

CHAPTER FIVE THE MARKET STRUCTURE

❑ This chapter discusses how a particular firm makes a decision to achieve its profit maximization objective.

➤ A firm's decision to achieve this goal is dependent on the type of market in which it operates.

➤ Four major types of markets:

- 1) Perfectly **Competitive** Market,
- 2) **Monopolistically** Competitive Market,
- 3) **Oligopolistic** Market, and
- 4) Pure **Monopoly** Market.

1. Perfectly Competitive Market

❖ **Perfect Competition** is a market structure characterized by a complete absence of rivalry among the individual firms.

❖ Pure Competition (perfectly competitive market) assumptions:

1. Large number of sellers and buyers
2. Perfect mobility of factors of production
3. Perfect knowledge
4. Homogeneous (identical) product
5. Freedom of entry and exit
6. No government interference

❖ The interaction of market supply and market demand determines the market price, and each firm in the industry **takes price**.



Which of the following is not a characteristic of perfect competition?

- | | |
|-----------------------|-----------------------------|
| A Perfect information | C Freedom of entry and exit |
| B Homogeneous goods | D A small number of firms |

Perfect competition is characterized by all of the following, **Except**:

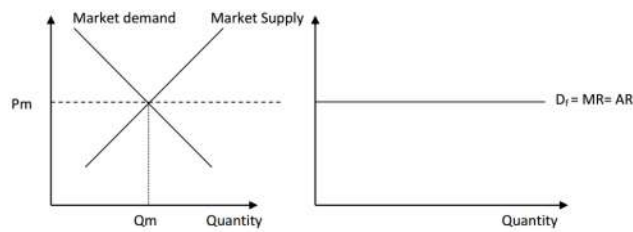
- A. Well informed buyers and sellers with respect to prices
- B. A large number of buyers and sellers.
- C. No restrictions on entry and exit from the industry.
- ☒ D. Considerable Advertising by the firms

❑ FROM THESE ASSUMPTIONS,

➤ A single producer under perfectly competitive market is a **price-taker**.

➤ That is, at the market price, the firm can supply whatever quantity it would like to sell. Once the price of the product is determined in the market, the producer takes the price (P_m) as given.

➤ Hence, the **demand curve** (D_f) that the firm faces in this market situation is a **horizontal line** drawn at the equilibrium price, P_m .



(a): Market demand and supply

(b): Demand curve of a firm

Short Run Equilibrium of The Firm

❑ The main objective of a firm is **Profit Maximization**. If the firm has to incur a loss, it aims to minimize the loss. Profit is the difference between total revenue and total cost.

❑ **Total Revenue (TR)**: it is the total amount of money a firm receives from a given quantity of its product sold.

- It is obtained by multiplying the unit price of the commodity and the quantity of that product sold.

$$TR = P \times Q, \text{ where } P = \text{price of the product} \\ Q = \text{quantity of the product sold.}$$

Average revenue (AR): it is the revenue per unit of item sold. It is calculated by dividing the total revenue by the amount of the product sold.

$$AR = \frac{TR}{Q} = \frac{P \cdot Q}{Q} \Rightarrow AR = P$$

Therefore, the firm's demand curve is also the average revenue curve.

Marginal Revenue: it is the additional amount of money/ revenue the firm receives by selling one more unit of the product. In other words, it is the change in total revenue resulting from the sale of an extra unit of the product. It is calculated as the ratio of the change in total revenue to the change in the sale of the product.

$$MR = \left\{ \frac{\Delta TR}{\Delta Q} \right\} = \frac{\Delta(P \times Q)}{\Delta Q}$$

$$= P \frac{\Delta Q}{\Delta Q} \text{ (because P is constant)} \Rightarrow \boxed{MR = P}$$

Thus, in a perfectly competitive market, a firm's average revenue, marginal revenue and price of the product are equal, i.e. $AR = MR = P = D_d$

- ❑ Since the purely competitive firm is a **price taker**, it will maximize its economic profit only by adjusting its **output**.
- ❑ In the short run, the firm has a **fixed plant**. Thus, it can adjust its output only through changes in the amount of **variable resources**. It adjusts its variable resources to achieve the output level that maximizes its profit.

