MANAGERIAL ECONOMICS
MODULE II
SUPPLY AND PRODUCTION FUNCTION

The term Supply refers to the quantity of a good or service that producers are willing and able to sell during a certain period under a given set of conditions. Supply of a good in economics means the quantity produced and supplied of the good per period by its producer-firm(s) at any particular price of the good. However, supply depends on many things other than the price of the good. Factors that must be specified include the price of the good in question, prices of related goods, the current state of technology, levels of input prices, weather, and so on. The amount of product that producers bring to the market, the supply of the product—depends on all these influences. Supply is derived from a producer's desire to maximize profits. Profit is the difference between revenues and costs. Resources and technology determine what it is possible to produce. Supply reflects a decision about which technologically feasible items to produce. The supply of a good or service refers to the quantities of a good or a service that producers are willing and able (ready) to produce (sell) at different prices in a given time period, ceteris paribus. Supply is an expression of seller's plans or intentions – an offer to sell – not a statement of actual sales.

The 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.

"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.

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:

i. Individual Supply Schedule:

Refers to a supply schedule that represents the different quantities of a product supplied by an individual seller at different prices.

ii. 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.

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.

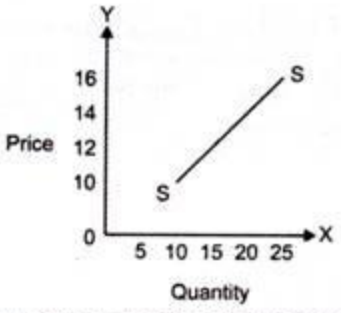


Figure-14: Individual Supply Curve

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:

$Sx = f(Px)$

Where:

Sx = Quantity supplied for product X

Px = Price of product X

f = Constant representing change produced in Sx with one unit change in Px

Assumptions in Law of Supply:

i. Assumes that the price of a product changes, but the change in the cost of production is constant
ii. Assumes that there is no change in the technique of production.
iii. Assumes that there is no change in the scale of production
iv. Assumes that the policies of the government remain constant.
v. Assumes that the transportation cost remain the same.

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.

i. 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 supply.

ii. 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.

iii. 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.

THEORY OF PRODUCTION

In economics, production theory explains the principles in which the business has to take decisions on how much of each commodity it sells and how much it produces and also how much of raw material ie., fixed capital and labor it employs and how much it will use. It defines the relationships between the prices of the commodities and productive factors on one hand and the quantities of these commodities and productive factors that are produced on the other hand. Production is a process of combining various inputs to produce an output for consumption. It is the act of creating output in the form of a commodity or a service which contributes to the utility of individuals.

In other words, it is a process in which the inputs are converted into outputs

Production Analysis

Production analysis basically is concerned with the analysis in which the resources such as land, labor, and capital are employed to produce a firm's final product. To produce these goods the basic inputs are classified into two divisions

Variable Inputs

Inputs those change or are variable in the short run or long run are variable inputs.

Fixed Inputs

Inputs that remain constant in the short term are fixed inputs.

FACTORS AFFECTING PRODUCTION

Most economists identify four factors of production. These are land, capital, labor and enterprise. Some economists, however, claim that there are really only three factors of production and that enterprise is a special form of labor.

1. Land:

Land in general terms includes the earth in which crops are grown and on which offices and factories are built, but in economics it has a wider meaning. It covers any natural resource which is used in production. So besides the land itself, it also includes what is beneath the land, such as coal, what grows naturally on the land e.g. rainforests and the sea, oceans and rivers and what is found in them, for instance fish.

2. Capital:

Capital would have to be used in the diversion of the course of a river. Capital is any human-made (manufactured) good used to produce other goods and services. It includes, for example, offices, factories, machinery, railways and tools. Capital is also referred to as capital goods and producer goods. Economists distinguish between capital and consumer goods. Capital goods are not wanted for their own sake but for what they can produce. In contrast consumer goods, such as food,

clothing and entertainment, are wanted for the satisfaction they provide to their owners.

3. Labour:

Labour covers all human effort – both-mental and physical, involved in producing goods and services. A road sweeper, a steel worker and a bank manager all contribute their labor. Somewhat confusingly, reference is sometimes made to human capital. This means the education, training and experience that workers have gained. The more human capital workers have, the more they should be capable of producing.

