Chapter Five

Market Structure

- There are four market structures in economics:
  1. **perfectly competitive market,**
  2. **pure monopoly market.**
  3. **monopolistically competitive market, and**
  4. **oligopolistic market**

- *Market can be classified into two,,*

1. **Digital marketing** *is the marketing of products or services* ***using digital technologies****, mainly on* the **internet** but also including **mobile phones, display advertising, and any other digital media.**

- Digital marketing channels are systems on the internet that can create, accelerate and **transmit product value from producer to the terminal consumer** by digital networks.

2. ***Physical market*** *is a* set up where buyers can physically meet their sellers and purchase the desired merchandise from them in exchange of money.

- In physical marketing, marketers will **effortlessly reach their target local customers** and thus they have more personal approach to show about their brands.
- The **choice of the marketing** mainly depends on the **nature of the products and services**.

1. ***Perfectly competitive market***

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

Assumptions of perfectly competitive market

1. **Large number of sellers and buyers:**

- **Number of sellers is assumed to be too** large that the **share of each seller** in the total supply of a product is **very small**. No single seller can influence the market price by changing the quantity of supply.
- **The number of buyers is so large** that the **share of each buyer in the total demand is very smal**l and that no single buyer can influence the market price by changing the individual or group demand for a product. In such a market structure**,**
- **Sellers and buyers are price takers**, i.e., the price is determined by the interaction of the market supply and demand forces.

2. **Homogeneous product:** homogeneity of the product implies that **buyers do not distinguish b/n products supplied** by the various firms of an industry. Product of each firm is regarded as a perfect substitute for the products of other firms. No firm can gain any competitive advantage over the other firm.
3. **Perfect mobility of factors of production:** factors of production are **free to move from one firm to another** throughout the economy. This means that **labour** can **move from one job to another** and from one region to another. Capital, raw materials, and other factors are not monopolized.

4. **Free entry and exit:** there is **no restriction or market barrier on entry** of new firms to the industry, and **no restriction on exit** of firms from the industry. A firm may enter the industry or **:-** government does not interfere in any way with the functioning of the market. There are **no discriminator taxes or subsidies,** no allocation of inputs by the procurement, or **any kind of direct or indirect control.** acquit it on its accord.
5. **Perfect knowledge about market conditions:** all the **buyers and sellers have full information** regarding the prevailing and future prices and availability of goods.
6. **No government interference**. e., the government follows the free enterprise policy.

- From these assumptions, a single producer under perfectly competitive market is **a price-taker** i.e., a given 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 in the figure below) 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.

