Economics 101A
(Lecture 22, Revised)

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Outline

1. Monopoly II
2. Price Discrimination
3. Oligopoly?
4. Game Theory

1 Monopoly II

- Welfare consequences of monopoly
  - Too little production
  - Too high prices

- Graphical analysis

2 Price Discrimination

- Nicholson, Ch. 18, pp. 508–515.

- Restriction of contract space:

  - So far, one price for all consumers. But:

  - Can sell at different prices to differing consumers (**first degree** or perfect price discrimination).

  - Self-selection: Prices as function of quantity purchased, equal across people (**second degree** price discrimination).

  - Segmented markets: equal per-unit prices across units (**third degree** price discrimination).

2.1 Perfect price discimination

- Nicholson, Ch. 14, pp. 508–510

- Monopolist decides price and quantity consumer-by-consumer

- What does it charge? Graphically,

- Welfare:

  – gain in efficiency;

  – all the surplus goes to firm

2.2 Self-selection

- Nicholson, Ch. 14, pp. 513–515

- Perfect price discrimination not legal

- Cannot charge different prices for same quantity to A and B

- Partial Solution:

  - offer different quantities of goods at different prices;

  - allow consumers to choose quantity desired

- Examples (very important!):
  - bundling of goods (xeroxing machines and toner);
  - quantity discounts
  - two-part tariffs (cell phones)

- Example:

- Consumer A has value \$1 for up to 100 photocopies per month

- Consumer B has value \$.50 for up to 1,000 photocopies per month

- Firm maximizes profits by selling (for ε small):
  - 100-photocopies for \$100-ε
  - 1,000 photocopies for \$500-ε

- Problem if resale!

2.3 Segmented markets

- Nicholson, Ch. 14, pp. 510–513

- Firm now separates markets

- Within market, charges constant per-unit price

- Example:
  - cost function $TC(y) = cy$.
  - Market A: inverse demand dunction $p_A(y)$ or
  - Market B: inverse dunction $p_B(y)$

- Profit maximization problem:

$$\max_{y_A, y_B} p_A(y_A)\, y_A + p_B(y_B)\, y_B - c(y_A + y_B)$$

- First order conditions:

- Elasticity interpretation

- Firm charges more to markets with lower elasticity

- Examples:
  - student discounts
  - prices of goods across countries:
    - airlines (US and Europe)
    - books (US and UK)
    - cars (Europe)
- As markets integrate (Internet), less possible to do the latter.

3 Oligopoly?

- Extremes:
  - Perfect competition
  - Monopoly

- Oligopoly if there are n (two, five...) firms

- Examples:
  - soft drinks: Coke, Pepsi;
  - cellular phones: Sprint, AT&T, Cingular,...
  - car dealers

- Firm i maximizes:

$$\max_{y_i} p\left(y_i + y_{-i}\right) y_i - c\left(y_i\right)$$

  where $y_{-i} = \sum_{j \neq i} y_j$.

- First order condition with respect to y_i:

$$p'_Y\left(y_i + y_{-i}\right) y_i + p - c'_y\left(y_i\right) = 0.$$

- Problem: what is the value of y_{-i}?

  – simultaneous determination?

  – can firms $-i$ observe y_i?

- Need to study strategic interaction

4 Game Theory

- Nicholson, Ch. 10, pp. 246–255.

- Unfortunate name

- Game theory: study of decisions when payoff of player i depends on actions of player j.

- Brief history:

  – von Neuman and Morgenstern, Theory of Games and Economic Behavior (1944)

  – Nash, Non-cooperative Games (1951)

  – ...

  – Nobel Prize to Nash, Harsanyi (Berkeley), Selten (1994)

- Definitions:

  - Players: $1, ..., I$

  - Strategy $s_i \in S_i$

  - Payoffs: $U_i\left(s_i, s_{-i}\right)$

- Example: Prisoner's Dilemma
  - $I = 2$
  - $s_i = \{D, ND\}$
  - Payoffs matrix:

$1 \setminus 2$	D	ND
D	$-4, -4$	$-1, -5$
ND	$-5, -1$	$-2, -2$

- What prediction?

- Maximize sum of payoffs

- Choose dominant strategies

- Battle of the Sexes game:

He \ She	Ballet	Football
Ballet	$2,1$	$0,0$
Football	$0,0$	$1,2$

- No dominant strategies

- **Nash Equilibrium**.

- Strategies $s^* = \left(s_i^*, s_{-i}^*\right)$ are a Nash Equilibrium if

$$U_i\left(s_i^*, s_{-i}^*\right) \geq U_i\left(s_i, s_{-i}^*\right)$$

for all $s_i \in S_i$ and $i = 1, ..., I$

5 Next lecture

- More game theory

- Back to oligopoly:

  - Cournot

  - Bertrand