glaxo's first £9 billion bid, Wellcome solicited higher counteroffers by other players, and received at least two substantial expressions of interest to make a higher offer. However, no one eventually entered the auction, since no one expected to win the contest against the advantaged player, Glaxo. And Wellcome was sold to Glaxo at a very low price.[3]

2   DEFINITION OF THE TOEHOLD PROBLEM

The application of almost-common value auctions to the toehold problem is straightforward. Auction theory predicts that a bidder in an auction, which had an ownership stake in the property being sold – even if only a relatively small one – is more likely to win the auction than its rivals which did not have such a stake. The reason is that, since the toeholder receives a fraction of the revenues, she will have an incentive to stay in the bidding a little longer than if she had no ownership stake, because doing so pushes up the winning price. According to Bulow et al. (1999), "the potential acquirer can gain either as a buyer that needs to pay premium for fewer shares or as a losing bidder that sells out a profit. A bidder that owns a toehold has an incentive to bid aggressively since every price it quotes represents not just a bid for the

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[3] It would be possible to object that Wellcome could have accepted those subsequent offers, disregarding the tender process. In this specific case, Wellcome's largest shareholder had obtained Glaxo's original bid in return for an undertaking not to encourage another bidder. But in general, auctions might create such a credibility problem, as I will further specify in what follows.

remaining shares but also an ask for its own holdings". For example, if a bidder owns 10 per cent of a company and bids €500 million for that company, she, as a part-owner, would receive €50 million as the share of the bid price (€500 million · 10 per cent). Therefore the net cost of the bid would be only €450 million.

This magnifies the other players' winner's curse – as already explained for the general case of almost-common value auctions in Section 1 – and hence leads other players to bid more conservatively, while the toeholder bids more aggressively[4]. Bulow et al. (1999) show that even when both players have toeholds, the player with the larger toehold has a very substantial advantage even when both toeholds are arbitrarily small. As a result, owning a toehold can help a bidder win an auction, and win very cheaply.

Bulow et al (1999) analyze the case of two risk-neutral bidders i and j that compete to acquire a company, where bidder k ($k = i, j$) owns a share θ_k of the company and observes a private signal t_k. As in pure common value auctions, the expected value of the company to either bidder is conditional on both signals. The company is sold following a normal ascending bid.

Their simple model yields a number of results: *a)* The probabilities of winning the auctions are highly sensitive to the relative size of bidders' stakes. (A bidder with zero stake has zero probability of winning); *b)* increasing a bidder's stake always makes it bid more aggressively; *c)* increasing a bidder's stake always increases its expected profits, whatever its signal; finally, *d)* increasing i's toehold has an ambiguous effect on j's profits. In particular, if j has a low signal it will be likely to sell its stake, and more aggressive bidding by i could increase her profits. In average, anyway, it is more likely that increasing i's toehold reduces j's profits[5].

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[4] The induced change in the rivals' bidding is a more important factor than the change in the toeholder's own strategy in raising the likelihood that the toeholder will win the auction. It is this that makes the toehold such an important strategic weapon. Toeholding might serve as a deterrent for other players, leading them to decide not to take part in the takeover contest at all.

[5] This means that a competitor with a smaller toehold that is relatively pessimistic about the value of the company will become more aggressive, counting on the large toeholder to buy it out at a higher price. But more relatively optimistic competitors will become more conservative because of an exacerbated winner's

There is a possible counterargument for such results, which catches the ambiguous effects described above, at *d)*. I refer to the position expressed by the merging parties in the Manchester United/BSkyB proposed merger, which I describe further in Section 4. According to this view, when opportunity costs are taken into account, the bidding advantage to a bidder with a stake becomes minimal, and thus the toehold problem is not that relevant. The rationale is as follows: a bidder with an ownership stake in the property being auctioned would, if it won the auction, have to forgo the share of the proceeds of the auction it would have received had another bidder won. So, quoting the example made by the parties, if bidder A had a toehold of 5 per cent, then a bid by A of £100 million would produce a flow-back of revenue to A of £5 million. But if a competing bidder B made a bid of £95 million then the revenue foregone by A as a result of the failure of B's bid would be £4.75 million. Thus A's advantage over B as a result of its toehold would be only £0.25 million (£5 million minus £4.75 million). However, Klemperer (1997) shows that even a small edge over competing bidders leads to a substantial toehold problem.