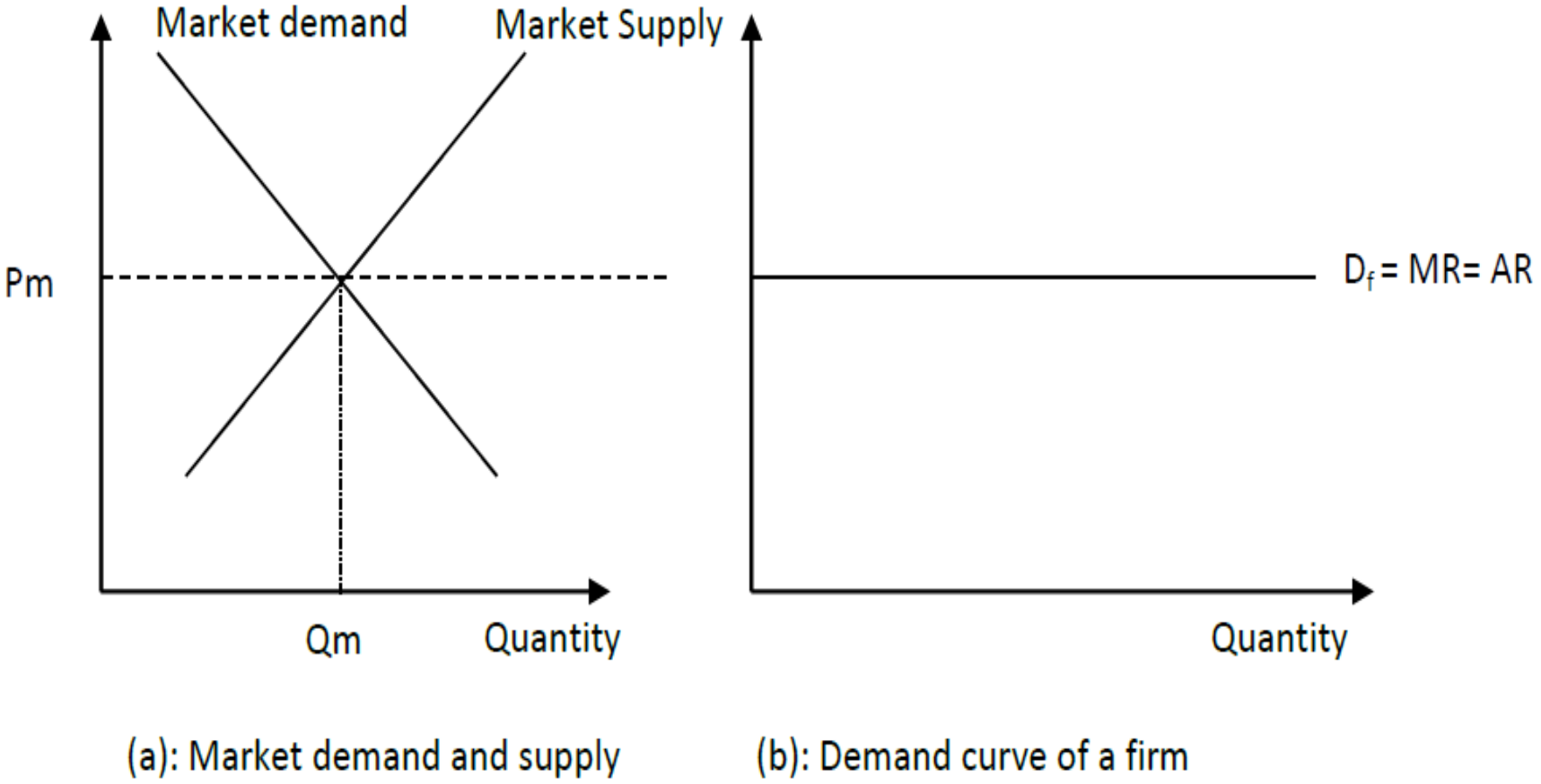

Figure 5.1: Individual and market demand curve

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 loss.
- Profit is the difference b/n 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 X Q

where P = price of the product

Q = 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.

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

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.

$$MR = \left\{ \Delta TR \,/\, \Delta Q \right\} = \Delta(PxQ) \,/\, \Delta Q$$

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

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

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.

