Industrial Economics

Chapter 6

Market structures

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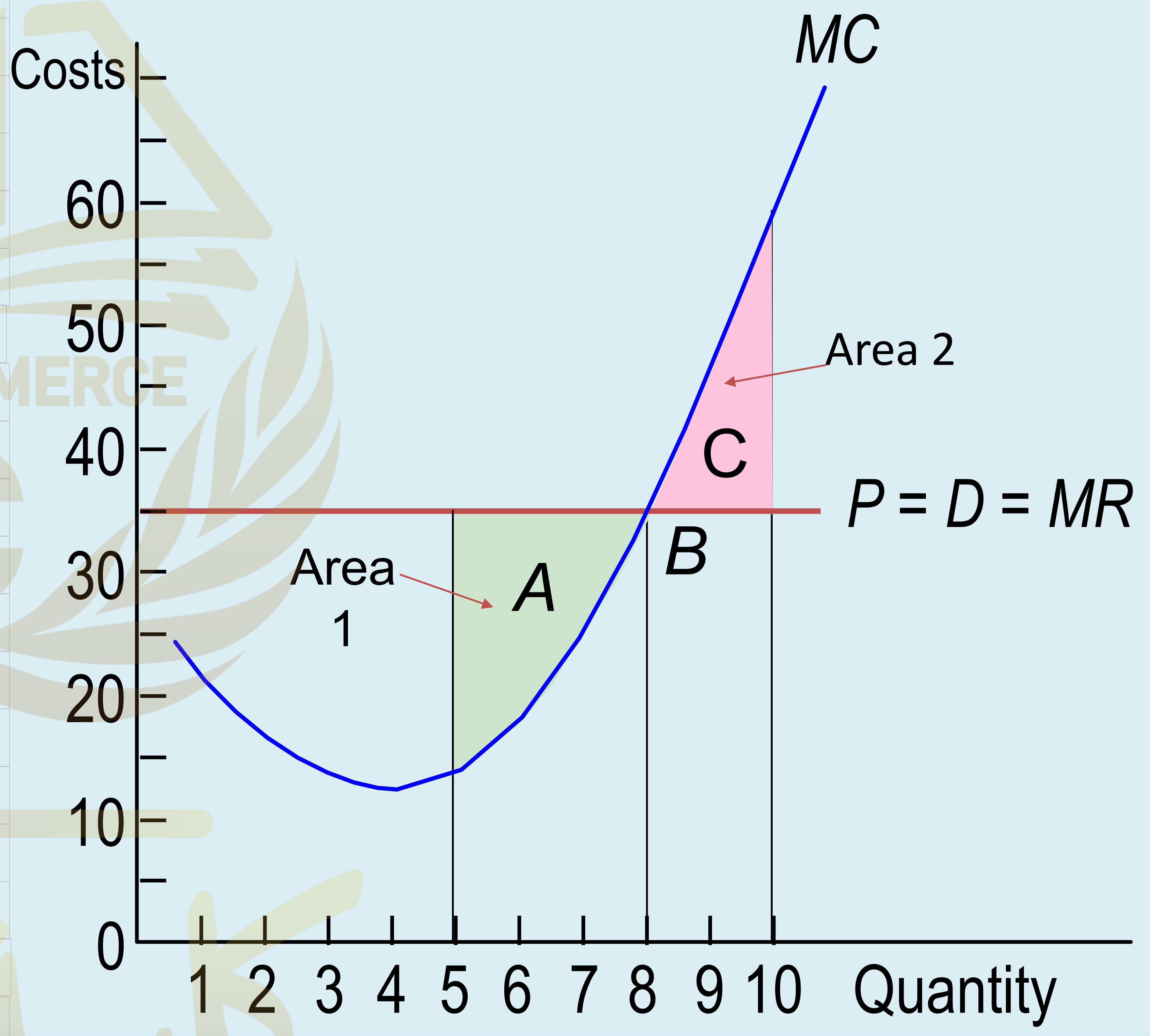
Example for Marginal Cost, Marginal Revenue, and Price

Price = MR	Quantity	Total Cost	Marginal Cost
35	0	40	
35	1	68	28
35	2	88	20
35	3	104	16
35	4	118	14
35	5	130	12
35	6	147	17
35	7	169	22
35	8	199	30
35	9	239	40
35	10	293	54



Example1:

Suppose the wheat market is perfectly competitive, The market price for wheat is $10 per unit, and the farmer produces 500 units at a total cost of $4,000.