2.1 Revenue-increasing Remedies

In their papers, Bulow et al (1999) and Klemperer (1997) put forward two ways of reducing the advantage to the toeholder. The first way is to **replace the English auction with a first-price** auction. The second way of reducing the advantage to the toeholder is to try and level the playing field by giving the rival bidding organization the opportunity to acquire stock at a low price, so that it has an equal shareholding.

2.1.1 "Best and final" sealed bid auctions

It is a well-known result in auction theory that first-price auctions (as well as the symmetric equilibrium of the ascending auction) are seller-optimal under reasonable conditions. Likewise, the first-price auction (unlike the ascending auction) remains close to optimal when one player has a small advantage.

In a sealed-bid auction in which each bidder independently makes a single "best and final offer" and the highest bidder wins the auction at the price she bid, bidders have

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curse. In short, the bidding behavior (aggressive vs. conservative) depends on which of the two roles played by the toeholders prevail. If a player is particularly pessimistic, it will act as a seller, not as a buyer.

no opportunity to update their beliefs about their opponents or to condition their behaviour on their opponents' behaviour; as a consequence, they cannot follow strategies such as staying in forever until the opponent quits. Thus, a small advantage for one player translates only to small changes in players' bidding strategies, and the equilibrium remains close to the first-price equilibrium of the original game. Also, small entry or bidding costs (such as those that characterized the Glaxo/Wellcome merger described in Section 1) have almost no effect.

Klemperer (1997) applies the toehold problem to the Airwaves auctions, a context in which a first-price sealed-bid auction would hamper network formation as opposed to an ascending auction. In order to preserve the desirable outcome of raising seller's (i.e., state's) revenues, Klemperer proposes an alternative auction design. Such format implies that the auction is run as usual, but that the two highest bidders have to compete in a final stage, which is run as a first-price auction. Running the second stage as a first-price auction overcomes the problem associated with almost-common value auctions by giving weaker bidders a reason to enter and stay in the auction. This increases final revenues.

Bulow et al. (1999) model the differences between an ascending auction and a first-price auction in the case of two players who both own a toehold. They find that

- The probability that the bidder with the higher signal wins the auction is greater in the first-price auction than in the ascending auction.

- With symmetric toeholds, the expected sale price is higher in an ascending auction than in a first price auction.

- With asymmetric toeholds, the expected sale price is higher in a first price auction than in an ascending price auction.

2.2   Options to "white-knights"

Klemperer (1997) noted that a first-price sealed-bid auction could have a credibility problem: could a company credibly commit to accept the highest bid and refuse to consider higher subsequent offers? According to Klemperer, one way to get around the credibility problem is to run a first-price auction and to award a 'break-up fee' (a sort

of 'penalty clause') or other options in case the winner of the auction ultimately does not win the company, i.e. the target management has accepted a subsequent offer.

Bulow et al. (1999) find that diluting the stock by giving free shares to the bidder with the smaller toehold can increase the expected sale price per share, that is, increase the nonbidding shareholders' wealth. In general, levelling the playing field by giving a second bidder the opportunity to buy a toehold cheaply is desirable for the seller, even if the seller has to cheaply sell part of the shares.

3   EMPIRICAL SURVEYS

The strongest empirical support to the theories I described in the last section is found in Betton and Eckbo (1998). An analysis of data from 1353 tender offer contests between 1971 and 1990 in the United States found that toeholds increase the likelihood of a single bidder contest, and that bidders without a toehold are less likely to revise their bids upwards after the initial round of bidding.

Most empirical evidence is anyway somewhat inconsistent with the results of mainstream economic theory – that potential bidders have an incentive to acquire a toehold prior to launching a takeover bid. Indeed, if it's true that toeholding amounts to a powerful strategic weapon, one could reasonably expect that potential bidders often try to acquire a toehold prior to launching a takeover bid. Empirical evidence as reported by Bris (2001) shows the contrary. In particular, according to empirical surveys, a low proportion of the acquirors purchase a toehold prior to launching a bid. In particular, as few as 3% of bidders follow the (apparently) optimal strategy of acquiring as many shares as possible on the open market and then launching a bid immediately afterwards. 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.

