Introduction

- Use Monte Carlo simulations (10,000 iterations)
- Participants will bid on a good with a set and known value "v".
- Each player will bid in the current round with a certain probability P of bidding the current price, of unique competitors, and a random risk aversion coefficient.
- All users pay for each bid placed.
- Winner receives good and pays final price.
- Simulation runs through until no competing bids are placed.

Conclusions

- Player incorporating the strategy wins more often than he would otherwise.
- Despite this, his average utility was lower.
- Why? The people who remained in the auction had low risk aversion.
- This drives up the average cost the player employing the strategy pays.

Further Research

- A model where the total number of users is not known, this is more like Amazon.
- Quikbid: Bidding strictly when the timer is close to 0.
- Bidding model: A bidding program that makes a bidding strategy, how to set the number of auctions at any given time.
Penny for Your Thoughts?
A Strategy to Win Penny Auctions

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What is a Penny Auction?

- Based off of All-Pay Auctions
- Users pay for bids, each bid moves price up by a penny
- Winner pays the final price and gets the good

Benefits?
- Winners pay a fraction of market price
- Fun to play, engaging auction mechanism

Downsides?
- Pay even if you don't win
- Riskier than traditional auctions
Market Size and Players

- By 2011, 8.43 million people participate in these auctions
- Most well known are:
  - QuiBids, Beezid, DealDash
- Recent phenomena, late 2000's
How Profitable are these sites?

• In the past week QuiBids sold items which total market value was $755,061.
• How much did they collect? $1,676,517!
How do they do that?!
A QuiBids example:
Recently a user bought an iPad for $49.31
Retail Value of an iPad: $649.99
How Much did the website make?
$.60 a bid \times 4931 \text{ bids total} = \$2958.60
Literature

Literature
Conclusions

- Not well understood or studied in literature
- Theoretical predictions of equilibrium drastically different from empirical evidence.
- Bidders do not behave rationally
- Auctioneer needs to balance number of users with number of auctions, otherwise suffers losses.
Theoretical Explanations of the Empirical Results

- Sunk Cost Fallacy: People feel they have something invested in the auction so they continue to bid.
- Many players stop playing before they develop a strategy to win.
- Those that do stay eventually learn a strategy, but do so slowly.
Our Objective

Participating in penny auctions seems risky: can a strategy be employed to increase a user's expected payoff?

Let's examine one such strategy - whether a user can create a more favorable outcome through creating the illusion of more bidders in an auction.
What About Our Model?

For this we go on a journey...
The Model
Introduction

- Use Monte Carlo Simulations (10,000 iterations)
- Participants will bid on a good with a set and known value "v"
- Each player will bid in the current round with a certain probability "p" s.t. \( p = f(\text{value}, \text{current price}, \# \text{ of unique competitors}, \text{and a random risk aversion coefficient}) \)
- All users pay for each bid placed
- Winner receives good and pays final price
- Simulation runs through until no competing bids are placed
Initial Orientation

- 1 good of value \( v = 225 \)
- \( N = 20 \) users
- \( n(i) = \# \) of users known by player \( i \)
- \( B = 100 \) bids/user
- \( CP = \) Current Price, starts at 0
- \( a(i) = \) risk aversion level of player \( i \)
- \( P(bid) = 1 - \frac{CP}{V} - a(i) \times n(i) \)
- Each player receives payoff \( \leq 0 \) if they lose and payoff \( > 0 \) if they win
Results from Control Group

- Each player won 5% of the time on average
- Average price paid is $109.16
- Average utility is 0
Implementation of Strategy

- One player will mimic 5 players, splitting his bids among multiple accounts
- This should increase the value of $n$ for other players, but not for himself
- We wish to see if employing this strategy increases both the probability of winning, and the total payoffs received by that player
- But most importantly, by how much?
Results from Strategic Group

- Strategic player won 15.7% rounds
- He received an average payoff of -2.24
- Average price paid by all is now $108.37
- Average price he pays is $110.98
- He bid 4.33 times the average #, and 3.79 times as much as before
Conclusions

- Player incorporating the strategy wins more often than he would otherwise
- Despite this, his average utility was lower
- Why? The people who remained in the auction had low risk aversion
- This drives up the average cost the player employing the strategy pays
Further Research

- A model where the total number of users is not known, this is more like Quibids
- Bidding strictly when the timer is close to 0, like people did in Amazon auctions. Models a bidding program (Bid-o-Matic)
- Auctioneer side strategy, how to set the number of auctions at any given time