

Reaching Agreements

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Auctions

- Auctions = method for allocating scarce resources in a society given preferences of agents
- Most common types of auctions:
 - English (first-price open-cry ascending), Dutch (reverse), first-price sealed bid, Vickrey auction (second-price sealed bid)
- Some interesting issues/problems:
 - **Lying** (lying bidders, lying auctioneer)
 - Bidder **collusion**

The English Auction (EA)

- Each bidder raises freely his bid (in public), auction ends if no bidder is willing to raise his bid anymore
- Bidding process public ➡ in correlated auctions, it can be worthwhile to counterspeculate
- In correlated value auctions, often auctioneer increases price at constant/appropriate rate, also use of reservation prices
- Dominant strategy in private-value EA: bid a small amount above highest current bid until one's own valuation is reached

The English Auction (EA)

- Advantages:
 - Truthful bidding is individually rational & stable
 - Auctioneer cannot lie (whole process is public)
- Disadvantages:
 - Can take long to terminate in correlated/common value auctions
 - Information is given away by bidding in public
 - Use of **shills** (in correlated-value EA) and “minimum price bids” possible, to drive prices
 - Bidder collusion **self-enforcing** (once agreement has been reached, it is safe to participate in a coalition) and identification of partners easily possible

Dutch/First-Price Sealed Bid Auctions

- Dutch (descending) auction: seller continuously lowers prices until one of the bidders accepts the price
- First-price sealed bid: bidders submit bids so that only auctioneer can see them, highest bid wins (only one round of bidding)
- DA/FPSB strategically equivalent (no information given away during auction, highest bid wins)
- Advantages:
 - Efficient in terms of real time (especially Dutch)
 - No information is given away during auction
 - Bidder collusion not self-enforcing, and bidders have to identify each other

Dutch/First-Price Sealed Bid Auctions – Problems

- No dominant strategy, individually optimal strategy depends on assumptions about others' valuations
- One would normally bid less than own valuation but just enough to win ➡ Incentive to counter-speculate
- Without incentive to bid truthfully, computational resources might be wasted on speculation
- Another problem: lying auctioneer
- Would be nice to combine efficiency of Dutch/FPSB with **incentive compatibility** of English auction ➡ Vickrey auction can be seen as attempt to achieve this

The Vickrey Auction (VA)

- Second-price sealed bid: Highest bidder wins, but pays price of second-highest bid
- Advantages:
 - Truthful bidding is dominant strategy
 - No incentive for counter-speculation
 - Computational efficiency
- Disadvantages:
 - Bidder collusion self-enforcing
 - Lying auctioneer
- Unfortunately, VA is not very popular in real life
- But very successful in computational auction systems

Discussions

How about lying?

- lying bidders
- lying auctioneers?

How about bidder collusion?

Cheating in English Auction

- The goal of the cheating in English auction is to induce the bidders to reach their maximum valuations
- In case of multiple bidding a cheating agent submits many bids adopting multiple (fake) identities
- Some of these bids are higher than his/her personal valuation of the product

On Cheating in Sealed-bid Auctions

Two forms of cheating in sealed-bid auctions:

- Bidder cheats in a first-price auction by examining the competing bids before submitting his own bid
- The seller examines the bids of a second-price auction before the auction clears and then submits a shill bid in order to increase the payment of the winning bidder

Bidder collusion in Dutch Auction

- The bidders can coordinate their bid prices so that the bids stay artificial low
- The bidders get the item at a lower price than they normally would