4   EXAMPLES

The most relevant example of the application of the toehold problem to a proposed transaction is the MMC's decision (issued on April 1999) to block the merger between BSkyB and Manchester United, in the UK. The MMC found, *inter alia*, that BSkyB

would, as a result of the merger, gain influence over (and information about) the Premier League's selling of rights that would not be available to its competitors. It would also benefit from its ownership stake in Premier League rights, providing a further advantage in the bidding process. These are examples both of toeholding and of other sources of slight advantage in otherwise common value auctions. Not surprisingly, the MMC's decision to block the merger was rooted in Klemperer's analysis of 'toehold effects' in bidding situations.

The MMC, in its report on the proposed merger (Appendix 4.1), considered, among other things, the auction process for broadcasting sports rights, both generally and more specifically in the context of English Premier League football. The MMC considered both the nature of the auction process and a possible 'toehold' effect.

The toehold effect, in this context, means that as a stakeholder in Premier League clubs BSkyB would receive a share of the payments made to those clubs for broadcast rights, and could therefore afford to bid more for those rights than a broadcaster who does not have stakes in any Premier League clubs. Put simply, imagine that BSkyB owned Manchester United and was bidding against Ondigital for Premiership rights. If Ondigital were to win, 7 per cent of its bid would go to BSkyB, since Manchester United accounted for roughly 7% of the shares of TV revenues for football clubs in the Premiership[6]. In such a scenario, whether it wins the rights or not, BSkyB has an incentive to push up the bidding that much more aggressively. This maginfies the winner's curse for OnDigital; in effect, OnDigital has to back off the bidding more than BSkyB. The 'toehold' affects both sides of the bidding equation, setting off a vicious circle for OnDigital and a virtuous circle for BSkyB. Ondigital, knowing that BSkyB can bid more aggressively, will scale back its bidding. BSkyB will always win the rights in an auction like this.[7]

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[6] The MMC found broadcast rights auctions for premiership matches to be closer to an ascending auction that to a first-price auction. Manchester United stated that an optimal auction design (i.e. a first-price sealed-bid auction) would not present a credibility problem for the Premier League as, unlike the sale of a company, the selling of rights was a repeated transaction.

[7] At the end of the story, while BSkyB was not able to take over Man Utd, it has taken strategic 9.9 per cent stakes in four Premiership clubs. It still has a toehold, but this time one shared across several different clubs rather than concentrated on one.

According to the MMC, depending on the type of auction used by the Premier League, BSkyB, even without a toehold, might have suffered less from the winner's curse than other bidders because of the greater knowledge that it as the incumbent would have of the existing value of televised football. Moreover, the MMC concluded that BSkyB might have enjoyed other advantages associated with being an incumbent. Firstly, it had a reputation for the high quality of its football broadcasting, and at the next sale of Premier League rights, clubs would have taken into account the fact that if they awarded the contract to BSkyB they knew they would get a high-quality product whereas with any competing broadcaster they were taking a risk. Furthermore, BSkyB had a much larger installed customer base than any other retailer, its own successful distribution platform, an established presence on other platforms, and a widely-known brand name. BSkyB had already made a commercial success of broadcasting large numbers of Premier League matches. For any other broadcaster this would have been a new venture and hence, inevitably, more of a risk.

Ettinger (2002) applies the toehold problem to another case on soccer retransmission rights, that of Canal+, the leading French Pay-TV channel. Canal+ owns one of the most important French professional soccer teams, *Paris Saint-Germain*. The auction revenue was divided among the professional teams, including *Paris Saint-Germain*. Therefore, in its capacity of TV channel, Canal + wanted to buy these rights for the lowest possible price but, as the owner of *Paris Saint-Germain*, Canal+ preferred the price to be high. Eventually, Canal+ won the auction for a total amount of more than a billion euros.

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