

**21****FORMS OF MARKET**

You are familiar with the term market. Market is the major source of distribution of goods and services. The purpose of producing goods is to sell them to the consumers who demand them. To sell the goods (and services) we need the medium of market. In today's world a buyer can get so many types of goods in the market. What are the different forms of market? As students of economics you must know the forms of market. This lesson is denoted for towards this.

**OBJECTIVES**

After completing this lesson, you will be able to:

- understand the concept of market;
- know the meaning of perfect competition and its features;
- explain the meaning of monopoly and its features;
- understand the meaning of monopolistic competition and its features;
- understand the meaning of oligopoly and its features; and
- draw a comparison among different forms of market.

21.1 WHAT IS A MARKET

Market is the heart and soul of modern economic life. Without market, producers' and consumers' activities hardly make any sense. In common parlance, market is assumed to be a place where goods are bought and sold. But in economics, the term 'market' does not refer to a specific place. Rather, it is a mechanism through which buyers and sellers come into contact with each other and buy and/or sell goods at mutually agreed prices.



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Main features of a market include:

- (a) **Buyers and Sellers:** Buyers and sellers must come into contact with each other for a market to exist. It is only after the contact between the buyer and the seller, that a transaction takes place.
- (b) **Area:** You can easily find a market place nearer to a human settlement. But in today's world, the market is not limited to a particular place. Today, in the age of Internet, we have a rapidly growing online market which is not limited to any geographical area. A buyer can place order to buy a good online. So modern Market exists physically and virtually.
- (c) **Commodity:** The transaction between buyer and seller has to be over some good or service. So a commodity becomes the integral part of a market.
- (d) **Different forms of Competition:** Forms of market depends on the degree of competition among the sellers selling the goods, where the degree of competition it self is determined by the inter relationship of among the goods and services sold by different sellers as well on number of sellers present in the market.
- (e) **Money transaction:** Money is the mediums of exchange in the modern day world. Consumers pay money to the seller to buy goods as services in the market. So money and market are inseparable.

21.2 BASIS OF DIFFERENT MARKET FORMS

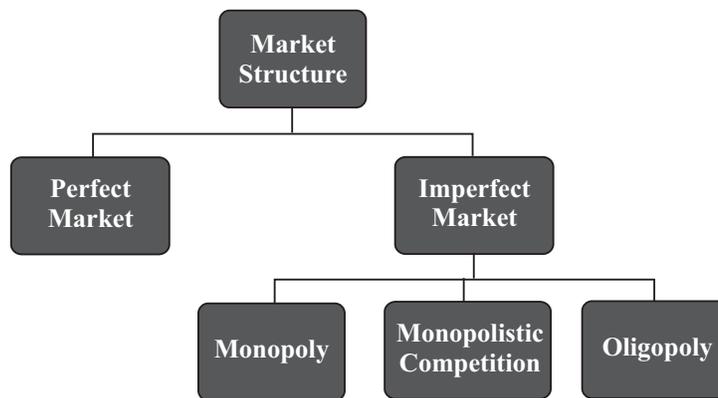
Different forms of market can exist on the basis of some distinguished characteristics. Some of these characteristics are:

- (a) **Number of Firms:** Number of firms in a market indicates the degree of control of a firm on the price of a commodity. For example, if there is a large number of firms competing against each other, a single firm supplies just a miniscule part of market supply and hence cannot influence the market supply and consequently the price significantly. Similarly, if there is only one firm in the market, it becomes the sole determinant of the market supply and therefore, exercises a great degree of control over the price.
- (b) **Ease of Entry and Exit of the Firms:** If the firms can easily enter a particular market or can leave the market without much loss, the price will be stable and profits will be just normal in the long run. In case there are restrictions on entry of new firms, the degree of control of existing firms increases and the possibility of earning higher profits also increases as the firms have a lesser degree of competition in such a case.
- (c) **Degree of Product Differentiation:** It simply means how unique the product offered by a particular firm is. The greater the degree of uniqueness (or higher degree of product differentiation), the greater is the control exercised by that

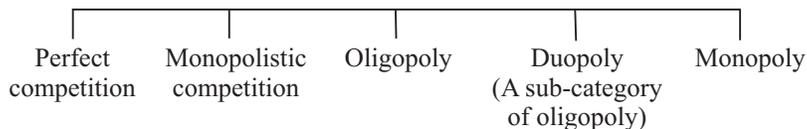
firm over its pricing decisions. In case, the goods offered by different firms are homogeneous, the individual firms lose their control over the market in price determination.

21.3 DIFFERENT FORMS OF MARKET STRUCTURE

Based on the above mentioned characteristics, we can classify different markets in the way as shown in the following chart



On the basis of degree of competition among sellers, we can say that while monopoly does not have any competition, on the otherhand perfect competition has maximum degree of competition. Oligopoly and monopolistic competition lie between these two extreme market forms.



INTEXT QUESTIONS 21.1

1. What is a market? Explain its salient features.
2. Define market structure?
3. Bring out main features of a market.
4. On what basis, can different market structures be distinguished from one another?
5. Which is the most competitive market structure?
6. Which is the least competitive market structure?
7. Is it necessary for a market to be some specific place?





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21.3.1 Perfect Competition

Like any other market structure, Perfect Competition is defined on the basis of its features. Perfect Competition is a market structure in which there is a large number of buyers and sellers who transact homogeneous or similar goods at a price fixed by the market or industry. Here, industry is a group of firms producing similar goods.

Features of Perfect Competition: Perfect Competition is characterized by:

1. **Very Large number of buyers and sellers:** In a perfectly competitive market, there is a very large number of buyers and sellers. For instance, if a single seller tries to raise the price, there is a large number of other sellers selling identical product at a lower price. Therefore, the demand for this particular firm decreases forcing it to come in line again with the industry determined price.
2. **Homogeneous Product:** The products offered by different firms are homogeneous in every respect so that the buyer does not have any basis to prefer the goods of one seller over the goods of another seller. The goods are identical in terms of quality, size, packing, and other terms of deal etc. This feature ensures the uniformity of the price throughout the market.
3. **Firm is a Price Taker:** The firm has to sell the goods at a price determined by the industry as the firm has no control over the price. The market or industry determines this price on the basis of market demand and market supply as shown in the figure. So industry is the price maker and firm is the price taker.
4. **Free Entry and Exit:** Under perfect competition firms are free to enter into the market or exit from the market at any point of time. This means that there is no obstruction from any where for a new firm to produce the same product produced by the existing firms in the market; similarly if a firm wishes to exit then it is free to do so.
5. **Perfect Knowledge:** This feature implies that both sellers and buyers have perfect knowledge about the goods and their prices so that it is not possible for a firm to charge a different price. It also ensures uniform price for the buyers and uniform cost function for the producers.
6. **Perfect Mobility:** The goods as well as the factors of production are perfectly mobile so that there is no restriction- legal or monetary (involving expenditure in movement of goods). This feature ensures that the price throughout the market tends to be uniform.
7. **No Selling Costs:** Selling costs are the costs aimed at promotion of sales of product of a firm, e.g. expenditure on advertisement of a product. In perfect competition, there is no need to incur selling cost because of assumption of

perfect knowledge and homogeneous goods. This implies that if people have complete knowledge about the product, the seller does not find it necessary to educate consumers through advertisements. Similarly, when goods are homogeneous, there is no basis on which the seller can claim superiority of his products over the products of its rivals.

8. **Shape of Demand Curve:** Under perfect competition, the demand curve for the firm is horizontal and perfectly elastic. It means that the firm can sell any amount of the product at the price determined by the industry, but the firm cannot vary the price.

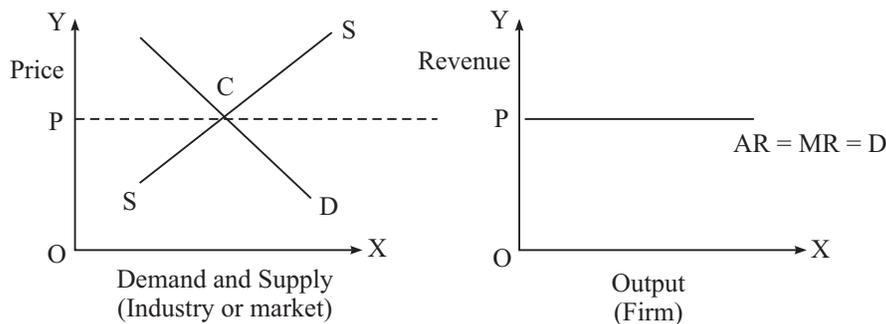


Fig. 21.1



INTEXT QUESTIONS 21.2

1. What is perfect competition? Explain its various features.
2. What is the relevance of the feature of 'large number of buyers and sellers' in perfect competition?
3. Why is there no need of selling cost in perfect competition?
4. What is the shape of demand curve for a product under perfect competition?
5. Why do firms earn only normal profits under perfect competition in the long run?
6. Under perfect competition, firm is a price-taker and not price maker. Explain.
7. Under perfect competition, all the firms sell their goods at the same price.
(True/False)

21.3.2 Monopoly

Monopoly is a market structure in which there is a single seller, there are no close substitutes for the commodity produced by the firm and there are barriers to entry.