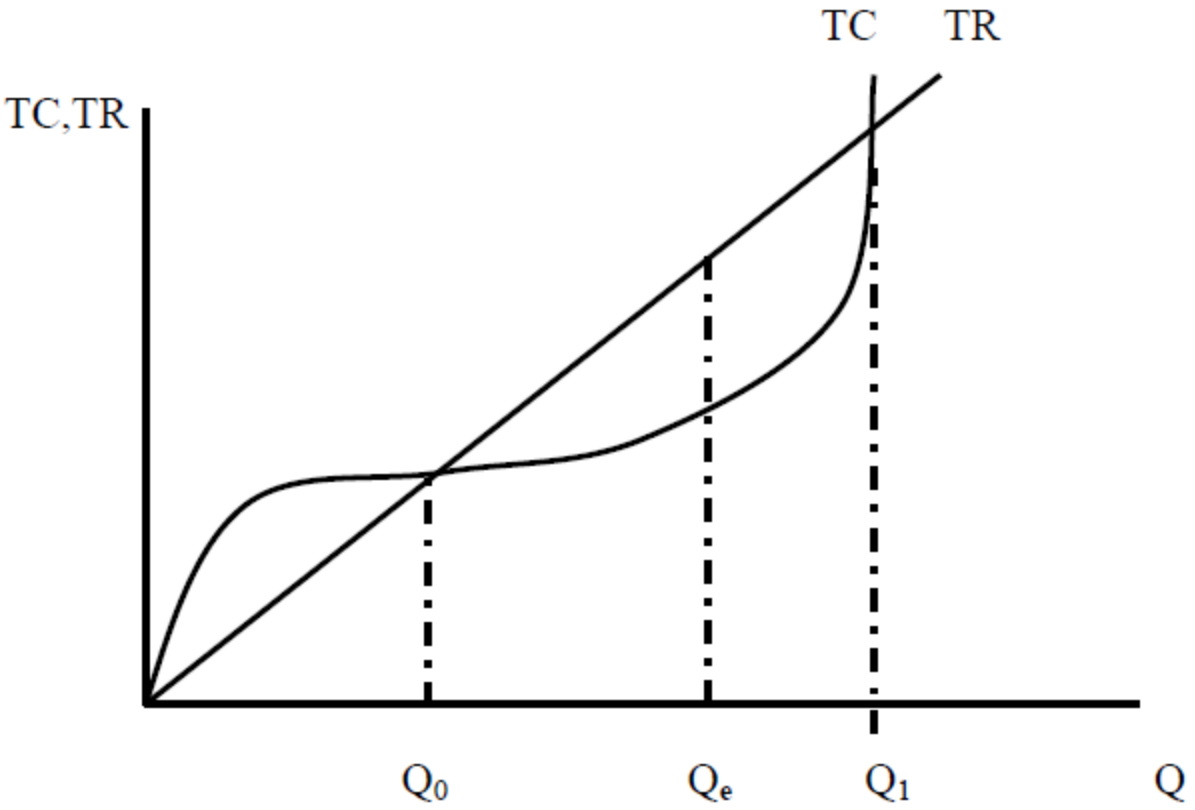

Figure 5.2: Total revenue and total cost approach of profit maximization

b) Marginal Approach (MR-MC)

- In the short run, the firm will maximize profit or minimize loss by producing the output at
- which MR = MC.
- Specially, the perfectly competitive firm maximizes its short-run total profits at the output when two conditions are met:
  - ➢MR = MC
  - ➢The slope of MC is greater than slope of MR; or MC is rising) (i.e., slope of MC is greater than zero).

Mathematically, $\prod = \mathbf{TR - TC}$

$\prod$ is maximized when $\dfrac{d\pi}{dQ} = 0$

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

- MR – MC = 0
- **MR = MC** ..... **First order condition (FOC)**

$$\frac{d^2\pi}{dQ^2} \prec 0$$

The $\dfrac{d^2\pi}{dQ^2} = \dfrac{d^2TR}{dQ^2} - \dfrac{d^2TC}{dQ^2} \prec 0$ **second order condition** of profit maximization is

That is,

$$\Rightarrow \frac{dMR}{dQ} - \frac{dMC}{dQ} \prec 0$$

$$\Rightarrow \frac{dMR}{dQ} \prec \frac{dMC}{dQ}$$

- $\dfrac{dMC}{dQ} \succ \dfrac{dMR}{dQ}$ where $\dfrac{dMR}{dQ}$=slope of MR and $\dfrac{dMC}{dQ}$=slope of MC

Therefore, **Slope of MC > slope of MR ------- Second order condition (SOC)**

⇨ **Slope of MC > 0** (because the slope of MR is zero)

Graphically, the marginal approach can be shown as follows.