A. What is the farmer's total revenue?

- Total Revenue (TR) = Price × Quantity
- TR = $10 × 500 = $5,000

B. What is the farmer's profit or loss?

- Profit/Loss = Total Revenue - Total Cost
- Profit = $5,000 - $4,000 = $1,000 **(Profit)**

Example2:

- The AAA Aquarium Co. sells aquariums for $20 each.
- Fixed costs of production are $20.
- The total variable costs are $20 for one aquarium, $25 for two units, $35 for the three units, $50 for four units, and $80 for five units.

Requirement:

1- In the form of a table, calculate total revenue, marginal revenue, total cost, and marginal cost for each output level (one to five units).

2- What is the profit-maximizing quantity of output?

Solution:

- **Price** = $20
- **FC** = $20
- **VC** = $20, $25, $35, $50, $80

Output (Units)	Total Revenue (P*Q) ($)	Marginal Revenue (Δ TR) ($)	Total Cost ($) (FC+VC)	Marginal Cost ($) (ΔTC)	Profit ($) (TR-TC)
1	20	20	40	40	-20
2	40	20	45	5	-5
3	60	20	55	10	5
4	80	20	70	15	10
5	100	20	100	30	0

✓ **We can maximize profits at 4 units of output.**

1.Which of the following best defines a market?

a. A physical location where goods are traded

b. A set of buyers and sellers whose behavior affects prices

c. A group of competing businesses

d. A regulated trading environment

2. In perfect competition, which condition is NOT required?

a. Product differentiation

b. Complete information about prices and products

c. Free entry and exit

d. Large number of firms

3- What occurs at the profit maximization point for a Competetive firm?

a. Total revenue equals total cost

b. Price equals average cost

c. Marginal cost equals marginal revenue equals price

d. Average revenue exceeds marginal cost

4. When should a firm shut down in the short run?

a. When total costs is less than total revenue

b. When price falls below average variable cost

c. When fixed costs are too high

d. When marginal cost is less than price

5. What characterizes monopolistic competition?

a. Single firm dominates the market

b. Products are completely identical

c. Many firms selling differentiated products

d. No control over pricing

6. Which market structure typically has the highest barriers to entry?

a. Perfect competition

b. Monopolistic competition

c. Oligopoly

d. Pure monopoly

7. What represents a positive economic profit as a market signal?

a. $\pi = 0$

b. Resources leaving the industry

c. $\pi < 0$

d. $\pi > 0$

8. How many firms typically operate in an oligopoly?

a. One

b. Few

c. Hundreds

d. Unlimited

9. What happens in perfect competition when economic profits exist?

a. Firms immediately exit the market

b. Prices rise significantly

c. New firms enter the market

d. Production decreases

10. When calculating profit, which formula is correct?

a. Revenue minus variable costs

b. Total revenue minus total cost

c. Price times quantity

d. Fixed costs plus variable costs

11. What determines a firm's marginal revenue?

a. Change in total cost with one unit change

b. Change in total revenue with quantity change

c. Average of all revenues

d. Fixed costs divided by quantity

12. What happens when price is less than average variable cost?

a. Firm reaches shutdown point

b. Firm maximizes profit

c. Firm enters market

d. Firm expands production

13. What characteristic is shared between perfect and monopolistic competition?

a. Identical products

b. Few sellers

c. Free entry and exit

d. Price control

14- Which of the following factors is not a characteristic of perfect competition?

A. large number of buyers and sellers

B. Well-informed buyers and sellers about product prices

C. Individual firms spend a considerable amount on advertising

D. No restrictions on entry into or exit from the industry

15. Which of the following markets have the fewest number of firms?

A. Monopoly

B. Perfect competition

C. Oligopoly

D. Monopolistic competition

16. If many sellers are selling an identical product, what is the implication of this scenario?

A. Significant losses for all the sellers

B. The market supply curve is horizontal

C. Chaos in the market

D. The sellers do not have the power to change the price of a product

17. Which of the following is true about a price-taking firm?

A. It is in contact with rival firms to fix the best price that all of them can charge
B. It is unable to influence the price of the product that it sells
C. It is asking the government to set a fixed price for its product
D. It can set the price of a product at any level that it wants

18. Which one is the characteristic of perfect competition?

A. It has a large number of buyers and sellers selling homogeneous products at a uniform price.
B. There is no free entry and exit for all the firms.
C. It has a large number of buyers and sellers where the government decides the price of the product.
D. It has a large number of buyers and sellers selling heterogeneous products at a uniform price.