❖ There are two ways to determine the level of output at which a competitive firm will **realize Maximum Profit** or **Minimum Loss**.

- i. *Total Revenue and Total Cost;*
- ii. *Marginal Revenue and Marginal Cost.*

a) Total Approach (TR-TC approach)

In this approach, a firm maximizes total profits in the short run when the (positive) difference between total revenue (TR) and total costs (TC) is greatest.

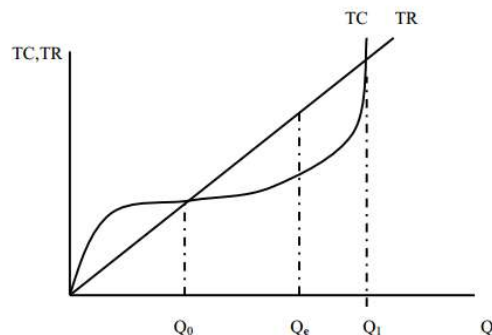


Figure 5.2: Total revenue and total cost approach of profit maximization

Note: The profit maximizing output level is Q_e because it is at this output level that the vertical distance between the TR and TC curves (or profit) is maximized.

b) Marginal Approach (MR-MC)

In the short run, the firm will maximize profit or minimize loss by producing the output at which marginal revenue equals marginal cost. More specifically, the perfectly competitive firm maximizes its short-run total profits at the output when the following two conditions are met:

- $MR = MC$
- The slope of MC is greater than slope of MR; or MC is rising).
(that is, slope of MC is greater than zero).

Mathematically, $\pi = TR - TC$

π is maximized when $\frac{d\pi}{dQ} = 0$

$$\text{That is, } \frac{d\pi}{dQ} = \frac{dTR}{dQ} - \frac{dTC}{dQ} = 0$$

$$\Rightarrow MR - MC = 0$$

$$\Rightarrow MR = MC \dots \dots \dots \text{First order condition (FOC)}$$

Graphically, the marginal approach can be shown as follows.

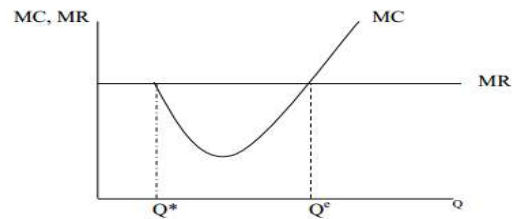


Figure 5.3: Marginal approach of profit maximization

- The profit maximizing output is Q_e , where $MC=MR$ and MC curve is increasing. At Q^* , $MC=MR$, but since MC is falling at this output level, it is not equilibrium output.
- Whether the firm in the short-run gets positive or zero or negative profit depends on the level of ATC at equilibrium. Thus, depending on the relationship between price and ATC , the firm in the short-run may earn economic profit, normal profit or incur loss and decide to shut-down business.

- i) **Economic/positive profit** - If the AC is below the market price at equilibrium, the firm earns a positive profit equal to the area between the ATC curve and the price line up to the profit maximizing output.

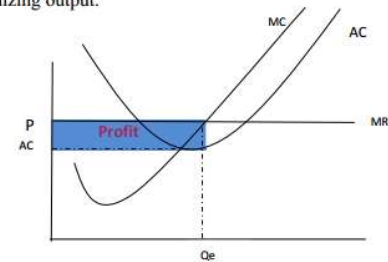


Figure 5.4: Economic profit a firm

- ii) **Loss** - If the AC is above the market price at equilibrium, the firm earns a negative profit (incurs a loss) equal to the area between the AC curve and the price line.

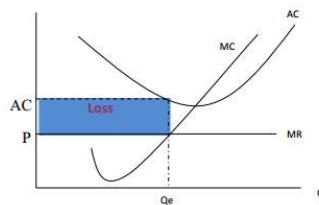


Figure 5.6: A firm incurring a loss

Which of the following statement is **Incorrect**?

