

In Figure-13, the movement from DD to D₂D₂ shows the decrease in demand with price at constant (OP). However, the quantity has also decreased from OQ to OQ₂.

3.7 Concept of Supply

In economics, supply refers to the quantity of a product available in the market for sale at a specified price at a given point of time. Unlike demand, supply refers to the willingness of a seller to sell the specified amount of a product within a particular price and time. Supply is always defined in relation to price and time. For example, if a seller agrees to sell 500 kgs of wheat, it cannot be considered as supply of wheat as the price and time factors are missing. Similarly, if a seller is ready to sell 500 kgs at a price of ₹ 30 per kg, then again it would not be considered as supply as the time element is missing. Therefore, the statement "a seller is willing to sell 500 kgs at the price of ₹ 30 per kg in a week" is ideal to understand the concept of supply as it relates supply with price and time.

Apart from this, the supply also depends on the stock and market price of the product. Stock of a product refers to quantity of a product available in the market for sale within a specified point of time. Both stock and market price of a product affect its supply to a greater extent. If the market price is more than the cost price, the seller would increase the supply of a product in the market. However, the decrease in market price as compared to cost price would reduce the supply of product in the market. For example, Mr. X has 100 kgs of a product. He expects the minimum price to be ₹ 90 per kg and the market price is ₹ 95 per kg. Therefore, he would release certain amount of the product, say around 50 kgs in the market, but would not release the whole amount. The reason being he would wait for better rates for his product. In such a case, the supply of his product would be 50kgs at ₹ 95 per kg.

3.8 Determinants of Supply

Supply can be influenced by a number of factors that are termed as determinants of supply. Generally, the supply of a product depends on its price and cost of production. In simple terms, supply is the function of price and cost of production. Some of the factors that influence the supply of a product are described as follows:

- **Price:** Refers to the main factor that influences the supply of a product to a greater extent. Unlike demand, there is a direct relationship between the price of a product and its supply. If the price of a product increases, then the supply of the product also increases and vice versa. Change in supply with respect to the change in price is termed as the variation in supply of a product. Speculation about future price can also affect the supply of a product. If the price of a product is about to rise in future, the supply of the product would decrease in the present market because of the profit expected by a seller in future. However, the fall in the price of a product in future would increase the supply of product in the present market.
- **Cost of Production:** Implies that the supply of a product would decrease with increase in the cost of production and vice versa. The supply of a product and cost of production are inversely related to each other. For example, a seller would supply less quantity of a product in the market, when the cost of production exceeds the market price of the product. In such a case, the seller would wait for the rise in price in future. The cost of production rises due to several factors, such as loss of fertility of land, high wage rates of labor, and increase in the prices of raw material, transport cost, and tax rate.
- **Natural Conditions:** Implies that climatic conditions directly affect the supply of certain products. For example, the supply of agricultural products increases when monsoon comes on time. However, the supply of these products decreases at the time of drought. Some of the crops are climate specific and their growth purely depends on climatic conditions. For example, Kharif crops are well grown at the time of summer, while Rabi crops are produce well in winter season.
- **Technology:** Refers to one of the important determinant of supply. A better and advanced technology increases the production of a product, which results in the increase in the supply of the product. For example, the production of fertilizers and good quality seeds increases the production of crops. This further increase the supply of food grains in the market.
- **Transport Conditions:** Refer to the fact that better transport facilities increase the supply of products. Transport is always a constraint to the supply of products, as the products are not available on time due to poor transport facilities. Therefore, even if the price of a product increases, the supply would not increase.

In India, sellers usually use road transport and the poorly maintained road makes it difficult to reach the destination on time. The products that are manufactured in one part of the city need to be spread in the whole country through road transport. This may result in the damage of most of the products during the journey, which can cause heavy loss for a seller. In addition, the seller can also lose his/her customers because of the delay in the delivery of products.

- **Factor Prices and their Availability:** Act as one of the major determinant of supply. The inputs, such as raw material, man, equipment, and machines, required at the time of production are termed as factors. If the factors are available in sufficient quantity and at lower price, then there would be increase in production. This would increase the supply of a product in the market. For example, availability of cheap labor and raw material nearby the manufacturing plant of an organization would help in reducing the labor and transportation costs. Consequently, the production and supply of the product would increase.

- **Government's Policies:** Implies that the different policies of government, such as fiscal policy and industrial policy, has a greater impact on the supply of a product. For example, increase in tax on excise duties would decrease the supply of a product. On the other hand, if the tax rate is low, then the supply of a product would increase.
- **Prices of Related Goods:** Refer to fact that the prices of substitutes and complementary goods also affect the supply of a product. For example, if the price of wheat increases, then farmers would tend to grow more wheat than rice. This would decrease the supply of rice in the market.

3.9 Law of Supply

Law of supply expresses a relationship between the supply and price of a product. It states a direct relationship between the price of a product and its supply, while other factors are kept constant. For example, in case the price of a product increases, sellers would prefer to increase the production of the product to earn high profits, which would automatically lead to increase in supply. Similarly, if the price of the product decreases, the supplier would decrease the supply of the product in market as he/she would wait for rise in the price of the product in future. The statement given for the law of supply is as follows:

"Other things remaining unchanged, the supply of a commodity expands with a rise in its price and contracts with a fall in its price."

The law of supply can be better understood with the help of supply schedule, supply curve, and supply function. Let us discuss these concepts in detail in the next sections.

