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Designing Auctions for Concessions—Guessing the Right Value to Bid and the Winner's Curse

This is the third in a series of four Notes on bidding for infrastructure concessions. The other three in the series examine how concession design affects competition in bidding and the sustainability of the contract, whether to auction or negotiate, and the case for periodic rebidding.

Once a government has decided to award a concession by auction, it needs to decide what kind of auction to use—whether a first-price or second-price auction, whether sealed or open bids, and whether sequential or simultaneous bids for multiple items. For concessions the standard is a first-price sealed bid auction in which bidders submit sealed envelopes containing their offer and the highest offer determines the price. The bidding may occur in one or two stages. In two-stage bidding the technical parameters of the bids are made comparable in the first stage, and only the main offer on the core bid parameter is submitted in the second. The main offer may relate to a price, a level of subsidy, a payment for net worth, or any other appropriate parameter; the discussion in this Note focuses on price. In one-stage bidding the entire bid is submitted, the envelopes are opened, the bids are made public, and the highest bidder wins. But it may not immediately be obvious who has won, because bids must first be compared and evaluated on all relevant dimensions. These bidding approaches parallel those for civil works and equipment contracts.

In recent years debate over optimal auction design has intensified. Problems with sealed bid auctions have led to reconsideration of their merits, and new auction methods have been tried. New Zealand, for example, used second-price sealed bids to auction licenses for radio spectrum. In a second-price auction the process of submitting and opening bids is like that in a first-price sealed bid auction, but the winner pays only the value offered by the second-highest bidder. In open auctions bids are made technically comparable, then the real bidding starts. In multiple rounds bidders raise their bids in response to others until only one bidder, the winner, is left. The winner pays the last price that he or she offered. Open auctions have been used for radio spectrum licenses in the United States.

Choosing an option

The choice of auction method is affected by arguments about:

- The political sustainability of the outcome.
- The robustness of firms' bidding strategies.
- The opportunities for collusion among firms.

All these elements combine in determining whether an auction design yields value; how that value is distributed among bidders, consumers, and the government; and whether the deal will last.

Political sustainability

Bidding for concession-type arrangements often occurs among only a few players, and the price offers can differ dramatically. The winning bid has often been several hundred million dollars higher than the second-highest one, as in the Mexican railway auctions (North-east concession) and the Peruvian phone system privatization. In second-price sealed bid auctions such huge differences can make the result politically unsustainable. The extreme outcome of New Zealand's radio spectrum auction, where the first bid was NZ$100,000 and the second only NZ$6, created obvious political problems (McMillan 1994).

Open bidding processes do not reveal what the winning bidder might have been willing to pay, because bidding stops when the winner offers just a little more than the second-highest bidder. The winner thus pays more or less the second-highest price, but nobody sees how much more could have been obtained. That tends to reduce political complications, unless the winning bidder's staff leaks information about how much it would have been willing to pay.

Sealed bid second-price auctions are clearly dangerous for political sustainability when there are only a few bidders, as is typical for concessions. If there were many bidders, the likelihood of big differences between the first and second bids would be much lower, but the transaction costs of the process might be prohibitive. First-price sealed bid auctions and open auctions can both yield reasonable sustainability, because in one case the first price wins and in the other the first price is unknown.

Guessing competitor strategy

In first-price auctions bidders need to guess how their rivals will bid. The better they guess, the smaller the premium they need to bid to win. If their guess is perfect, they can bid just above the second price, as in an open auction, and still win. Some bidders take multiple envelopes to the bid opening. If they find that they are the only bidder or if their most serious competitors do not show up, they submit the envelope with their lowest bid. The more risk averse bidders are, the more likely that they will bid "too high" just to make sure that they win.

In second-price auctions they bid what they think the concession is worth. They do not need to think about others' valuations and can thus focus on valuing their own bid. First-price auctions make bidding more complex for bidders, increasing the risk that clever firms rather than efficient ones win. But in sealed bid first-price auctions government revenue should be higher than in second-price sealed bid ones if bidders are risk averse.[1]

For a standard equipment contract the bidders often know what their own costs will be and can then calculate the best offer. But for many concessions bidders may need to value the right to the concession, which depends not just on their own skill but on factors affecting all bidders, such as consumers' willingness to pay and regulators' future behavior. Cases where the bid value depends only on characteristics of the bidder are called private value auctions. Cases where the value depends on factors that affect all bidders are called common value auctions.

Different bidders have different information and different abilities to value a concession. So the most optimistic bidder rather than the most efficient one could win the auction, resulting in the failure of the winner, pressures for renegotiation, and excessive costs. That is called the winner's curse.[2]

Bidders therefore need to assume that they are overoptimistic and adjust their bids downward. If they do not assume that they are the most optimistic bidder and discount the bid accordingly, they will not survive for long in an industry based on common value auctions. Inexperienced bidders often fall prey to the winner's curse.

Experienced long-term players selected through prequalification to bid for concessions adjust their bid prices conservatively so as not to fall prey to the winner's curse. But they might bid more aggressively if they had better information about the value of the concession. Open bidding gives them some better information, because it reveals what others are willing to bid. If pessimistic bidders see that everybody is still bidding when they are thinking of quitting, they might continue to bid. And if bidders see that most others have started to drop out, they would revise their valuation downward. Thus under open bidding among prudent, experienced bidders the winning bid on average should be higher and the likelihood of an overoptimistic bid lower. For governments the outcome should be better and more sus-

tainable deals on average. It was this expectation that led the U.S. Federal Communications Commission to choose open bidding for auctioning rights to radio spectrum.