- A. If $AC < P$, then a firm earns a normal profit
- B. If $AC > P$, then the firm incur a loss
- C. If $AC < P$, then a firm earns a positive abnormal profit
- D. If $MC=MR$, then the firm is at equilibrium

If the ATC is above the price ($P=MR$), the firm incurs _____

- A. Pure profit
- B. Abnormal profit
- C. losses
- D. normal profit

- iii) **Normal Profit (zero profit) or break-even point** - If the AC is equal to the market price at equilibrium, the firm gets zero profit or normal profit.

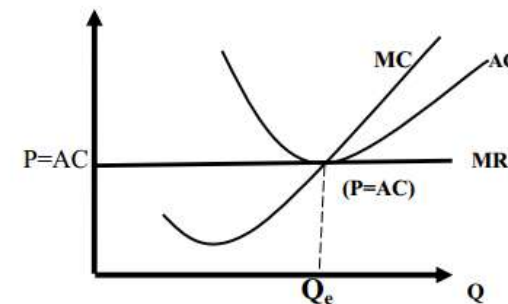
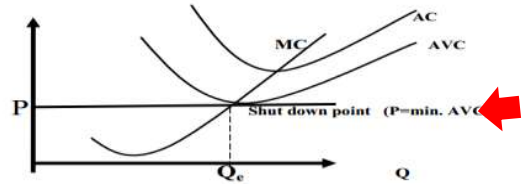


Figure 5.7: A firm earning a normal profit

- iv) **Shutdown point** - The firm will not stop production simply because AC exceeds price in the short-run. The firm will continue to produce irrespective of the existing loss as far as the price is sufficient to cover the average variable costs. This means, if P is larger than AVC but smaller than AC , the firm minimizes total losses. But if P is smaller than AVC , the firm minimizes total losses by shutting down. Thus, $P = AVC$ is the shutdown point for the firm.



❑ **QUESTION:** A firm is operating in *Perfectly Competitive Market* having:

- Fixed cost=700 Birr; Total variable cost= 550 Birr ; Total Cost=1250 Birr
- Total Revenue= 650 Birr

❖ **Solution:**

- Profit=Total Revenue(TR)-Total(TC)=650-1200= - 600 Birr(Loss) BUT....
 - ✓ The firm should stay in the businesses b/c $AVC=550/Q < P=650/Q$
- If Total Revenue changes to 500 Birr; profit=500-1200= -700 (Loss) BUT.....
 - ✓ The firm should shut down the businesses b/c $AVC=550/Q > P=500/Q$

Example: Suppose that the firm operates in a perfectly competitive market. The market price of its product is \$10. The firm estimates its cost of production with the following cost function:
 $TC=2+10q-4q^2+q^3$

- What level of output should the firm produce to maximize its profit?
- Determine the level of profit at equilibrium.
- What minimum price is required by the firm to stay in the market?

Solution

Given: $p=\$10$ and $TC=2+10q-4q^2+q^3$

- The profit maximizing output is that level of output which satisfies the following condition

$MC=MR$ &

MC is rising

Thus, we have to find MC & MR first

• MR in a perfectly competitive market is equal to the market price. Hence, $MR=10$

Alternatively, $MR = \frac{dTR}{dq}$ where $TR = P \cdot q = 10q$ Thus, $MR = \frac{d(10q)}{dq} = 10$

$$MC = \frac{dTC}{dq} = 10 - 8q + 3q^2$$

• To determine equilibrium output just equate MC & MR

And then solve for q .

$$10 - 8q + 3q^2 = 10$$

$$-8q + 3q^2 = 0$$

$$q(-8 + 3q) = 0$$

$$q = 0 \text{ or } q = 8/3$$

Now we have obtained two different output levels which satisfy the first order (necessary) condition of profit maximization

• To determine which level of output maximizes profit we have to use the second order test at the two output levels. That is, we have to see which output level satisfies the second order condition of increasing MC .

• To see this first we determine the slope of MC

$$\text{Slope of } MC = \frac{dMC}{dq} = -8 + 6q$$

• At $q = 0$, slope of MC is $-8 + 6(0) = -8$ which implies that marginal cost is decreasing at $q = 0$. Thus, $q = 0$ is not equilibrium output because it doesn't satisfy the second order condition.