3.9.1 Supply Schedule

Supply schedule shows a tabular representation of law of supply. It presents the different quantities of a product that a seller is willing to sell at different price levels of that product. A supply schedule can be of two types, which are as follows:

- **Individual Supply Schedule:** Refers to a supply schedule that represents the different quantities of a product supplied by an individual seller at different prices. Table-8 shows the supply schedule for the different quantities of milk supplied in the market at different prices:

Table-8: Individual Supply Schedule	
Price of Milk (per liter in ₹)	Quantity Supplied(1000 per day in liters)
10	10
12	13
14	20
16	25

- **Market Supply Schedule:** Refers to a supply schedule that represents the different quantities of a product that all the suppliers in the market are willing to supply at different prices. Market supply schedule can be drawn by aggregating the individual supply schedules of all individual suppliers in the market. Table-9 shows the market supply schedule of a product supplied by three suppliers, A, B, and C:

Table-9: Market Supply Schedule				
Price of Product X (per unit in ₹)	Individual Supply (per day)			Market Supply (per day)
	A	B	C	
100	750	500	450	1700
200	800	650	500	1950
300	900	750	650	2300
400	1000	900	700	2600

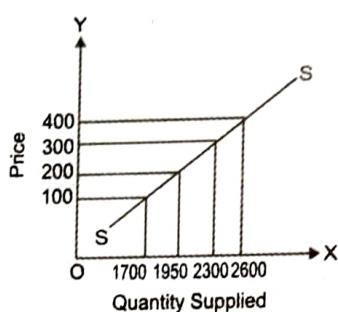
3.9.2 Supply Curve

The graphical representation of supply schedule is called supply curve. In a graph, price of a product is represented on Y-axis and quantity supplied is represented on X-axis. Supply curve can be of two types, individual supply curve and market supply curve. Individual supply curve is the graphical representation of individual supply schedule, whereas market supply curve is the representation of market supply schedule. Figure-14 shows the individual supply curve for the individual supply schedule (represented in Table-8):

**Figure-14: Individual Supply Curve**

In Figure-14, the supply curve is showing a straight line and an upward slope. This implies that the supply of a product increases with increase in the price of a product.

Figure-15 shows the market supply curve of market supply schedule (represented in Table-9):

**Figure-15: Market Demand Curve**

The slope of market supply curve can be obtained by calculating the supply of the slopes of individual supply curves. Market supply curve also represents the direct relationship between the quantity supplied and price of a product.

3.9.3 Supply Function

Supply function is the mathematical expression of law of supply. In other words, supply function quantifies the relationship between quantity supplied and price of a product, while keeping the other factors at constant. The law of supply expresses the nature of relationship between quantity supplied and price of a product, while the supply function measures that relationship. The supply function can be expressed as:

$$S_x = f(P_x)$$

Where

S_x = Quantity supplied for product X

P_x = Price of product X

f = Constant representing change produced in S_x with one unit change in P_x

3.9.4 Assumptions in Law of Supply

As discussed earlier, the law of supply expresses the change in supply with relation to change in price. In other words, the main assumption of law of supply is that it studies the effect of price on supply of a product, while keeping other determinants of supply at constant. Apart from this, there are certain assumptions that are necessary for the application of law of supply, which are as follows:

- Assumes that the price of a product changes, but the change in the cost of production is constant. This is because if the cost of production rises with increase in price, then sellers would not supply more due to the reduction in their profit margin. Therefore, law of supply would be applicable only when the cost of production remains constant.
- Assumes that there is no change in the technique of production. This is because the advanced technique would reduce the cost of production and make the seller supply more at a lower price.
- Assumes that there is no change in the scale of production. This is because if the scale of production changes with a period of time, then it would affect the supply. In such a case, the law of supply would not be applicable.
- Assumes that the policies of the government remain constant. If there is an increase in tax rates, then the supply of product would decrease even at the higher price. Therefore, for the application of law of supply, it is necessary that government policies should remain constant.

- Assumes that the transportation cost remain the same. In case the transportation cost reduces, then the supply would increase, which is invalid according to the law of supply.
- Assumes that there is no speculation about prices in future, which otherwise can affect the supply of a product. If there is no speculation about products, then the economy is assumed to be at balance and people are satisfied with the available products and do not require any change.

3.9.5 Exception to Law of Supply

According to the law of supply, if the price of a product rises, then the supply of the product also rises and vice versa. However, there are certain conditions where the law of supply is not applicable. These conditions are known as exceptions to law of supply. In such cases, the supply of a product falls with the increase in price of a product at a particular point of time. For example, there would be decrease in the supply of labor in an organization when the rate of wages is high. The exception of law of supply is represented on the regressive supply curve or backward sloping curve. It is also known as exceptional supply curve, which is shown in Figure-16:

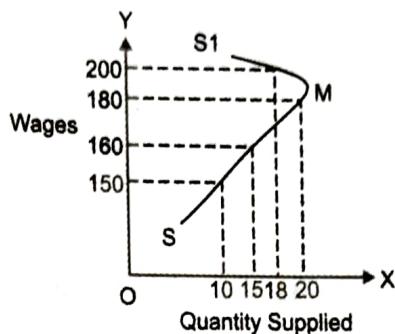


Figure-16: Exceptional Supply Curve

In Figure-16, SMS1 is the exceptional supply curve for labor. In this case, wages are regarded as the price of labor. It can be interpreted from the graph that as the wages of a worker increases, its quantity supplied that is working hours decreases, which is an exception to the law of supply. Some of the exceptions of law of supply are as follows:

- Speculation:** Refers to the fact that the supply of a product decreases instead of increasing in present when there is an expected increase in the price of the product. In such a case, sellers would not supply the whole quantity of the product and would wait for the increase in price in future to earn high profits. This case is an exception to law of demand.
- Agricultural Products:** Imply that law of supply is not valid in case of agricultural products as the supply of these products depends on particular seasons or climatic conditions. Thus, the supply of these products cannot be increased after a certain limit in spite of rise in their prices.
- Changes in Other Situations:** Refers to the fact that law of supply ignores other factors (except price) that can influence the supply of a product. These factors can be natural factors, transportation conditions, and government policies.

