Electronic Commerce

Chapter 3: Pricing

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Objectives

• Factors affecting pricing
• Determining price
• Dynamic pricing
• Auctions
Factors affecting pricing

- Factors affecting pricing
  - Demand
Factors affecting pricing

- Factors affecting pricing
  - Elasticity
Factors affecting pricing

- Factors affecting pricing
  - Market structure
  - Recession
  - Production cost
Determining price

- Game theory model
  - Consists of: players, strategies, payoffs
  - Prisoners' dilemma
Determining price

• Game theory model
  • Companies A and B both produce phones

<table>
<thead>
<tr>
<th>Price</th>
<th>Unit contribution</th>
<th>Number in margin at that price</th>
<th>segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>$800</td>
<td>2,000,000</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>$300</td>
<td>2,000,000</td>
<td></td>
</tr>
</tbody>
</table>

• What price companies A and B will set for their phones?
Determining price

- Game theory model
  - Companies A and B both produce phones
Determining price

- Game theory model
  - A player’s **best response** is the strategy that maximizes the player’s payoff, given the strategies of the other players.
  - A strategy is a **dominant strategy** for a firm if it is optimal, no matter what strategy is used by the other players.
  - The firms are in a **Nash Equilibrium** if the strategy of each firm is the best response to the strategies of the other firms. Equivalently, in a Nash equilibrium, none of the firms have any incentive to unilaterally deviate from its strategy.
Dynamic pricing

- Determining the right prices to charge a customer for a product or a service: complex task
- Customers' information is increasingly recorded with the advances of the Internet and e-commerce technologies
- The cost of changing products’ prices: menu cost
  - Is very large for companies with many products and services
  - Reduced significantly in e-commerce
Dynamic pricing

- Definitions
  - Price dispersion
  - Price discrimination
- Price dispersion
  - Spatial
  - Temporal
- Price discrimination
  - First degree (perfect) differentiation: different prices for different units sold and people
  - Second degree price differentiation: different prices for different units sold
  - Third degree price differentiation: different prices for different people
Dynamic pricing

• Price differentiation through product differentiation
  • Dell computer

• Dynamic pricing methods
  • Posted price mechanism
  • Price discovery mechanism

• Example of dynamic pricing: airline industry
  • Consumer segmentation
    • Business class: date and time are more important
    • Economy class: fare is more important
  • Available seats adjustment in specific periods
Auctions

• From Babylon to the Roman Empire to Buddhists
• Auction: seller offering item for sale
  • **Bids**: price potential buyer willing to pay
  • **Bidders**: potential buyers
  • **Private valuations**: amounts bidders willing to pay
  • **Auctioneer**: manages auction process
  • **Shill bidders**: bidder who seller or auctioneer employees
Auctions

• English auctions
  • Bidders publicly announce their successive higher bids until no higher bid is forthcoming
  • The item sold to the highest bidder at that bidder’s price
  • Known as Ascending-price auction
    • Open auction (open-outcry auction)
• Minimum bid
  • The price at which an auction begins
  • If not met: item removed (not sold)
Auctions

• English auctions
  • Reserve price
    • Seller’s minimum acceptable price
    • Not announced
    • If not exceeded: item withdrawn (not sold)

• Yankee auctions
  • Multiple items are offered
  • Highest bidder allotted bid quantity
  • Remaining items allocated to next highest bidders until all items distributed
  • Bidders pay lowest successful bidder price
Auctions

- English auctions
  - English auction seller drawback
    - May not obtain maximum possible price
  - English auction buyer drawback
    - **Winner’s Curse**
      - Psychological phenomenon
      - Caught up in competitive bidding excitement
      - Bidders risk bidding more than their private valuations
Auctions

• Dutch auctions
  • Open auction
    • Bidding starts at a high price
    • Drops until bidder accepts price
  • Also called descending-price auctions
  • Seller offers number of similar items for sale
  • Common implementation
    • Use a clock (price drops with each tick)
    • If items remain: clock restarted
Auctions

- Dutch auctions
  - Advantages
    - Seller obtains close to highest private valuation
    - Quickly move large numbers of commodity items
  - Disadvantages
    - Sales or product interest generated: does not justify cost of operation
    - Customer confusion
- Successful examples
  - Google initial public offering stock sale (2004)
Auctions

• Sealed-bid auctions
  • Bidders submit bids independently
  • Prohibited from sharing information

• First-price sealed-bid auction
  • Highest bidder wins
  • If multiple items auctioned: next highest bidders awarded remaining items at their bid price

• Second-price sealed-bid auction (Vickrey auctions)
  • Highest bidder awarded item at second-highest bidder price
  • William Vickrey: 1996 Nobel Prize in Economics
Auctions

• Double Auctions
  • Sealed bid or open outcry
  • Good for: items of known quality traded in large quantities
  • No item inspection before bidding
  • Auctioneer
    • Matches sellers’ offers starting with lowest price and then goes up
    • To buyers’ offers starting with highest price and then goes down until all quantities offered are sold
  • Example: New York Stock Exchange
Auctions

• Reverse (Seller Bid) Auctions
  • Multiple sellers submit price bids
    • Auctioneer represents single buyer
  • Bids for given amount of specific item to purchase
  • Prices go down as bidding continues
    • Until no seller is willing to bid lower
  • Used by consumers
  • Largest dollar volume
    • Businesses: both buyers and sellers
      • Buyer acts as auctioneer
      • Screens sellers before participation
## Auctions

<table>
<thead>
<tr>
<th>Auction type</th>
<th>Key characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>English auction</td>
<td>Starting from a low price, bidding increases until no bidder is willing to bid higher.</td>
</tr>
<tr>
<td>Dutch auction</td>
<td>Starting from a high price, bidding automatically decreases until the bidder accepts the price.</td>
</tr>
<tr>
<td>First-price sealed-bid auction</td>
<td>Secret bidding process; the highest bidder pays the amount of the highest bid.</td>
</tr>
<tr>
<td>Second-price sealed-bid auction</td>
<td>Secret bidding process; the highest bidder pays the amount of the second-highest bid.</td>
</tr>
<tr>
<td>Vickrey auction</td>
<td></td>
</tr>
<tr>
<td>Double auction (open-outcry)</td>
<td>Buyers and sellers declare combined price-quantity bids. The auctioneer matches seller offers (lowest to highest) with buyer offers (highest to lowest). Buyers and sellers can modify bids based on knowledge gained from other bids.</td>
</tr>
<tr>
<td>Double auction (sealed-bid)</td>
<td>Buyers and sellers declare combined price-quantity bids. The auctioneer (specialist) matches seller offers (lowest to highest) with buyer offers (highest to lowest). Buyers and sellers cannot modify their bids.</td>
</tr>
<tr>
<td>Reverse auction (seller-bid)</td>
<td>Multiple sellers submit price bids to an auctioneer that represents a single buyer. The bids are for a given amount of a specific item that the buyer wants to purchase. Prices go down as the bidding continues until no seller is willing to bid lower.</td>
</tr>
</tbody>
</table>

**FIGURE 6-1**  Key characteristics of seven major auction types
End of chapter 3