prices of the import commodities of the country are increased. If the elasticity of demand for the export commodities of the country is elastic, the demand for export commodities are increased considerably as a result of reduction in price of the export commodities due to devaluation. On the other hand, if the elasticity of demand for import commodities of the country is also elastic, the demand for import commodities are decreased considerably as a result of increase in price of the import commodities due to devaluation. As a result the deficit in balance of payment will reduce. Thus for the success of devaluation policy, it is necessary that the elasticity of demand for export and import will be elastic.

Thus it is seen that the practical importance or application of the concept of elasticity of demand are infinite to solve the economic problems and to take economic decisions.

■ 2.4. Basis of Supply

Analysis of supply is very important for discussing theory of production. Actually the main objective of production is the supply of commodity in the market. For this the different aspects of supply are analysed here.

• **2.4.1. Definition of Supply : The amount of a particular commodity seller or producer prepare to sell at a fixed price and at a fixed time is called supply.** Supply is considered from two angles. One is the supply of an individual seller and the other is the total supply in the market. The amount of a particular commodity an individual seller prepare to sell at a fixed price and at a fixed time is the **supply of an individual**. On the other hand, the amount of particular commodity all the sellers in the markets collectively prepare to sell at a fixed price and at a fixed time is the **total supply in the market.**

• **2.4.2. Factors Determining Supply or Determinants of Supply :** Supply of a commodity depends on many factors. The main factors which determined supply or determinants of supply are discussed here.

(1) **Price of the commodity :** Supply of a commodity mainly depends on the price of that commodity. Generally supply increases as a result of increase in price and supply decreases as a result of decrease in price.

(2) **Price of other commodities :** Supply of any commodity is also dependend on the price of other commodities.

(3) **Price of the factors of production :** Cost of production of the commoidty is increased if the prices of the factors of production of that commodity is increased. As a result the amount of supply of the commodity may decrease compare to the previous amount of supply at a fixed price.

(4) **Conditions of techniques for production :** Cost of production changed due to change in techniques for production. As a result amount of supply is also changed. For example, if cost of production is decreased due to improvement in techniques of production, the seller may increase the amount of supply compare to the previous amount of supply at a fixed price.

(5) **Objective of the producer or firm :** If the objective of the firm or producer is to maximize sales instead of maximize profit then the amount of supply may increase compare to the previous amount of supply.

(6) **Conception of the seller regarding future price :** The supply of a commodity is also influenced by the conception of the seller regarding future price of that commodity. For example, if the seller expects that the price of the commodity will further increase in future due to increase in price at present, then sellers will supply less amount of the commodity at present.

Thus it is seen that supply of any commodity depends on many factors.

• **2.4.3. The Supply Function :** Supply of a commodity depends on few factors. For this reason the supply of a commodity may change due to change in atleast any one of the determinants of supply. So supply is the dependent variable and the determinants of supply are the independent variable. Actually the supply for any commodity is the function of the determinants of supply. The functional relation of dependance between the supply for the commodity and the determinants of supply is called supply function. Supply function can be expressed in terms of symbols. For example the supply function of a commodity is

$$S_x = f(P_x, P_0, P_f, T, G, E)$$

Here S_x = Supply of commodity x.

P_x = Price of commodity x.

P_0 = Price of other commodities.

P_f = Price of the factors of production.

T = Conditions of techniques for production.

G = Goal or objective of the producer.

E = Expectation or conception of the seller regarding future price.

The above supply function is called general form of supply function. From this fuction it is clear that there exist a dependence relation of P_x, P_0, P_f, T, G, E with S_x. But if all the independent variables (P_x, P_0, P_f, T, G, E) are changed simultaneously then it is not possible to determine the effect on S_x seperately for each of the independent variable. For this reason taking any one of this determinants as variable and other determinants as constant, we try to discuss the relation of that determinants with S_x. For example, in any fixed time keeping the other determinants of supply as constant, the relation between the price of the commodity (P_x) with the supply for that commodity (S_x) will be

$$S_x = f(P_x)$$

This supply functions is called special supply function.

• **2.4.4. Law of Supply :** Price of other commodities, price of the factors of production, techniques of production, time etc. remaining constant the supply of any commodity is increased as the price of the commodity is increased and the supply of the commodity is decreased as the price of the commodity is decreased. This direct relation between price of a commodity and the amount of supply of that commodity is called **law of supply.**

Thus, due to law of supply, the seller wants to sell more amount of the commodity in the market when the price of the commodity is increased and the seller wants to sell less amount of the commodity when the price of the commodity is decreased. Supply of any commodity is thus increased due to increase in the price of that commodity because —

(1) The producer wants to maximise his profit.