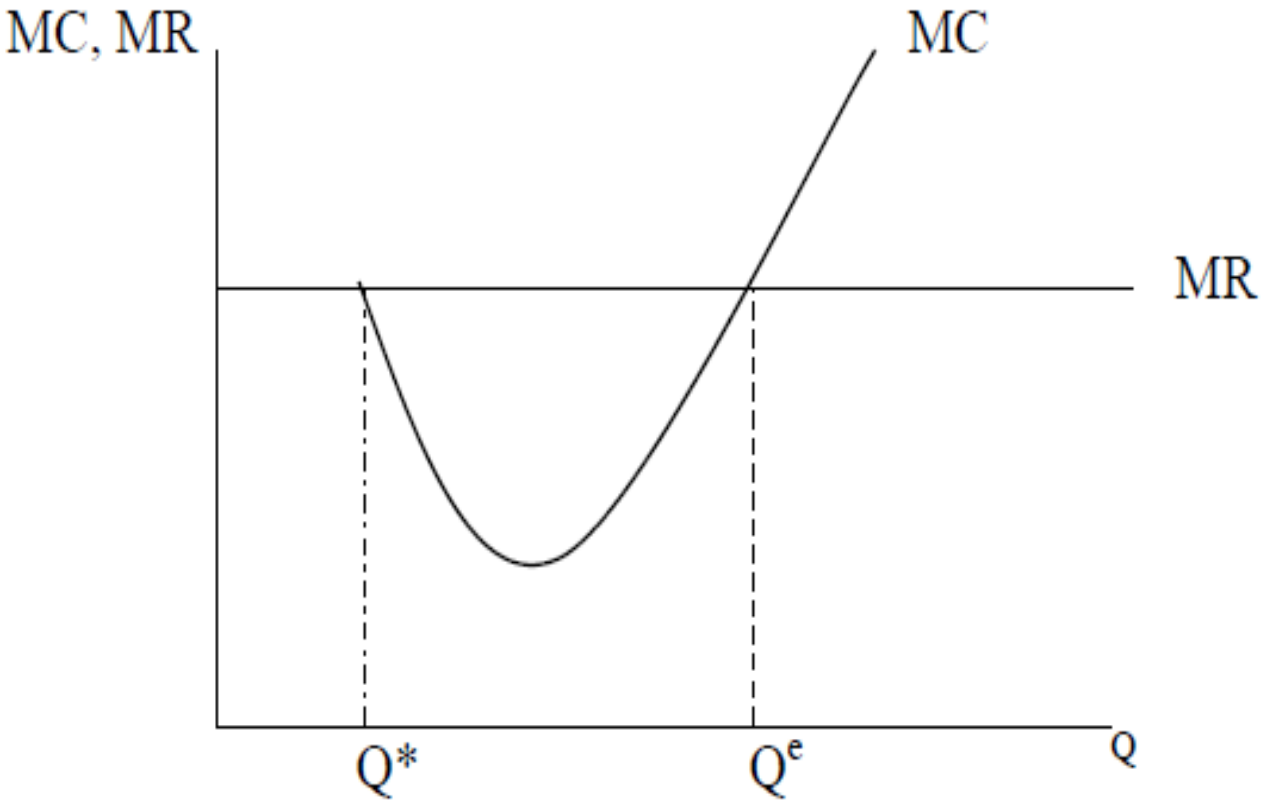

Figure 5.3: ***Marginal approach of profit maximization***

- Profit maximizing output is Qe, 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 b/n price and ATC, the firm in the short-run may earns economic profit, normal profit or incurs a 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.