3.10 Expansion and Contraction of Supply

The change in quantity supplied with change in price is regarded as expansion or contraction of supply. Expansion of supply refers to increase in quantity supplied due to increase in the price of a product. Similarly, contraction of supply refers to decrease in quantity supplied due to decrease in the price of a product. It should be noted that expansion or contraction of supply is related to increase or decrease in the price of a product, while other factors are kept constant. Expansion or contraction of supply can be represented on the same graph. Figure-17 shows the expansion and contraction of supply:

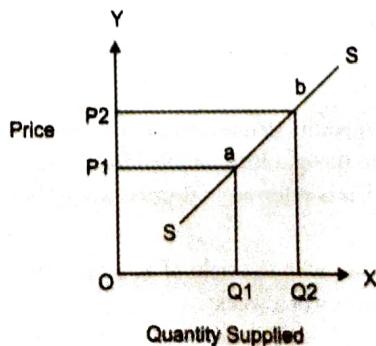


Figure-17: Expansion and Contraction of Supply

In Figure-17, movement of supply curve from a to b is termed as expansion of supply when the price increases from OP_1 to OP_2 and quantity supplied from OQ_1 to OQ_2 , while the movement from b to a is termed as contraction of supply.

3.11 Increase and Decrease in Supply

Increase and decrease in supply is referred to change in quantity supplied with change in other determinants of supply, while keeping the price of the product constant. When the supply of a product is more, irrespective of its price, it is called increase in supply. However, when the supply of a product decreases without a change in its price, it is termed as decrease in supply. In the graphical representation of increase and decrease in supply, the graph shows shifts from one supply curve to another supply curve. Figure-18 shows the increase in supply:

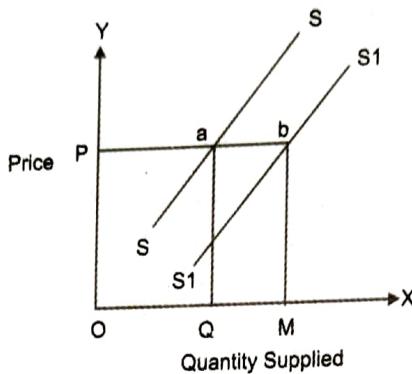


Figure-18: Increase in Supply

In Figure-18, the shift from SS to S₁S₁ with shift in quantity supplied from OQ to OM is showing an increase in supply, while keeping the price at constant at OP. Figure-19 shows the decrease in supply:

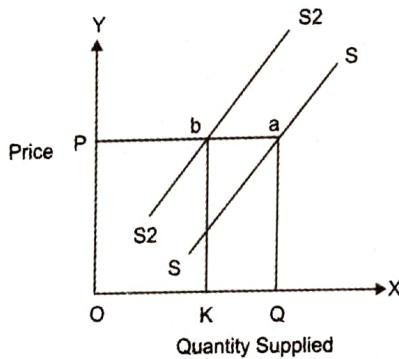


Figure-19: Decrease in Supply

In Figure-19, the shift from SS to S₂S₂ with shift in quantity supplied from OQ to OK is showing a decrease in supply while keeping the price at constant at OP.

3.12 Market Equilibrium-Demand and Supply Equilibrium

The market price refers to a current price at which a product is sold in the market. It is determined by the collaboration of two functions, namely, demand and supply. According to economic theory, the market price of a product is determined at a point where the forces of supply and demand meet. The point where the forces of demand and supply meet is called equilibrium point. Conceptually, equilibrium means state of rest. It is the stage where the balance between two opposite functions, demand and supply, is achieved.

Market equilibrium refers to the stage where the quantity demanded for a product is equal to the quantity supplied for the product. The price when the quantity demanded is equal to the quantity supplied for the product is known as equilibrium price. Equilibrium price is also termed as market clearing price, which is referred to a price when there is neither an unsold stock nor an unsupplied demand.

Let us understand the concept of market equilibrium with the help of an example. Table-10 shows the market demand and supply for talcum powder in Mumbai with their varying prices of a week:

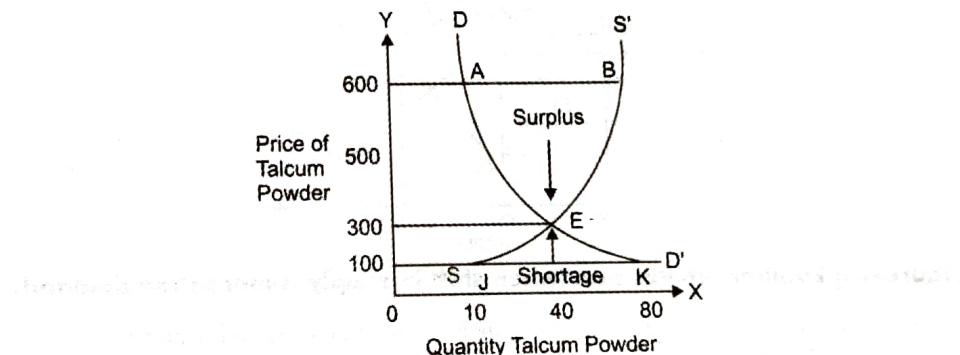
Table-10: Demand and Supply Schedule for Talcum Powder

Prices (in ₹)	Demand (in thousands)	Supply (in thousands)	Market Position	Effect on Price
100	80,000	10,000	Shortage	Rise
200	55,000	28,000	Shortage	Rise
300	40,000	40,000	Equilibrium	Stable
400	28,000	50,000	Surplus	Fall
500	20,000	55,000	Surplus	Fall
600	15,000	60,000	Surplus	Fall

Let us determine the market equilibrium price in a free market, where there is no factor to control the demand and supply forces, in the next sections.