In general, governments should provide as much relevant information to bidders as possible so as to make bidding more aggressive. More information sometimes reveals weaknesses in a concession proposal and thus reduces bid prices. But in such cases the winner would have had to renegotiate anyway.

Collusion

First-price sealed bid auctions may offer a little better protection against collusion by bidders than open auctions. Suppose there is a bidding cartel among some of the bidders. In an open auction they can see when one of them breaks ranks and bids more aggressively than agreed. Other members of the cartel can immediately retaliate by also bidding more aggressively. Fear of such retaliation strengthens discipline in the cartel. In sealed bid auctions, however, retaliation can occur only if there is repeated bidding for concessions involving similar players. But that is often the case, particularly for water concessions today. So in practice sealed bid auctions may not always provide better protection against cartels than open auctions.

Moreover, many sealed bid auctions are in reality open. As a result of widespread corruption bidders often learn about their competitors' bids before bid award and can adjust their own bids accordingly. Two-stage bidding offers the best safeguards against such practices. The price envelope is submitted on the day of bid opening, and deadlines tend to be firm. Bidders try to hand in their envelope just before the deadline so as to reduce the possibility that the envelope will be tampered with and to take advantage of any information that may emerge until the last minute. Bids are opened publicly and in the presence of auditors, who ensure that those who open the bid read it out correctly and do not suppress or distort information.

While sealed bid auctions can be made somewhat collusion-proof, open auctions can also be "proofed" a bit. For example, in an open auction bidders' identities can be kept secret. Bidders need not be in the same room and can bid remotely. Reputable auditors can ensure the integrity of the process. But cartels can still retaliate better against defectors under open auctions than under sealed bid schemes.[3]

When competition is weak, governments can use reserve prices to guard against collusive low bids. Keeping reserve prices secret helps ensure that risk-averse bidders pay more rather than less. But care must be taken to prevent arbitrary manipulation of secret reserve prices by corrupt auctioneers. One way is to deposit the reserve price in a sealed envelope with reputable auditors.

The use of reserve prices also tends to serve political aims, by convincing the public that state assets are not sold below value. This purpose sometimes runs counter to sound use of reserve prices. For example, when assets might fetch less than book value, it is often politically difficult to set a reserve price below book value. But these cases are, of course, tough to handle under any circumstances.

First-price sealed bid or open auctions?

Altogether, it is thus not quite clear whether first-price sealed bid auctions or open auctions are preferable. The private sector often uses some form of competitive negotiation, which in principle operates like an open auction. But for government procurement or procurement by regulated monopolies it is generally desirable to allow less discretion than is involved in competitive negotiation. Broadly, the following general arguments about the relative merits of open and sealed bids might then hold. When there is strong competition among many bidders or among diverse bidders, open auctions might be preferable, because collusion is unlikely, anticipating the bidding strategies of others is unnecessary, and the danger of the

winner's curse is lower. In such cases fixed price contracts are in principle relatively more desirable than cost-sharing contracts. However, first-price sealed bid auctions may be preferable to guard against collusion when the number of bidders is small. To stimulate bidding competition, contracts should have higher cost sharing between the concessionaire and the customers. Sealed bids may also be preferable when bidders are risk averse and when bidders are diverse; under these circumstances sealed bids may increase the bids placed by the winner.

Simultaneous or sequential auctions?

In selling rights to radio spectrum the United States used a simultaneous open auction. Bidders bid simultaneously on all areas where they wished to acquire a license to use a particular frequency. Areas were auctioned simultaneously because of the possibilities for significant complementarities. For example, telecommunications firms might want to own licenses in adjacent areas to reduce the costs of building out the infrastructure for wireless communication systems. If areas are auctioned sequentially, bidders for one area cannot know whether they can acquire a valuable adjacent area and therefore bid less for the first or not at all. Simultaneous auctions make sense only when they are open, because bidders must be able to adjust their bids in response to others.

The sale of U.S. radio spectrum so far represents the only use of simultaneous auctions for concession-type arrangements. For most concessions it is not clear that such auctions offer significant benefits. Simultaneous auctions were considered for the three major rail concessions in Mexico. But bidders could not aggregate concessions, because no bidder could win more than one. Bidders simply needed to value each concession and bid what it was worth to them. A simultaneous auction might make sense for airport slots that have to be aggregated into routes, because it would allow the market to decide how to aggregate them most efficiently. Once the pieces of a system are auctioned, secondary markets bear the burden of improving on the aggregation of concessions or licenses.

The role of the regulator in auctions

Regardless of the type of auction used, discretion will almost certainly play a part in the evaluation of bids. Bids may vary on so many dimensions that nondiscretionary comparison is impossible. Moreover, prequalification and shortlisting may already have involved some judgment when the bidders' reputation and integrity matter, not just their verifiable track record. So it is important that the auctioneers (or panels of bid evaluators) be at arm's-length from political pressures and from bidders' interests. Just like regulators, they must be independent.

That said, why not have the regulator conduct the auction? Since auctions are essentially a mechanism to improve information in price review processes, the regulator seems a particularly appropriate choice.

[1] For more technical expositions of these points see McAfee and McMillan 1987 and Milgrom 1989.

[2] "Lowballing" bidders—called "coyotes" in Mexico—bid low in the hope of making gains later in renegotiation. If bidders expect that they can get away with renegotiation, they have no incentive to bid responsibly. For bidding to be meaningful, failure to comply with the terms of the bid must impose costs on the winning bidder. In a meaningful auction the winner's curse is a serious threat to the winner.

[3] This is an instance where some degree of nontransparency prevents collusion. Although overall, rules to ensure transparency are valuable, the design of such rules needs to take such instances into account.

References

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