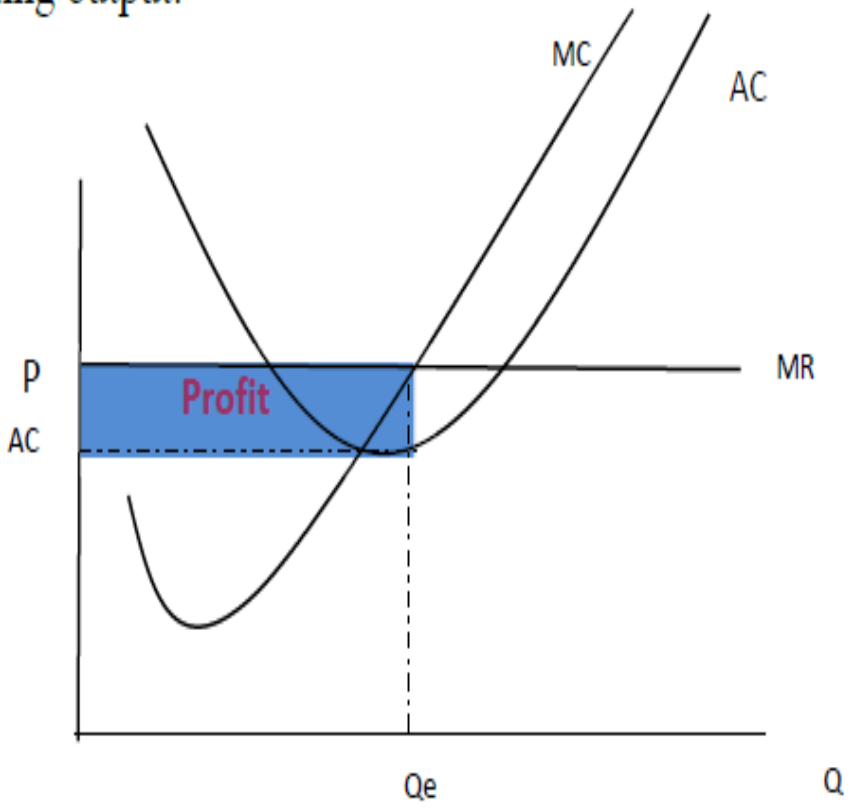

Figure 5.4: Economic profit a firm

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.