19. In perfect competition how the prices of goods and services are decided?

A. Demand and supply forces decide the prices of goods and services.

B. The seller decides the prices of goods.

C. Government influences the prices of goods.

D. Buyers control the price level by influencing demand for the products.

20. Sellers in perfect competition are:

A. Price maker

B. Price taker

C. Wealthy

D. Poor

21. Sellers in the perfect competition are price takers because:

A. Sellers get a lot of pressure from other competing firms to accept the prevailing equilibrium price in the market.

B. Buyers influence the prices of products.

C. Government forces the sellers to sell a product at a particular price.

D. None of the above.

22. How is the demand curve in a perfectly competitive market?

A. The demand curve is a vertical line at the market price.

B. The demand curve is flat.

C. The demand curve cannot be calculated

D. The demand curve is a horizontal line at the market price.

Example 3 on perfect competition:

A firm in a perfectly competitive market has the following cost structure:

- Fixed Costs = $200
- Variable Costs = per unit $75, $70, $65, $60, $ 55, $50, $45, $40, $35, $30
- Market Price = $70 per unit
- Quantity produced = 10 unit

Requirement:

1- Calculate the firm's total revenue, total cost, and profit.

Solution:

Quantity	Price	Fixed Cost ($)	Variable cost	Total Revenue ($) (P*Q)	Total Cost ($) (FC+ VC)	Profit ($) (TR - TC)
1	70	200	75	70	275	-205
2	70	200	70	140	270	-130
3	70	200	65	210	265	-55
4	70	200	60	280	260	20
5	70	200	55	350	255	95
6	70	200	50	420	250	170
7	70	200	45	490	245	245
8	70	200	40	560	240	320
9	70	200	35	630	235	395
10	70	200	30	700	230	470

How can we calculate the monopoly’s revenue?

- **Total Revenue**

$$P \times Q = TR$$

- **Average Revenue**

$$TR/Q = AR = P$$

- **Marginal Revenue**

$$\Delta TR/\Delta Q = MR$$

Quantity of Water (Q)	Price (P)	Total Revenue ($TR = P \times Q$)	Average Revenue ($AR = TR/Q$)	Marginal Revenue ($MR = \Delta TR/\Delta Q$)
0 gallons	$11	$ 0	—	
				$10
1	10	10	$10	
				8
2	9	18	9	
				6
3	8	24	8	
				4
4	7	28	7	
				2
5	6	30	6	
				0
6	5	30	5	
				−2
7	4	28	4	
				−4
8	3	24	3	

- **A Monopoly’s Marginal Revenue**
  - A monopolist’s marginal revenue is always *less than* the price of its good.
    - The demand curve is downward sloping.
    - When a monopoly drops the price to sell one more unit, the revenue received from previously sold units also decreases.
    - When a monopoly increases the amount it sells, it has two effects on total revenue (P x Q).
    - The output effect—more output is sold, so Q is higher.
    - The price effect—price falls, so P is lower.

Profit Maximization:

- When marginal revenue equals marginal cost.

Comparing Monopoly and Competition :

- For a competitive firm,

Price equals marginal cost.

$$P = MR = MC$$

- For a monopoly firm,

Price exceeds marginal cost.

$$P > MR = MC$$

A monopoly's Profit:

- ✓ Profit equals total revenue minus total costs.

Profit = TR - TC

Profit = (P*Q – ATC*Q)

Profit = (P - ATC) Q

- ✓ The monopolist will receive economic profits as long as price is greater than average total cost.

Example 4:

The demand curve for the treatments is given by the first two columns in Table below; its total costs are given in the third column.

Requirement:

1- For each level of output, calculate total revenue, marginal revenue, average cost, and marginal cost.