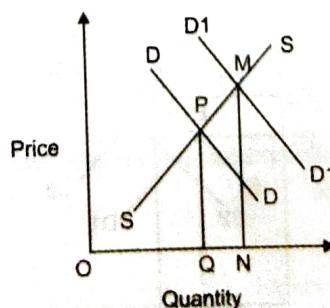
3.12.1 Determination of Market Price

As discussed earlier, the equilibrium price of a product is determined when the forces of demand and supply meet. For understanding the determination of market equilibrium price, let us take the example of talcum powder shown in Table-10. In Table-10, we have taken the initial price of talcum powder as ₹ 100. In this case, the quantity demanded is 80,000, while the supply is 10,000. This results in the shortage of 70,000 of talcum powder in the market. Due to this shortage, the sellers get a chance to earn more by increasing the price of the talcum powder and consumers are ready to purchase at the price quoted by sellers due to shortage of talcum powder. This increase in profit results in increase in the production of a product to earn more profit, which, in turn, increases the supply of the product. The process of increase in prices goes on till the price of talcum powder reaches to ₹ 300. At this price, the demand and supply is equal to 40,000. Therefore, equilibrium is achieved and the equilibrium price is ₹ 300. Similarly, if the supply of talcum powder increases beyond ₹ 300, then the sellers need to decrease their prices to sell their unsold stock. They would also stop production that results in the decrease in supply. In such a case, consumers would buy more due to reduction in price of talcum powder. This would continue till the stock would achieve equilibrium and the equilibrium price come out to be ₹ 300. The graphical representation of equilibrium of demand and supply is shown in Figure-20:

**Figure-20: Equilibrium of Demand and Supply**

3.12.2 Shifts in Market Equilibrium

If there is a shift in supply or demand curve, then the equilibrium point also gets shifted. The shift in demand curve and equilibrium is shown in Figure-21:

**Figure-21: Shift in Demand and Equilibrium**

In Figure-21, initially the equilibrium price is found at PQ and quantity at OQ . However, when the demand curve shifted from DD to D_1D_1 , then equilibrium also shifts from PQ to MN . Now, the equilibrium price is at MN and the quantity is at ON . In this case, the supply does not show any changes. It can also be interpreted from Figure-21 that the equilibrium price has increased with an increase in quantity, when demand curve shifts.

The shift in supply curve and equilibrium is shown in Figure-22:

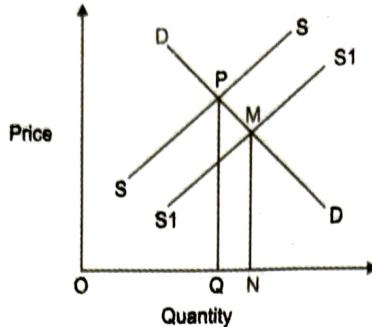


Figure-22: Shift in Supply Curve and Equilibrium

In Figure-22, initially the equilibrium price is found at PQ and quantity at OQ . However, when the supply curve shifted from SS to S_1S_1 , then equilibrium also shifts from PQ to MN . Now, the equilibrium price is at MN and the quantity is at ON . In this case, the demand does not show any changes. It can also be interpreted from Figure-22 that the equilibrium price has decreased and quantity has increased, when supply curve shifts.

Now, let us determine the effect of simultaneous shifts in the demand and supply curve on the equilibrium point. It basically depends on the extent of shift in the demand and supply curves. In case the shift in supply curve is greater than the demand curve, then equilibrium price decreases and output increases. It can be better explained with the help of Figure-23:

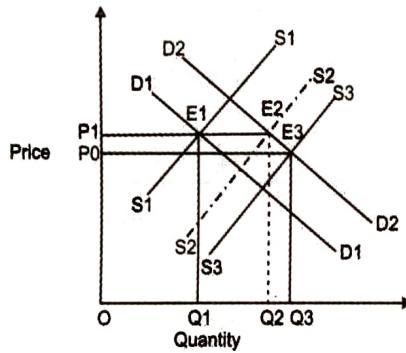


Figure-23: Equilibrium Position (when shift in supply is more than demand)

In Figure-23, initially equilibrium position, E_1 is obtained by balancing demand curve, D_1D_1 and supply curve, S_1S_1 . Equilibrium price at E_1 is P_1 and quantity is OQ_1 . When the demand curve shifts from D_1D_1 to D_2D_2 and supply curve shifts from S_1S_1 to S_3S_3 , then equilibrium also shifts from E_1 to E_3 . In this case, supply shift is greater than the shift in demand; therefore, equilibrium price falls down to P_0 and output increases to OQ_3 . However, if the shift in demand and supply curve is equal that is D_2D_2 and S_2S_2 respectively, then the equilibrium price remain constant and output increases to Q_2 .

In case, shift in demand curve is greater than the shift in supply curve, then the both, equilibrium price and quantity, increase, as shown in Figure-24:

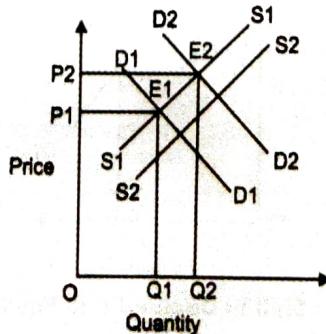


Figure-24: Equilibrium Position (when shift in demand is more than supply)

In Figure-24, initially equilibrium position, E₁ is obtained by balancing the demand curve, D₁D₁ and supply curve, S₁S₁. Equilibrium price at E₁ is P₁ and quantity is OQ₁. When the demand curve shifts from D₁D₁ to D₂D₂ and supply curve shifts from S₁S₁ to S₂S₂, then equilibrium also shifts from E₁ to E₂. In this case, demand shift is greater than the shift in supply; therefore, equilibrium price increases to P₂ and output increases to OQ₂.



Case Study-1: Demand and Supply Analysis of ABC Pvt. Ltd.

ABC Pvt. Ltd. was an organization that deals in Fast Moving Consumer Goods (FMCG). Established in 1999, the organization had a workforce of 500 employees. ABC had released a new product in the market. It wanted to determine the price of the product at which the supply and demand of the product would be stable. Therefore, the organization kept the price of its product ₹ 80 initially. At this price, the supply of the product was 20,000 per week. ABC thought that as they are well known brand in FMCG, people would readily accept their product, which would increase their demand. On the contrary, the demand of the product was only 1000, which was equal to nil for the organization. This resulted in heavy losses for ABC. Therefore, the organization decided to reduce the rate of the product to match it with the market, but it could not reduce the price suddenly. ABC set the price of the product ₹ 70 and reduced supply to 15,000 per week. This time the demand went up to 5000. After that, they reduced the price to ₹ 50. At this stage, the demand and supply for the organization's product became equal, that was 10,000. Now, the organization started earning high profit margins. Therefore, it fixed the price ₹ 50 per product at the supply of 10,000 per week.