(2) The number of seller may increase.

• **2.4.5. Supply Curve :** At a fixed time the different amount of supply of any commodity at different price if expressed in a schedule then the schedule is called supply schedule. Supply curve is obtained by drawing the supply schedule in the graph paper. Thus the different amount of supply the supplier prepare to supply at different price, when expressed in the graph paper is called **supply curve.**

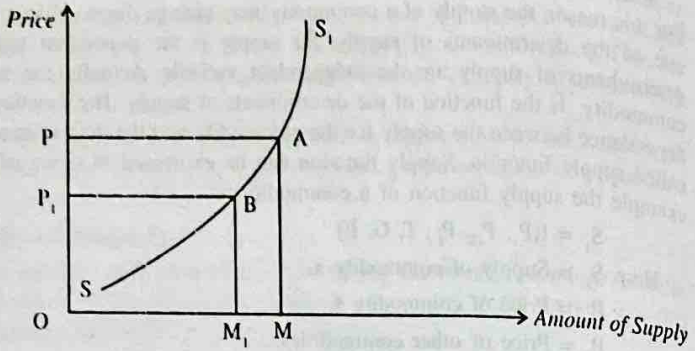


Fig : 2.21.

In Fig.2.21., amount of supply is plotted along the horizontal axis and the price of the commodity is plotted on the vertical axis. The amount of supply at different price is shown by the different points. In the figure, the point A represents the amount of supply OM when the price of the commodity is OP. Similarly the point B represents the amount of supply OM_1 when price is OP_1 In this way by joining the points A,B the locus. SS_1 is derived. The locus SS_1 is the supply curve. From the diagram it is seen that the supply curve is upward rising *i.e.* the slope of the supply curve is positive. Supply curve is upward rising due to law of supply *i.e.* supply is increased due to increase in price and the supply is decreased due to decrease in price. So supply curve is upward rising due to law of supply.

❖ **2.4.5.1. Why Supply Curve is Upward Rising :** The different amount of supply the supplier prepare to supply at different price, when expressed in the graph paper is called supply curve. Supply curve is generally upward rising *i.e.* supply is increased due to increase in price and supply is decreased due to decrease in price. The causes of the upward sloping supply curve are now discussed.

(1) **Law of Diminishing Returns :** In a production process other inputs remaining constant if one input is increased continuously, the addition in productive capacity of the variable input (marginal product of the variable input) is decreased continiously after a certain level. This is called law of diminishing returns. This law operates in the short run production process. For this addition in productive capacity *i.e.* marginal product of the variable input decreases. As a result cost of production tends to increase. For this reason price of the commodity tends to increase due to increase in cost of production along with the increase in output. Thus supply is increased as a result of increase in price and supply is decreased as a result of decrease in price due to law of diminishing returns *i.e.* supply curve is upward rising due to law of diminishing returns.

(2) **Expectation of the seller to maximise profit :** The producer or the seller generally supply the commodity with the expectation to maximise profit. Other things remaining constant if the price of the commodity is increased, profit per unit is also increased. As a result the seller or producer increases the supply of the commodity with the expectation to increase profit. On the other hand, other things remaining constant if the price of the commodity is decreased, profit per unit is also decreased. As a result the seller or producer decreases the supply of the commodity. Thus it is seen that supply curve is upword rising due to expectation of the seller to maximise profit.

(3) **Change in number of producer or seller :** Other things remaining constant if the price of the commodity is increased, the amount of profit is also increased. The number of producer or seller may increase due to expectation of earning larger profit. As a result supply of the commodity may increase. On the other hand, the number of producer or seller may decrease if the price of the commodity is decreased. As a result supply of the commodity may decrease. Thus supply curve is upward rising due to change in number of producer or seller.

• **2.4.6. Exceptions to the law of supply :** Price of other commodities, price of the factors of production, techniques of production, time etc. remaining constant, the supply of any commodity is increased as the price of the commodity is increased and the supply of the commodity is decreased as the price of the commodity is decreased. This direct relation between price of the commodity and the amount of supply of that commodity is called law of supply. There exist some exceptions to this law. The exceptions are now discussed.