• At $q = 8/3$, slope of MC is $-8 + 6(8/3) = 8$, which is positive, implying that MC is increasing at $q = 8/3$

Thus, the equilibrium output level is $q = 8/3$

- Above, we have said that the firm maximizes its profit by producing $8/3$ units. To determine the firm's equilibrium profit we have to calculate the total revenue that the firm obtains at this level of output and the total cost of producing the equilibrium level of output.

$TR = \text{Price} \times \text{Equilibrium Output}$

$$= \$10 \times 8/3 = \$80/3$$

TC at $q = 8/3$ can be obtained by substituting $8/3$ for q in the TC function, i.e.,

$$TC = 2 + 10(8/3) - 4(8/3)^2 + (8/3)^3 \approx 19.18$$

Thus the equilibrium (maximum) profit is

$$\Pi = TR - TC$$

$$= 26.67 - 19.18 = \$7.48$$

- To stay in operation the firm needs the price which equals at least the minimum AVC .

Thus, to determine the minimum price required to stay in business, we have to determine the minimum AVC .

AVC is minimal when derivative of AVC is equal to zero. That is: $\frac{dAVC}{dQ} = 0$

Given the TC function: $TC = 2 + 10q - 4q^2 + q^3$, $TVC = 10q - 4q^2 + q^3$

$$AVC = \frac{TVC}{q} = \frac{10q - 4q^2 + q^3}{q} = 10 - 4q + q^2$$

$$\frac{dAVC}{dq} = 0 \rightarrow \frac{d(10 - 4q + q^2)}{dq} = 0$$

$$= -4 + 2q = 0$$

• $q = 2$ i.e. AVC is minimum when output is equal to 2 units.

The minimum AVC is obtained by substituting 2 for q in the AVC function i.e., $\text{Min } AVC = 10 - 4(2) + 2^2 = 6$. Thus, to stay in the market the firm should get a minimum price of \$6.

5.2.3 Short run equilibrium of the industry

Since the perfectly competitive firm always produces where $P = MR = MC$ (as long as P exceeds AVC), the firm's short-run **supply curve** is given by the *rising portion of its MC curve above its AVC, or shutdown point* (see figure 5.7).

The industry/market supply curve is a horizontal summation of the supply curves of the individual firms. Industry supply curve can be obtained by multiplying the individual supply at various prices by the number of firms, if firms have identical supply curve.

An industry is in equilibrium in the short-run when market is cleared at a given price i.e. when the total supply of the industry equals the total demand for its product, the prices at which market is cleared is equilibrium price. When an industry reaches at its equilibrium, there is no tendency to expand or to contract the output.

5.3. Monopoly market

5.3.1. Definition and characteristics

This is at the opposite end of the spectrum of market structures. Pure monopoly exists when a single firm is the only producer of a product for which there are no close substitutes. The main characteristics of this market structure include:

1. **Single seller:** A pure or absolute monopoly is a one firm industry. A single firm is the only producer of a specific product or the sole supplier of the product; the firm and the industry are synonymous.
2. **No close substitutes:** the monopolist's product is unique in that there are no good or close substitutes. From the buyer's view point, there are no reasonable alternatives.
3. **Price maker:** the individual firm exercises a considerable control over price because it is responsible for, and therefore controls, the total quantity supplied. Confronted with the usual downward sloping demand curve for its product, the monopolist can change product price by changing the quantity of the product supplied.
4. **Blocked entry:** A pure monopolist has no immediate competitors because there are barriers, which keep potential competitors from entering in to the industry. These barriers may be economic, legal, technological etc. Under conditions of pure monopoly, entry is totally blocked.

