Industrial Economics

CHAPTER 6
MARKET STRUCTURES

TYPES OF MARKET STRUCTURE

- **A market is a set of buyers and sellers whose behavior affects P at which a good is sold.**
- **<u>Economists describe different types of markets by:</u>**
- 1. the number of firms
- 2. whether the products of different firms are identical or different
- 3.how easy it is for new firms to enter the market

TYPES OF MARKET STRUCTURE

- **The 4 major types of markets can be viewed on a continuum.**

MARKET STRUCTURES

- **Degree of competition in the industry**
- High levels of competition – Perfect competition
- Limited competition – Monopoly
- Degrees of competition in between

MARKET STRUCTURE

- **Determinants of market structure**
  - Freedom of entry and exit
  - Nature of the product – homogenous (identical), differentiated
  - Control over supply/output
  - Control over price
  - Barriers to entry

MARKET STRUCTURES

	Number of Firms	Influence on Price	Product Differentiation	Advertising	Barriers to Entry
Perfect Competition	Many	None	No	No	None
Monopolistic Competition	Many	Limited	Some	Yes	Limited
Oligopoly	Few	Some	Some	Yes	Significant
Pure Monopoly	One	Extensive	No	Yes	Complete

1)PERFECT COMPETITION

- **6 conditions required for perfect competition:**
- The number of firms is large.
- The firms' products are identical.
- There is free entry and exit, that is, there are no barriers to entry.
- There is complete information.
- Firms are profit maximizers.
- Both buyers and sellers are price takers.

1)PERFECT COMPETITION

- Firm is a P taker –it can produce as much or as little as it likes without affecting market P.
- Firm must match P offered by its competitors because products are identical. Otherwise, consumers shift their purchases to another firm.
- Industry, which is comprised of all the individual firms, can impact P through the forces of S and D.

THE NECESSARY CONDITIONS FOR PERFECT COMPETITION

- **The number of firms is large.**
- Large number of firms means that any one firm's output is very small when compared with the total market.
- What one firm does has no bearing on market quantity or market price.

THE NECESSARY CONDITIONS FOR PERFECT COMPETITION

- **Firms' products are identical.**

This requirement means that each firm's output is .indistinguishable from any other firm's output .Firms sell homogeneous product

THE NECESSARY CONDITIONS FOR PERFECT COMPETITION

- **There is free entry and free exit.**
- Firms are free to enter a market in response to market signals such as price and profit.
- Barriers to entry are social, political, or economic impediments that prevent other firms from entering the market.
- Technology may prevent some firms from entering the market.
- There must also be free exit, without incurring a loss.

THE NECESSARY CONDITIONS FOR PERFECT COMPETITION

- There is complete information.

Firms and consumers know all there is to know about the .market – prices, products, and available technology
Any technological advancement would be instantly known .to all in the market

THE NECESSARY CONDITIONS FOR PERFECT COMPETITION

- Firms are profit maximizers.

The goal of all firms in a perfectly competitive market is .profit and only profit
There is no non-price competition (based on quality, brand .name, or the like)

THE NECESSARY CONDITIONS FOR PERFECT COMPETITION

- **Both buyers and sellers are price takers.**
  - A *price taker* is a firm or individual who takes the market price as given.
  - Neither supplier nor buyer possesses market power.

MARKET STRUCTURE

- **Advantages of Perfect Competition:**
- High degree of competition helps allocate resources to most efficient use
- Price = marginal costs
- Normal profit made in the long run
- Firms operate at maximum efficiency

THE PROFIT-MAXIMIZING LEVEL OF OUTPUT

- The goal of the firm is to maximize profits.
- When it decides what quantity to produce it continually asks how changes in quantity would affect its profit.
- Since profit is the difference between total revenue and total cost, what happens to profit in response to a change in output is determined by marginal revenue (MR) and marginal cost (MC).

.A firm maximizes profit when *MC = MR*

PROFIT-MAXIMIZING LEVEL OF OUTPUT

- Marginal revenue (MR) is the change in total revenue associated with a change in quantity.
- Marginal cost (MC) is the change in total cost associated with a one unit change in quantity.

