Economic Insight from Internet Auctions

Patrick Bajari
Ali Hortacsu
E-Commerce and Internet Auctions

Background

• $45 billion in e-commerce in 2002
• 632 million items listed for auction on eBay alone generating $15 billion in gross sales.
• $21.4 billion for the fourth quarter of 2004
• e-commerce sales accounted for 2.2% of all sales in 2004
Reason Behind Rapid Growth

• Online auctions provide a less costly way for buyer and sellers to meet
  – Creates a more liquid market for specialized goods
• Online auctions are a substitute for more traditional markets
  – Antique dealers
• Online auctions can be fun
  – Competing in strategic bidding
  – Sharing their insight with others
Structure of the paper

• Mechanics of auction and rules used
• Last minute bidding and the “winners curse”
• Asymmetric information and Reputation mechanisms
• Auction design and insight from internet auctions
Mechanics of auction and rules used

- eBay auction characteristics
  - Set deadline where all bidding stops
  - Seller can set reserve price (not seen by bidders) and/or price were auction starts
  - Feedback system explaining past buyers experience dealing with the seller
  - Bid incrementally, Proxy bid automatically updates bid

- Other online auctions have different rules including auctions where bids extend the auction end time ten minutes
Figure 1. Sample eBay Listing
eBay “snipe” bidding

• Increase in bids around auction close despite length of the auction
  – sample of 240, 89 had bids in the last minute and 29 had bids in the last ten seconds
  – Less likely to occur when action end is not fixed
• Last minute bidding difficult to explain using auction theory
  – Proxy bidding resembles the second-price sealed bid auction. Were the payment of the winning bidder pays the second highest price.
  – in this situation it is a dominate strategy to bid their private value using a proxy bid
Explanations for “snipe” bidding

• “tacit collusion”- collusion of the bidders against the sellers. A strategy to prevent bidding wars.
  – However early bid activity not correlated with increased final sales price

• Presence of naive bidders that do not understand proxy bidding.
  – Results in user placing incremental bids in response to competitors bids
Other explanations for “snipe” bidding continued

• Common value
  – Bidders want to withhold information about their value of the good until the last minute
  – Evidence for this is that there is more last minute bidding in antique actions compared to computer actions

• Snipe bidding is due to multiple identical items being listed at the same time

• Bidders have uncertainty about their private valuation of the good
Second before auction deadline and % chance in winning the auction

<table>
<thead>
<tr>
<th>Seconds Won Before End</th>
<th>Number of Items</th>
<th>% of Total Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
<td>0.10%</td>
</tr>
<tr>
<td>1</td>
<td>28</td>
<td>2.00%</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0.10%</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>0.60%</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0.10%</td>
</tr>
<tr>
<td>5 to 10</td>
<td>53</td>
<td>3.80%</td>
</tr>
<tr>
<td>11 to 20</td>
<td>53</td>
<td>3.80%</td>
</tr>
<tr>
<td>21 to 30</td>
<td>27</td>
<td>1.90%</td>
</tr>
<tr>
<td>31 to 45</td>
<td>31</td>
<td>2.20%</td>
</tr>
<tr>
<td>46 to 60</td>
<td>11</td>
<td>0.80%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>215</strong></td>
<td><strong>15%</strong></td>
</tr>
</tbody>
</table>
The “Winners Curse”

- Winners curse is being overly ambitious about the value of good
- Winners curse increases in online auctions because the buyers can not directly observe the characteristics of object being sold.
- Inexperienced bidders are frequently the subject to winners curse
- 48% of all internet fraud claims were related to misrepresentation of goods in online auctions
Measuring winners curse

- Compare the price paid at auction to the market value
  - Buy baseball cards on eBay and then have them appraised.
  - Jin and Kato found that fraud rate was 11% in online auctions compared to 3.2% in stores
  - the increased winners curse is due to asymmetric information
  - Internet auctions allow economists to determine weather the ex-post quality of the goods they buy online is equal to the price paid in the auction
Baseball card experiment