Example: Indian Railways which is operated under government of India.

Monopoly also implies absence of competition.



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Features of Monopoly: Monopoly is characterized by:

1. **Single Seller:** In monopoly, there is only one firm producing the product. The whole industry consists of this single firm. Thus, under monopoly, there is no distinction between firm and industry. Being the only firm, there is significant control of the firm over supply and price. Thus under monopoly, buyers do not have the option of buying the commodity from any other seller. They have to buy the product from the firm or they can go without the commodity. This fact gives immense control to the monopolist over the market.
2. **No Close Substitute:** There are no close substitutes of the product produced by the monopolist firm. If there are close substitutes of the product in the market, it implies presence of more than one firm and hence no monopoly. In order to ensure a total of control over the market by the monopolist firm, it is assumed that there are no close substitutes of the product.
3. **No to Entry:** Monopoly can only exist when there is strong barriers before a new firm to enter the market. In fact once a monopoly firm starts producing the product, no other firm can produce the same. One reason for this is the ability of the monopolist to produce the product at a lower cost than any new firm who thinks to enter the market. If a new firm who knows that it can not produce at a lower cost than the monopolist, then that firm will never enter the market for fear of losing out in competition. Similarly the monopolist who is operating for a long time may be enjoying reputation among its customers and is in a better position to use the situation in its own benefit. A new firm has to take long time to achieve this and so may not be interested to enter the market.
4. **Price Maker:** Being the single seller of the product, the monopolist has full control over the pricing of the product. On the other hand, if there is a large number of buyers in the market, so no single buyer exercises any significant influence over price determination. Thus, it is a seller's market. So monopoly firm is a price maker.
5. **Price Discrimination:** Having considerable control over the market on account of being single seller with no entry of other firms, the monopolist can exercise policy of price discrimination, it means that the monopolist can sell different quantities of the same product to a consumer at different price or same quantity to different consumers at different prices by adjudging the standard of living of the consumer.

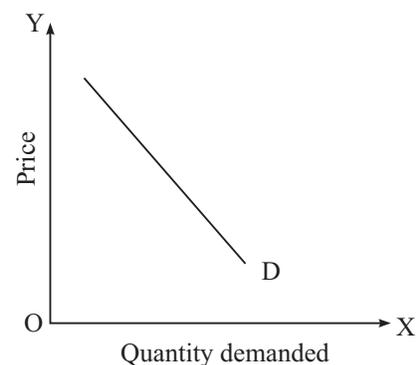


Fig. 21.2

6. **Shape of Demand Curve:** Since a monopolist has full control over the price, therefore, he can sell more by lowering the price. This makes the demand curve downward sloping. As there is no competition of the firm in the market, demand curve is in elastic. See figure 2.



INTEXT QUESTIONS 21.3

1. What is monopoly? Explain its features.
2. Draw a comparison between perfect competition and monopoly.
3. In what forms, can there be barriers to entry of other firms? What role do these barriers play?
4. Why do we assume that there are no close substitutes of the goods produced by a monopolist?
5. What kind of profits are earned by a monopolist in the long run and why?
6. Define price discrimination.
7. Under monopoly, firm is price taker. (True/False)

21.3.3 Monopolistic Competition

Monopolistic Competition is a market structure in which there is a large number of sellers in the market of a commodity, but the product of each seller differs in some respect from the product of the other sellers. Thus, product differentiation is the cornerstone of Monopolistic Competition. Monopolistic competition is like an amalgam of monopoly and perfect competition, and hence the name Monopolistic Competition. According to J.S. Bains, “Monopolistic Competition is a market structure where there is a large number of sellers, selling differentiated but close substitute products.”

Example: Restaurants, Market for Toothpaste etc.

Features of Monopolistic Competition

Monopolistic Competition is characterized by:

1. **Large number of firms:** Under monopolistic competition, there is a large number of firms selling closely related products. Thus the control of a particular firm is somewhat diminished when compared to that of monopoly.
2. **Product Differentiation:** Product Differentiation is a very important feature of Monopolistic Competition. This differentiation could be on the basis of quality, packaging, colour etc. or this differentiation could also be just a matter of perception.

For example: You must have seen different brands of tooth paste. Even if they look different having different taste, the product it has same use.





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3. **Selling Costs:** Under monopolistic competition firms spend a lot on advertisement of their product in order to attract the customers and sell their product. Every firm tries to promote its product through advertisement for which it bears some extra cost over and above its cost of production. This is called selling cost.
4. **Non-Price Competition:** Under Monopolistic Competition, sometimes, firms compete with each other without changing price. They may start various promotion schemes, gift schemes or compete in terms of advertisement etc. Thus, firms compete under in every possible way to attract consumers and gain maximum possible market share.
5. **Nature of Demand Curve:** Like monopoly, Monopolistic Competition also has a downward sloping demand curve. However due to the existence of competitors in the market, the degree of steepness of the curve is little less, reflecting greater price elasticity of demand and less control of the firm than that of monopoly. (see figure 21.3).

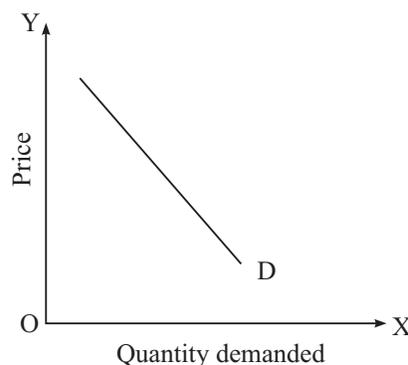


Fig. 21.3



INTEXT QUESTIONS 23.4

1. Define monopolistic competition. Explain its features
2. Draw comparison between perfect competition and Monopolistic competition.
3. Draw comparison between monopoly and monopolistic competition.
4. Explain product differentiation under monopolistic competition.
5. Monopolistic competition is an amalgam of monopoly and perfect competition. Explain.
6. Explain 'Non-price competition'.
7. Fill in the blanks with appropriate words:
 - (i) Under monopolistic competition, the number of firms is
 - (ii) Demand curve under monopolistic competition is sloping.
 - (iii) Product differentiation is the cornerstone of

21.3.4 Oligopoly

Oligopoly is an important form of imperfect competition. Oligopoly exists when there are few firms selling the product. W.H. Fellner wrote a book on oligopoly

with the title, “Competition among the Few”. This title aptly summarizes what oligopoly is. Oligopoly can simply be defined as the competition among the few firms. The products of these firms may either be close substitutes or homogeneous.

Example: Mobile service providers, car industry, airlines etc.

A. Features of Oligopoly

Oligopoly is characterized by following features:

1. **Interdependence:** Interdependence is a very significant feature of Oligopoly. When the number of firms is small, any strategy regarding change in price, output or quality of a product, will depend on the rival’s reaction for its success. Thus, the success of price reduction policy by one company (say, Pepsi) will depend on reaction by its rival (say, Coke). For example, if Pepsi lowers the price per bottle from Rs 10 to Rs 8, the effect of this step on demand for Pepsi will depend on the counter-strategy of Coke. If Coke decides to follow price war strategy and lowers price from Rs 10 per bottle to Rs 7 per bottle, demand for Pepsi may decrease even below its initial level.
2. **Indeterminate Demand Curve:** Demand curve presents different quantities of a product demanded at various prices. However, demand for a product at different prices can be known only when rivals’ counter strategies can be predicted with certainty. This being not possible, we cannot draw the usual demand curve for the firm’s product in case of oligopoly.
3. **Selling Costs:** Oligopoly firms bear selling cost such as advertisement, sales promotion etc. to sale the product.
4. **Group Behaviour:** Since there are a few firms under oligopoly, there is a tendency among them to come together in order to avoid competition. They may meet secretly to negotiate price and quantity in the market. The aim is to maximise profit in the same manner as a monopolist does. Obviously when they come together it looks as if all firms have become a single entity like a monopolist. But such groupism is done secretly as the government may take action if it comes to know about this type of group behaviours of firm where in firms are trying to reduce competition among them selves. Note that when firms form a group secretly to share profit or quantity etc. it is called collusive oligopoly. When firms work independently and compete with each other, it is called non-collusive oligopoly.
5. **Price Rigidity:** In oligopoly market, once the price of the product is fixed by the firms, it is normally not changeable. So price is rigid. The reasons for this is that firms face different types of consumers having different elasticities of



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demand. So response of change in quantity due to change in price many vary from one firm to another creating uncertainty about future sales. So fearing this firms do not change price once its is fixed.

B. Types of Oligopoly

Oligopoly may further be classified into collusive oligopoly and non-collusive oligopoly.

(a) Collusive oligopoly

The firms under oligopoly may decide to co-operate with each other and make common policies for all the firms. Thus, firms may collude with each other work on common pricing policies and make common output decisions. In such an environment, the group of firms can behave like a monopolist and earn supernormal profits. This group of colluding firms is called ‘cartel’. One prominent example of cartel is ‘the Organization of Petroleum Exporting Countries (PEC)’.

(b) Non-collusive oligopoly

When firms do not co-operate with each other and engage in fierce competition with each other, the market is called non-collusive oligopoly. Under such environment, while competing with each other, firms drive price levels, and profit levels down to the level of normal profit only.