(1) **Commodities which cannot be repeatedly produce :** Supply of the commodities which are produced only once and cannot be repeatedly produced, remain constant even though the price of these commodities are increased. For example the picture painted by Rabindranath Tagore himself. Law of supply does not hold here.

(2) **Labour market :** In the labour market the supply of labour hour for individual labourer is increased upto a certain stage due to increase in the price of labour or wage rate. But after that certain stage the supply of labour hour is decreased due to increase in wage rate. Because the labourer wish to enjoy more leisure at high wage rate. As a result the time for work *i.e.*, supply of labour hour is decreased. This is an exception to the law of supply.

(3) **Sell under economic distress (acute poverty) :** If the seller is on economic distress, supply is increased even though the price of the commodity is decreased. For example poor Indian farmers at the time of harvesting, increase the supply even though the price of their products are very low. This is also an exception to the law of supply.

(4) **Expectation of the seller regarding future price :** The price of any commodity when increases continuously sellers may realize that the price of the commodity will also increase in the future. In this situation the sellers decrease their supply at present inspite of the increase in price of the commodity. On the other hand, when the price of any commodity decreases continuously the sellers may realize that the price of the commodity will also decrease in future. In this situation the sellers increase their supply at present inspite of the decrease in price of the commodity.

Here it is mentioned that the supply curve is not upward rising to the right where the law of supply does not hold. In these cases the supply curve may be parallel to the price axis or downword sloping to the right or backward bending (labour market). These supply curves are called **abnormal supply curve.**

• **2.4.7. Supply Change : Changes in Quantity Supplied and Changes in Supply—Shifts in the Supply Curve :** The amount of a particular commodity the seller or producer prepare to sell at a fixed price and at a fixed time is called supply. Supply may change in two ways—one is changes in quantity supplied and the other is the changes in supply.

❖ **2.4.7.1. Changes in Quantity Supplied :** According to the law of supply, price of other commodities, price of the factors of production, techniques of production, time etc. remaining constant, the supply of any commodity is increased as the price of the commodity is increased and the supply of the commodity is decreased as the price of the commodity is decreased. As a result the seller moves from one point to another point on the same supply curve. The movement on the same supply curve is called changes in **quantity supplied**. Changes in quantity supplied is now explained with the help of Fig. 2.22.

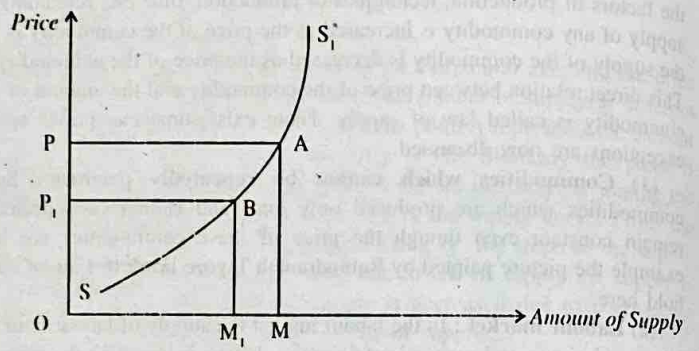


Fig : 2.22.

In Fig 2.22., the amount of supply is plotted on the horizontal axis and price of the commodity is plotted on the vertical axix. SS_1 is the supply curve for the commodity. On this supply curve the amount of supply is OM when price is OP. The amount of supply decrease from OM into OM_1 due to decrease in price from OP to OP_1. So it is seen that other things remaining constant the seller moves from A to B on the same supply curve SS_1 due to change in price only. Thus change in price on the same supply curve is the changes in qutantity supplied.

❑ **2.4.7.1.1. Causes of Changes in Quantity Supplied :** Changes in quantity supplied occur due to many factors. The main causes of changes in quantity supplied are discussed below :

(1) **Law of Diminishing Returns :** In a production process other inputs remaining constant if one input is increased continuously, the addition in productive capacity of the variable input (marginal product of the variable input) is decreased continuously after a certain level. This is called law of diminishing returns. This law operates in the short run production process. For this addition to productive capacity *i.e.* marginal

product of the variable input decreases. As a result cost of production tends to increase. For this reason price of the commodity tends to increase due to increase in cost of production along with the increase in output. Thus supply is increased as a result of increase in price and supply is decreased as a result of decrease in price due to law of diminishing returns. Therefore, law of diminishing return is a cause of changes in quantity supplied.

