Auctions of a single object[1]

Reference: Auction Theory, V. Krishna, Academic Press, Elsevier Science (2002)

1 Independent private values (IPV)

• Model. Bidders are symmetric and risk neutral.

• Second price sealed bid auction: dominant strategy of each bidder is to bid true valuation.

• First price sealed bid auction: each bidder bids below his own valuation (see your course notes). The optimal bidding strategy depends on the distribution.

• Second price sealed bid auction is riskier for seller. However, on average, they give the same expected revenue.

• Reserve prices: then, the good is sold less often, but at the same time, prices are bounded below. There exists an optimal reserve price solving the trade-off.

• Revenue equivalence principle. All auctions such that (i) the allocation rule as well as the payment is contingent only on bids, (ii) the bidder with the highest value always wins, (iii) the bidder with value at the lowest bound of the distribution expects zero surplus give the same expected revenue. Principle fails when (1) bidders are risk-averse; (2) distribution are asymmetric; and (3) values are common instead of private.

• Optimal auctions. Requires to distort simple auction formats. In the simplest model, only add a reserve price. Otherwise, add various tools (e.g. entry fees, exit fees, different reserve prices for different bidders).

• Efficient auctions. Auctions that allocate the good to the bidder with the highest willingness to pay. If an auction is not efficient, it is subject to resale.

2 Interdependent values and affiliation

• Interdependent values. Bidder i has a signal σ_i and the true value of the object to bidder i is a function of all signals $V_i = v_i(\sigma_1, ..., \sigma_n)$. So, pure common values is $v_i(\cdot, ..., \cdot) = v(\cdot, ..., \cdot)$ for all i and private values is $v_i((\sigma_1, ..., \sigma_n) = \sigma_i$.

• Winner's curse. In a common value auction, bidder 1 only knows his own signal. His estimate is $E[V|\sigma_1]$. If he wins, this reveals that all other bidders had a worse signal. After winning, bidder 1 revises his estimate which becomes $E[V|\sigma_1, S < \sigma_1] < E[V|\sigma_1]$ where S is the second highest signal. Curse must be anticipated to design strategies.

• Affiliations. Means that the signals are correlated. Precisely, if some signals are high, then it is likely that others are also high.

[1]This document is intended to provide only a few take-home messages. It is not a substitute for attending class and taking notes.