MARGINAL REVENUE

- Since a perfect competitor accepts the market price as given, for a perfectly competitive firm marginal revenue is equal to price (*MR = P*).
- To maximize profits, a firm should produce where marginal cost equals marginal revenue.

HOW TO MAXIMIZE PROFIT

- If marginal revenue does not equal marginal cost, a firm can increase profit by changing output.

The supplier will continue to produce as long as marginal u .cost is less than marginal revenue

HOW TO MAXIMIZE PROFIT

- The supplier will cut back on production if marginal cost is greater than marginal revenue.
- Thus, the profit-maximizing condition of a competitive firm is MC = MR = P.

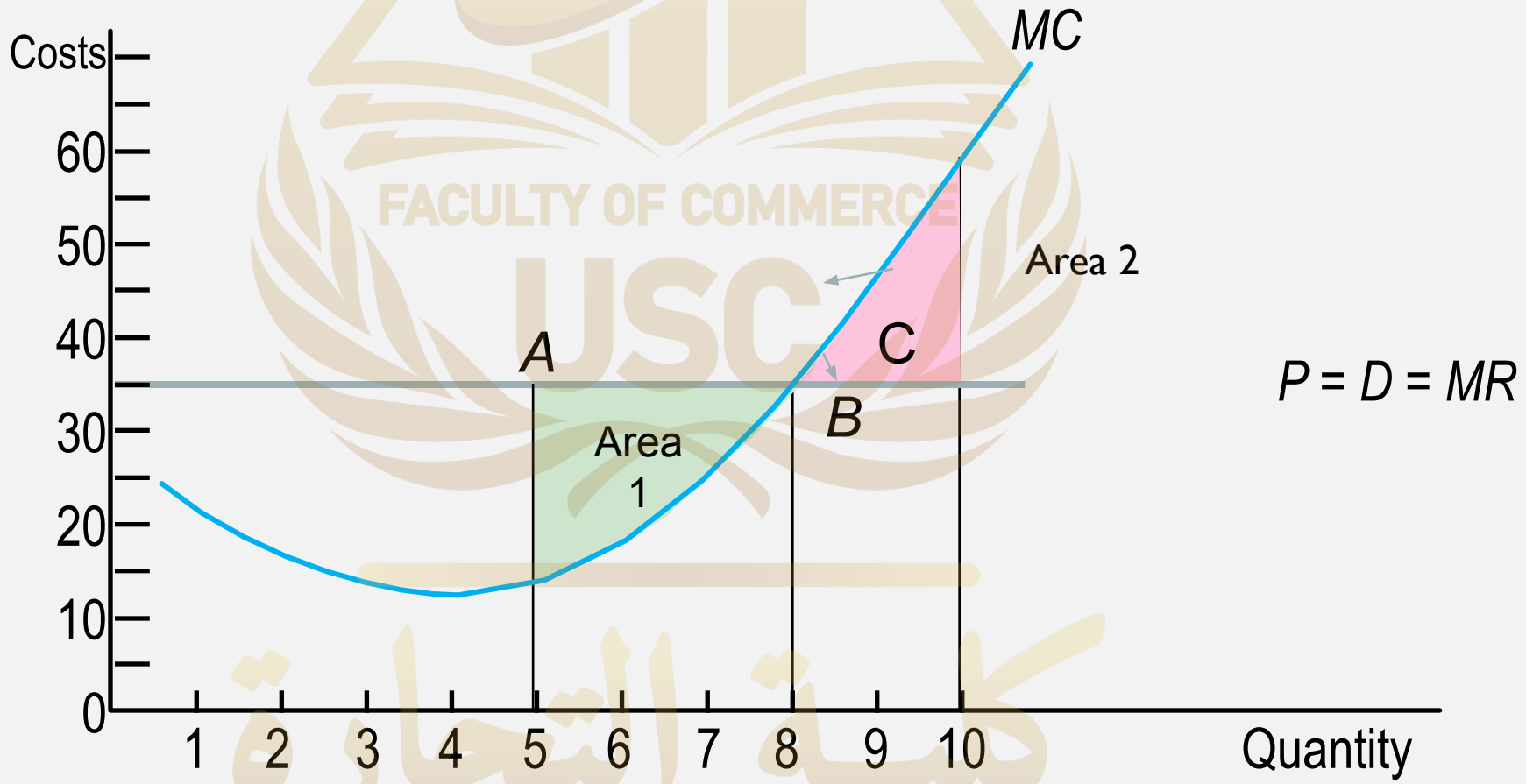
MARGINAL COST, MARGINAL REVENUE, AND PRICE