(2) **Expectation of the seller to maximise profit :** The producer or the seller generally supply the commodity with the expectation to maximise profit. Other things remaining constant, if the price of the commodity is increased, profit per unit is also increased. As a result the seller or producer increases the supply of the commodity with the expectation to increase profit. On the other hand, other things remaining constant if the price of the commodity is decreased, profit per unit is also decreased. As a result the seller or producer decreases the supply of the commodity. Therefore, expectation of the seller to maximise profit is a cause of changes in quantity supplied.

(3) **Changes in number of Producer or Seller :** Other things remaining constant if the price of the commodity is increased, the amount of profit is also increased. The number of producer or seller may increase due to expectation of earning larger profit. As a result supply of commodity may increase. On the other hand, the number of producer or seller may decrease if the price of the commodity is decreased. As a result supply of the commodity may decrease. Therefore, changes in number of producer or seller is a cause of changes in quantity suppled.

❖ **2.4.7.2. Changes in Supply—Shifts in the Supply Curve :** Supply of any commodity depends not only on the price of that commodity but also depends on other factors. The price of a commodity remaining constant, the supply for the commodity is changed as a result of change in other determinants of supply (*e.g.* price of other commodities, price of the factors of production, techniques of production, time etc). This is called **changes in supply. Supply curve** shifts its position due to changes in supply. Price of the commodity remaining constant, if the supply for the commodity is increased due to change in at least any one of the other determinants of supply, the supply curve shifts to the right of the old supply curve. On the other hand, due to these changes if supply is decreased, the supply curve shifts to the left of the old supply curve. This is shown in Fig 2.23.

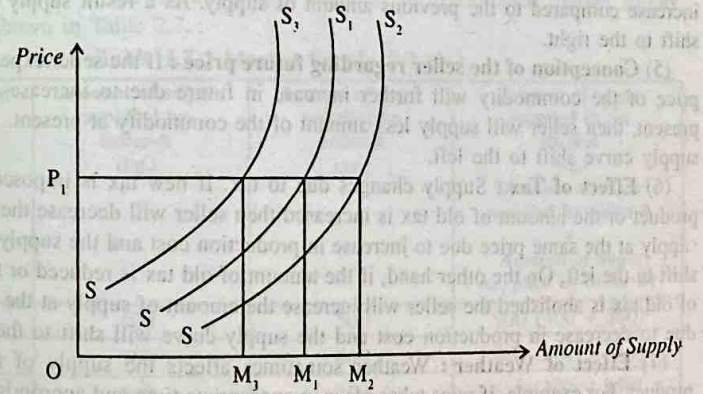


Fig : 2.23.

In Fig 2.23., the amount of supply is plotted on the horizontal axis and price of the commodity is plotted on the vertical axis. In Fig 2.23., SS_1 is the initial supply curve. Here OM_1 is the amount of supply at price OP_1. Price remaining constant if the price of the factors of production for the commodity is decreased or the techniques of production is improved, cost of production for the commodity will decrease and the seller will increase the supply of the commodity at the same price. As a result supply curve shifts from SS_1 to SS_2. Here OM_2 is the amount of supply at the same price OP_1 *i.e.*, supply is increased at the same price.

On the other hand, price remaining constant if the price of all the factors of production for the commodity is increased, the cost of producton for the commodity will increase and the seller will decrease the supply of the commodity at the same price. As a result supply curve shifts from SS_1 to SS_3. Here OM_3 is the amount of supply at the same price OP_1 *i.e.*, supply is decreased at the same price. Therefore the supply curve shifts its position due to changes in supply.

□ **2.4.7.2.1. Causes of Changes in Supply—Causes of shifts in the Supply Curve :** Changes in supply occur due to many factors. The main causes of changes in supply or shifts in the supply curve are discussed below.

(1) **Price of other commodities :** Changes in supply occur due to change in price of other commodities. For example supply of mustard seed will decrease due to increase in price of wheat even though the price of mustard seed remain constant. As a result, supply curve of mustard seed will shift to the left because more lands will be used to cultivate wheat in place of mustard seed.

(2) **Price of the factors of production :** Cost of production of the commodity is increased if the price of the factors of production for that commodity is increased. As a result the amount of supply of the commodity at each price may decrease compare to the previous amount of supply and the supply curve may shift to the left.

(3) **Conditions of techniques for production :** If cost of production is decreased due to improvement in techniques of production, the seller may increase the amount of supply compare to the previous amount of supply at a fixed price. As a result supply curve may shift to the right.