INTEXT QUESTIONS 21.5

1. What is oligopoly? Explain its features.
2. Define oligopoly. Give example.
3. Explain nature of demand curve under oligopoly.
4. ‘Interdependence’ and ‘Group Behaviour’ are two very important features of oligopoly. Comment.
5. What is collusive oligopoly?
6. What is non-collusive oligopoly?



TERMINAL EXERCISE

1. Define a market. What are different types of market?
2. What is Perfect Competition ? Explain its features briefly.
3. What is Monopoly ? Explain its features briefly.
4. What is Monopolistic Competition ? Explain its features briefly.

5. Fill in the blanks:

- (a) Price determination by industry is a feature of
- (b) Under Oligopoly, price tends to be
- (c) In Monopoly, the number of firms is
- (d) Product Differentiation is the corner stone of
- (e) Interdependence is the most important feature of
- (f) Market is a place, a particular geographical location. (True/False)



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ANSWERS TO INTEXT QUESTIONS

21.1

- 1. Refer to 21.2
- 2. Refer to 21.3
- 3. Refer to 21.2
- 4. Refer to 21.3
- 5. Perfect competition
- 6. Monopoly
- 7. No

21.2

- 1. Refer to 21.3.1
- 2. Refer to 21.3.1 pt. 1
- 3. Refer to 21.3.1 pt. 7
- 4. Refer to 21.3.1 pt. 2
- 5. Refer to 21.3.1 pt. 4
- 6. Refer to 21.3.1 pt. 2
- 7. True

21.3

- 1. Refer to 21.3.2
- 2. Refer to 21.3.1 and 21.3.2
- 3. Refer to 21.3.2 point No. 3
- 4. Refer to 21.3.2 point No. 2
- 5. Refer to 21.3.2 point No. 3

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6. Refer to 21.3.2 point No. 6
7. False

21.4

1. Refer to 21.3.3
2. Refer to 21.3.1 and 21.3.3
3. Refer to 21.2 and 21.3
4. Refer to 21.3.3 point No. 2
5. Refer to 21.3.3
6. Refer to 21.3.3 point No. 4
7. (i) large
(ii) downward
(iii) monopolistic competition

21.5

1. Refer to 21.3.4 and 21.4.4 (A)
2. Refer to 21.3.4 (A)
3. Refer to 21.3.4 (A) point No. 2 and 6
4. Refer to 21.3.4 (A) point No. 1 and 4
5. Refer to 21.3.4 (B) part (a)
6. Refer to 21.3.4 (B) part (b)



22

PRICE DETERMINATION UNDER PERFECT COMPETITION

One of the objectives of firm and industry is to maximize profit. As an alternative, the firm also wants to minimize loss. Whatever it may be, a firm must determine the price and quantity that will ensure achieving these goals. The manner in which a firm/industry determines the price and output depends on the market form in which it is operating. In the preceding lesson, you learnt that there are various forms of market in which a firm or industry operate. This lesson is devoted towards determination of price and quantity by the industry and a firm under the market form or perfect competition.



OBJECTIVES

After completing this lesson, you will be able to:

- explain the meaning of equilibrium price;
- explain the process by which the twin market forces of demand and supply determine the equilibrium market price of a commodity under perfect competition;
- explain the concepts of excess demand and excess supply;
- identify the effects of change in demand and/or supply on equilibrium price and quantity; and
- understand the process of price determination of a competitive firm.

22.1 MEANING OF EQUILIBRIUM PRICE

Equilibrium means a position from which there is no tendency to change.

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Price Determination Under Perfect Competition

Prof. Marshall compared demand and supply to the two blades of a pair of scissors. A moment of reflection will show that it is not blade alone that cuts the cloth. Both the blades together, do it. Similarly, it is not demand or supply alone that determines the price of a commodity. Together through interaction they determine the equilibrium price of a commodity.

The forces of demand and supply determine the price of a commodity. There is a conflict in the aim of producers and consumers. Producers want to sell the goods at the highest price to maximize profit and consumers want to buy the goods at the lowest price to maximize satisfaction.

Equilibrium price will be determined where quantity demanded is equal to quantity supplied in the market. This is called market equilibrium price of the commodity.

Industry Demand and Supply Under Perfect Competition

In lesson 21, you have learnt that the industry under perfect competition is defined as the collection of Large number of firms producing the homogeneous product. In such a situation no firm enjoys any power to determine its own price. The price of the commodity is determined at the level of the industry through the interaction of the forces of demand and supply of the commodity in the market. Since industry is the price maker, the industry demand curve is downward sloping (same as the market demand for a product given in lesson 15). Similarly the industry supply curve of the product is an upward sloping curve (same as the market supply curve given lesson 19).

22.2 PROCESS OF ARRIVING AT EQUILIBRIUM PRICE

Consider the following schedule 22.1 showing market demand and market supply of good X are given..

Table 22.1 Determination of Equilibrium Price of good X.

Price (₹ Per kg)	Market Demand (kg)	Market Supply (kg)
6	16	24
5	18	22
4	20	20
3	22	18
2	24	16

Let us assume that the initial price is ₹ 6 per kg and the respective levels of quantity demanded and supplied are 16 and 24 kg respectively. Obviously, quantity supplied at this price is exceeding quantity demanded. So, the suppliers or producers will offer a lower price to the buyers to ensure that their goods do not remain unsold. So, the price gradually moves from ₹ 6 to ₹ 5 per kg. At this relatively lower price, demand expands to 18 kg while supply contracts to 22 kg (in accordance with the respective laws of demand and supply), but still there is a gap between supply and demand. So the suppliers still feel that all of their goods might not sell in the market as quantity demanded is less than quantity supplied. So, they reduce price further so as to ensure that their goods do not remain unsold. This process continues till the price level reaches a point where quantity demanded equals quantity supplied. Thus, when the price falls from ₹ 5 to ₹ 4, quantity demanded as well as quantity supplied is equal to 20 kg. Now the suppliers have no reason to reduce their price further. Hence as long as quantity supplied exceeds the quantity demanded, price of the commodity keeps falling till both become equal.

Note that, when supply exceeds demand, we call it excess supply that causes price to fall till demand and supply become equal to each other.

On the otherhand, at a very low price of ₹ 2, quantity demanded is 24 kg which is higher than quantity supplied of 16 kg. Since demand is higher than supply, price of the commodity increases to ₹ 3. At ₹ 3, the quantity demanded is 22 kg which is still higher than the quantity supplied of 18 kg. This further results in increase in price to ₹ 4 where we find that quantity demanded and supplied have become equal at 20 kg.

Hence as long as quantity demanded exceeds the quantity supplied, the price of the commodity keeps increasing till both demand and supply become equal to each other.

Note that when demand exceeds supply, we call it excess demand that causes price to rise till demand equals supply.

In the example, at ₹ 4, demand and supply of the commodity are equal and hence there is no reason for the price to fluctuate from here. Hence ₹ 4 is the equilibrium market price. At this price 20 kg is equilibrium quantity.

The process of price determination has also been explained with the help of figure 22.1. In the figure, DD is the demand curve and SS is the supply curve. The negative slope of demand curve DD indicates a negative relation between price of



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Price Determination Under Perfect Competition

the commodity and its quantity demanded. Similarly, positive slope of the supply curve SS indicates a positive relation between price of the commodity and its quantity supplied. Demand curve DD and supply curve SS intersect each other at point E, which is the point of equilibrium at which equilibrium price is ₹ 4 per kg. and equilibrium quantity demanded and supplied is 20 kg. Equilibrium price is also defined as the price at which demand curve and supply curve intersect each other. (alternatively, equilibrium price is the price at which quantity demanded of a commodity equals its quantity supplied).

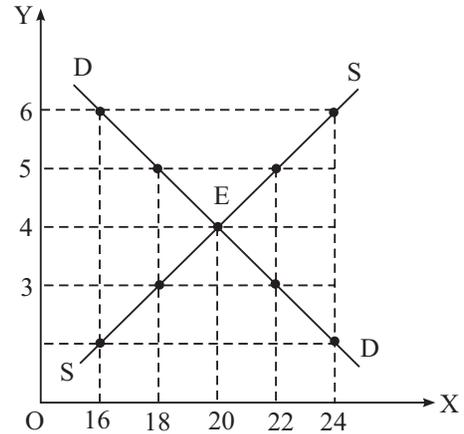


Fig. 22.1

Price Determination for a Firm under Perfect Competition

Under perfect competition, the industry determines the price following the same route of adjustment as described above with the help of twin market forces of demand and supply. Firms have to accept the price determined by the industry and offer their output at this price. This can be shown with the help of the following figure.