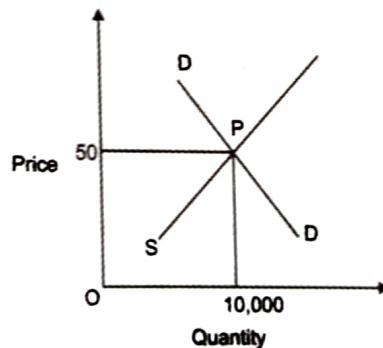
Questions:

Q1. Prepare a demand and supply schedule for the new product described in the case study.
Ans. The demand and supply schedule is shown in the following table:

Demand and Supply Schedule for the Product of ABC				
Prices (in ₹)	Demand	Supply (in thousands)	Market Position	Effect on Price
80	1000	20000	Surplus	Fall
70	5000	15000	Surplus	Fall
50	10000	10000	Equilibrium	Stable

Q2. Prepare a graph for the representation of equilibrium condition.

Ans. The following figure shows the equilibrium position for the ABC's product:



Equilibrium Position of the ABC's Product

In the preceding figure, P is the equilibrium position for the ABC's product. In this case, equilibrium price is ₹ 50 and demand and supply is 10,000 per week.

(*Case study presented is the proprietary information of the respective organization, and is used here specifically and only for educational purpose.)

3.13 Summary

In this chapter, you have learned the concept of demand. Next, the chapter has explained various types of demand, such as autonomous and derived demand, short-run and long-run demand, and organization and industrial demand. It has also discussed the determinants of individual and market demand. These determinants include the price of a product, customer's income, standard of living, and growth of population. In addition, the chapter has laid emphasis on the law of demand and its assumptions in detail. Apart from this, it has also discussed various demand-related concepts, such as demand schedule, demand curve, and demand

The symbolic representation of elasticity of supply is as follows:

$$e_s = \frac{\Delta S}{S} : \frac{\Delta P}{P}$$

$$e_s = \frac{\Delta S}{S} * \frac{P}{\Delta P}$$

$$e_s = \frac{\Delta S}{\Delta P} * \frac{P}{S}$$

Change in quantity supplied (ΔS) is the difference between the new quantity supplied (S_1) and original quantity supplied (S). It can be calculated by the following formula:

$$\Delta S = S_1 - S$$

Similarly, change in price is the difference between the new price (P_1) and original price (P). It can be calculated by the following formula:

$$\Delta P = P_1 - P$$

5.11.1 Types of Elasticity of Supply

The degree of change in the quantity supplied with respect to change in the price of a product varies in different situations. Following are different types of elasticity of supply:

- **Perfectly Elastic Supply:** Refers to a situation when the quantity supplied completely increases or decreases with respect to proportionate change in the price of a product. In such a case, the numerical value of elasticity of supply ranges from zero to infinity ($e_s = \infty$). This situation is imaginary as there is no such product whose supply is perfectly elastic. Therefore, this situation does not have any practical implication. In such a case, the price remains constant as the price of a product does not affect the quantity supplied. Let us understand the concept of perfectly elastic demand with the help of an example.

Example 4: The supply schedule of product X is shown in Table-9:

Table-9: Supply Schedule for Product X	
Price (₹ Per Kg.)	Quantity Supplied (Kgs. in thousands)
100	50
100	70
100	90

Prepare a supply curve for the supply schedule of product X and determine the type of elasticity of supply demonstrated by the supply curve.

Solution: The supply curve for product X is shown in Figure-15:

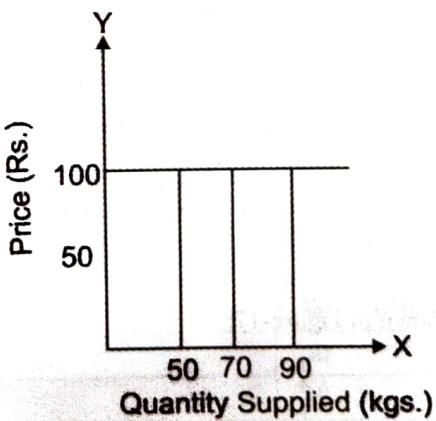


Figure-15: Supply Curve for Product X

Figure-15 shows that the price of product X remains constant at ₹ 100 per kg. However, the quantity supplied changes from 50,000 Kgs to 90,000 Kgs at the same price rate. Therefore, the supply of product X is perfectly elastic ($e_s = \infty$).

- **Relatively Elastic Supply:** Refers to a condition when the proportionate change in the quantity supplied is more than proportionate change in the price of a product. In such a case, the numerical value of elasticity of supply is greater than one ($e_s > 1$). For example, if the quantity supplied increases by 30% with respect to 10% change in the price of a product, it is called relatively elastic supply. The concept of relatively elastic supply is explained with the help of an example.

Example 5: The quantity supplied and the price of product P is shown in Table-10:

Table-10: Supply Schedule for Product P	
Price (₹ Per Kg.)	Quantity Supplied (Kgs. in thousands)
50	30
51	35
52	40

Prepare a supply curve for the supply schedule of product P and determine the type of elasticity of supply demonstrated by the supply curve.

Solution: The supply curve for product P is shown in Figure-16:

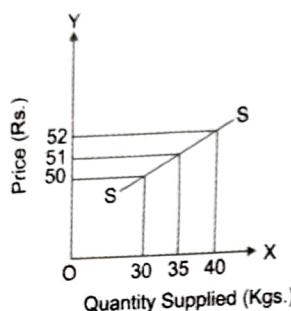


Figure-16: Supply Curve for Product P

In Figure-16, when the price of product P is ₹ 50, the quantity supplied is 30,000 Kgs. However, when the price increases to ₹ 51, supply reaches to 35,000. Similarly, when the price further increases to ₹ 52, the supply reduces to 40,000 Kgs. This shows that the change in price is only one rupee while the change in supply is 5,000. In other words, the proportionate change in quantity supplied is more than the proportionate change in the price of product P. Therefore, the supply of product P is highly elastic ($e_s > 1$).