(4) **Objective of the producer or firm :** If the objective of the firm or producer is to maximise sales instead of maximising profit then the amount of supply may increase compared to the previous amount of supply. As a result supply curve may shift to the right.

(5) **Conception of the seller regarding future price :** If the seller expects that the price of the commodity will further increase in future due to increase in price at present, then seller will supply less amount of the commodity at present. As a result supply curve shift to the left.

(6) **Effect of Tax :** Supply changes due to tax. If new tax is imposed upon the product or the amount of old tax is increased then seller will decrease the amount of supply at the same price due to increase in production cost and the supply curve will shift to the left. On the other hand, if the amount of old tax is reduced or the amount of old tax is abolished the seller will increase the amount of supply at the same price due to decrease in production cost and the supply curve will shift to the right.

(7) **Effect of Weather :** Weather sometimes affects the supply of agricultural product. For example, if rains takes place in appropriate time and appropriate quantity

the production and supply of agricultural product will increase and the supply curve will shift to the right. On the other hand, if excess rain or drought takes place the production and supply of agricultural product will decrease and the supply curve will shifts to the left.

• **2.4.8. Individual Supply Schedule and Market Supply Schedule—Individual Supply and Market Supply :** At a fixed time the different amount of supply of any commodity at different price if expressed in a schedule, then the schedule is called supply schedule. Supply schedule is of two types. One is individual supply schedule and the other is market supply schedule.

At a fixed time the different amount of any commodity a seller prepare to sell at different price when expressed in a schedule then that schedule is called **individul supply schedule.**

A hypothetic individual supply schedule for a commodity is shown in Table 2.6. :

Table 2.6. : Individual Supply Schedule

Price of sugar per kg. (Rs.)	Amount of sugar supplied (kg.)
30	400
25	360
20	300

From the above individual supply schedule it is seen that when the price of sugar is Rs. 30 per kg. then a seller supplies 400 kg. of sugar. But when the price of sugar is Rs. 25 per kg. then the seller supplies 360 kg. of sugar. Further when the price of sugar is Rs. 20 per kg. then the seller supplies 300 kg. of sugar. The individual supply schedule thus shows how much a seller want to sell at different price of a commodity. From this individual supply schedule it is also seen that the amount of supply is smaller if price is decreased and the amount of supply is larger if price is increased.

At a fixed time the different amount of any commodity which the sellers jointly sell at different price of the commodity when expressed in a schedule then that schedule is called **market supply schedule.** Let us assume that there are only two sellers in the market. Seller-A and seller-B. The sum of the individual supply schedule of these two sellers is the market supply schedule. A hypothetical market supply schedule is shown in Table 2.7. :

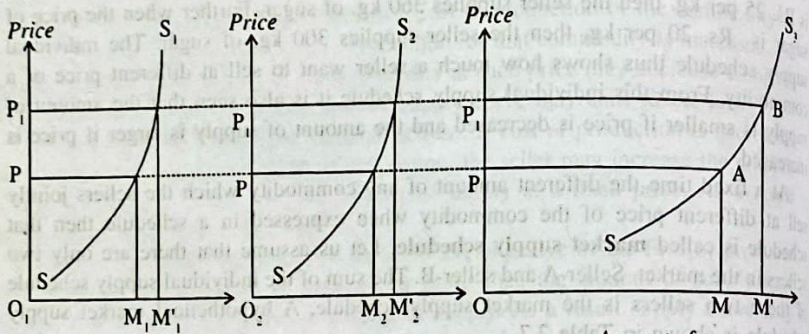
Table 2.7. : Market Supply Schedule

Price of sugar per kg. (Rs.)	Amount of sugar supplied by Seller-A (kg.)	Amount of sugar supplied by Seller-B (kg.)	Amount of sugar supplied in the market (kg.) (Amount of sugar supplied by Seller-A + Amount of Sugar supplied by Seller-B)
30	400	500	900 (400 + 500)
25	360	440	800 (360 + 440)
20	300	350	650 (300 + 350)

From the above market supply schedule, it is seen that when the price of sugar is Rs. 30 per kg then seller A supplies 400 kg of Sugar and seller B supplies 500 kg of sugar. Therefore at price Rs. 30, the supply of sugar in the market is 900 kg (400 kg + 500 kg). When the price of sugar reduced to Rs. 25 per kg, then seller A supplies 360 kg of sugar and seller B supplies 440 kg of sugar. Therefore at price Rs. 25, the supply of sugar in the market is 800 kg. (360 kg. + 440 kg.). In the same manner when the price of sugar is Rs. 20 per kg, then the supply for sugar in the market is 650 kg (300 kg + 350 kg). The market supply schedule thus shows how much the sellers jointly supply in the market at different price of a commodity. From the market supply schedule it is also seen that the amount of supply in the market is smaller if price is decreased and the amount of supply in the market is larger if price is increased.