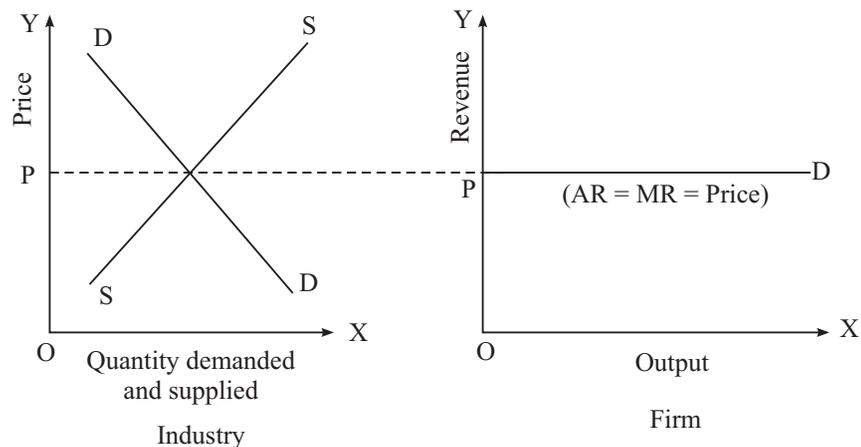


Fig. 22.2

Price Determination Under Perfect Competition

Industry		Firm					
Price (₹ per kg)	Quantity Demanded (kg)	Quantity Supplied (kg)	Price (₹ per kg)	Quantity Supplied	TR (P×Q)	AR AR = P	MR
2	20	12	4	0	0	4	–
3	18	14	4	1	4	4	4
4	16	16	4	2	8	4	4
5	14	18	4	3	12	4	4
6	12	20	4	4	16	4	4

Under perfect competition at price ₹ 4 per kg industry demand and industry supply are both equal to 16 kg and hence the equilibrium price determined by the industry is ₹ 4 per kg which has to be followed by all the firms of the industry. The firm may sell any quantity but the price remains constant at ₹ 4 per kg. That is why $AR = MR$ in perfect competition, and are represented by a revenue curve which is parallel to x-axis.



INTEXT QUESTIONS 22.1

1. Define equilibrium price.
2. Which force of price determination is relatively more important and why?
3. Can we have two levels of equilibrium price for demand curve DD and supply curve SS? Support your answer with reason.
4. Tick the correct answer:
 - (i) Point of intersection of demand curve and supply curve shows:
 - (a) The equilibrium price
 - (b) The equilibrium quantity
 - (c) Neither of the two
 - (d) Both equilibrium price and quantity
 - (ii) Equilibrium price of a commodity is the price at which
 - (a) Quantity demanded and supplied, both rise
 - (b) Supply is maximum
 - (c) Demand is maximum
 - (d) Quantity demanded and supplied are equal.

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Price Determination Under Perfect Competition

- (iii) Equilibrium means
 - (a) The variables are changing continuously
 - (b) Demand and supply are unequal
 - (c) The variables show no tendency to change
 - (d) None of the above
- (iv) If at some particular price, the quantity demanded exceeds its quantity supplied, then
 - (a) Price will rise
 - (b) Demand will fall
 - (c) Supply will increase
 - (d) All of the above

Let us now explain the excess demand and excess supply situation by using diagrams.

22.3 EXCESS DEMAND

Excess Demand is the gap between demand and supply when demand is more than supply. If at a given price, the quantity demanded of a commodity exceeds its quantity supplied we have excess demand. For example, in the table 22.1, when price is ₹ 2 per kg., demand is 24 kg. while supply is just 16 kg. So this is a situation of excess demand.

Process of Adjustment

One very interesting and important feature of price mechanism is that any disequilibrium is self-correcting. Thus if there is excess demand at any price, price will move in such a way so as to bring equilibrium between demand and supply. In Fig. 22.1, when price is ₹ 2, quantity demanded is 24 kg but quantity supplied is just 16 kg. So there is excess demand of $24 - 16 = 8$ kg. In this situation, buyers realize that some of them will have to go without the commodity as supply is less than that of demand. So they compete to buy the product and in the process, offer a higher price. So, effectively price moves from ₹ 2 to ₹ 3 per kg. At this relatively higher price, demand contracts from 24 kg to 22 kg and supply expands from 16 to 18 kg. So, the magnitude of excess demand has diminished from 8 kg to 4 kg, but still there is a gap and some of the buyers have still to go without the commodity. So there is still competition, which raises the price further to ₹ 4 per kg, where demand contracts further to 20 kg and supply expands to 20 kg. Now, both quantity demanded and quantity supplied are equal.

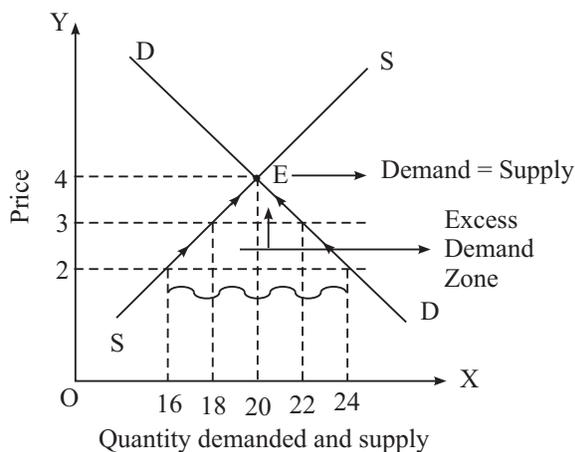


Fig. 22.3

So, the equilibrium has been brought about by increase in price, which also contracts demand and expands supply. We can summarize the process as follows:

- (a) In case of excess demand, price starts rising, as the buyers try to compete out each other.
- (b) As a result of rise in price, demand starts contracting and supply starts expanding.
- (c) All these movements of price, demand and supply result in getting equilibrium restored, though at a higher price, than before.

22.4 EXCESS SUPPLY

Excess Supply is the gap between demand and supply when Supply is more than demand. If at a given price, the quantity supplied of a commodity exceeds its quantity demanded we have excess Supply. For example, in the table 22.1, when price is ₹ 6 per kg., demand is 16 kg. while supply is just 24 kg., obviously this is a situation of excess Supply.

Process of Adjustment

When quantity supplied is more than quantity demanded at price of ₹ 6 per kg., the suppliers are now worried as they know that because of excess supply, all of their goods might not be sold. Every supplier now wants to ensure that his goods are not left unsold. In a bid to ensure this, the supplier, tries to lure consumers by lowering the price to ₹ 5 per kg. But other suppliers are also doing precisely the same. So, the price effectively falls to ₹ 5 per kg. But even at this relatively lower price, supply still exceeds demand by 4 kg. and so another cycle of offering a lower



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price starts. This continues till the price reaches the level of ₹ 4 per kg where quantity demanded equals quantity supplied. At this price, suppliers have no reason to offer a lower price, as they know that at this price all their goods are going to be sold. So the equilibrium in this case has been brought about by decrease in price, which also contracts supply and expands demand.

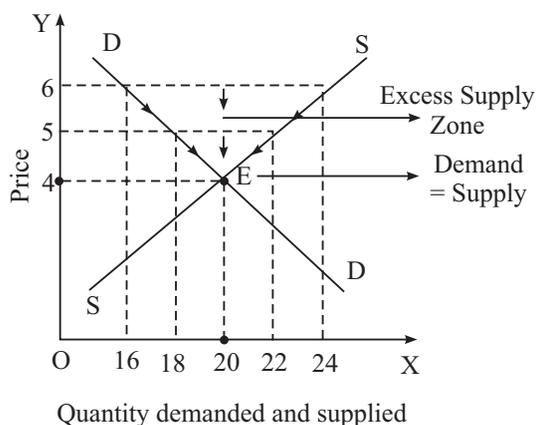


Fig. 22.4

We can summarize the process as follows:

- In case of excess supply, price starts falling, as the suppliers try to compete out each other.
- As a result of fall in price, demand starts expanding and supply starts contracting.
- All these movements of price, demand and supply result in getting equilibrium restored, though at a lower price, than before.



INTEXT QUESTIONS 22.2

- What is excess demand?
- What is excess supply?
- How is equilibrium between demand and supply restored in case of excess demand?
- How is equilibrium between demand and supply restored in case of excess supply?
- Explain the effect of adjustment process on price, demand and supply in case of excess demand?
- Explain the effect of adjustment process on price, demand and supply in case of excess supply?

22.5 EFFECT OF CHANGE IN DEMAND ON EQUILIBRIUM PRICE AND QUANTITY

As demand and supply are the twin forces determining the equilibrium price of a commodity, any change in either or both of them is bound to bring in some change in price. We will study, in this section, the effect of change in demand, supply held constant.

(i) Effect of Increase in demand

When due to any external factor such as rise in population, rise in income of people, demand for a commodity increases (for every price level), the demand curve shifts rightwards. As a result, it now intersects the supply curve at a new, higher level, which causes the price to rise. As shown in the figure below, initial demand curve DD intersects supply curve SS at point e .

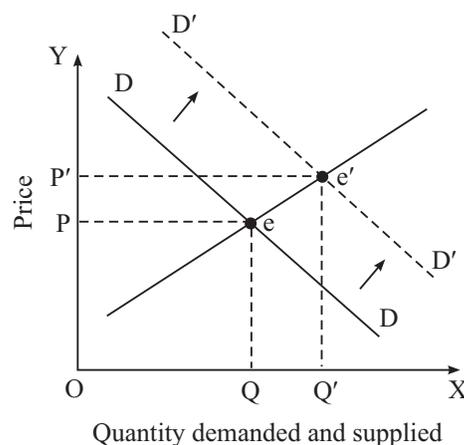


Fig. 22.5

The equilibrium price is OP and the equilibrium quantity demanded and supplied are OQ . Now, suppose demand increases and as a result, demand curve shifts rightwards. This new demand curve $D'D'$ intersects the supply curve SS at point e' . So, the new equilibrium price is OP' which is higher than the earlier price OP . It may also be noted that the equilibrium quantity demanded and supplied have also risen from OQ to OQ' .