Price = MR	Quantity	Total Cost	Marginal Cost
35	0	40	
35	1	68	
35	2	88	
35	3	104	
35	4	118	
35	5	130	
35	6	147	
35	7	169	
35	8	199	
35	9	239	
35	10	293	

MARGINAL COST, MARGINAL REVENUE, AND PRICE FIG. 11-2A, P. 237

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

MARGINAL COST, MARGINAL REVENUE, AND PRICE, FIG. 11-2B, P. 237



COSTS RELEVANT TO A FIRM

P=MR	Output	Total cost	Marginal Cost	Average Total Cost	Total Revenue	Profit
-	0	40				
35	1	68				
35	2	88				
35	3	104				

COSTS RELEVANT TO A FIRM

P = MR	Output	Total Cost	Marginal Cost	Average Total Cost	Total Revenue	Profit TR-TC
—	0	40.00	—	—	0	–40.00
35.00	1	68.00	28.00	68.00	35.00	–33.00
35.00	2	88.00	20.00	44.00	70.00	–18.00
35.00	3	104.00	16.00	34.67	105.00	1.00
35.00	4	118.00	14.00	29.50	140.00	22.00
35.00	5	130.00	12.00	26.00	175.00	45.00
35.00	6	147.00	17.00	24.50	210.00	63.00

THE ROLE OF PROFITS AS MARKET SIGNALS

Profit Calculation	Type of Profit	Market Signal
$\pi > 0$	Positive economic profit, or Economic profit	Entry. Resources are drawn into the industry.
$\pi = 0$	Zero economic profit, Zero profit, or Normal profit	Static. The industry is in long run equilibrium.
$\pi < 0$	Economic loss	Exit. Resources leave the industry.

THE SHUTDOWN POINT

- The firm will shut down if it cannot cover variable costs.
- A firm should continue to produce as long as price is greater than average variable cost.
- Once price falls below that point it will be cheaper to shut down temporarily and save the variable costs.

- The shutdown point is the point at which the firm will be better off by shutting down than it will if it stays in business.

- Suppose the wheat market is perfectly competitive. If the market price for wheat is $10 per unit and a farmer produces 500 units at a total cost of $4,000:
- a. What is the farmer's total revenue?
- b. What is the farmer's profit or loss?

- 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)

- 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. In the form of a table, calculate total revenue, marginal revenue, total cost, and marginal cost for each output level (one to five units).
- **What is the profit-maximizing quantity of output?**

Output (Units)	Total Revenue ($)	Marginal Revenue ($)	Total Cost ($)	Marginal Cost ($)	Profit ($)
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

IMPERFECT OR MONOPOLISTIC COMPETITION

- Imperfect competition refers to those market structures that fall between perfect competition and pure monopoly.
- Monopolistic Competition
- Many firms selling products that are similar but not identical.
- Markets that have some features of competition and some features of monopoly.

• Imperfect or Monopolistic Competition

- **Characteristics of Monopolistic Competition:**
- Many buyers and sellers
- Products differentiated
- Relatively free entry and exit
- Each firm may have a tiny 'monopoly' because of the differentiation of their product
- Firm has some control over price
- **Examples** – restaurants, professions – solicitors, etc., building firms – plasterers, plumbers, etc.

MONOPOLISTIC COMPETITION EXERCISE

- The firm asks you how much to charge to maximize profits. 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. For each level of output, calculate total revenue, marginal revenue, average cost, and marginal cost. What is the profit-maximizing level of output for the treatments and how much will the firm earn in profits?

