Chapter 11 - Monopoly
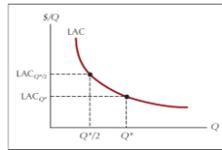
☐ **Monopoly**: a market structure in which a single seller of a product with no close substitutes serves the entire market.

    ◻ A monopoly has significant control over the price it charges.

Five Sources Of Monopoly

1. Exclusive Control over Important Inputs
2. Economies of Scale
3. Patents
4. Network Economies
5. Government Licenses or Franchises

**Natural Monopoly**

Give examples

Profit Maximization and Revenue or the Monopolist

12-2

☐ The monopolist's goal is to maximize economic profit.

    ◻ In the short run this means to choose the level of output for which the difference between total revenue and short-run total cost is greatest.

☐ As price falls, total revenue for the monopolist does not rise linearly with output.

    ◻ Instead, it reaches a maximum value at the quantity corresponding to the midpoint of the demand curve after which it again begins to fall.

    ◻ Total revenue reaches its maximum value when the price elasticity of demand is unity.

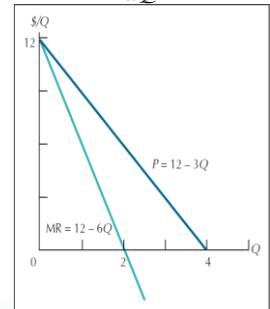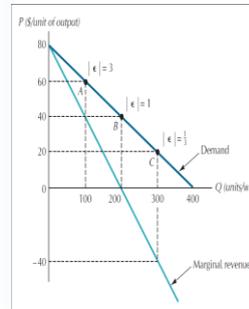
Demand, Total Revenue, and Elasticity

12-3
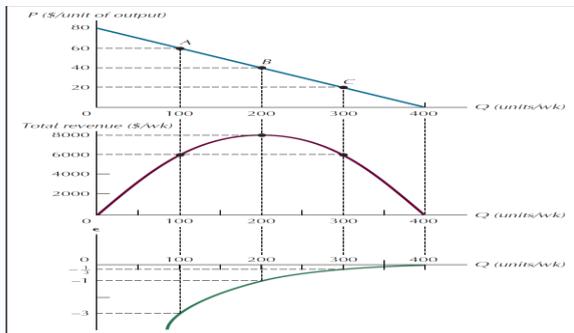
The Demand Curve and Corresponding Marginal Revenue Curve

12-4

$$P = a - bQ \text{ then } TR = aQ - bQ^2 \quad MR = \frac{dTR}{dQ} = a - 2bQ$$

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Profit Maximization

The goal of the firm is to find the level of output (Q) which maximizes profit (π)
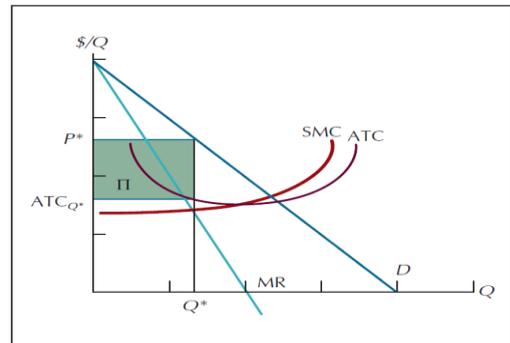
$$\text{Max } \pi(Q) = PQ - TC(Q)$$

F.O.C. $\pi = TR - TC$

$$\frac{d\Pi}{dQ} = \underbrace{P + Q\frac{dP}{dQ}}_{MR} - \underbrace{\frac{dTC}{dQ}}_{MC} = 0 \qquad \begin{array}{l} MR - MC = 0 \\ or\ MR = MC \end{array}$$

S.O.C. $\dfrac{d^2\pi}{dQ^2} = \dfrac{dMR}{dQ} - \dfrac{dMC}{dQ} < 0$
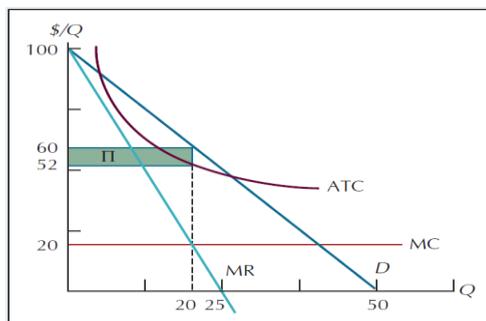
$$If\ \frac{dMC}{dQ} > 0\ and\ \frac{dMR}{dQ} < 0\ \ suff.$$

$$If\ \frac{dMC}{dQ} < 0,\ \left|\frac{dMR}{dQ}\right|\ must\ be > \left|\frac{dMC}{dQ}\right|$$

The Profit-Maximizing Price and Quantity for a Monopolist

The Profit-Maximizing Price and Quantity for Specific Cost and Demand Functions

The Profit-maximizing Monopolist

- If a monopolist's goal is to maximize profits, she will never produce an output level on the inelastic portion of her demand curve.