4. Enterprise:

Enterprise is the willingness and ability to bear uncertain risks and to make decisions in a business. Entrepreneurs are the people who organize the other factors of production and who crucially bear the risk of losing their money, if their business fails. Entrepreneurs decide what to produce – taking into account consumer demand, and how to produce it. Some of the risks faced by any business can be insured against.

THE PRODUCTION FUNCTION:

The production function shows the relation between input changes and output changes. It also shows the maximum amount of output that can be obtained by the firm from a fixed quantity of resources.

The production function is expressed as:

Q = f (K, L, etc.)

Where Q is output (which is the dependent variable) and K and L are capital and labour inputs, respectively. We can think of other inputs as well, such as land. For the sake of convenience we assume here that the firm employs only two factors of production— labour and capital. The firm's output is treated as a flow, i.e., so

many units per period of time. The volume of output of the firm's product, per period of time, depends on the quantities of these factors that are used by the firm.

Let us now suppose that the firm wishes to increase its volume (rate) of output. This can be achieved by increasing the inputs of one or both factors of production. However, it is very easy to vary the quantity of labour in the production process. It can be done very quickly (in a week or a month). On the other hand, a fairly long period of time is required to vary the quantity of other factors, for example, change the quantity (or usage) of capital, e.g. to install a new machine. The speed with which different kinds of factors can be varied largely depends on the time period under consideration. Here we assume that the firm is making decisions within two time periods — the short-run and the long-run.

The Short-Run and the Long-Run:

The distinction between the short-run and the long-run is based on the difference between fixed and variable factors. A factor of production is treated as a fixed factor if it cannot easily be varied over the time period under consideration. On the other hand, a variable factor is one which can be varied over the time period under consideration.

The Short-Run:

The short-run refers to the period of time over which one (or more) factor(s) of production is (are) fixed. In the real world, land and capital (such as plant and equipment) are usually treated as fixed factors. Here we are considering a simple production process with only two factors. We treat capital as the fixed factor and labour as the variable factor.

Thus, output becomes a function of (i.e., output depends on the usage of) the variable factor labour working on a fixed quantity of capital. In other words, if the firm wishes to vary its production in the short-run, it can do so only by changing the quantity of labour. With a fixed quantity of capital, this necessitates changing the proportions in which labour and capital are combined in the production process.

The Long-Run:

On the other hand the long- run is defined as the period over which all factors of production can be varied, within the confines of existing technology. In the long-run all factors are variable. Moreover the long-run also permits factor substitution. More capital and less labour or more labour and less capital can be used to produce a fixed amount of output.

THE LAW OF VARIABLE PROPORTION

Law of Variable Proportion is regarded as an important theory in Economics. It is referred to as the law which states that when the quantity of one factor of production is increased, while keeping all other factors constant, it will result in the decline of the marginal product of that factor. Law of variable proportion is also known as the Law of Proportionality. When the variable factor becomes more, it can lead to negative value of the marginal product. The law of variable proportion can be understood in the following way. When variable factor is increased while keeping all other factors constant, the total product will increase initially at an increasing rate, next it will be increasing at a diminishing rate and eventually there will be decline in the rate of production.

Assumptions of Law of Variable Proportion

Law of variable proportion holds good under certain circumstances, which will be discussed in the following lines.

1. **Constant state of Technology**: It is assumed that the state of technology will be constant and with improvements in the technology, the production will improve.
2. **Variable Factor Proportions**: This assumes that factors of production are variable. The law is not valid, if factors of production are fixed.
3. **Homogeneous factor units**: This assumes that all the units produced are identical in quality, quantity and price. In other words, the units are homogeneous in nature.
4. **Short Run**: This assumes that this law is applicable for those systems that are operating for a short term, where it is not possible to alter all factor inputs.

Explanation of the Law:

In order to understand the law of variable proportions we take the example of agriculture. Suppose land and labour are the only two factors of production. By keeping land as a fixed factor, the production of variable factor i.e., labour can be shown with the help of the following table:

Table 1.

Units of Land	Units of Labour	Total Production	Average Production	Marginal Production	
10 Acres	0	–	–	–	
"	1	20	20	20	
"	2	50	25	30	1st stage
"	3	90	30	40	MP > AP
"	4	120	30	30	AP = MP
"	5	140	28	20	
"	6	150	25	10	2nd stage
"	7	150	21.3	0	MP=0 and TP Maximum
"	8	140	17.5	–10	3rd stage MP < 0

From the table 1 it is clear that there are three stages of the law of variable proportion.