- **Relatively Inelastic Supply:** Refers to a condition when the proportionate change in the quantity supplied is less than proportionate change in the price of a product. In such a case, the numerical value of elasticity of supply is less than one ($e_s < 1$). For instance, the elasticity of supply would be less than unit, if the quantity supplied increases by 20% with respect to 30% change in the price of a product.

Example-6: The quantity supplied and the price of product Z is shown in Table-11:

Table-11: Supply Schedule for Product Z	
Price (₹ Per Kg.)	Quantity Supplied (Kgs. in thousands)
50	30
55	31
60	32

Prepare a supply curve for the supply schedule of product Z and determine the type of elasticity of supply demonstrated by the supply curve.

Solution: The supply curve for product Z is shown in Figure-17:

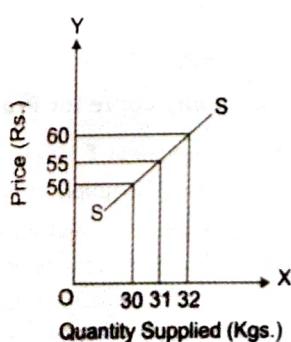


Figure-17: Supply Curve for Product Z

In Figure-17, when the price of product Z is ₹ 50, the quantity supplied is 30,000 Kgs. When price increases to ₹ 55, supply reaches to 31,000. Similarly, when the price of product Z increases to ₹ 60, the supply increases to 32,000 Kgs. This shows that the change in price is five rupees while the change in supply is 1,000. In other words, the proportionate change in quantity supplied is less than the change in the price of product Z. Therefore, the supply of product Z is relatively inelastic ($e_s < 1$).

- Unit Elastic Supply:** Refers to a situation when the proportionate change in the quantity supplied is equal to the proportionate change in the price of a product. The numerical value of unit elastic supply is equal to one ($e_s = 1$).

Example 7: The quantity supplied and the price of product Y is shown in Table-12:

Table-12: Supply Schedule for Product Y	
Price (₹ Per Kg.)	Quantity Supplied (Kgs. in thousands)
50	30
51	31
52	32

Prepare a supply curve for the supply schedule of product Y and determine the type of elasticity of supply demonstrated by the supply curve.

Solution: The supply curve for product Y is shown in Figure-18:

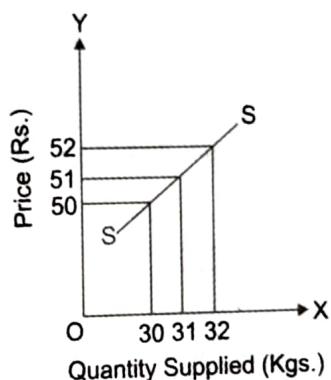


Figure-18: Supply Curve for Product Y

In Figure-18, when the price of product Y is ₹ 50, the quantity supplied is 30,000 Kgs. When price increases to ₹ 51, supply reaches to 31,000. Similarly, when the price increases to ₹ 52, the supply increases to 32,000 Kgs. This shows that the proportionate change in quantity supplied is equal to the change in the price of product Y. Therefore, the supply of product Y is unit elastic ($e_s = 1$).

- Perfectly Inelastic Supply:** Refers to a situation when the quantity supplied does not change with respect to proportionate change in price of a product. In such a case, the quantity supplied remains constant in all the instances of change in price. The numerical value of elasticity of supply is equal to zero ($e_s = 0$). This situation is imaginary as there is no such product whose supply is perfectly inelastic. Therefore, this situation does not have any practical implication.

Example 8: The quantity supplied and the price of product R is shown in Table-13:

Table-13: Supply Schedule for Product R	
Price (₹ Per Kg.)	Quantity Supplied (Kgs. in thousands)
50	30
55	30
60	30

Prepare a supply curve for the supply schedule of product R and determine the type of elasticity of supply demonstrated by the supply curve.

Solution: The supply curve for product R is shown in Figure-19:

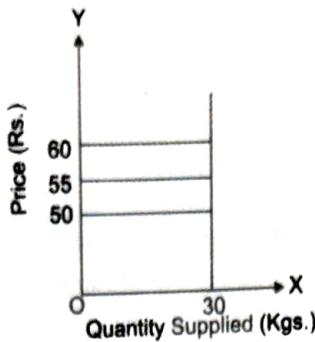


Figure-19: Supply Curve for Product R

Figure-19 shows that the supply of product R remains constant at 30,000 Kgs. However, the price changes from ₹ 50 to ₹ 60 at the same supply rate. Therefore, the supply of product X is perfectly inelastic ($e = 0$).

5.11.2 Methods of Measuring Elasticity of Supply

Apart from determining the elasticity or inelasticity of supply, an organization needs to estimate the numerical value of elasticity of supply for making various business decisions. The numerical value of elasticity of supply can be measured with the help of the following methods:

- **Proportionate Method:** Refers to one of the important methods of measuring elasticity of supply. In this method, elasticity of supply can be calculated by dividing the percentage change in quantity supplied with the percentage change in price of a product. The formula used for calculating elasticity of supply through proportionate method is as follows:

$$e_s = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

$$\text{Percentage change in quantity supplied} = \frac{\text{New quantity supplied } (\Delta S)}{\text{Original quantity supplied } (S)}$$

$$\text{Percentage change in price} = \frac{\text{New price } (\Delta P)}{\text{Original Price } (P)}$$

