Auctions

Common value auctions

Sniping

Common value auctions

- Examples: mineral extraction rights, radio frequencies, etc.
- Value is the same for everyone, but uncertain
- players have different information and believes about the value of the goods
- Winners curse: the winner's estimate of the value of the product is higher than that of all others. Therefore it is probably to high and the winner might pay more than the true value of the product.

Example revisited

- Archie and Betty buy Veronica’s books in order to resell them again.
- Veronica’s collection of comic books consists of two parts: a set of Disney books and a set of Marvin books
- Archie knows the value of the Marvin books, but has no idea about the value of the Disney books.
- Betty knows the value of the Disney books, but has no idea about the value of the Marvin books.

Example revisited

- The value of the Marvin books is called V_a
- The value of the Disney books is called V_b
- So the value of the whole collection for both Archie and Betty is V_a+V_b
- Archie knows V_a and beliefs the value of V_b is uniformly distributed between 0 and 0.5 ($1000) $\Rightarrow$
- Archie expects that $V_a+V_b = V_a+ 0.25$
- Betty knows V_b and beliefs the value of V_a is uniformly distributed between 0 and 0.5 ($1000) $\Rightarrow$
- Betty expects that $V_a+V_b = V_b+ 0.25$

Example (Vickrey auction)

- Veronica uses the Vickrey auction to sell the books.
- Suppose Archie and Betty bid their true valuations
- Suppose Archie knows that V_a=0.1 and that Archie wins.
- Archie has to pay Betty's bid (V_b+0.25) although he knows the books are only worth V_b+0.1
- Archie suffers from the winner's curse

Example revisited

- Thesis: the Nash equilibrium is for Archie to bid $2.V_a$ and Betty to bid $2.V_b$
- Proof:
- Suppose Betty bids $2.V_b$ and Archie wins the auction then his profit is $(V_a+V_b)-2.V_b= V_a-V_b$
- Archie only wins the auction if his bid $b>2.V_b$
- His expected profit equals:
- $\int_0^{½b}(V_a-V_b)dV_b + \int_{½b}^1 0dV_b = V_a.½b - ½(½b)^2$
- The profit is maximal when $b=2.V_a$

Example (first-price auction)

- Suppose Veronica uses the first-price auction to sell the books.
- Thesis: the Nash equilibrium is for Archie to bid V_a and Betty to bid V_b
- Proof:
- Suppose Betty bids V_b and Archie wins the auction then his profit is $(V_a+V_b)-b$
- Archie only wins the auction if his bid $b>V_b$
- His expected profit equals:
- $\int_0^b (V_a+V_b)-b \, dV_b + \int_b^1 0 dV_b = V_a . b - ½b^2$
- The profit is maximal when $b=V_a$

Risk attitudes

1. Risk averse bidders
   1. No effect in Vickrey auctions
   2. Bid higher in first-price auction (remember that bidding just below your private value is optimal)
2. Risk averse auctioneers
   - Prefer first-price auction over Vickrey auction due to more certain price. (the mean is the same but the Vickrey auction contains a variance that risk averse auctioneers want to minimize.)