Auctions

A Presentation by

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Candy Auction

- Jar contains a number of candies.
- The winner of the various auctions will get 1 cents per candy.
- You are bidding for the money in these envelopes, *not for the candy*!
- Playing for real money!

\[ \frac{4}{3} \pi r^3 \]

Things Sold by Auction:

radio spectrum, prize bulls, race horses, off-shore oil leases, timber, antiques, tobacco, fresh fish, used cars, cut flowers (Holland), coins, stamps, wine, art, houses (80% in Australia), U.S. Treasury bills, stocks, pork bellies, OJ, gold, wheat, foreign currency, TV broadcast rights for sports, corporations, celebrities' signatures...
FCC Auctions


“The most dramatic example of game theory’s new power. It was a triumph, no only for the FCC and the taxpayers, but also for game theory (and game theorists).” (*Fortune*, February 6, 1995)

“The government is smoking something to think they are going to get $10 billion for these licenses” [$20 billion raised]

(MCI chairman Bert Roberts, October 20, 1993)

“For once, the government is doing a great job of dragging money out of people.”

(McCaw chairman Wayne Perry, June 6, 1994)

English (Oral Ascending) Auction

• An auctioneer calls out an increasing series of prices, until no bidder is willing to top the current price.
• To buy things, prices go in the reverse direction.
• *Examples:* antiques, real estate, art, wine, tobacco
• Used by the Babylonians.
• Low transactions costs

English Auction: How to Bid

• If you know your value
  – bid up to your value
  – Ignore jump bids
• If your value is uncertain
  – Other bids signal something about value
First Price Sealed-Bid Auction

- Each bidder submits a bid in an envelope. The bids are opened at the same time, and the high bid wins the object and pays his bid.
- Examples: Government sales of timber and offshore oil, government purchases of french fries, airplanes, road construction, pencils, zero gravity toilets...
- Typically used by bureaucracies (government or large firms) to sell or buy things.

Candy Auction

- There were 1080 candies in the jar.
- Consequently, the envelopes contain $____.
- My record profit is $74.
- Rarely lose.

The Winner’s Curse

- “I paid too much for it, but it’s worth it.”
  - Sam Goldwyn
- The winner’s curse is the fact that the bidder who most overestimates the value of the object wins the bidding.
- Uncertain resale value can induce winner's curse.
- Should reduce bid to adjust for this effect.
- Reduce bids more the more bidders there are.
The Winner's Curse

• Estimates tend to follow a normal distribution, or bell curve.
• The highest estimate, on average, is larger than the average estimate.
• Average estimate reflects actual value.

Distribution of Value Estimates

Size of Adjustment

| Average Adjustment Needed, in Standard Deviations, for Given Number of Bidders |
|-----------------|---|---|---|---|---|---|---|---|---|---|
| 2               | 3 | 4 | 5 | 10 | 15 | 20 | 50 | 100 | 500 | 1000 |
| 0.56            | 0.84| 1.03| 1.16| 1.54| 1.74| 1.87| 2.25| 2.51| 3.04| 3.24 |

Standard deviation is a measure of the “average error” in forecast.
Conclusions

• Winner’s curse requires a downward adjustment in estimate which is larger the more bidders there are.
• Winner’s curse effect is smaller the higher one’s signal, because the fact that others had lower signals is less meaningful the higher a bidder’s signal.

Conclusions, Continued

• Problem of winner's curse is smaller in English auction, because other value estimates revealed, reducing uncertainty.
• English auction will tend to have higher prices than sealed-bid auctions.
• English auction reduces regret.

