

Theory of Firms: Perfect Competition

Definition of Perfect Competition Market

A perfect competition market is a theoretical market structure characterized by a large number of small firms, identical products, and no barriers to entry or exit. In this market, no single firm has the power to influence the price of goods or services, and prices are determined purely by supply and demand.

- Perfect competition is a theoretical market structure where all firms sell identical products, and no single firm can influence the market price.
- It serves as the benchmark for analyzing real-world markets and is characterized by its efficiency in resource allocation.

So, Perfect competition is a market structure with the following attributes:

1. A large number of small firms and buyers.
2. Homogeneous (identical) products.
3. Free entry and exit of firms.
4. Perfect information for buyers and sellers.
5. Firms are "price takers," meaning they accept the market price determined by overall supply and demand.

Characteristics of Perfect Competition

1. Large Number of Sellers and Buyers

- Many firms supply the market, and no single firm's output significantly affects the total supply or price.

2. Homogeneous Products

- All products are perfect substitutes, meaning buyers do not differentiate between suppliers.

3. Free Entry and Exit

- Firms can freely enter or leave the market, ensuring no long-term supernormal profits or losses.

4. Perfect Information

- Market participants have full knowledge about prices, quality, and technology.

5. Price Takers

- Firms do not have the power to set prices and must sell at the prevailing market price.

6. Perfect Resource Mobility

- Factors of production (labor and capital) can move freely between firms and industries.

Revenue in Perfect Competition

1. Total Revenue (TR):

$$TR = P \times Q$$

where P is the price and Q is the quantity sold.

2. Average Revenue (AR):

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

meaning AR equals the price.

3. Marginal Revenue (MR):

$$MR = \frac{\Delta TR}{\Delta Q} = P$$

Under perfect competition:

$$AR = MR = P$$

Equilibrium of a Competitive Firm in the Short Run and Long Run

Equilibrium of a Competitive Firm in the Short Run:

The fundamental goal of a business firm is the maximization of profit, irrespective of the time period under consideration. Profit becomes maximum only when a firm reaches equilibrium.

A firm will reach equilibrium when the following two conditions are fulfilled simultaneously:

(i) $MC = MR$.

This is the necessary condition or first- order condition (FOC) for equilibrium, and

(ii) MC curve must cut MR curve from below, or slope of $MC > \text{slope of } MR$.

This condition is known as the sufficient condition or second-order condition (SOC).

Economists call $MC = MR = P$ as the ‘golden rule of output’ determination of a competitive firm.

Here, we will first examine short run equilibrium situation of a competitive firm:

A competitive firm is characterized by:

- (i) Large number of sellers
- (ii) Homogeneous product
- (iii) Free entry and exit of firms.

So far as the ‘**short run**’ time is concerned, no new firms can enter the industry or the existing firms exit from the industry. However, in the long run, entry or exit is free.

We know that under perfect competition every firm/buyer behaves as a ‘**price-taker**’. To all, price is given and known. However, this price is determined in the competitive industry in the short run by short run demand and supply curves for the industry.

This price, once determined in this way, is accepted by all firms and buyers. No one has the power to influence the price. Against this backdrop of market price, a firm aims at maximizing its profit by producing a certain level of output where $P = MC$.

The equilibrium output of a competitive firm operating in the short run has been shown in Fig. 4.3 where the revenue and cost curves have been drawn. It is to be kept in mind that a firm in the short run may enjoy abnormal profit if total revenue (TR) exceeds total cost (TC). Further, it may incur loss in the short run if TC exceeds TR. Or it may earn only normal profit if TR equals TC.

All these three possibilities have been shown in Fig. 4.3. Fig. 4.3(a) describes supernormal profit enjoyed by Firm A. Fig. 4.3(b) shows normal profit enjoyed by Firm B and Fig. 4.3(c) shows loss incurred by Firm C. In all the figures, curves labeled as SAC and SMC are known as short run average cost and short-run marginal cost curves.