2- What is the profit-maximizing level of output for the treatments and how much will the firm earn in profits?

Price	Quantity	TC
$25.00	0	$130
$24.00	10	$275
$23.00	20	$435
$22.50	30	$610
$22.00	40	$800
$21.60	50	$1,005

Solution:

Price ($)	Quantity	Total Cost ($)	Total Revenue ($) (P*Q)	Marginal Revenue ($) ($\Delta$TR/$\Delta$Q)	Average Cost ($) TC/ Q	Marginal Cost ($) (ΔTC/ ΔQ)	Profit ($) TR - TC
25.0	0	130	0.0				-130.0
24.0	10	275	240.0	24	27.5	14.5	-35.0
23.0	20	435	460.0	46	21.75	16	25.0
22.5	30	610	675.0	21.5	20.33	17.5	65.0
22.0	40	800	880.0	20.5	20.0	19	80.0
21.6	50	1005	1080.0	20	20.1	20.5	75.0

- The profit maximizing output for this treatment is 40.
- because if the firm increases the output at 50 , marginal revenue will be less than marginal cost which cause negative economic profit.

The Herfindahl-Hirschman Index (HHI)

- The Herfindahl-Hirschman Index (HHI) is a common measure of market concentration and is used to determine market competitiveness, often pre- and post-merger and acquisition (M&A) transactions.

- The HHI is calculated by squaring the market share of each firm competing in a market and then summing the resulting numbers.
  - $\text{HHI} = \sum (Market\ Share)^2$

The Herfindahl-Hirschman Index (HHI)

- **Unconcentrated Industry:**

HHI < 1,500.Indicates a competitive market

- **Moderately Concentrated Industry:**

HHI between 1,500 and 2,500.Some firms have moderate market power

- **Highly Concentrated Industry:**

HHI > 2,500.Indicates dominance by one or a few firms

Example 5 on Concentration Ratio:

Suppose there are 10 producing companies in a market.

The production percentages for **the top three companies** are 35%, 20%, and 10%.

✓Calculate the concentration ratio for these three companies.

Solution

- The concentration ratio is the sum of market shares covered by the largest firms.

So, the concentration ratio for the first 3 companies are:

- Concentration ratio = 35%+20%+10%

  = **65 %**

Example 6 on (HHI):

Suppose there are 10 producing companies in a market. The production percentages for the top three companies are 35%, 20%, and 10%. Calculate the HHI for the top three companies.

Solution

- $HHI = (35)^2 + (20)^2 + (10)^2$

  $= 1225 + 400 + 100 = 1725$

✓ **Moderately Concentrated Industry**

Example 7 on HHI:

Assume that there are four banks in a market. Bank A holds 40 percent of bank deposits in the market, Bank B holds 30 percent, Bank C holds 20 percent, and Bank D holds 10 percent.

Requirement:

1. Calculate HHI for the three banks before merge.
2. Assume that Bank C, with 20 percent of the market, acquires Bank D, which has 10 percent of the market. Calculate HHI after merge.

Solution:

1. **HHI for bank deposits <u>before merge</u>** $= (40)^2 + (30)^2 + (20)^2 + (10)^2$

$= 1{,}600 + 900 + 400 + 100 =$ **3,000**.

2. **The HHI <u>after merger</u>** $=(40)^2 + (30)^2 + (20 + 10)^2$.

$=1{,}600 + 900 + 900 =$ **3,400**.

✓The merger therefore increased the HHI by 400, from 3,000 to 3,400.

Example 8

If a market has 5 suppliers and each of the top two suppliers holds 20 percent of the market share, which of the following best represents the concentration ratio for the top 2 suppliers and their respective HHI?

A. Concentration ratio = 4%; HHI = 40

B. Concentration ratio = 40%; HHI = 800

C. Concentration ratio = 40%; HHI = 0.4

D. Concentration ratio = 4%; HHI = 0.08

Solution

✓ ***The correct answer is B.***

The concentration ratio is the sum of the two suppliers' market share.

Therefore, 20% + 20% = ***40%.***

For the HHI, we take $20^2 + 20^2 =$ ***800****.*

Example 9

- **Suppose the market shares of firms in an industry are as follows:**

Firm	Market Share
Firm A	30
Firm B	30
Firm C	20
Firm D	10
Firm E	10

Requirement:

- Calculate the HHI for this industry.
- Classify the industry as unconcentrated, moderately concentrated, or highly concentrated based on the HHI.