Supply curve is obtained by drawing the supply schedule on the graph paper. Supply curve is of two types. One is individual supply curve and the other is the market supply curve. Individual supply curve is obtained by expressing the individual supply schedule on the graph paper. At the time of drawing individual supply curve, the amount of supply is plotted, on the horizontal axis and price of the commodity is plotted on the vertical axis. The market supply curve is obtained by adding the individual supply curve.

It is assumed that there are only two sellers in the market. Seller-A and Seller-B. Market supply curve is obtained by adding these two individual supply curve side by side.



Amount of individual supply (Seller-A)

Fig : 2.24.

Amount of individual supply (Seller-B)

Fig : 2.25.

Amount of market supply

Fig : 2.26.

In Fig 2.24., SS_1 is the individual supply curve of seller A and in Fig. 2.25., SS_2 is the individual supply curve of seller B. From Fig. 2.24. it is seen that at price OP, the amount of supply of seller A is O_1M_1 and from Fig. 2.25. it is seen that at price OP, the amount of supply of seller B is O_2M_2. Therefore at price OP, the amount of supply in the market is OM ($O_1M_1 + O_2M_2$). This is shown in figure 2.26. by the point A. As a result of rise in price to OP_1, the amount of supply of seller A is $O_1M'_1$ and the amount of supply of seller B is $O_2M'_2$. Therefore at price OP_1, the amount of market supply is OM' ($O_1M'_1 + O_2M'_2$). This is shown in Fig. 2.26. by the point B. The locus SS_3 is obtained through the point A and B. Here the locus SS_3 is the market

supply curve. From the diagram it is seen that the market supply curve SS_3 is upward rising. Therefore the market supply curve will be upward rising if the individual supply curve is upward rising.

2.5. Elasticity of Supply

Other things remaining constant, the percentage change in quantity supplied of any commodity due to one per cent change in the price of that commodity is called **elasticity of supply.** Therefore.

$$\text{Elasticity of supply } (E_s) = \frac{\text{Percentage change in quantity supplied of the commodity}}{\text{Percentange change in price of the commodity}}$$

$$\text{i.e., Elasticity of supply } (E_s) = \frac{\dfrac{\text{Change in quantity supplied}}{\text{Initial quantity supplied}} \times 100}{\dfrac{\text{Change in price}}{\text{Initial price}} \times 100}$$

Elasticity of supply is now expressed with the help of symbols.

Let, q = initial quantity supplied.

Δq = small change in quantity supplied (Δ = small change, this symbol is called delta).

P = initial price.

Δp = small change in price.

$$\text{Therefore, Elasticity of supply } (E_s) = \frac{\dfrac{\Delta q}{q} \times 100}{\dfrac{\Delta p}{P} \times 100} = \frac{\Delta q}{q} \times \frac{P}{\Delta p} = \frac{\Delta q}{\Delta p} \cdot \frac{P}{q}.$$

Elasticity of supply is of different types.

(1) **Unit Elasticity of Supply :** If the percentage change in quantity supplied of the commodity is equal to the percentage change in price then it is called unit elasticity of supply. Here $E_s = 1$ *i.e.* the value of the elasticity of supply is equal to one. In Fig. 2.27., OS_1 is the unit elasticity supply curve.

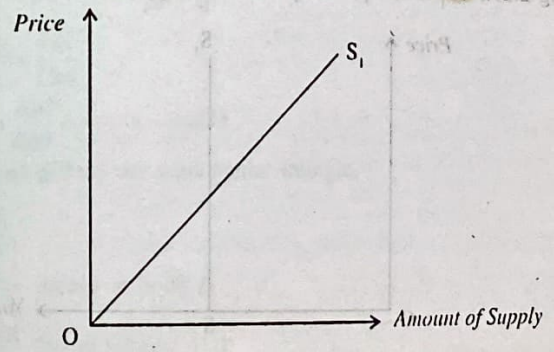


Fig : 2.27.