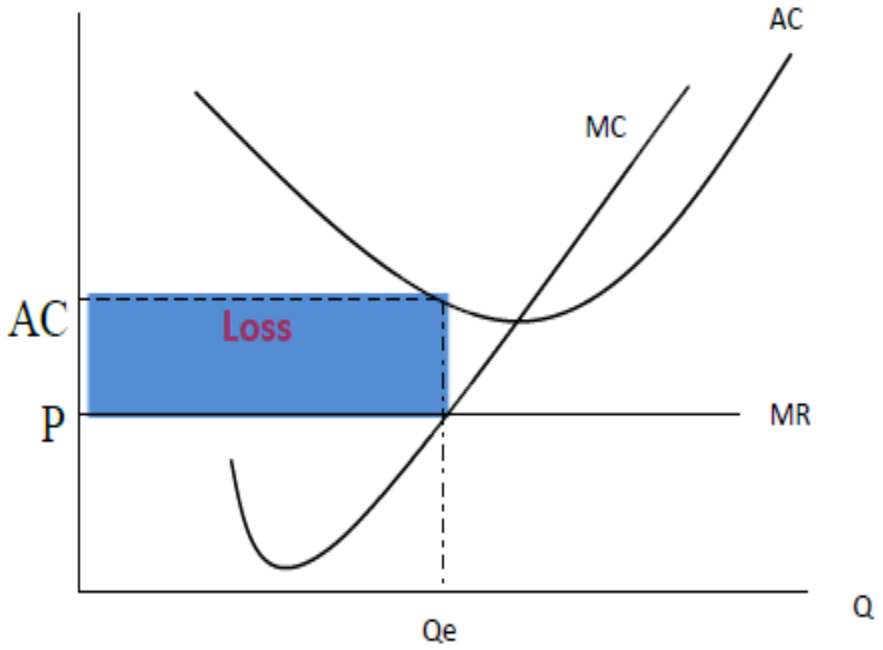

Figure 5.6: *A firm incurring a loss*

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**.**

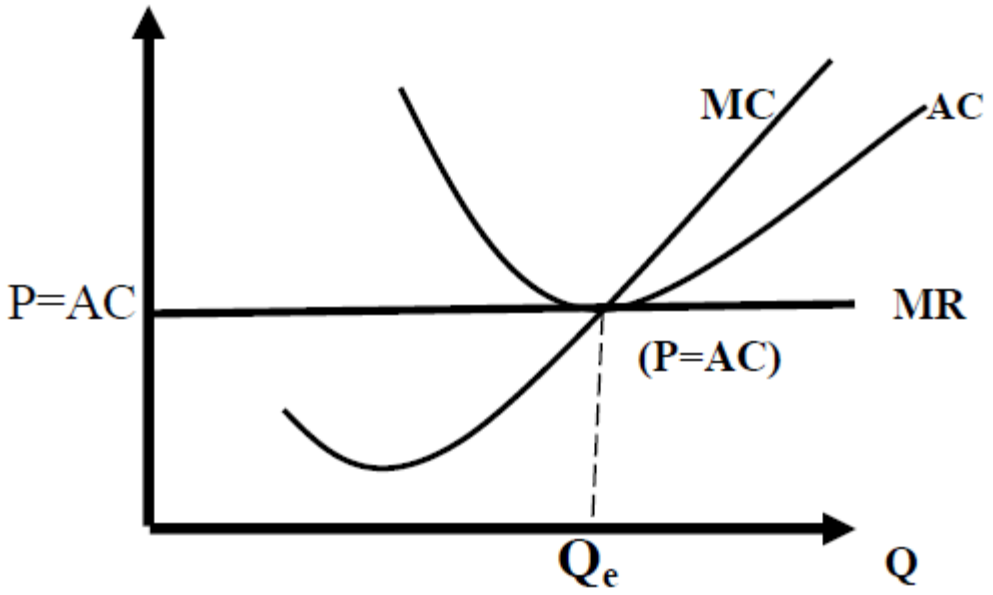

Figure 5.7: A firm earning a normal profit

iv) *Shutdown point -* *The firm will not stop production simply because AC exceeds price in the* short-run. If *AVC < P <* AC, the firm minimizes total losses. But if *P < AVC, the firm* minimizes total losses by shutting down. Thus, *P = AVC is the shutdown point for the firm.*

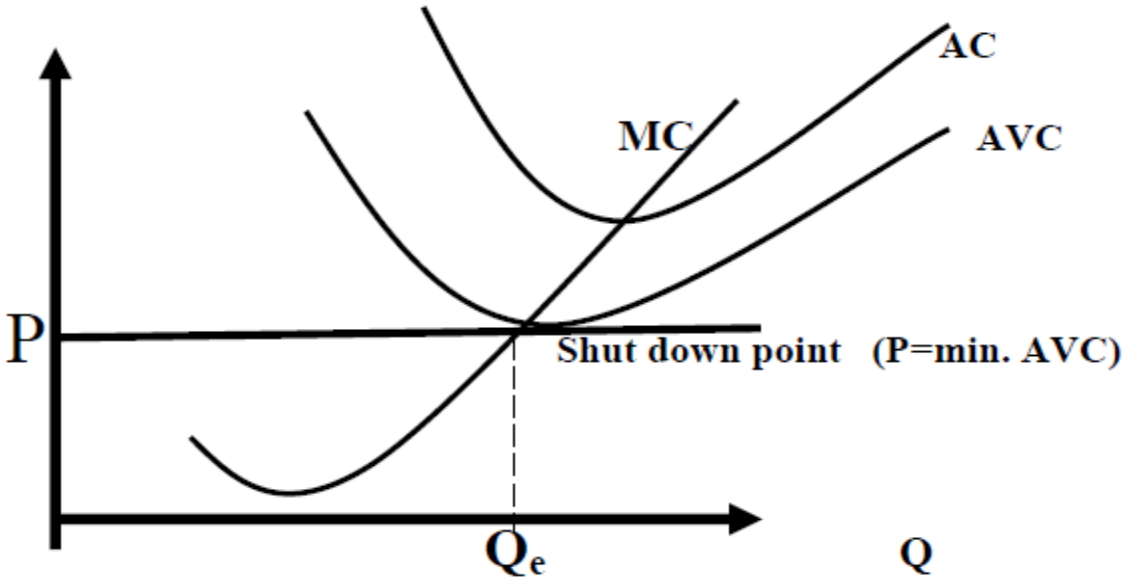

Figure 5.8: *A shut down point*

Example: Suppose that a 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:

$$TC = 2 + 10q - 4q2 + q3$$

A) What level of output should the firm produce to maximize its profit?

