A Primer on the Competitive Effects of Mergers in Auction and Bidding Markets

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Introduction

In a variety of industries, the U.S. antitrust authorities have analyzed the competitive effects from mergers using theoretical models of auction or bidding markets. Some recent examples were the mergers of Oracle and PeopleSoft, SunGard and Comdisco, and Flowserve and Ingersoll-Dresser.[1] In some industries, the participants make transactions using formal auction procedures. However, in other markets, the participants employ a combination of formal auction procedures (such as the submission of bids) and less formal negotiation techniques.[2] The three cases cited above belong to this latter category. One important distinction between auction markets and other markets is that competitors in an auction market bid for each customer. This implies that different customers potentially pay different prices for what is otherwise an identical product or service.

Competitive bidding is commonly used in the purchase of specialized services (such as construction) and specialized products, such as large industrial equipment and military hardware.[3] In addition, competitive bidding has also been used for some agricultural products where quality differences are important, such as tea, tobacco, and furs. Formal auctions are also used to ensure that the selling or purchasing process is transparent and efficient. For example, governments often use formal auction procedures to limit the discretion of their purchasing agents, and, thereby, reduce the opportunity for corruption.

My goal in this article is to describe what economic theory has to say about bidding behavior in two commonly used forms of auctions, open auctions and sealed-bid auctions.[4] I then apply that theory to the analysis of mergers in auction markets.

Bidding behavior in open and sealed-bid auctions

To simplify the discussion, I will describe bidding behavior in a procurement auction where all bidders are selling identical goods, but each bidder has a potentially unique cost of supplying the good to each buyer.[5] I also assume that while each bidder knows his or her own cost of producing the good for a particular buyer, he or she does not know the costs of the rival bidders.

In very general terms, it is possible to distinguish between two common types of procurement auctions: sealed-bid auctions and open auctions.[6] In a sealed-bid auction, each bidder submits a bid, and the buyer purchases the good from the lowest bidder at a price equal to his bid.[7] In an open auction, the price is allowed to fall until there is only one bidder willing to supply the good at the specified price.[8] In many informal auction markets, it can be difficult to determine if bidding procedures are more similar to an open auction or to a sealed-bid auction.[9]

To analyze noncollusive bidding behavior in a simple open auction, consider the following example. Suppose further that three suppliers of a homogeneous good. And suppose the three bidders, 1 through 3, have costs of supplying the good to a particular buyer of $30, $35, and $40 respectively. While each bidder knows his own cost of supplying the good, he is uncertain about the costs of his rivals. In an open auction, the price begins high and falls until only one bidder is willing to supply the good at the current price. At each price, the bidders

In a sealed-bid auction, each supplier selects his bid by weighing the increased profit he would receive from a higher bid that still wins against his lower probability of winning when he submits that higher bid. Consider the case of two firms bidding to supply a buyer for whom each anticipated a positive probability that are the two lowest cost suppliers. For each, increasing its bid by a given amount will decrease its probability of winning. If the firms were to merger, however, the same increase in the bid of the merged bidder would reduce the probability of winning by a smaller amount than if the firms were still competing. Hence, the merged bidder has a unilateral incentive to increase its bid to that customer. Moreover, as other suppliers observe less aggressive bidding on the part of the merged supplier, they will react by bidding less aggressively themselves.[14] The overall affect from the merger is, thus, to increase the prices paid by all buyers for whom the merging suppliers previously had some probability of being the two lowest bidders. Note that this effect does not depend on the merging suppliers knowing when they would have been the two lowest bidding suppliers, only that, but for the merger, they believed that there was some probability that they would be.

In both open and sealed-bid auctions, the more often the merging parties would have been the two lowest bidders, but for the merger, the larger the competitive effects of the merger.[15] The effects of a merger, however, will be distributed differently across buyers for each type of bidding.[16] In open auctions, the effects of the merger will be concentrated on those customers where the merging parties would have actually been the two lowest bidders. In a sealed-bid auction, the effects will be spread over all buyers for whom the merging bidders believed with some probability they would

have been the two lowest bidders but for the merger.

