#### 14.01 Principles of Microeconomics, Fall 2007 Chia-Hui Chen November 9, 2007

Lecture 23

# Monopoly and Monopsony

# Outline

- 1. Chap 10: Multi-Plant Firm
- 2. Chap 10: Social Cost of Monopoly Power
- 3. Chap 10: Price Regulation
- 4. Chap 10: Monopsony

### 1 Multi-Plant Firm

How does a monopolist allocate production between plants? Suppose the firm produces quantity  $Q_1$  with cost  $C_1(Q_1)$  for plant 1, and quantity  $Q_2$  with cost  $C_2(Q_2)$  for plant 2. The total quantity is

$$Q_T = Q_1 + Q_2.$$

And the profit is

$$\pi = Q_T P(Q_T) - C_1(Q_1) - C_2(Q_2) = (Q_1 + Q_2) P(Q_1 + Q_2) - C_1(Q_1) - C_2(Q_2).$$

To solve, use the first order constraint:

$$\frac{d\pi}{dQ_1} = P(Q_1 + Q_2) + (Q_1 + Q_2)\frac{dP(Q_1 + Q_2)}{dQ_1} - \frac{dC_1}{dQ_1} = 0,$$

Since

$$P(Q_T) + Q_T \frac{dP(Q_T)}{dQ_1} = P(Q_T) + Q_T \frac{dP(Q_T)}{dQ_T} = MR(Q_T)$$
$$MR(Q_T) = MC_1(Q_1).$$

Similarly,

$$MR(Q_T) = MC_2(Q_2).$$

Thus,

$$MR(Q_T) = MC_1(Q_1) = MC_2(Q_2).$$

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# 2 Social Cost of Monopoly Power

Firstly, compare the producer and consumer surplus in a competitive market and a monopolistic market. In the competitive market, the quantity is determined by

$$MC = AR$$

while in the monopolistic market, the quantity is determined by

$$MC = MR$$

(see Figure 1). Therefore, in going from a perfectly competitive market to a

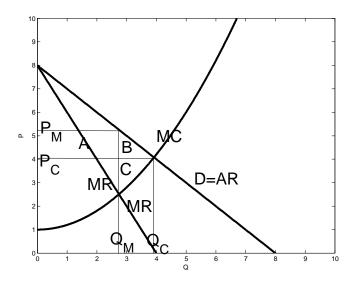


Figure 1: Consumer and Producer Surplus in Monopolist Market.

monopolistic market, the change of consumer surplus and producer surplus are, respectively,

$$\Delta CS = -(A+B),$$

and

$$\Delta PS = A - C.$$

The deadweight loss is

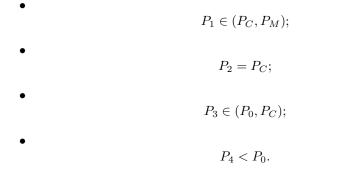
DWL = B + C.

In fact, social cost should not only include the deadweight loss but also rent seeking. The firm might spend to gain monopoly power by lobbying the government and building excess capacity to threaten opponents.

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#### **3** Price Regulation

In perfectly competitive markets, price regulation causes deadweight loss, but in monopoly, price regulation might improve efficiently. Now we discuss four possible price regulations in monopolistic markets.  $P_1$ ,  $P_2$ ,  $P_3$ ,  $P_4$  are:



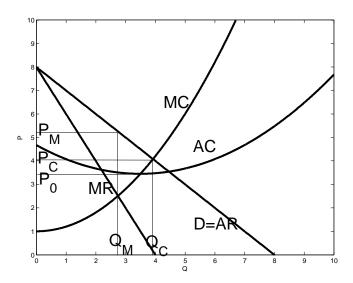


Figure 2: Comparing Competitive and Monopolist Market.

Price between the competitive market price and monopolist market price. Suppose the price ceiling is  $P_1$ . The new corresponding AR and MR curves are shown in Figure 3. Given the new MR curve, the equilibrium quantity will be  $Q_1$ .

$$Q_1 \in (Q_M, Q_C).$$

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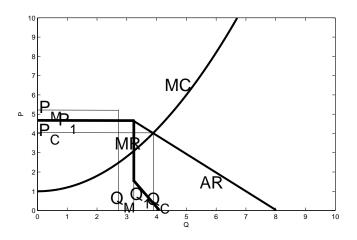


Figure 3: Price between the Competitive Market Price and Monopolist Market Price.

- Price equal to the competitive market price. The new corresponding MR and AR curves are shown in Figure 4. In this case the equilibrium price and quantity are as same as those of the competitive market.
- Price between the competitive market price and the lowest average cost. Suppose the price ceiling is  $P_3$ . The new corresponding MR and AR curves are shown in Figure 5. The equilibrium quantity will be  $Q_3$ .

$$Q_3 \in (Q_C, Q_0).$$

The new bold line describes the relation between price and quantity.

**Price lower than the lowest average cost.** The firm's revenue is not enough for the cost, thus it will quit the market. There is no production.

The analysis shows that if the government sets the price ceiling equal to  $P_2$ , the outcome is the same as in a competitive market, and there is no deadweight loss.

**Natural monopoly.** In a natural monopoly, a firm can produce the entire output of the industry and the cost is lower than what it would be if there were other firms. Natural monopoly arises when there are large economies of scale (see Figure 6). If the market is unregulated, the price will be  $P_M$  and the quantity will be  $Q_M$ . To improve efficiency, the government can regulate the price. If the price is regulated to be  $P_C$ , the firm cannot cover the average cost and will go out of business.  $P_R$  is the lowest price that the government can set so that the monopolist will stay in the market.

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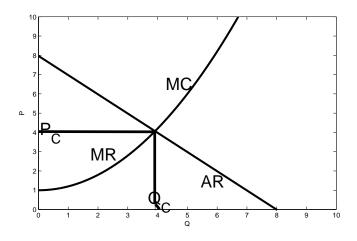


Figure 4: Price Equal to the Competitive Market Price.

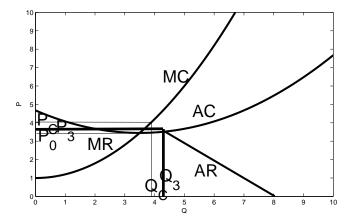


Figure 5: Price between the Competitive Market Price and the lowest Average Cost.

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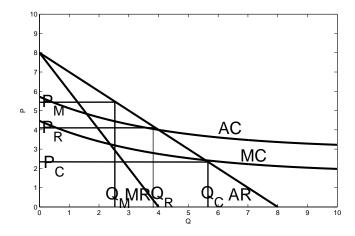


Figure 6: Regulating the Price of a Natural Monopoly.

## 4 Monopsony

Monopsony refers to a market with only one buyer. In this market, the buyer will maximize its profit, which is the difference of value and expenditure:

$$\max \Pi(Q) = V(Q) - E(Q).$$

When the profit is maximized,

$$\frac{d}{dQ}(V(Q) - E(Q)) = 0.$$

Thus

$$MV = ME$$
,

namely, the marginal value (additional benefit form buying one more unit of goods) is equal to the marginal expenditure (additional cost of buying one more unit of goods).

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