B) Determine the level of profit at equilibrium.

C) What minimum price is required by the firm to stay in the market?

Solution

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

A) The profit maximizing output is that level of output which satisfies the following conditions:

- 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
- $MC = dTC/dq = 10 – 8q + 3q^2$
- To determine equilibrium output just equate MC & MR and then solve for q.

$10 – 8q + 3q2 = 10$

$- 8q + 3q2 = 0$

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

$q = 0$ or $q = 8/3$

- Now we have obtained two different output levels which satisfy the first order (necessary) condition of profit maximization.
- To determine the level of output that maximizes profit we have to use the second order test at the two output levels. i.e., 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
- Slope of MC =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

B) 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 = Price * Equilibrium Output = $ 10 * 8/3= $ 80/3
- $TC = 2 + 10\,(8/3) - 4\,(8/3)^2 + (8/3)^3 \approx 19.18$
- Thus the equilibrium (maximum) profit is

$$\prod = TR - TC$$

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

C) 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: $dAVC/dq = 0$.
- Given the TC function: $TC = 2+10q - 4q^2 + q^3$,

  $TVC = 10q - 4q^2 + q^3$

  $AVC = TVC/q = (10q - 4q^2 + q^3)/q = 10 - 4q + q^2$

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

  $\rightarrow q = 2$ i.e. AVC is minimum when output is 2 units.
- Min AVC = $10 - 4(2) + 2^2 = 6$. Thus, to stay in the market the firm should get a minimum price of $ 6.

Short run equilibrium of the industry

- Since the perfectly competitive firm always produces where *P = MR = MC (as long as P >* AVC), the firm‘s short-run supply curve is given by the *rising portion of its MC curve above its AVC, or shutdown point.*
- The industry/market supply curve is a horizontal summation of 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.

2. ***Monopoly market***

Definition and characteristics

- 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 thus controls, the total quantity supplied. Confronted with the usual down ward 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** as there are **barriers**, which keep potential competitors from entering into the industry. The barriers may be economic, legal, technological etc. Under pure monopoly, entry is totally blocked.

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:

i) 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.

ii) **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.

iii) Efficiency: a primary and technical reason for growth of monopolies is **economies of scale**. The most efficient plant 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.**

iv) 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 to patent monopolies.

3 Monopolistically competitive market

- Can be defined as *the market organization in which there are* ***relatively many firms selling differentiated products.***
- *It is the blend of perfect 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.
- This market is characterized by:

(i) **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).

(ii) **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.

(iii) **Easy entry and exit:** like the monopoly, 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.

(iv) **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.

4. ***Oligopoly market***

This is a market structure is characterized by:

- **Few dominant firms:** there are few firms although the exact number of firms is undefined. Each firm produces a significant portion of the total output.
- **Interdependence:** since few firms hold a significant share in the total output of the industry, each firm is affected by the price and output decisions of rival firms. Therefore, the distinguishing characteristic of oligopoly is **the *interdependence among firms in the* Industry.**

- **Entry barrier:** there are considerable obstacles that hinder a new firm from producing and supplying the product. The barriers may include **economies of scale, legal, control of strategic inputs**, etc.
- **Products may be homogenous or differentiated.** If the product is homogeneous, we have a ***pure oligopoly***. *If the product is differentiated, it will be a* ***differentiated oligopoly.***
- **Lack of uniformity in the size of firms:** Firms differ considerably in size. Some may be small, others very large. Such a situation is asymmetrical.

- **Non-price competition:** firms try to avoid price competition due to the fear of price wars and hence depend on non-price methods like advertising, after sales services, warranties, etc. This ensures that firms can influence demand and build brand recognition.
- A **special type of oligopoly** in which there are only **two** firms in the market is known as ***duopoly.***

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