The symbolic representation of elasticity of supply is as follows:

$$e_s = \frac{\Delta S}{S} : \frac{\Delta P}{P}$$

$$e_s = \frac{\Delta S}{S} * \frac{P}{\Delta P}$$

$$e_s = \frac{\Delta S}{\Delta P} * \frac{P}{S}$$

Change in quantity supplied (ΔS) is the difference between the new quantity supplied (S_1) and original quantity supplied (S). It can be calculated by the following formula:

$$\Delta S = S_1 - S$$

Similarly, change in price is the difference between the new price (P_1) and original price (P). It can be calculated by the following formula:

$$\Delta P = P_1 - P$$

For example, quantity supplied of a product increases from 1000 units to 1500 units and price changes from ₹ 50 to ₹ 55 per unit. In such a case, the elasticity of supply would be as follows:

$$P_1 = ₹ 55, P = ₹ 50, S_1 = 1500 \text{ units}, S = 1000 \text{ units}$$

$$\text{Therefore, } \Delta S = S_1 - S = 1500 - 1000 = 500 \text{ units and } \Delta P = P_1 - P = ₹ 55 - ₹ 50 = ₹ 5$$

$$e_s = 500/5 * 50/1000 = 0.5 \text{ (less than unit)}$$

According to this method, if the numerical value of elasticity of supply is more than one, it represents relatively elastic supply. On the other hand, if the numerical value of elasticity of supply is less than one, then the elasticity of supply would be relatively inelastic. Apart from this, if the numerical value of elasticity of supply is equal to one, it would represent unitary elastic supply.

- **Point Method:** Refers to the method in which elasticity of supply is measured at a particular point on the supply curve. In such a case, to measure the elasticity of supply, a tangent needs to be drawn along with the demand curve. The calculation of elasticity of supply at a particular point would be clearer with the help of Figure-20:

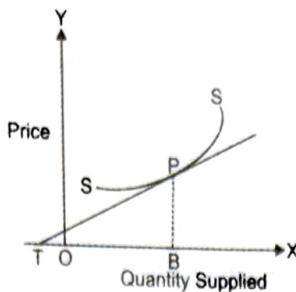


Figure-20: Measuring Point Elasticity of Supply

In Figure-20, TF tangent is drawn from the point P to measure elasticity of supply. This tangent meets X axis at T point. Another vertical line from P is intersecting X-axis at B point. Now, we can calculate elasticity of supply at point P as under:

$$e_s = TB/OB$$

5.11.3 Factors Determining Elasticity of Supply

As discussed in the previous section, the numerical value of elasticity of supply is different for different situations. The elasticity of supply is influenced by a number of factors. Some of the factors that determine the elasticity of supply are as follows:

- **Nature of a Good:** Acts as a major determinant that influence the elasticity of supply. Goods, such as antiques and old wines, cannot be reproduced in the same form; therefore, the supply of such goods remains constant. Similarly, in case of perishable goods, such as vegetables, fruits, and other eatables, the supply would be inelastic. This is because the supply of perishable goods cannot be increased or decreased easily. On the contrary, in case of durable goods, such as furniture and electric appliances, the supply would be elastic as their supply can be increased or decreased quickly.
- **Production Technology:** Refers to the level of technology that helps in determining the elasticity of supply. The supply of a good produced by using higher level technology is faster with respect to the change in its price.
- **Time Period:** Affects the elasticity of supply to a larger extent. In short-run, elasticity of supply is low while in the long run elasticity of supply is more. Therefore, changes in prices do not affect the supply of a good immediately. If the price remains high for a longer period, only then suppliers prefer to increase the supply of product.
- **Scale of Production:** Puts a significant impact on the elasticity of supply. In case of small-scale production of goods, the supply would be inelastic and vice versa. For example, if an organization has a large scale production of soaps, then an increase in the price of soaps would increase the supply of soaps without any time lag.
- **Agricultural Products:** Act as a major determinant of elasticity of supply in case of agricultural products. The supply of agricultural products, such as fruits, vegetables, and food grains, depends on natural factors, including rain, humidity, and sunlight. Therefore, the production of agricultural products cannot be increased or decreased easily. Consequently, the supply of these products is relatively inelastic.



Case Study-1: Product Selection in XYZ Pvt. Ltd.

XYZ Pvt. Ltd. is a large-scale organization that has four product lines, namely, A, B, C, and D. The organization needs to determine the products which yield maximum profit as well as the products that are less demanded and should be withdrawn from the market. Therefore, the head of the organization called upon a team of economists to deal with the situation.

The economists analyzed the four product lines and drawn the following conclusions:

- **Product Line A:** Showed a larger change in demand with a smaller change in its price
- **Product Line B:** Showed no change in the demand with change in its price
- **Product Line C:** Showed proportionate change in demand was more than the proportionate change in its price
- **Product Line D:** Showed proportionate change produced in demand was less than the proportionate change in its price

The economists recommended the organization that product lines B and D had negligible effect on demand with change in their prices. Therefore, these products were valuable for the organization to earn regular revenue. However, the demand for product lines A and C changes with the fluctuation in prices. Thus, product lines A and C would generate irregular revenue for the organization. The economists also suggested that the organization can keep most of the products in the category of regular revenue products and only few in the irregular revenue product lines. However, all this is based on the risk taking capacity of the organization.

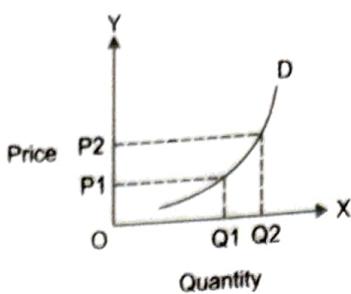


Figure-10: Exceptional Demand Curve

In Figure-10, D represents the demand curve in which OQ_1 is the price, and OQ_2 is the initial demand. When the price rises from OP_1 to OP_2 , then the demand also rises from OQ_1 to OQ_2 . This implies that if the price of a product increases its demand also increases, which constitutes an exception to law of demand.

