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Dominance and the Second Price Auction

- A central question in economics: how are prices set.
- In monopoly the question is how much money can the monopolist extract from buyers?
- A common method of price setting is to sell items by means of an auction.

Types of Auctions

- English auction-announced bids, sold to highest bidder at the price bid (oral, first-price)
- Sealed bid (first-price)
- Descending bid
- Sealed bid second price – each buyer submits a single bid at the same time, sold to highest bidder at the second highest bid.
- Sealed bid second price = English auction – why?

A Simple Sealed Bid Second Price Auction Model

a single item is to be auctioned.

value to the seller is zero.

two buyers

value $v_i > 0$ to buyer i

possible values 2 or 4

“independent private values”

(compare: common value auction – oil field)

each buyer submits a bid b_i equal to one of the possible values

the item is sold to the highest bidder at the second highest bid

Solution

suppose that the second highest bid is \hat{b} and that there are M ($=1,2$ obviously) winning bidders

then a winning bidder gets $\frac{v^i - \hat{b}}{M}$

all other players get 0

Dominance

weak dominance never a lower payoff no matter what the opponent does, and sometimes a higher payoff

strict dominance a higher payoff no matter what the opponent does

admissibility: never use a weakly dominated strategy

Application of Weak Dominance to Second Price Auction

the strategy of bidding $b_i = v_i$ weakly dominates all other strategies

Calculate utility. Let \hat{b} be the bid by the other player.

Your value = 2	Bid 2	Bid 4
$\hat{b} = 2$	0	0
$\hat{b} = 4$	0	-1

Your value = 4	Bid 2	Bid 4
$\hat{b} = 2$	1	2
$\hat{b} = 4$	0	0

Theory of Second Price Auctions

The highest valued buyer wins the auction and pays the second highest value.

- What happens with many possible values? Bids? More bidders? [discussed in section]
- What happens in a first price auction?
- Can the seller design an auction that gathers more revenue?

If the seller knows the buyers values, then he should just charge the highest value (minus a penny, perhaps): this yields more revenue

- What happens when the seller does not know in advance what the buyer values will be.

Theory of choice under uncertainty, to be discussed later in the course.