(ii) Effect of Decrease in Demand

When due to any external event such as fall in income level, demand for a commodity falls, the demand curve shifts leftwards. So, this new demand curve intersects supply curve at a lower level which causes the price to fall. As shown in



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the figure 22.8, initial demand curve DD intersects the supply curve SS at point e.

The equilibrium price is OP and the equilibrium, quantity demanded and supplied are OQ. Now, suppose demand decreases and as a result, demand curve shift leftwards. This new demand curve D'D' intersects the supply curve SS at point e'. So, the new equilibrium price is OP' which is lower than the earlier price OP. It may also be noted that the equilibrium quantity demanded and supplied have also decreased from OQ to OQ'.

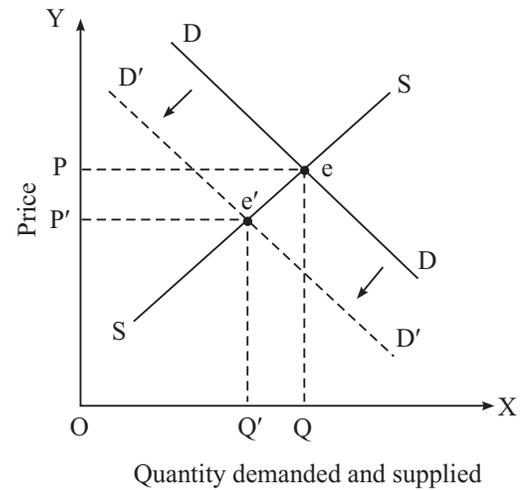


Fig. 22.6

22.6 EFFECT OF CHANGE IN SUPPLY ON EQUILIBRIUM PRICE AND QUANTITY

In this case, we will show the impact of change in supply of the commodity while demand for it remains the same.

(i) Effect of Increase in Supply

When due to any external factor such as a bumper crop, supply of a commodity increases (for every price level), the supply curve shifts rightwards. As a result, it now intersects the demand curve at a new, lower level, which causes the price to fall. As shown in the figure 24.9, demand curve DD intersects the initial supply curve SS at point e.

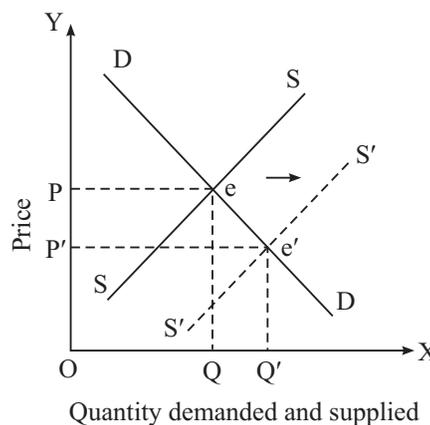


Fig. 22.7



Notes

The equilibrium price is OP and the equilibrium quantity demanded and supplied are OQ . Now, suppose, supply increases and as a result, supply curve shifts rightwards. This new supply curve $S'S'$ intersects demand curve DD at point e' . So, the new equilibrium price is OP' which is higher than the earlier price OP . It may also be noted that the equilibrium quantity demanded and supplied have fallen from OQ to OQ' .

(ii) Effect of Decrease in Supply

When due to any external event such as paucity of raw material or say, floods or drought, supply for a commodity falls, the supply curve shifts leftwards. So, this new supply curve intersects demand curve at a higher level which causes the price to rise. As shown in the figure 22.10 demand curve DD intersects the initial supply curve SS at point e .

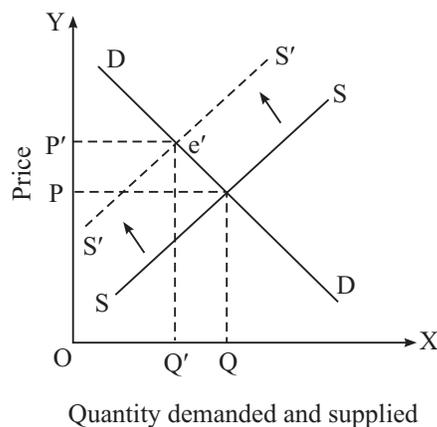


Fig. 22.8

The equilibrium price is OP and the equilibrium quantity demanded and supplied are OQ . Now, suppose supply decreases and as a result, supply curve shifts leftwards. This new supply curve $S'S'$ intersects the demand curve DD at point e' . So the new equilibrium price is OP' which is higher than the earlier price OP . It may also be noted that the equilibrium quantity demanded and supplied have also decreased from OQ to OQ' .

22.7 EFFECT OF SIMULTANEOUS CHANGE IN DEMAND AND SUPPLY ON EQUILIBRIUM PRICE AND QUANTITY

Effect of any change in demand and supply will lead to a resultant change on equilibrium price. The direction of change in price will depend on relative strength



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of change in demand and supply. For example, if both supply and demand increase and increase in demand is greater than increase in supply, price will rise. Any kind of change in demand and supply and their effect on price can be shown by drawing relevant demand and supply curves. A few cases are given here.

Increase in Both Demand and Supply

The three possible cases when both demand and supply are increasing can be explained as follows:

(a) Increase in Demand = Increase in Supply

The upward effect of increase in demand on price equals downward effect of increase in supply. As both the forces are equal in magnitude, price level remains the same. This is shown in the figure 22.11.

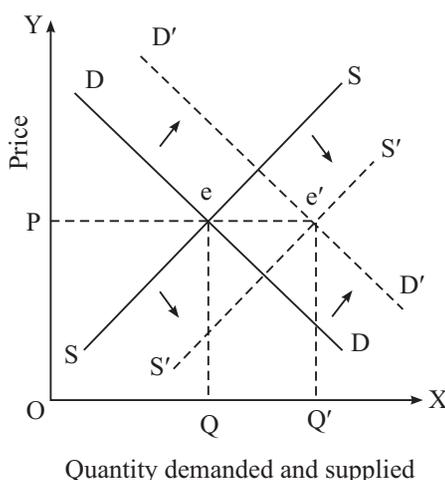


Fig. 22.9

(b) Increase in Demand > Increase in Supply

As in this case, the upward effect of increase in demand on price is greater than that of downward effect of increase in supply. As a result, price level rises. This is shown in the figure 22.12.



Notes

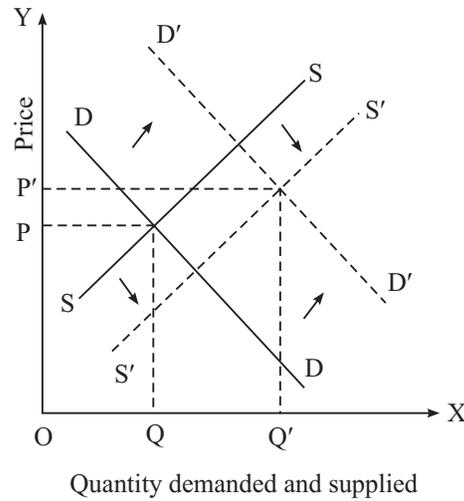


Fig. 22.10

(c) Increase in Demand < Increase in Supply

In this case, the upward effect of increase in demand on price is less than that of downward effect of increase in supply. As a result, price level falls. This is shown in the figure 22.13.

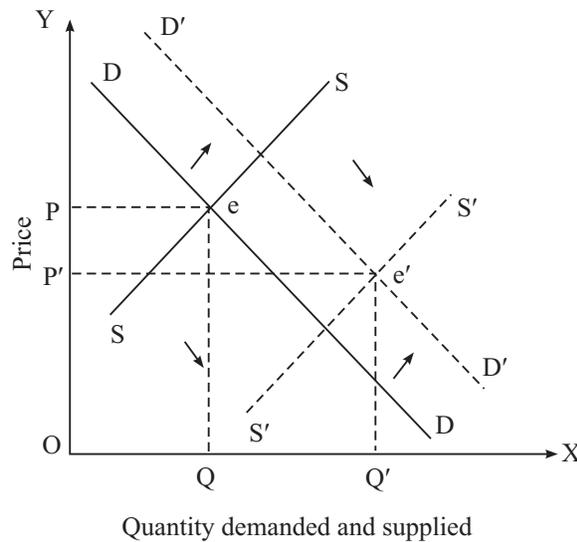


Fig. 22.11

Some other Cases

Similarly, we may conceive of many more other cases of change in demand and supply. A simultaneous decrease in both of them with three possibilities as described above or decrease in one of them and increase in the other again the magnitude of decrease or increase affecting the price and quantities change in demand and supply

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with their different elasticities and so on. The possibilities may be numerous but the method to arrive at the equilibrium price remains essentially the same.



