

Economics 101A

(Lecture 20)

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November 9, 2006

Outline

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

1 Welfare: Consumer Surplus

- Nicholson, Ch. 5, pp. 145–149 [OLD: Ch. 5, pp. 139–143]
- Evaluate welfare effects of price change from p_0 to p_1
- Proposed measure:

$$e(p_0, u) - e(p_1, u)$$

- Can rewrite expression above as

$$\begin{aligned} e(p_0, u) - e(p_1, u) &= \left(e(0, u) + \int_0^{p_0} \frac{\partial e(p, u)}{\partial p} dp \right) - \\ &\quad - \left(e(0, u) + \int_0^{p_1} \frac{\partial e(p, u)}{\partial p} dp \right) \\ &= \int_{p_1}^{p_0} \frac{\partial e(p, u)}{\partial p} dp \end{aligned}$$

- What is $\frac{\partial e(p, u)}{\partial p}$?

- Remember envelope theorem...

- Result:

$$\frac{\partial e(p, u)}{\partial p} = h(p, u)$$

- Welfare measure is integral of area to the side of Hicksian compensated demand

- Graphically,

- Example of welfare effects: Imposition of Tax
- Welfare before tax
- Welfare after tax

2 Profit Maximization: Monopoly

- Nicholson, Ch. 13, pp. 385–393 [OLD: Ch. 18, pp. 496–504]
- Nicholson, Ch. 9, pp. 248–255 [OLD: Ch. 13, pp. 335–342]
- **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 \rightarrow low mark-up
 - relatively inelastic demand \rightarrow 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

3 Price Discrimination

- Nicholson, Ch. 13, pp. 397–404 [OLD: 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).

3.1 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

3.2 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 $\$100-\varepsilon$
 - 1,000 photocopies for $\$500-\varepsilon$
- Problem if resale!

3.3 Segmented markets

- 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)
 - * drugs (US vs. Canada vs. Africa)

- As markets integrate (Internet), less possible to do the latter.

4 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:

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

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

- First order condition with respect to y_i :

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

- Problem: what is the value of y_{-i} ?
 - simultaneous determination?
 - can firms $-i$ observe y_i ?
- Need to study strategic interaction

5 Next Lecture

- Game theory
- Back to oligopoly:
 - Cournot
 - Bertrand