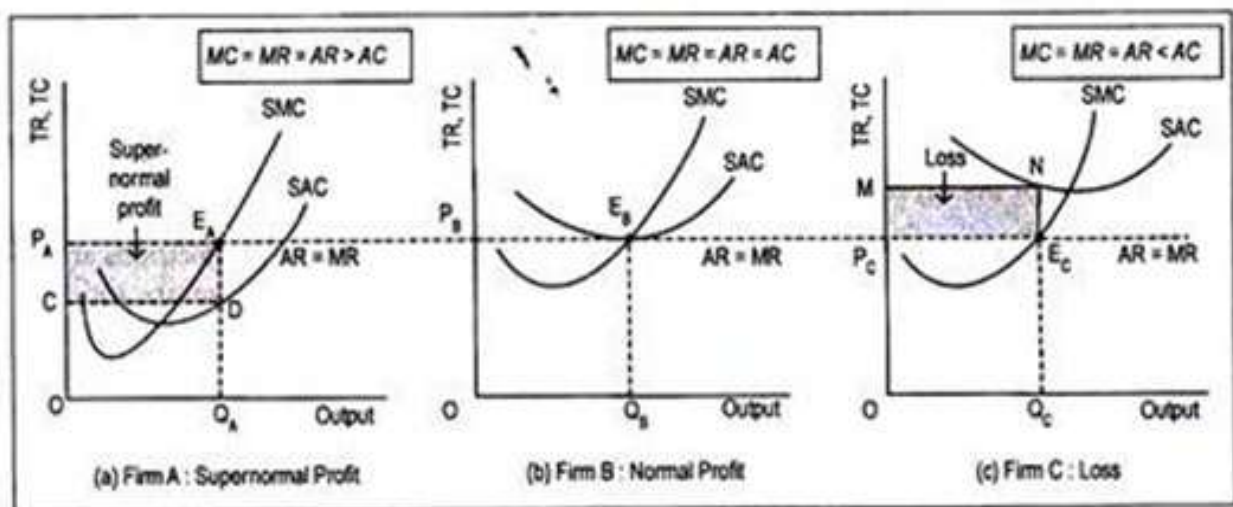


Fig. 4.3: Short Run Equilibrium of Firm

Firm A is in equilibrium at point E_A since at this point both the conditions for equilibrium have been satisfied.

Corresponding to this equilibrium point, profit-maximizing volume of output becomes OQ_A . Firm A now earns revenue to the extent of $OP_A E_A Q_A$ from the sale of output of OQ_A . And, it incurs a cost of production to the extent of $OCDQ_A$. Since revenue exceeds cost, Firm A earns supernormal profit by the amount $P_A E_A DC$.

For Firm B, equilibrium output is Q_B corresponding to the equilibrium point E_B . Since revenue ($OP_B E_B Q_B$) for OQ_B output is the same as that of its cost of production ($OP_B E_B Q_B$), Firm B enjoys only normal profit. Point E_B may be called break-even point since revenue equals cost.

Firm C incurs a loss though it attains equilibrium at point E_C . In other words, a competitive firm may reach equilibrium even after incurring losses. Here, loss amounts to the area $P_C E_C N M$, since costs exceed revenue.

Thus, a firm in the short run may:

(i) Earn supernormal profit if

$$SMC = MR = AR > SAC;$$

(ii) Earn normal profit if

$$SMC = MR = AR = SAC; \text{ and}$$

(iii) Suffer a loss if

$$SMC = MR = AR < SAC.$$

Note that although the ‘**golden rule of output**’ determination is satisfied, the firm in the short run incurs a loss.

Will a firm continue in business if it incurs a loss in the short run? In the short run, even after making negative profit (i.e., loss), a firm will stay in business if it can manage variable costs. A firm in the short run faces both fixed and variable costs.

If no output is produced, the firm should bear fixed costs. So it must produce in the short run in such a way that it covers up at least variable costs. Then loss will be equivalent to fixed costs only. However, it will go out of business only if it fails to cover up variable costs from the sale of goods.

It will maximize profit only if it becomes an ‘**economic drop out**’ by discontinuing production. Here ‘**drop out**’ is paying.

Equilibrium of a Competitive Firm in the Long Run:

Long run is that time period when firms can adjust their fixed inputs. In other words, a firm in the long run can change its scale of production as well as output to achieve maximum profit. If some firms earn excess profit in the long run, new firms will be attracted to enter the industry. Similarly, whenever some firms incur losses for a long time, they will go out of business.