Notes



INTEXT QUESTIONS 22.3

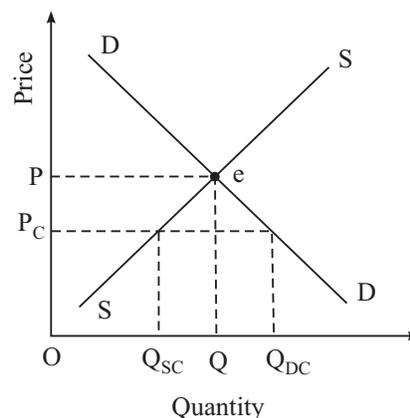
1. With the help of diagrams, show the effect of increase and decrease in demand on price when supply remains constant.
2. With the help of diagrams, show the effect of increase and decrease in supply on price when demand remains constant.
3. Show the effect of increase in supply on price of a commodity when its demand is perfectly elastic.
4. Show the effect of simultaneous decrease in demand and supply on price when supply changes relatively to a greater extent.

22.8 SIMPLE APPLICATION OF DEMAND AND SUPPLY ANALYSIS

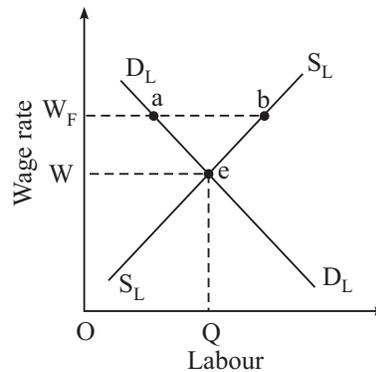
Determination of equilibrium price finds many applications in daily life and has implications for formulation of policies by the government. For example, formation of policies regarding floor price and ceiling price can be explained with the help of equilibrium price.

(a) **Ceiling price:** When the price prevailing in the market is too high and is affecting the interests of the consumers adversely, the government has to step in and decide ceiling price. The sellers are not allowed to raise price of their products beyond this ceiling price and thus the interests of the consumers are protected. An example of this may be rent control policy. Suppose the current rent for a particular type of flats is determined at OP which is

exorbitant. In such a case, the government can fix the rent arbitrarily at OP_c which is lower than OP and will give some relief to tenants (consumers). It may be mentioned that at this controlled rent OP_c , the demand for flats (OQ_{DC}) exceeds supply of flats (OQ_{SC}) and this may lead to unscrupulous practices for which the government may have to take preventive and remedial measures. It may also be mentioned that fixation of price at a level above OP has no point as price mechanism will automatically push the price level back to OP .



(b) **Floor Price:** It is not necessary that price determined is always too high. Sometimes it may be too low also. It may happen especially in markets with excessive supply of something. For example, Indian labour market is a market with excessive supply of labour. In such a setting, the wage rate determined by the market forces of demand and supply is generally too low (especially in the market for unskilled labour). To protect workers' interests in such a case the government may pass minimum wage legislation. Suppose, the wage rate prevailing in the market is OW which is too low. The government may pass minimum wage legislation and fix minimum wages at OW_F . This minimum wage level is floor price. The government does not allow the price level to go lower than floor price and thus sellers' interests are protected. (worker is the seller of his labour).



Notes



INTEXT QUESTIONS 22.4

1. What is ceiling price?
2. What is floor price?
3. What is the need for minimum wage legislation?
4. Explain ceiling price with the help of graph.
5. Define equilibrium price?



WHAT YOU HAVE LEARNT

- Equilibrium price is the price at which market demand for a commodity equals its market supply.
- Equilibrium price is determined by the interaction of the forces of demand and supply of a commodity. The point of intersection of demand curves and supply curve is called 'Equilibrium point' and the price and quantity determined at this point are called 'equilibrium price' and 'equilibrium quantity'.
- The property of flexibility ensures that any disequilibrium in demand and supply is self-correcting through movement of price.

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Notes

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- Excess demand means more demand than supply at a given price.
- Excess supply means more supply than demand at a given price.
- With rise/fall in demand for a commodity, for a given supply both equilibrium price and quantity will rise/fall.
- With rise/fall in supply of a commodity for a given demand, both equilibrium price and quantity will fall/rise.
- When both demand and supply increase or decrease, their effect on equilibrium price and quantity depends on relative magnitude of change in demand and supply.
- Ceiling price is the price fixed below equilibrium price to protect consumers' interests. The government does not allow the price to move above the ceiling price.
- Floor price is the price fixed above equilibrium price to protect sellers' interests. The government does not allow the price to fall below the floor price. Minimum wage legislation is an example.



TERMINAL EXERCISE

1. What is equilibrium price? Explain with the help of diagram.
2. What is excess demand? How is equilibrium between demand and supply restored in case of excess demand?
3. What is excess supply? How is equilibrium between demand and supply restored in case of excess supply?
4. Explain the effect of simultaneous increase in demand and increase in supply on equilibrium price and quantity. Use relevant diagrams.
5. Market demand and supply schedule of a commodity is given below:

Price (Rs per kg)	Quantity demanded (kg)	Quantity supplied (kg)
2	20	12
3	18	14
4	16	16
5	14	18
6	12	20

- (i) What is the equilibrium price of the commodity?
- (ii) What is the equilibrium quantity demanded and supplied at this price?

- (iii) What happens if initial price is Rs 2 per kg?
 - (iv) What happens if initial price is Rs 6 per kg?
6. Explain the concept of ceiling price and floor price.



ANSWER TO INTEXT QUESTIONS

22.1

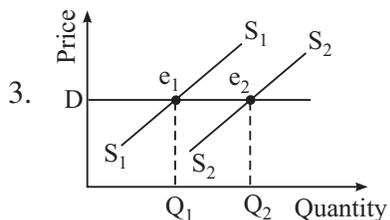
- 1. Refer to 22.1
- 2. Refer to 22.1
- 3. Refer to 22.2
- 4. (i) (d)
(ii) (d)
(iii) (c)
(iv) (d)

22.2

- 1. Refer to 22.3
- 2. Refer to 22.4
- 3. Refer to 22.3 (Process of Adjustment)
- 4. Refer to 22.4 (Process of Adjustment)
- 5. Refer to 22.3
- 6. Refer to 22.4

22.3

- 1. Refer to 22.5
- 2. Refer to 22.6



So price remains the same, whereas quantity rises.



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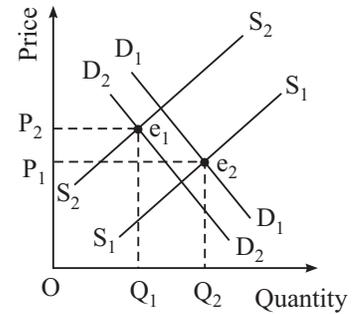
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4. As a result of shift in demand curve from D_1D_1 to D_2D_2 and supply curve from S_1S_1 to S_2S_2 , the equilibrium point moves from e_1 to e_2 . (Note that the magnitude of shift is greater for supply curve). consequently, equilibrium price increases from p_1 to p_2 which equilibrium quantity falls from Q_1 to Q_2 .



22.4

1. Refer to 22.8(a)
2. Refer to 22.8(b)
3. Refer to 22.8(b)
4. Refer to 22.8(a)



23

REVENUE AND PROFIT MAXIMIZATION OF A COMPETITIVE FIRM

Every producer/firm wants to get money by selling the product it has produced. Revenue or turnover is money that a firm/producer receives from its normal business activities, usually from the sale of goods and services to customers. The firm wants to recover its cost of production from the revenue it earns. In fact the firm wants to create simply of revenue over cost as well. How does a competitive firm achieve its goal of profit maximization is the topic of discussion here. The analysis is only meant for a competitive firm.



OBJECTIVES

After completing this lesson, you will be able to:

- understand the concept of total revenue (TR); average revenue (AR) and marginal revenue (MR);
- distinguish between super normal profit, normal profit, and loss; and
- explain producers equilibrium of a competitive firm by using TR and TC approach as well MR and MC approach.

23.1 CONCEPT OF REVENUE

Revenue (sometimes called sales) refers to all the money a Firm/producer takes in from doing what it does – whether making goods or providing services. Total revenue of a firm is defined as the total sales proceeds in the market. The firm sales different quantities of the product to its customers at the prevailing market price. So the total revenue can be calculated by multiplying price with quantity. Symbolically

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Revenue and Profit Maximization of a Competitive Firm

$$TR = PXQ$$

where TR = Total revenue

P = Price

Q = Quantity.

Average Revenue (AR)

AR is defined as the ratio of total revenue to quantity of the product. Symbolically,

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

Put $TR = P \times Q$

i.e. $AR = \frac{P \times Q}{Q}$

or $AR = P$

Average revenue is also known as the price of the product. In other words AR is the revenue per unit of the product sold by the firm.

Marginal revenue (MR)

Marginal revenue is defined as the increase in the total revenue due to an extra unit of the commodity sold by the firm in the market. In other words MR is the addition to TR as a result of the additional unit of the good sold. Symbolically,

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

where Δ stands for change in.

Under perfect competition (refer to Lesson 22- “Forms of Market”), the price of the product is given as the product is homogeneous. So the TR of a firm can increase or decrease depending on the quantity it sells. If the quantity decreases TR will decrease and if quantity increases TR will also increase. See the Table below to know the behaviour of TR of a firm under perfect competition.

