Economics 101A
(Lecture 18)

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Outline

1. Welfare: Producer Surplus
2. Welfare: Consumer Surplus
3. Profit Maximization: Monopoly

1 Welfare: Producer Surplus

- Nicholson, Ch. 9, pp. 261–263 [OLD: Ch. 13, pp. 350–351]

- Producer Surplus is easier to define:

$$\pi\left(p, y_0\right) = py_0 - c\left(y_0\right).$$

- Can give two graphical interpretations:

  1. Rewrite as

  $$\pi\left(p, y_0\right) = y_0\left[p - \frac{c\left(y_0\right)}{y_0}\right].$$

  Profit equals rectangle of quantity times (p - Av. Cost)

2. Remember:

$$f(x) = f(0) + \int_0^x f'_x(s)\, ds.$$

Rewrite profit as

$$\left[p * 0 + p \int_0^{y_0} 1 dy\right] - \left[c(0) + \int_0^{y_0} c'_y(y)\, dy\right] =$$

$$= \int_0^{y_0} \left(p - c'_y(y)\right) dy - c(0).$$

Producer surplus is area between price and marginal cost (minus fixed cost)

2 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

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

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

- Remember envelope theorem...

- Result:

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

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

- Graphically,

3 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 relative to market

- **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

4 Next Lecture

- Market Power

- Price Discrimination