This happens because, in the long run, under perfect competition, entry and exit are easy and free. As a result, all firms in the industry enjoy only normal profit. In the

long run, free entry and exit of firms ensure that abnormal profits or losses will be wiped out completely.

Fig. 4.4 explains long run adjustment of a competitive firm where LMC and LAC represent the long run marginal and average cost curves. Corresponding to the price OP , the typical firm is in equilibrium at point E . The equilibrium output, thus determined, is OQ^* and the firm is making only normal profit.

Thus equilibrium conditions in the long run become:

(i) $AR = P = LMC$, and

(ii) $P = LAC$.

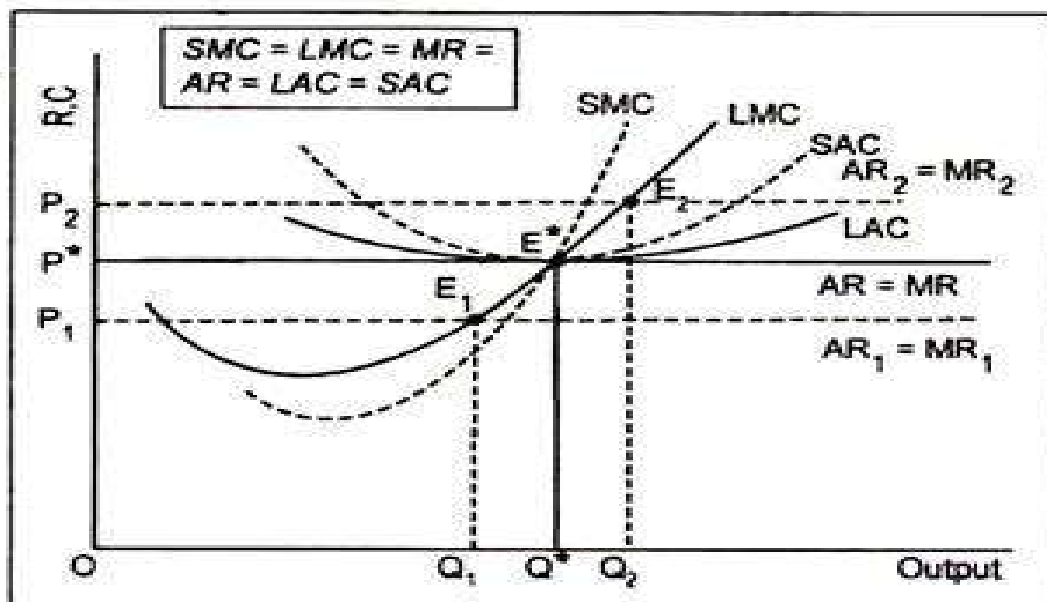


Fig. 4.4: Long Run Equilibrium of a Firm

It can also be written as:

$$LMC = LAC = P$$

LMC equals LAC at the latter's minimum point i.e., point E^* . At the equilibrium point, SMC equals LMC and SAC equals LAC. Thus, given the above equilibrium conditions, we have

$$SMC = LMC = SAC - LAC = P = MR$$

However, the firm cannot be in equilibrium in the long run at a price greater or less than OP^* . At a price OP_2 , $LMC > LAC$. Thus, point E_2 cannot be described as a long

run equilibrium one. Corresponding to point E_2 , the firm produces OQ_2 output and gets excess profit.

This will attract new firms to join the industry till excess profit is wiped out. Entry of new firms will cause output in the industry to rise. Thus, supply will rise and price will continue to decline until OP^* price is reached where only normal profit will be enjoyed.

Similarly, at the price OP_1 , though the firm is in equilibrium at point E_1 , it incurs a loss since $LMC < LAC$. Loss-making firms will, however, leave the industry. Consequently, output and supply in the industry will decline. This will cause price to rise to OP^* where there is no incentive on the part of the firms to leave. At this price, every firm is making only profit. Pure profits or losses are eliminated in the long run.

Finally, long run equilibrium of a competitive firm is always attained at the minimum point of the LAC curve. This means that the firm is capable of utilizing its plant optimally. Operation at the lowest point of LAC also implies that the resources of the society get optimally utilized. This is where efficiency of perfect competition lies.