MONOPOLISTIC COMPETITION EXERCISE

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

Monopolistic Competition Exercise
Solution

Price ($)	Quantity	Total Cost ($)	Total Revenue ($)	Marginal Revenue ($)	Average Cost ($)	Marginal Cost ($)	Profit ($)
25.0	0	130	0.0				-130.0
24.0	10	275	240.0	24	27.5	27.5	-35.0
23.0	20	435	460.0		21.75		25.0
22.5	30	610	675.0		20.33		65.0
22.0	40	800	880.0		20.0		80.0
21.6	50	1005	1080.0		20.1		75.0

Monopolistic Competition Exercise Solution

- 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. On the other hand the firm decrease its output at, there will be an incentive to increase its output as marginal revenue exceeds marginal cost.

Oligopoly

- Is a market form in which a market or industry is dominated by a small number of sellers who likely to be aware of the actions of the others and can influence price or quantity sold.

Assumptions of oligopolies

- 1. Few large firms
- There are a few large firms that dominate the industry.
- They can influence the price or quantity produced.
- 2. Firms interact with each other
- Firms in oligopoy do not act independently of each other.
- They take into account the likely reactions of their competitors.

Assumptions of oligopolies

- 3. Product differention
- Firms sell similar products.
- They engage in competitive advertising.
- They engage in brand marketing.
- They try to convince consumes that their product is better.

Assumptions of oligopolies

- 4. Collusion

  Is an agreement among firms to divide the market, set prices, or limit production.
- Eg. OPEC

Assumptions of oligopolies

- 5. Firms may pursue objectives other than profit maximisation
  a) Maximise sales:
- Once a certain level of profit has been earned the firm may concentrate on increasing their share of the market.
-
- **b) Prevent government intervention:**
- To avoid regulation from authorities, firms may operate in ways that reduce their perceived dominance or anti-competitive behavior.

Assumptions of oligopolies

- 6. There may be barriers to entry into the industry
- **Firms may not be able to enter the industry because of:**
- A. Economies of scale
- B. Limit pricing
- C. Control over the channels of distribution
- D. Brand proliferation

Barriers to Entry

A. Economies of Scale

- Large firms produce on a large scale and benefit form decreased cost per unit .
- If a new firm tries to enter the market the existing firm that is well established can afford to lower price to deter them.
- New firms will be unable to compete due to the huge set up costs involved.

Barriers to Entry

- B. Limit Pricing
- Is an agreement between firms to set a relatively low price to make it unprofitable for new firms to enter the industry.
- C. Control over the channels of distribution
- Ologopolies may refuse to supply retailers who stock the products of competitors.
- D. Brand proliferation
- The same firm produces several brands of the same type of product.
- This will leave very little room for new firms to competitor.

Oligopoly

- **Examples of oligopolistic structures:**
  - Supermarkets
  - Banking industry
  - Chemicals
  - Oil
  - Medicinal drugs
  - Broadcasting

Oligopoly

- **Measuring Oligopoly:**
- **Concentration ratio** – the proportion of market share accounted for by top X number of firms:
  - E.g. 5 firm concentration ratio of 80% - means top 5 five firms account for 80% of market share
  - 3 firm CR of 72% - top 3 firms account for 72% of market share

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.

THE HERFINDAHL-HIRSCHMAN INDEX (HHI)

- Unconcentrated Industry: HHI < 1,500.Indicates a competitive market with many small firms and no significant market power.
- Moderately Concentrated Industry: HHI between 1,500 and 2,500.Some firms have moderate market power, but the market remains relatively competitive.
- Highly Concentrated Industry: HHI > 2,500.Indicates dominance by one or a few firms, which may lead to less competition and potential concerns about market power or anti-competitive practices.

THE HERFINDAHL-HIRSCHMAN INDEX (HHI)

- The following example of calculating the HHI before and after a merger illustrates the use of the formula.
- 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.

