Economics 101A
(Lecture 19)

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Outline

1. Profit Maximization: Monopoly
2. Price Discrimination
3. Oligopoly?

1 Profit Maximization: Monopoly

- Nicholson, Ch. 11, pp. 371-380
- Nicholson, Ch. 14, pp. 501-510
- **Perfect competition.** Firms small
- **Monopoly.** One, large firm. Firm sets price p to maximize profits.
- What does it mean to set prices?
- Firm chooses p, demand given by $y = D(p)$
- (OR: firm sets quantity y. Price $p(y) = D^{-1}(y)$)

- Write maximization with respect to y

- Firm maximizes profits, that is, revenue minus costs:

$$\max_y p(y)\, y - c(y)$$

- Notice $p(y) = D^{-1}(y)$

- First order condition:

$$p'(y)\, y + p(y) - c'_y(y) = 0$$

or

$$\frac{p(y) - c'_y(y)}{p} = -p'(y)\,\frac{y}{p} = -\frac{1}{\varepsilon_{y,p}}$$

- Compare with f.o.c. in perfect competition

- Check s.o.c.

- Elasticity of demand determines markup:
  - very elastic demand $\longrightarrow$ low mark-up
  - relatively inelastic demand $\longrightarrow$ higher mark-up

- Graphically, y^* is where marginal revenue $(p'(y)\,y + p(y))$ equals marginal cost $(c'_y(y))$

- Find p on demand function

- Example.

- Linear inverse demand function $p = a - by$

- Linear costs: $C(y) = cy$, with $c > 0$

- Maximization:

$$\max_{y} (a - by)\, y - cy$$

- Solution:

$$y^*(a, b, c) = \frac{a - c}{2b}$$

and

$$p^*(a, b, c) = a - b\frac{a - c}{2b} = \frac{a + c}{2}$$

- s.o.c.

- Figure

- Comparative statics:

  – Change in marginal cost c

  – Shift in demand curve a

- Monopoly profits

- Case 1. High profits

- Case 2. No profits

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

- Graphical analysis

2 Price Discrimination

- Nicholson, Ch. 14, pp. 513-519

- 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 discrimination

- 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

- 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

- Firm now separates markets

- Within market, charges constant per-unit price

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

- 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)
    - drugs (US vs. Canada vs. Africa)
- 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 Next Lecture

- Game theory

- Back to oligopoly:
  - Cournot
  - Bertrand