Certain cases that are exceptions to the law of demand are as follows:

- **Giffen Paradox:** Refer to one of the major criticism of law of demand. Giffen Paradox was given by Sir Robert Giffen, who classified goods into two types, inferior goods and superior goods, generally called Giffen goods. The inferior goods are those whose demand decreases with increase in consumer's income, such as cheap potatoes and vegetable ghee. These goods are of low quality; therefore, the demand for these goods decreases with increase in consumer's income. In addition, if the price of these goods increases, then the demand for these goods increases assuming that the high price good would be of good quality. For example, coffee is considered as superior and tea as inferior. In case the price of both of these goods increases, the consumers would increase the demand of tea to satisfy their need by paying the same amount.
- **Necessity Goods:** Refer to goods that are considered as essential for consumers. The demand of necessity goods does not increase or decrease with increase or decrease in their prices. For example, salt is a necessity good whose consumption cannot be increased in case its price decreases. In such a scenario, the law of demand is not applicable.
- **Prestige Goods:** Refers to goods that are perceived as a status symbol, such as diamond and Johny Walker Scotch Whisky. The demand for these goods remains same in case of increase or decrease in their price. In such a case, the law of demand is not applicable.
- **Speculation:** Refers to an assumption of consumers about the change in prices of a product in future. If the price of a product is expected to rise in future, then the demand for the product increases in the present situation. However, this is against the law of demand.
- **Psychologically Biased Customers:** Refer to one of the important exceptions to the law of demand. Different customers have different perceptions about the price of a product. Some customers have perceptions that low price means bad quality of a particular product, which is not true in all cases. Therefore, if there is a fall in the price of a product, then the demand for that product decreases automatically.
- **Brand Loyalty:** Refers to the preference of a consumer towards a particular brand. Consumers do not prefer to change a brand with increase in the price of that brand. For example, if a consumer prefers to wear Levi's jeans, he would continue to purchase it, irrespective of increase in its price. In such a situation, the law of demand cannot be applied.
- **Emergency Situations:** Refers to a condition for which the law of demand is not applicable. In emergencies, such as war, flood, earthquake, and famine, the availability of goods become scarce and uncertain. Therefore, in such situations, consumers prefer to store a large quantity of goods, regardless of their prices.

3.6 Changes in Demand and Quantity Demanded

In economics, the terms change in quantity demanded and change in demand are two different concepts. Change in quantity demanded refers to change in the quantity purchased due to increase or decrease in the price of a product. In such a case, it is incorrect to say increase or decrease in demand rather it is increase or decrease in the quantity demanded. On the other hand, change in demand refers to increase or decrease in demand of a product due to various determinants of demand, while keeping price at constant.

Changes in quantity demanded can be measured by the movement of demand curve, while changes in demand are measured by shifts in demand curve. The terms, change in quantity demanded refers to expansion or contraction of demand, while change in demand means increase or decrease in demand.

3.6.1 Expansion and Contraction of Demand

The variations in the quantity demanded of a product with change in its price, while other factors are at constant, are termed as expansion or contraction of demand. Expansion of demand refers to the period when quantity demanded is more because of the fall in prices of a product. However, contraction of demand takes place when the quantity demanded is less due to rise in the price of a product. For example, consumers would reduce the consumption of milk in case the prices of milk increases and vice versa. Expansion and contraction are represented by the movement along the same demand curve. Movement from one point to another in a downward direction shows the expansion of demand, while an upward movement demonstrates the contraction of demand. Figure-11 demonstrates the expansion and contraction of demand:

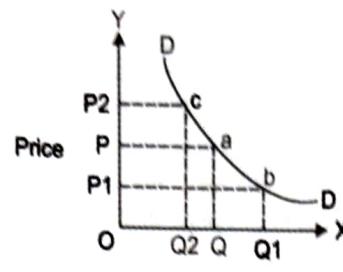


Figure-11: Expansion and Contraction of Demand

When the price changes from OP to OP₁ and demand moves from OQ to OQ₁, it shows the expansion of demand. However, the movement of price from OP to OP₂ and movement of demand from OQ to OQ₂ show the contraction of demand.

3.6.2 Increase and Decrease in Demand

Increase and decrease in demand are referred to change in demand due to changes in various other factors, such as change in income, distribution of income, change in consumer's tastes and preferences, change in the price of related goods, while price factor is kept constant. Increase in demand refers to the rise in demand of a product at a given price. On the other hand, decrease in demand refers to the fall in demand of a product at a given price. For example, essential goods, such as salt would be consumed in equal quantity, irrespective of increase or decrease in its price. Therefore, increase in demand implies that there is an increase in demand for a product at any price. Similarly, decrease in demand can also be referred as same quantity demanded at lower price, as the quantity demanded at higher price.

Increase and decrease in demand is represented as the shift in demand curve. In the graphical representation of demand curve, the shifting of demand is demonstrated as the movement from one demand curve to another demand curve. In case of increase in demand, the demand curve shifts to right, while in case of decrease in demand, it shifts to left of the original demand curve. Figure-12 shows the increase and decrease in demand:

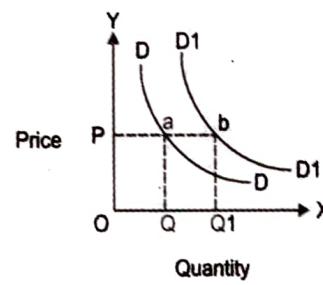


Figure-12: Increase in Demand

In Figure-12, the movement from DD to D₁D₁ shows the increase in demand with price at constant (OP). However, the quantity has also increased from OQ to OQ₁. Figure-13 shows the decrease in demand:

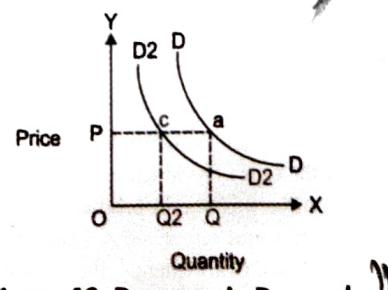


Figure-13: Decrease in Demand