Table 23.1: TR, AR and MR of a competitive Firm

Price	Quantity	TR	MR	AR
10	0	0	0	0
10	1	10	10	10
10	2	20	10	10
10	3	30	10	10
10	4	40	10	10



Notes

As given in the table the price of the commodity is given at ` 10. It remains at 10 whatever quantity is sold. Now when quantity is 1, $TR = 10 \times 1 = 10$. When quantity increase to 2, $TR = 10 \times 2 = 20$. When quantity further increases to 3 and 4, TR increases to 30 and 40 respectively. This shows that under perfect competition, the total revenue of a firm increases due to increase in quantity given the price of the commodity in the market. Similarly, in the reverse way, if quantity falls from 4 to 3 TR decreases from 40 to 30 and so on.

Another point to be learnt about TR is that, it increases at a constant rate. Starting from 10, TR increases to 20, 30, 40 at a constant rate of 10 given the price and increase in each unit of quantity.

Coming to AR , since $AR = \frac{TR}{Q}$ or price, you may club them as a single column in the table instead of showing them separately. We have only given them in this table for the purpose of calculating AR and to show that it is same as price.

In the table, you can see that MR is also 10 at each point. In the beginning, MR is shown as 10 and $TR = 10$. It means that TR has increased from 0 to 10 when quantity has increased from 0 to 1. When quantity increases from 1 to 2, TR increase from 10 to 20. So $\Delta TR = 20 - 10 = 10$ and $\Delta Q = 2 - 1 = 1$. So MR at the 2nd quantity or 2nd unit of the commodity is given as $\frac{\Delta TR}{\Delta Q} =$

$\frac{20-10}{2-1} = \frac{10}{1} = 10$. Similarly when quantity increases from 2 to 3, TR increases

from 20 to 30. So MR at 3rd unit of the good is given as $\frac{30-20}{3-2} = \frac{10}{1} = 10$. and

so on. MR shows the manner in which TR is increasing as a result of one unit increase in the quantity of the good. So MR is measured between two quantities.

Relationship between AR and MR and TR

From the table above we can easily state the relationship between AR , MR and TR of the firm under perfect competition as follows.

1. Since price or AR is given under perfect competition and is constant throughout, AR and MR are always equal. i.e. $AR = MR$ for competitive firm.
2. Between MR and TR , it can be said that MR is the rate of change of TR . In other words, the value of MR at any quantity gives the value at which TR has increased above its previous unit.

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Revenue and Profit Maximization of a Competitive Firm

Diagrammatic Presentation

We can give the diagrams of TR , AR and MR as given in Fig. 23.1 below.

Take, TR first. In order to draw the diagram of TR , take the values of TR (as given the table) on the vertical axis and the different values of quantity (Q) on the horizontal axis. Plot each combination of Q and TR and join these combinations to get TR curve. Here TR is a straight line through the origin as shown in the diagram.

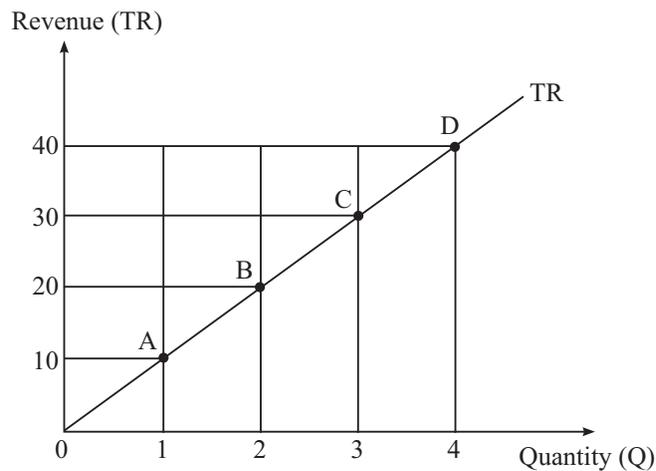


Fig. 23.1

As given in the diagram, the combination of $Q = 1$ and $TR = 10$ is plotted at point A. Point B shows $Q = 2$, $TR = 20$, point C shows $Q = 3$, $TR = 30$ and point D shows $Q = 4$ and $TR = 40$. Join 0, A, B, C and D to get TR .

The diagram for AR and MR for a firm under perfect competition is a horizontal line as shown in the diagram Fig. 23.2 below.

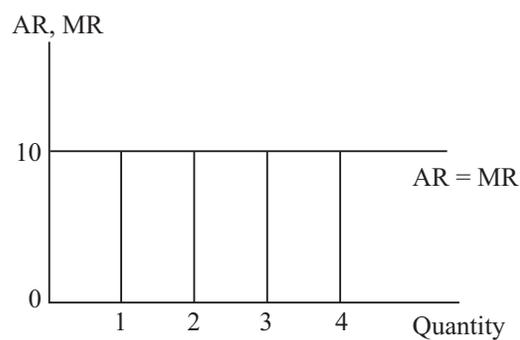


Fig. 23.2

In the table it is given that $AR = MR = 10$ at each quantity sold. So AR and MR start from 10 on the vertical axis which measures them. Then it becomes a horizontal line as there is no change in AR and MR with increase in quantity.



INTEXT QUESTIONS 23.1

1. Define TR, AR and MR symbolically.
2. If price is `5 and quantity sold increases from 6 to 7, find out TR, AR and MR?

Where $P = \text{price}$, $Q = \text{Quantity}$,

$\Delta = \text{increase in}$.

23.2 VARIOUS CONCEPTS OF PROFIT

Profit is defined as the difference of total revenue (TR) over total cost (TC) of the firm.

So profit = $TR - TC$. Economists often distinguish between super normal profit and normal profit. Super normal profit is defined as the surplus of total, revenue over total cost. This means total revenue is greater than total cost. In other words if the difference between total revenue and total cost is positive or greater than zero, then we can say that the firm is earning super normal profit.

Example: A firm sells 5 units of a good at price 10. Its total cost of production is 40. Does supernormal profit exist, and how much?

Ans: $TR = 5 \times 10 = 50$

$TC = 40$

$TR - TC = 50 - 40 = 10$

Since $10 > 0$ i.e. $TR - TC$ is positive, there is super normal profit which is equal to 10.

If we want to find out whether super normal profit exists at each unit of the output or at each quantity of the output then we must compare revenue and cost at each quantity.

You know that revenue per unit of the good is called average revenue (AR).

Similarly, cost per unit of the good is called average cost (AC). If $AR - AC$ is positive or $AR > AC$ then there will be super normal profit. You can use price instead of AR also.



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Notes

Revenue and Profit Maximization of a Competitive Firm

Normal profit

When total revenue equals total cost, the difference between them becomes zero. Such a situation is called normal profit or zero profit. So normal profit means

$$TR - TC = 0 \text{ or } TR = TC.$$

This also means that AR or P equals AC if we divide quantity. i.e. $\frac{TR}{Q} = \frac{TC}{Q}$.

or $AR = AC$

Loss

When the firm's total cost exceeds total revenue, i.e. $TC > TR$ the firm incurs loss. In other words loss of the firm implies that its TR is less than TC . At the unit level, loss means AR or P is less than AC ($AR < AC$). In a situation of loss the firm is not able to recover its cost of production after selling the product.



INTEXT QUESTIONS 23.2

1. The average cost of a firm is 10. It sold 10 units at a price of 10. What type of profit did the firm earn?
2. If $TR > TC$, then there is normal profit. True or false
3. If $TR = TC$, then there is super normal profit. True or false.
4. If $AR < AC$, then there is loss. True or false

23.3 PROFIT MAXIMIZATION OF A COMPETITIVE FIRM

The major objective of a firm is to maximize profit. To attain this we can explain two different approaches.

1. TR and TC approach
2. MR and MC approach

TR and TC approach

As we know that profit is the difference between total revenue and total cost, profit maximization through this approach states that the firm should produce that quantity of output at which the difference between total revenue and total cost is the maximum ($TR - TC$ is maximum).

This can be explained by using the following table. [Recall the lesson on cost you have studied earlier].

Table 23.2: Profit maximization of a firm: TR and TC approach

Q	TR	TC	TR-TC = Profit
1	10	15	-5
2	20	20	0
3	30	22	8
4	40	25	15 (TR - TC is maximum.)
5	50	40	10
6	60	60	0
7	70	85	-15



Notes

As shown in the table, the TR of a competitive firm is increasing at a constant rate of 10. It starts from 0 when quantity is 0, Then with in each unit increase in the quantity TR is increasing by 10 i.e. when $Q = 1$, $TR = 10$.

When $Q = 2$, $TR = 20$ and so on. On the otherhand TC of the firm is 15 even if $Q = 0$. This is because of presence of fixed cost as already told in the lesson on cost. TC slowly increases in the beginning and then increases fast with increase in quantity of output. At $Q = 1$, $TC = 15$, then at $Q = 2$, $TC = 20$ which is an increase of 5. When $Q = 3$, $TC = 22$ which is an increase of 2 i.e. less than the previous unit. After this TC increases faster which you can easily verify.