RCA Transponder Auction, 1981

<table>
<thead>
<tr>
<th>Order</th>
<th>Winning Bidder</th>
<th>Price Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TLC</td>
<td>$14,400,000</td>
</tr>
<tr>
<td>2</td>
<td>Billy H. Batts</td>
<td>$14,100,000</td>
</tr>
<tr>
<td>3</td>
<td>Warner Amex</td>
<td>$13,700,000</td>
</tr>
<tr>
<td>4</td>
<td>RCTV</td>
<td>$13,500,000</td>
</tr>
<tr>
<td>5</td>
<td>HBO</td>
<td>$12,500,000</td>
</tr>
<tr>
<td>6</td>
<td>Inner City</td>
<td>$10,700,000</td>
</tr>
<tr>
<td>7</td>
<td>UTV</td>
<td>$11,200,000</td>
</tr>
<tr>
<td>AVG</td>
<td></td>
<td>$12,871,428</td>
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</table>
### Olympic Competition

<table>
<thead>
<tr>
<th>Year</th>
<th>City</th>
<th>Network</th>
<th>$M 1983</th>
<th>$M 1988</th>
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</thead>
<tbody>
<tr>
<td>1960</td>
<td>Rome</td>
<td>CBS</td>
<td>0.4</td>
<td>1.35</td>
</tr>
<tr>
<td>1964</td>
<td>Tokyo</td>
<td>ABC</td>
<td>1.5</td>
<td>4.83</td>
</tr>
<tr>
<td>1968</td>
<td>Mexico</td>
<td>ABC</td>
<td>4.5</td>
<td>12.9</td>
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<tr>
<td>1972</td>
<td>Munich</td>
<td>ABC</td>
<td>7.5</td>
<td>17.9</td>
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<tr>
<td>1976</td>
<td>Montreal</td>
<td>ABC</td>
<td>25</td>
<td>43.9</td>
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<tr>
<td>1980</td>
<td>Moscow</td>
<td>NBC</td>
<td>87</td>
<td>105.7</td>
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<tr>
<td>1984</td>
<td>Los Angeles</td>
<td>ABC</td>
<td>225</td>
<td>216.2</td>
</tr>
<tr>
<td>1988</td>
<td>Seoul</td>
<td>NBC</td>
<td>300</td>
<td>253.8</td>
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<tr>
<td>1992</td>
<td>Barcelona</td>
<td>NBC</td>
<td>401</td>
<td>281.9</td>
</tr>
<tr>
<td>1996</td>
<td>Atlanta</td>
<td>NBC</td>
<td>456</td>
<td>290.9</td>
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<tr>
<td>2000</td>
<td>Sydney</td>
<td>NBC</td>
<td>705</td>
<td>423.0*</td>
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<tr>
<td>2004</td>
<td>Athens</td>
<td>NBC</td>
<td>293</td>
<td>475.8*</td>
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<tr>
<td>2008</td>
<td>TBA</td>
<td>NBC</td>
<td>894</td>
<td>536.4*</td>
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</tbody>
</table>

### Linkage

- Tying or linking prices to actual outcomes
  - Reduces uncertainty
  - Mitigates the winner’s curse
  - Reduces regret
  - Increases prices on average

### Examples of Linkage

- Royalties -- Seoul Olympics
- Cost-sharing
- Oral auction
- Second-price (Vickrey) auction
- Accurate information provision
Linkage Conclusions

• It is in the seller’s interest to adopt the policy of revealing accurate information about value, to reduce winner’s curse.
• Cost-sharing and royalties reduce winner’s curse problem by sharing risk.

Collusion in Bidding

• Recognition of likely winner
  – Timber auctions
• Bidding rings
  – Hold internal auction to determine winner
  – Share proceeds among ring
  – Antiques auctions

Collusion in Auctions

• Illegal!
• Highway contracting
• Most caught because a co-conspirator calls DOJ
• C+ cheating
  – Copies of rival’s bids turned in
Collusion Prevention

- Inform DOJ
- High reserve price
- Sealed bid auctions
- Conceal bidders' identities
- Infrequent auctions
- Bundled items
- Encourage entry

Wilson Auction

- Oral ascending auction
- $20 bill at auction
- Highest bidder wins $20, pays nothing
- Second-highest bidder pays bid, wins nothing.

Wilson Auction Conclusion

- War of Attrition
  - Lobbying competition
- Proceeds dissipated in the fight
- Some games should be avoided
Dutch Auction

- Opening price starts high, falls until a bidder accepts
- Used to sell cut flowers in Holland
- Equivalent to sealed-bid