- The profit-maximizing level of output must lie on the elastic portion of the demand curve.

- **Shutdown condition for a monopolist:** he should cease production whenever average revenue is less than average variable cost at every level of output.

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A Monopolist Has No Supply Curve

- The monopolist is a price maker.
  - When demand shifts rightward elasticity at a given price may either increase or decrease, and vice-versa.
    - So there can be no unique correspondence between the price a monopolist charges and the amount she chooses to produce.

- Monopoly has a *supply rule*, which is to equate marginal revenue and marginal cost.

Calculating Monopoly Output

- Suppose that the market for cell phones has a linear demand curve of the form
$$Q = 2,000 - 20P$$
or
$$P = 100 - Q/20$$
- The total costs of the cell phone producer are given by
$$TC = C(Q) = 0.05Q^2 + 10,000$$

Calculating Monopoly Output

- To maximize profits, the monopolist chooses the output for which $MR = MC$
- We need to find total revenue
$$TR = P \cdot Q = 100Q - Q^2/20$$
- Therefore, marginal revenue is
$$MR = 100 - Q/10$$
while marginal cost is
$$MC = 0.1Q$$

Calculating Monopoly Output

- Thus, $MR = MC$ where
$$100 - Q/10 = 0.1Q$$
$$Q^* = 500 \qquad P^* = 75$$
- At the profit-maximizing output,
$$C(Q) = 0.05(500)^2 + 10,000 = 22,500$$
$$AC = 22,500/500 = 45$$
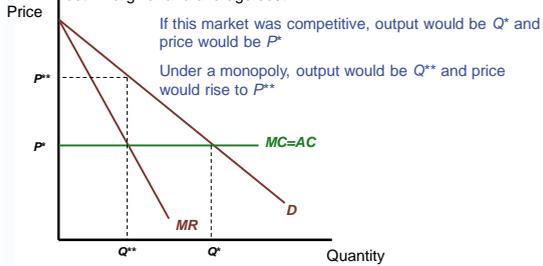$$\pi = (P^* - AC)Q = (75 - 45) \cdot 500 = 15,000$$

3

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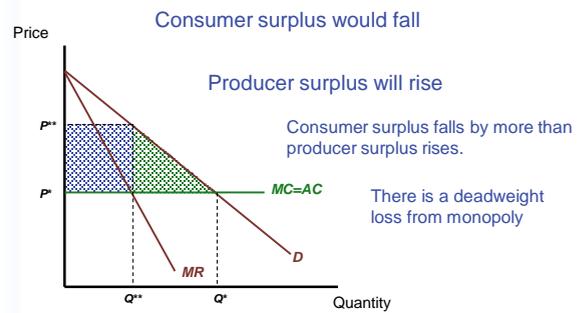
Monopoly and Resource Allocation

To evaluate the allocational effect of a monopoly, we will use a perfectly competitive, constant-cost industry as a basis of comparison
  • the industry's long-run supply curve is infinitely elastic with a price equal to both marginal and average cost

Price

If this market was competitive, output would be Q^* and price would be P^*

Under a monopoly, output would be Q^{**} and price would rise to P^{**}

P^{**}

P^* MC=AC

MR

D

Q^{**} Q^* Quantity

Monopoly and Resource Allocation

Price

Consumer surplus would fall

Producer surplus will rise

Consumer surplus falls by more than producer surplus rises.

There is a deadweight loss from monopoly

P^{**}

P^* MC=AC

MR

D

Q^{**} Q^* Quantity

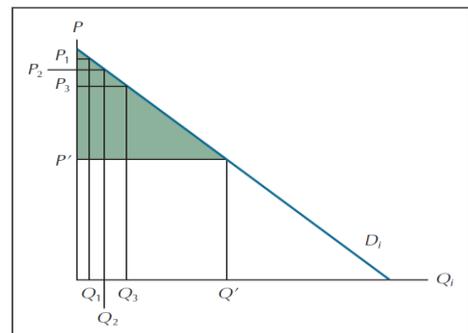## Price Discrimination

☐ *Price discrimination:* a practice where the monopolist charge different prices to different buyers.

☐ *First-degree price discrimination:* is the term used to describe the largest possible extent of market segmentation.