Now look at the column on profit, marked as $TR - TC$. At $Q = 1$, $TR - TC = -5$. This means that there is loss at this level of output because $TC > TR$. So the firm must increase output. At $Q = 2$, $TR = TC$ so that $TR - TC = 0$. Here the firm is able to recover the cost. At $Q = 3$, $TR - TC = 8$ and at $Q = 4$, $TR - TC = 15$. At $Q = 5$, $TR - TC = 10$ which has fallen from the previous level of 15. At $Q = 6$, $TR - TC$ falls to 0 and then at $Q = 7$, $TR - TC$ is again negative at -15 indicating loss. From this it is clear that at $Q = 4$, $TR - TC$ is maximum at 15. So firm must produce 4 units to maximize profit because here the difference between TR and TC is maximum.

Diagrammatic Presentation

We can show the profit maximization process in a suitable diagram given as fig. 23.3.

MODULE - 8

Market and Price Determination



Notes

Revenue and Profit Maximization of a Competitive Firm

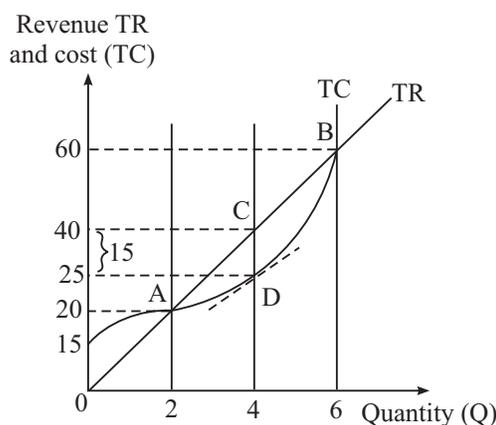


Fig. 23.3

In the diagram revenue and cost are measured on vertical axis. Quantity measured on horizontal axis. The TR is a straight line through the origin.

The TC curve starts from 15 on vertical axis and then rises like an inverse 'S' shaped curve as shown in the lesson on cost. From quantity 0 to 1 there is loss as $TC > TR$ here. At $Q = 2$, $TR = TC$. This is shown as TR and TC curves meeting at point A. At $Q = 4$, $TR = 40$, (which corresponds to) point C on TR curve. At the same level of $Q = 4$, point C and TC is 25, corresponding to point D. The distance CD is the maximum difference between TR and TC. Then at $Q = 6$, $TR = TC$ again and after that TC curve is above TR curve indicating loss. So at $Q = 4$, profit is maximized.

According to this Method, the profits of a firm can be estimated by calculating Marginal Revenue (It is the change in total Revenues by selling of additional Unit of Output) and Marginal cost (it is the addition to the total cost/Total variable cost by producing one additional unit of Output) at different levels of Output the profit of a firm will be maximum at that level of output which MC is equal to MR.

$$MC = MR$$

or $MR - MC = 0$

MR and MC Equality approach to firm's Equilibrium is based on two conditions.

- First order necessary condition. The Firm's MC must be equal to its MR at the equilibrium level of Output.
- Second order or sufficient condition. At the equilibrium level of Output the MC should be rising i.e. the MC curve should have positive slope or MC curve intersects MR curve from below.

Table 23.3: Profit maximization through MC and MR Approach

Q	MR	MC	MR – MC	Total
1	5	8	-3	-0 loss
2	5	5	0	0
3	5	2	3	0
4	5	3	2	5 Profit
5	5	4	1	6
6	5	5	-0	
7	5	7	-2	0 loss

In the table quantity Q is increasing from 1 to 7. Marginal revenue (MR) is constant at 5 since the firm is under perfect competition (already told in the section on revenue). The marginal cost (MC) starts at 8 and then falls and increases to 5 and continues falling to 4 at Q = 5. After that MC rises to 5 at Q = 6 and then further rises to 7 at Q = 7.

From the behaviour of MR and MC, you can see that initially between Q = 0 to 1, $MC > MR$. As $MC = 8$ and $MR = 5$. At Q = 1, $MC = MR = 5$. Then between Q = 2 to Q = 6 MC lies below MR. Then again at Q = 6, MC rises to be equal to MR at 5. We can say that initially when $MC > MR$ there is loss. So the firm must increase output. Then when $MC = MR$ at Q = 2 there was no profit and no loss. But after that between Q = 3 to Q = 5, MC lies below MR. This is the zone of profit. For example at Q = 3, $MR - MC = 5 - 2 = 3$. At Q = 4, $MR - MC = 5 - 3 = 2$. At Q = 5, $MR - MC = 5 - 4 = 1$. At Q = 6, $MR - MC = 5 - 5 = 0$. i.e. We can say that profit starts at from 0 at Q = 2 to 3 at Q = 3, 2 at Q = 4, 1 at Q = 5 and 0 at Q = 6. Adding all these we get total profit to be $0 + 3 + 2 + 1 + 0 = 6$, when Q = 6. After that at Q = 7, there is loss again. So profit is maximized at Q = 6. In the table it is clearly shown that $MR = MC$ at two points, one when Q = 2 and then when Q = 6. However at Q = 2, profit was not maximum as the firm had loss earlier at Q = 1 with MC more than MR at the time. But at Q = 6, $MC = MR$, but total profit is already maximum as indicated by the fact that MC was less than MR when they become equal. Also after that MC exceeds MR creating loss. Hence at Q = 6, both the conditions of profit maximization are satisfied.



Notes

MODULE - 8

Market and Price Determination



Notes

Revenue and Profit Maximization of a Competitive Firm

Diagrammatic presentation

The above table can be presented diagrammatically in fig. 23.4.

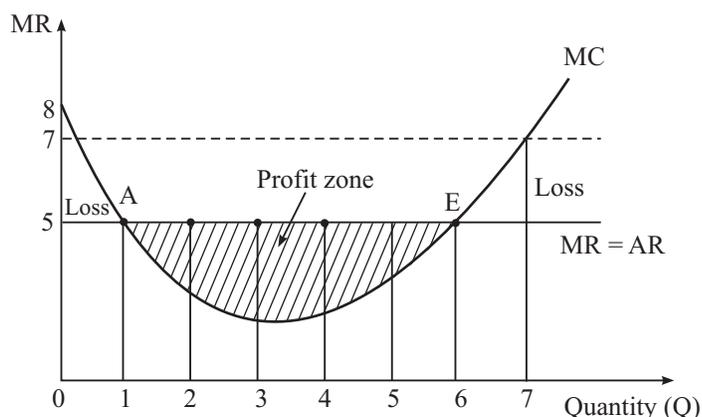


Fig. 23.4

In the diagram MR and MC are measured on vertical axis. Quantity is measured on horizontal axis. MR is horizontal at 5. It is also same as AR as said earlier. MC is a 'u' shaped curve starting from 5 at Q = 1, MC is above MR indicating loss. Other MC Q = 2, MC = MR, at point A. Here MC cuts MR from above. MC lies below MR so profit stands from point A when Q = 2. Profits are napped as long as MC is less than MR and till they are equal at point when Q = 6. At point, E, MC = MR and MC is less than MR when they become equal. Diagrammatically it means that MC cuts MR from below. So "E" is the point of profit maximization which satisfies both the conditions.



INTEXT QUESTIONS 23.3

1. Maximum profit implies that MC is above MR after both are equal. True or false.
2. At quantity 2, $TR = TC$. After that TC lies below TR and again they become equal at quantity. 6. Do you firm agree that profit maximizing output lies between these two quantities. Yes/No.



WHAT YOU HAVE LEARNT

- Total revenue (TR) is the total sales proceeds of the firm. $TR = \text{Price} \times \text{Quantity}$.



Notes

- $AR = \frac{TR}{Q}$ and $MR = \frac{\Delta TR}{\Delta Q}$.
- AR and MR are equal under perfect competition.
- Super normal profit refers to a situation when $TR > TC$ or $AR > AC$.
- Normal profit implies that $TR = TC$ or $AR = AC$. It is also called zero profit.
- Loss implies that $TR < TC$ or $AR < AC$.
- Profit maximizing output is that output where $TR - TC$ is maximum as per TR and TC approach.
- As per MR and MC approach, profit maximizing condition are
 - (i) $MC = MR$
 - (ii) MC must be less than MR before they are equal.



TERMINAL EXERCISE

1. Define total revenue, average revenue and marginal revenue. Give their relationship.
2. Fill TR, AR and MR column.

P	Q	TR	AR	MR
	20	4		
	20	5		
	20	6		
3. Distinguish between super normal and normal profit.
4. Write a short note on loss of a firm by giving numerical example?
5. Explain the profit maximization principle by using TR and TC approach. Give suitable diagram.
6. Explain profit maximization conditions of a competitive firm by using suitable diagram?
7. Construct an imaginary table show the profit maximization output by using TR and TC approach?
8. Construct an imaginary shown the profit maximizing output of a competitive firm by using MR and MC approach?

MODULE - 8

Market and Price
Determination



Notes

Revenue and Profit Maximization of a Competitive Firm



ANSWERS TO INTEXT QUESTIONS

23.1

1. $TR = P \times Q$, $AR = \frac{TR}{Q}$, $MR = \frac{\Delta TR}{\Delta Q}$

2.

P	Q	TR	AR	MR
5	6	30	5	5
5	7	35	5	5

23.2

1. Normal profit or zero profit.
2. False
3. False
4. True.

23.3

1. True
2. Yes.