

# Auctions

Governments are increasingly using auctions as a mechanism for awarding contracts for construction and other services, selling securities, disposing of property, and granting licenses to exploit scarce resources, while a casual inspection of the offerings by Ebay is convincing evidence that auctions also play an important role in the private sector. Procurement auctions are also becoming more important, as well as business-to-business auctions of inventory. Auctions are of special interests to economists studying business strategy, because they seem to provide a relatively transparent mechanism to view one side of the market.

There are many different ways to auction an item, and we begin Chapter 19 with a description of some standard mechanisms, including sealed bid auctions, ascending auctions and descending auctions. We also distinguish between those auctions in which the winner pays what she bids, the winner pays a lesser amount such as the second highest bid, and all pay auctions, where everyone pays what they bid regardless of whether they win or not. Although few auctions actually requires all bidders to pay their bid, patent races, and other competitions in research and development can be modeled as all pay auctions.

Then we derive the strategic form solution for auctions, specializing to the framework to deal with known cases. The experimental approach is to see how closely the theoretical and empirical outcomes correspond, and to explore the empirical outcomes of auctions for which there is no known theoretical solution to see if certain necessary conditions are met.

Chapter 19 analyzes the specifications that give rise to equivalence between different types of auctions. We examine two types of equivalence. Strategic equivalence is a concept we introduced in the third chapter, on the extensive form and developed further in our discussion of the revelation principle, requires different auction types to yield the same bidding rules in the strategic form solutions. For example first price sealed bid auctions and descending auctions are strategically equivalent, because the winning bidder pays her bid, and has no information about the other bids except that they are lower than hers. We check this out as an experimental settings: there is a debate whether the adrenaline rush associated with a bidding might affect behavior.

Revenue equivalence is weaker, requiring only that the expected revenue to the auctioneer and the expected surplus to each of the bidders be equated across both auctions. Under a wide range of conditions many auction mechanisms are revenue equivalent. Many auctions are revenue equivalent if all buyers are risk neutral and draw independent signals from a common probability distribution about the value of the auctioned object. By comparing samples of bids with the valuations of their bidders we can see whether there is a statistical difference between that are revenue equivalent. The revenue equivalence theorem provides us with a benchmark for

investigating the conditions under which its conditions are not met, and how that leads to preferences over different auctions.

In Chapter 20 we explore how relaxing the risk neutrality assumption; we show how this can be tested by imposing greater concavity on preferences, and noting the effect on the revenue generated. Asymmetry in the probability distributions is another reason for the revenue equivalence theorem to break down, and we check the prediction of the theory out here as well.

Interdependent signals leads to different preferences over the auction type in Chapter 20. Analyzing common value auctions, where the signal bidders receive about their valuation has a common unknown mean is case warranting special attention because of the many examples that fall under it. The theory shows that second price yields more than ascending, and both yield more than first price sealed bid, a prediction that can be tested in experimental settings. In this example we also discuss what happens when some bidders are more informed than others, drawing a signal from a less diffuse probability distribution.

The last item on the agenda are issues related to collusion between bidders and the cost of entry.