☐ *Second-degree price discrimination:* price discrimination where the same rate structure is available to every consumer and the limited number of rate categories tends to limit the amount of consumer surplus that can be captured.

☐ *Third-degree price discrimination:* charging different prices to buyers in completely separate markets.
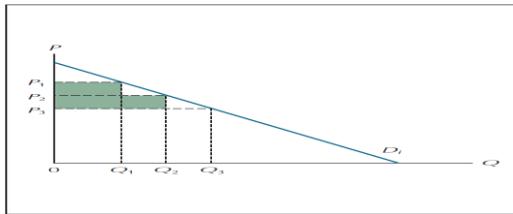
First Degree or Perfect Price Discrimination

P

P_2 P_1
P_3

P'

D_I

Q_1 Q_3 Q' Q_I
Q_2

4

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Second-Degree Price Discrimination

□ **Second-degree price discrimination**: price discrimination where the same rate structure is available to every consumer and the limited number of rate categories tends to limit the amount of consumer surplus that can be captured.

Model of Third- Degree Price Discriminating Monopolist

1. Firm produces for two different markets: 1, 2

2. Firm charges two different prices in each market: P_1, P_2

3. Goal of firm is to maximize profit.

Suppose that marginal costs for the two markets are the same. How does a monopolist maximise profit with this type of price discrimination?

Set the marginal revenue in each market equal to marginal cost. (i.e., the monopolist maximises total profits by maximising profits from each group individually.)

This implies that $MR_1 = MC = MR_2$ at the optimum. Otherwise, the monopolist could raise revenues by switching sales from the low MR group to the high MR group.

Solving

$$TR = TR_1 + TR_2 \qquad TR_1 = P_1Q_1 \qquad TR_2 = P_2Q_2$$

$$\pi = P_1Q_1 + P_2Q_2 - TC(Q_1 + Q_2)$$

$$\frac{d\pi}{dQ_1} = MR_1 - MC = 0$$

$$\frac{d\pi}{dQ_2} = MR_2 - MC = 0$$

We want to find the level of Q_1 and Q_2 that maximizes profit.

Example

$$TR = TR_1 + TR_2 \qquad TR1 = P_1Q_1 \qquad TR2 = P_2Q_2$$

MC = AC = 20

$P_1 = 100 - Q_1$ $\qquad\qquad$ $P_2 = 80 - 2Q_2$

What is the optimal price for each group?

$MR_1 = 100 - 2Q_1 = MC = 20$

$MR_2 = 80 - 4Q_2 = MC = 20$

$Q_1{}^* = 40$ $\qquad$ $Q_2{}^* = 15$ $\qquad$ $P_1{}^* = 60$ $\qquad$ $P_2{}^* = 50$

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Solving

12-21

Firm maximizes profit by producing where $MR_1 = MC$, $MR_2 = MC$
or $\qquad MR_1 = MR_2$

Solving: -
$$P_1(1 - \frac{1}{|E_1|}) = P_2(1 - \frac{1}{|E_2|})$$
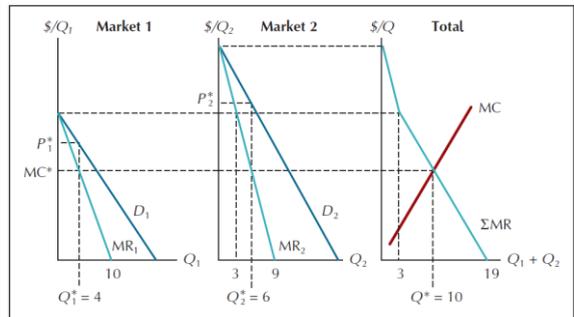
$$\frac{P_1}{P_2} = \frac{(1 - \frac{1}{|E_2|})}{(1 - \frac{1}{|E_1|})}$$

Let's assume $E_1 = 2$ and $E_2 = 4$

$$\frac{P_1}{P_2} = \frac{(1 - \frac{1}{|4|})}{(1 - \frac{1}{|2|})} = \frac{.75}{.5} = 1.5 \, or \, P_1 = 1.5 P_2$$

Firm will charge higher price in market which has the lower
price elasticity of demand. (E must be greater than 1)

The Profit-Maximizing Monopolist Who Sells in Two Markets

12-22

Public Policy Toward Natural Monopoly

12-23

- ☐ State Ownership And Management
- ☐ State Regulation Of Private Monopolies
- ☐ Exclusive Contracting For Natural Monopoly
- ☐ Vigorous Enforcement Of Antitrust Laws
- ☐ A Laissez-faire Policy Toward Natural Monopoly

A Natural Monopoly

12-24