5.3.2. Sources of monopoly

The emergence and survival of monopoly is attributed to the factors which prevent the entry of other firms in to the industry. The barriers to entry are therefore the sources of monopoly power. The major sources of barriers to entry are:

- Legal restriction:** Some monopolies are created by law in public interest. Such monopoly may be created in both public and private sectors. Most of the state monopolies in the public utility sector, including postal service, telegraph, telephone services, radio and TV services, generation and distribution of electricity, rail ways, airlines etc... are public monopolies.
- Control over key raw materials:** Some firms acquire monopoly power from their traditional control over certain scarce and key raw materials that are essential for the production of certain other goods. For example, Aluminum Company of America had monopolized the aluminum industry because it had acquired control over almost all sources of bauxite supply; such monopolies are often called raw material monopolies.
- Efficiency:** a primary and technical reason for growth of monopolies is economies of scale. The most efficient plant (probably large size firm,) which produces at minimum cost, can eliminate the competitors by curbing down its price for a short period and can acquire monopoly power. Monopolies created through efficiency are known as natural monopolies.
- Patent rights:** Patent rights are granted by the government to a firm to produce commodity of specified quality and character or to use specified rights to produce the specified commodity or to use the specified technique of production. Such monopolies are called patent monopolies.

- v) High Entry costs
vi) Agreement between producers

Which one is/are causes of monopoly?

- A. Firms are not willing to sell the raw materials to another firm
- B. Natural factors Endowments
- C. Legal restrictions
- D. Economies of scale(Efficiency)
- E. All of the Above

5.4. Monopolistically Competitive Market

❑ This market model can be defined as *the market organization in which there are relatively many firms selling differentiated products.*

❑ It is the blend of Competition and Monopoly.

- The competitive element arises from the existence of large number of firms and no barrier to entry or exit.
- The monopoly element results from differentiated products, i.e. similar but not identical products. A seller of a differentiated product has limited monopoly power over customers who prefer his product to others. His monopoly is limited because the difference between his product and others are small enough that they are close substitutes for one another.

NOTE....

- The model of **Monopolistic Competition** assumes a large number of firms. It also assumes easy entry and exit.
- This model differs from the model of perfect competition in one key respect: it assumes that the goods and services produced by firms are **differentiated**. This differentiation may occur by virtue of advertising, convenience of location, product quality, reputation of the seller, or other factors.
- Product differentiation gives firms producing a particular product some degree of **price-setting** or **monopoly power**. However, because of the availability of close substitutes, the price setting power of monopolistically competitive firms is **quite limited**.
- Monopolistic competition is a model characterized by many firms producing similar but differentiated products in a market with easy entry and exit.

This market is characterized by:

- Differentiated product:** the product produced and supplied by many sellers in the market is similar but not identical in the eyes of the buyers. There is a variety of the same product. The difference could be in style, brand name, in quality, or others. Hence, the differentiation of the product could be real (eg. quality) or fancied (e.g. difference in packing).
- Many sellers and buyers:** there are many sellers and buyers of the product, but their number is not as large as that of the perfectly competitive market.
- Easy entry and exit:** like the PCM, there is no barrier on new firms that are willing and able to produce and supply the product in the market. On the other hand, if any firm believes that it is not worth to stay in the business, it may exit.
- Existence of non-price competition:** Economic rivals take the form of non-price competition in terms of product quality, advertisement, brand name, service to customers, etc. A firm spends money in advertisement to reach the consumers about the relatively unique character of its product and thereby get new buyers and develop brand loyalty. Many retail trade activities such as clothing, shoes, soap, etc are in this type of market structure.

Chapter summary



Characteristics	Market models			
	Pure Competition	Monopolistic Competition	Oligopoly	Pure Monopoly
Number of firms	Large	Many	Few	One or Single
Type of product	Homogeneous	Differentiated	Homogeneous or differentiated	Unique, no close substitutes
Control over price	None	Some, but within rather narrow limits	Limited by mutual interdependence and collusion	Significant
Condition of entry	Very easy	Relatively easy	Considerable barriers/obstacles	Blocked
Examples	Agricultural products	Clothes, Shoes	Steel, Automobiles	Local utilities



Which one is the correct ascending order in the market structure based on number of buyers and sellers?

- ☒ A. Pure monopoly--Oligopoly--Monopolistically Competitive--Perfectly competitive
 B. Perfectly competitive--Monopolistically Competitive--Oligopoly--Pure monopoly
 C. Monopolistically Competitive--Pure monopoly--Perfectly competitive--Oligopoly
 D. Oligopoly--Pure monopoly--Monopolistically Competitive--Perfectly competitive

THE END!
THANK YOU SO MUCH!!