• Jin and Kato experiment of upgraded baseball cards
• Professional services grade baseball cards based on condition on a scale from 1-10
• Jin and Kato purchased 100 cards that were not graded by a grading service but the seller placed grade on auction site
Baseball card experiment

- Sellers that claimed cards were 9-10 had actual grades of 6.34
- Sellers that claimed cards were 8.5 or below had an actual value of 6.87
- Buyers were willing to pay 27% more for cards advertised as having grades 9-9.5 and 47% more for cards advertised as being perfect 10s
- Shows the problem with fraud and the winners curse
- Although buyers overvalue cards rated by the seller, buyers do take into consideration the source of the information and shade their bids.
  - Upgraded Ken Griffey Jr advertised as 10 sold for 94.26, 30 dollars over the average value.
  - Compared to a graded Griffey that trades for $1450
- Shows that bidders to some extent automatically correct for the winners curse
Yin’s experiment

• Yin tried to determine how aggressive bidders bid based on the information given about a product
• 233 auctions, asked survey respondents to place a value on each product excluding any information on the seller's reputation
• Calculated the variance of participants' evaluation and compared them to the final selling price
• Yin found that the winning bid is negatively correlated with the normalized variance of survey response
• As the dispersion of individuals' evaluations of the product increases they are likely to bid less for that good
Plot of Normalized price vs Normalized SD
Reputation Mechanisms

• The anonymity of the seller creates information asymmetries along with not being able to physically inspect the good.
  – To ensure honesty eBay created the voluntary feedback
    • +1 for positive feedback, 0 neutral, -1 negative feedback

• Faults with the system
  – Almost all comments are positive only .6% negative or neutral comments
  – Costly activity with only 52.1 % of buyers review the seller
Effectiveness of feedback system

- Estimating the market price of reputation in online auctions.
  - done by measuring the market price of online auctions through hedonic regressions

- Comparison of all the different studies not easy because of differences in reporting their findings

- All of the studies show that there is some premium placed on seller reputation
  - Varies between studies as much as 10-12% premium placed on

- The value of reputation increases with value of the good being auctioned

- Jury is still out on the effectiveness of the reputation system used by eBay
Auction Design and insight

• The internet is a good way to test different variations of auction models
  – Need to test the theory
  – Give real world incentives not present in experiments
  – Auction participants seem to make more rational decisions compared to other types of experiments
  – Data is readily available
Comparing the Dutch and sealed bid first price format

• Auction theory suggests that the Dutch auction and the sealed bid first price auction are equivalent
• Found that the Dutch auction yielded 30 percent higher average revenue compared to the first price auction
• Dutch auction attracted almost double the number of bidders
• Problem with the experiment is that they could not control for bidders having private value or common value for the objects being sold
  – Outcomes may differ depending on type of valuation by bidders
Other issues investigated using internet auctions

- Strategic difference between the second price auction and the English auction
- Whether or not a reserve price should be revealed or kept secret
  - In theory, seller should be indifferent to both situation in the second price English auction (eBay)
  - However, a secret reserve can increase revenue by 1% (in coin auctions)
  - Auctions with reserves concerning Pokemon cards received less revenue
  - No one answer to the question and depends on the good being sold
Prevalence of the Ascending English Auction

• All major online auction sites use ascending English auctions
  – eBay, Amazon, Yahoo!
  – 121 out of 142 auction sites surveyed use this type of auction

• The open ascending English auction yields higher revenue compared to the sealed bid counterpart
  – Because other bidders evaluation is know minimizing the winner’s curse

• Ascending auction yields benefits for all
  – Decreased winner’s curse
  – Increased revenue to the seller
  – Higher commission to the hosting site
Conclusion

• Internet auctions are an inexpensive way to collect high quality data on different auction formats.

• In online auctions, economists can observe all the information known by the bidders, limiting confounding variables.

• Internet auctions can be easily altered to allow for comparison of different auction theories.