Solution

- HHI= $(30)^2 + (30)^2 + (20)^2 + (10)^2 + (10)^2$

  $= 900 + 900 + 400 + 100 + 100 = \mathbf{2400}$

- The HHI is 2400, which indicates a moderately concentrated industry.

Example 10

1. An industry initially consists of the following firms and market shares: Calculate the pre-merger HHI.

2. If Firm X merges with Firm Y, Calculate the post-merger HHI.

3. Determine the change in HHI (ΔHHI) and explain whether the merger would raise antitrust concerns.

Firm	Market Share
Firm X	40
Firm Y	30
Firm Z	20
Firm W	10

Solution

1. Pre-Merger HHI:

HHI (Pre-Merger) = (40)2 + (30)2 + (20)2 + (10)2

= 1600 + 900 + 400 + 100 = **3000**

2. Post-Merger HHI:

- Firm X and Firm Y merge to form a firm with 40 + 30 = 70 market share. Then adjust the table.

Firm	Market Share
Firm XY	70
Firm Z	20
Firm W	10

Post-Merger HHI= (70)2 + (20)2 + (10)2 = 4900+ 400 + 100 = **5400**

3. ΔHHI = 5400 – 3000 = **2400**

- ✓ **Indicating a significant increase in market concentration.**
- ✓ **This merger would likely raise antitrust concerns.**

23. What is the primary characteristic for oligopoly?

a. Complete absence of competition

b. Industry dominated by a small number of large firms

c. Perfect competition among many small firms

d. Single firm controlling the entire market

24. In a monopolistic market, the relationship between price (P) and marginal cost (MC) is:

a. $P = MC$

b. $P < MC$

c. $P > MC$

d. P and MC are unrelated

25. Which of the following is NOT a characteristic of a duopoly?

a. High barriers to entry

b. Easy to enter the market

c. Possibility of price leadership

d. Abnormal profits

26. In a monopoly, profit maximization occurs when:

a. Price equals marginal revenue

b. Marginal revenue equals marginal cost

c. Average revenue equals marginal cost

d. Total revenue is at its peak

27. What is a natural monopoly?

a. A government-granted monopoly

b. A monopoly based on resource ownership

c. When a single firm can supply at lower cost than multiple firms

d. When multiple firms compete equally

28. Which industry is NOT typically considered an example of oligopolistic structure?

a. Local food trucks

b. Banking industry

c. Oil industry

d. Supermarket chains

29. The concentration ratio in an oligopoly measures:

a. The total number of firms in the market

b. The market share of the smallest firms

c. The proportion of market share held by top firms

d. The profit margins of competing firms

30. What distinguishes a competitive firm from a monopoly?

a. Faces a downward-sloping demand curve

b. Is a price maker

c. Is a price taker

d. Reduces price to increase sales

31. A monopolist's marginal revenue is always:

a. Equal to the price

b. Greater than the price

c. Less than the price

d. Zero

32. Which is an advantage of monopoly?

a. Lower consumer prices

b. Encourages R&D and innovation

c. Perfect market efficiency

d. Maximum consumer choice

33. When a monopoly increases sales quantity, the price effect means:

a. Total revenue always increases

b. Price rises to match demand

c. Price falls for all units sold

d. Quantity remains constant

34. The main criticism of monopolies is:

a. Too much consumer choice

b. Excessive competition

c. Consumer exploitation through high prices

d. Low barriers to entry

35. In oligopolistic markets, non-price competition often involves:

a. Price wars

b. Branding and advertising

c. Quantity restrictions

d. Cost leadership

36. A monopolist's profit is calculated as:

a. Total revenue divided by quantity

b. Price plus average total cost

c. (Price - ATC) × Quantity

d. Marginal revenue plus marginal cost

37. When marginal revenue becomes negative, it indicates:

a. Increased profits

b. Optimal production level

c. Revenue is decreasing with additional sales

d. Cost efficiency

38. Price discrimination is most commonly associated with:

a. Perfect competition

b. Oligopoly

c. Monopolistic competition

d. Monopoly

Thank you!