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- How Reverse Auctions on an Online Platform Can Create Win-Win-Situations -

Mercateo, Europe's leading online procurement platforms for business customers, introduced the feature of a reverse auction for any selected basket of goods in November 2012. The result is better terms on all items and thus cheaper baskets of goods for the customers. To the supplier who offers his products on Mercateo, at first glance this means a drop in prices and reduced margins. IFAMD explains how suppliers should position themselves and what prices they should bid on the platform so as to draw their own advantage from these auctions.

In a *reverse auction*, the customer or buyer holds an auction among all the suppliers of the goods he demands. The suppliers underbid each other in order to prevail in the auction and to sell their products to the customer. All of auction theory can be mirrored between classic *sales auctions* ("forward auctions") and *procurement auctions* ("reverse auctions").

You may wonder at this point why an online platform such as Mercateo should hold procurement auctions, rather than sales auctions. The reason is to do with the nature of the markets in question. Two conditions must be in place for an auction to make sense: A *scarce* good (or scarce demand if it is to be a procurement auction) and the greatest possible number of *interested parties* who want to buy this good (or want to meet the demand with their products). So far the setting is symmetrical. With respect to the markets of the products that are offered on a procurement platform like Mercateo, we actually find plenty of interested parties on both sides: the multitude of all suppliers and the multitude of all customers who populate the platform. Yet in the individual bilateral business relations, it is really always the customer who has a limited demand for goods while the supplier will typically want to deliver "as much as possible" of the goods. When the customer receives his basket of goods, his demand is satisfied for the time being. When, conversely, the supplier delivers the goods, its sales department will already be busy generating new customers again. So the "scarcity" tends to exist on the demand side, rather than on the supply side. A few items, e.g. ones that have gone out of stock, constitute the exception that proves the rule.

Mercateo also provides the possibility of a purchase auction for any basket of goods the customer may select. The auction design of this reverse auction implemented by Mercateo corresponds to a so-called *combinatorial second-price auction*. "Second-price auction" means that the price that is to be paid to the winner of the auction is *not* the price that this bidder submitted to the system as his bid price. Instead, in a second-price auction the customer pays to the lowest bidder (= the winner) the price that the second-lowest bidder submitted as his bid price. At first glance, this rule may appear somewhat unusual. Customers may wonder why they should pay "too much", seeing that a cheaper offer existed, and even from exactly the bidder who will in fact deliver the good. The rationale for this design is to be found in the bidding strategy that suppliers will adopt when facing a second-price auction: Given that the supplier who wins the auction will not be paid his own bid price anyway but rather that of the second-lowest bidder, there is no reason for him to bid a price that is any higher than his very bottom line – the price

that he would only just be prepared to bid in order to sell the good under maximum competitive pressure. We call this the indifference price: The price that, all things considered, leaves the supplier indifferent as to whether or not the good is sold. If the supplier bids his indifference price in a situation with no competitive pressure, he will win the auction and reap a comfortable margin if the second-lowest bidder posted a considerably higher bid. If, by contrast, competitive pressure is high and the supplier still wins, his margin will be smaller – in fact it will be just as great or small as the level of competition permits. If the competitive price lies even below his indifference price, he simply does not win – but neither would he have won with a higher bid. Thus, the bidding strategy is a "no-brainer": Bid your indifference price and you will optimally participate in the auction.

This bidding strategy, which we may ascribe to rational and intelligent bidders, results in an effect which you may have been wondering about all along: Such a second-price auction need not necessarily involve a dynamic "we're all underbidding each other"-process of the type you may be familiar with from a classical English auction. Here, the supplier merely submits his bid once for each item. Whenever a basket of goods containing this item is auctioned, the indifference price is consulted to decide whether this supplier receives the right to deliver the item. Note that the final price for the item may be a different one each time – depending on whatever happens to be the second-lowest bid price in the Mercateo data base for a comparable item in each instance.

Suppliers are naturally reluctant to reveal their indifference prices. As the very lowest calculation that the item permits, the indifference price constitutes highly relevant strategic information, both for the customer and for competitors. In an auction conducted directly by the customer, this reluctance would lead to the so-called *exposure problem*: The suppliers bid less aggressively than their reservation prices would suggest, solely in order not to reveal their reservation prices to the customer. However, in the case of the Mercateo platform, it is not the customer who conducts the auction but rather Mercateo as an impartial authority. The exposure problem therefore reduces to the suppliers' faith in Mercateo, to their confidence that the platform will dutifully safeguard all data.

By the way, this seemingly unusual design of a second-price auction is in fact much less exotic than you might think upon hearing about it for the first time. Its inventor, Sir William Vickrey, received no less than the Nobel Prize in economics, and the entire business model of Google AdWords is based on continuous second-price auctions for advertising space next to the search results.

But let us return to Mercateo: The auctions held there are *combinatorial second-price auctions*. We have yet to discuss the "combinatorial" aspect of the auctions. In theory, combinatorial auctions are ones that permit the bid price on a bundle of items to differ from the sum of the bid prices on each item in the bundle. In many auctions, the auctioneer (for good reasons) expects a better result if he grants the bidder the opportunity to specifically assign a larger price reduction only to the bundle because the bidder can then rest assured that he will not be in a situation where he reduced his bid but wins only part of the bundle in the auction. Such assurance becomes important whenever, e.g. due to economies of scale, the indifference price for the bundle is indeed lower than the sum of the indifference prices for the individual items. Such differential treatment of bundles and individual items is, however, *not* possible

in the Mercateo auction. Here, bid prices can only be submitted for individual items; no price discrimination is possible among different bundles of items.

Nevertheless, the Mercateo auction is of a highly combinatorial nature: Every item carries shipping costs, which depend on the size of the total delivery that is to be shipped by a given supplier for the basket of goods in question. Mercateo has found a clean algorithmic solution to the optimisation of shipping costs in the context of comparing the total costs of the baskets of goods (the baskets being arbitrarily composed of items from various suppliers) – a mathematical challenge that is anything but trivial. This logic of auctioning baskets of goods fully deserves the label *combinatorial* auction.

Finally, we wish to honour our promise by identifying the advantage that suppliers can gain from purchase auctions on the Mercateo platform. As a supplier, you will typically pursue either of two pricing strategies: Either you select a low price to increase your market share or you want to increase your margin to make a profit, in which case you may even be tempted to engage in “strategic supply reduction” so as not to create unnecessary competition. If you follow the former strategy, reverse auctions on the procurement platform afford you the guaranty of realising the greatest possible volume of sales, given your indifference price. In this case, every consumer’s click on the auction button ought to be good news, since consumers will find it hard to ignore your items.

If, by contrast, you opt for a high price, you will in any event have to sufficiently differentiate your products from the competition in order to sustain the high price. In this case, there is no reason to be afraid of Mercateo’s procurement auctions. On the contrary: The second-price auction mechanism rewards a lack of competition (due to your efforts at differentiation) with a high price. In the ideal case in which no other bidder can be found for an alternative product, the mechanism resorts to the catalogue price which, along with their bid prices for the auction, every supplier must submit to the platform for every item on offer. The auction winner’s own catalogue price is then used as the relevant second price or, in other words: In the absence of competition, the auction mechanism relies on the catalogue price instead of the indifference price. Do bear this in mind when formulating your pricing strategies on the Mercateo platform.

In case you require game theoretic advice in this context or with similar issues of pricing strategy in your sales or procurement environment, please do not hesitate to get in contact with us at any time.

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