- Substituting these values in the formula gives the HHI for bank deposits in this market: $(40)^2 + (30)^2 + (20)^2 + (10)^2$.
- Completing this calculation gives the before merger HHI:
  - $1{,}600 + 900 + 400 + 100 = 3{,}000.$
- Next assume that Bank C, with 20 percent of the market, acquires Bank D, which has 10 percent of the market. The HHI after the merger would be $(40)^2 + (30)^2 + (20 + 10)^2$.
- Completing this calculation gives the post-merger HHI:
- $1{,}600 + 900 + 900 = 3{,}400.$
- The merger therefore increased the HHI by 400, from 3,000 to 3,400.

EXERCISE 1: CALCULATING HHI

- **Suppose the market shares of firms in an industry are as follows:**
- **Calculate the HHI for this industry**
- **.Classify the industry as unconcentrated, moderately concentrated, or highly concentrated based on the HHI.**

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

EXERCISE 1: CALCULATING HHI

- HHI=900+900+400+100+100=2400

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

Exercise 2: HHI and Mergers

- An industry initially consists of the following firms and market shares: Calculate the pre-merger HHI.
- If Firm X merges with Firm Y, calculate the post-merger HHI.
- 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

• Exercise 2: HHI and Mergers

- **Pre-Merger HHI:**
- **HHI (Pre-Merger)=1600+900+400+100=3000**
- **Post-Merger HHI:**
- **Firm X and Firm Y merge to form a firm with 40+30=70% market share.**

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

Exercise 2: HHI and Mergers

- HHI (Post-Merger)=4900+400+100=5400
- ΔHHI=5400−3000=2400
- The change in HHI is **2400**, indicating a significant increase in market concentration. This merger would likely raise **antitrust concerns**.

Monopoly

- While a competitive firm is a *price taker*, a monopoly firm is a *price maker*.
- A firm is considered a *monopoly* if . . .
  - it is the sole seller of its product.
  - its product does not have close substitutes.
- The fundamental cause of monopoly is *barriers to entry*.

Monopoly

- The monopolist is the supply-side of the market and has complete control over the amount offered for sale.
- Profits will be maximized at the level of output where marginal revenue equals marginal cost.

WHY MONOPOLIES ARISE

- **<u>Barriers to entry have three sources:</u>**
  - Ownership of a key resource.
  - The government gives a single firm the exclusive right to produce some good.
  - Costs of production make a single producer more efficient than a large number of producers.

WHY MONOPOLIES ARISE

- **Monopoly Resources**
- Although exclusive ownership of a key resource is a potential source of monopoly, in practice monopolies rarely arise for this reason.
- **Government-Created Monopolies**
- Governments may restrict entry by giving a single firm the exclusive right to sell a particular good in certain markets.

NATURAL MONOPOLIES

- An industry is a natural monopoly when a single firm can supply a good or service to an entire market at a smaller cost than could two or more firms.
- A natural monopoly arises when there are economies of scale over the relevant range of output.

MONOPOLY VERSUS COMPETITION

- Monopoly
- Is the sole producer
- Faces a downward-sloping demand curve
- Is a price maker
- Reduces price to increase sales
- Competitive Firm
- Is one of many producers
- Faces a horizontal demand curve
- Is a price taker
- Sells as much or as little at same price

A MONOPOLY'S REVENUE

- Total Revenue

$$P \times Q = TR$$

- Average Revenue

$$TR/Q = AR = P$$

- Marginal Revenue

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

TABLE A MONOPOLY'S TOTAL, AVERAGE, AND MARGINAL REVENUE

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	

PROFIT MAXIMIZATION

- A monopoly maximizes profit by producing the quantity at which marginal revenue equals marginal cost.
- It then uses the demand curve to find the price that will induce consumers to buy that quantity.

A MONOPOLY'S PROFIT

- **Profit equals total revenue minus total costs.**
  - **Profit = TR - TC**
  - **Profit = (TR/Q - TC/Q) x Q**
  - **Profit = (P - ATC) x Q**
- **The monopolist will receive economic profits as long as price is greater than average total cost.**