Since the former group of buyers is smaller than the latter, open auctions tend to have larger price effects on fewer buyers, whereas sealed-bid auctions tend to have smaller price effects on a larger number of buyers. Thus, during the merger review, any debates about which type of auction better matches actual industry practice in the end will imply less about the aggregate size of the competitive effects on buyers than with how any competitive harm from the merger is distributed across buyers.[17]

Conclusion

The analysis of competitive effects from mergers in auction markets can be conceptually difficult. However, as with other types of markets, the competitive effects from a merger are more likely to be of concern the larger the group of buyers is for which the merging parties, but for the merger, are likely to be the two lowest bidders. The concerns raised by such circumstances are not necessarily diminished when the bidding is more like either an open auction rather than a sealed-bid auction. Nor are the concerns necessarily diminished because of uncertainty about the identity of the buyers to which merging bidders would have submitted the two lowest bids but for the merger.

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[1] *United States v Oracle Corp.*, 331 F. Supp. 2d 1098 (N.D. Cal. 2004); *Texas v. Oracle Corp.,* 157 F. App'x 19 (9th Cir. 2005); *United States v. Sungard Data Sys., Inc.,* 172 F. Supp. 2d 172 (D.D.C. 2001); *United States v. Ingersoll-Dresser Pump Co.*, No. 00-1818, 2001 WL 99895 (D.D.C., Jan. 24, 2001).
[2] Charles Thomas and Bart Wilson, <u>Verifiable Offers and the Relationship Between Auctions and</u>

Multilateral Negotiations, 115 Economic Journal 1016–1031(2005), show using experimental evidence that multilateral negotiations tend to results in outcomes similar to what we describe below as sealed bid and open auctions.

[3] In such cases it is not possible to maintain a list price since, until a customer specifies its needs, it is not clear what the good is that needs to be priced.

[4] *See* http://www.ftc.gov/bc/international/docs/Bidding_US.pdf for a recent statement from the U.S. Department of Justice and the Federal Trade Commission on empirical approaches for assessing competitive effects in auction markets.

[5] A procurement auction involves bidders submitting bids for the opportunity to supply a product or service to a particular buyer.

[6] There are other types of auctions but these two are the most common forms. Thus, they are the ones most likely to be considered by the agencies when analyzing the effects of mergers.

[7] In the economic literature on auctions, this type of auction is often referred to as a first-price sealed-bid auction.

[8] In the economics literature on auctions, this type of auction is sometimes referred to as an English auction or button auction.

[9] In fact, Charles Thomas and Bart Wilson, *supra* note 2, find that multilateral negotiations, where customers are able to negotiate with many sellers at the same time before arriving at a price and determining a trading partner, result in a price and outcome that is somewhere between the outcomes of an open auction and sealed-bid auction. In general, if purchasers in a market are able to credibly use the offers of other bidders to elicit better prices, then the competition is likely to be more similar to an open auction than a sealed-bid auction.

[10] This result depends on a theoretical model that assumes that the price in an open auction falls continuously. In such a model, failing to drop out when price equals his cost, implies that a bidder is risking being designated the winner at a price below his cost. If instead, price in the auction falls by discrete increments, then a bidder may choose to drop out when the price in the auction is just below his cost. However, assuming that the discrete bidding increments are small, the difference between bidders dropping out at their cost or just below will make no material difference to the analysis.

[11] For some buyers one supplier might be the lowest cost supplier, but for other suppliers the low cost supplier will be different. However, when submitting their bids, the suppliers cannot accurately predict which supplier is the lowest cost supplier for a particular bidder. In this way, each supplier has some probability of being the lowest cost supplier.

[12] Keith Waehrer and Martin K. Perry, The Effects of Mergers in Open Auction Markets, 34(2) Rand Journal of Economics 287–304 (2003) show that this assumption is consistent with the assumption that the merger generates no efficiencies.

[13] This effect does not depend on whether or not the merged supplier could predict before the auction for which particular buyers, but for the merger, the merging suppliers would have been the two lowest cost suppliers.

[14] This result can be found in a number of papers in the economics literature, including Keith Waehrer, Asymmetric Auctions With Application to Joint Bidding and Mergers, 17 International Journal of Industrial Organization 437–52 (1999).

[15] Even in sealed-bid auctions, the effects on buyers can differ if the merging parties have reason to believe that they are more likely to be the two lowest bidders for a certain group of buyers. We would expect a merger to have a larger effect on buyers when the merging parties have a reasonable expectation of being close rivals.

[16] There are other differences in the effects of a merger in an open versus sealed-bid auctions. Keith Waehrer, *supra* note 11, shows that in sealed-bid auctions the price increases from a merger increase the profits of all bidders. However, in an open auction, the profits of only the merging bidders rise.

[17] By aggregate effect on buyers I mean the sum of all of the price increases that result from the merger.