STAGE I- In this stage average production increases as there are more and more doses of labour and capital employed with fixed factors (land). We see that total product, average product, and marginal product increases but average product and marginal product increases up to 40 units. Later on, both start decreasing because proportion of workers to land was sufficient and land is not properly used. This is the end of the first stage.

STAGE II-This stage starts from where the first stage ends or where AP=MP. In this stage, average product and marginal product start falling. We should note that marginal product falls at a faster rate than the average product. Here, total product increases at a diminishing rate. It is also maximum at 70 units of labour where marginal product becomes zero while average product is never zero or negative.

STAGE III- this stage begins where second stage ends. This starts from 8th unit. Here, marginal product is negative and total product falls but average product is

still positive. At this stage, any additional dose leads to positive nuisance because additional dose leads to negative marginal product.

Graphic Presentation:

In fig. 1, on OX axis, we have measured number of laborers while quantity of product is shown on OY axis. TP is total product curve. Up to point 'E', total product is increasing at increasing rate. Between points E and G it is increasing at the decreasing rate. Here marginal product has started falling. At point 'G' i.e., when 7 units of labourers are employed, total product is maximum while, marginal product is zero. Thereafter, it begins to diminish corresponding to negative marginal product. In the lower part of the figure MP is marginal product curve.

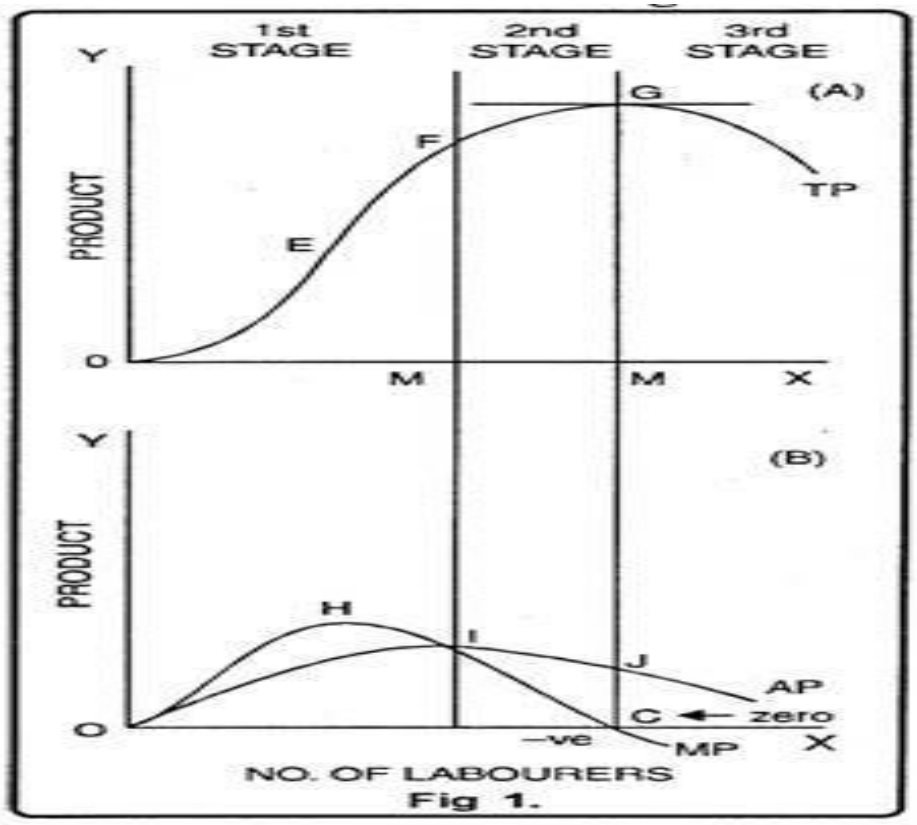


Fig 1.

Up to point 'H' marginal product increases. At point 'H', i.e., when 3 units of labourers are employed, it is maximum. After that, marginal product begins to decrease. Before point 'I' marginal product becomes zero at point C and it turns

negative. AP curve represents average product. Before point 'I', average product is less than marginal product. At point 'I' average product is maximum. Up to point T, average product increases but after that it starts to diminish.

Total Product	Marginal Product	Average Product
Stage I		
First increases at increasing rate then at diminishing rate.	Increases in the beginning then reaches a maximum and begins to decrease.	First increases, continues to increase and becomes maximum.
Stage II		
Continues to increase at diminishing rate and becomes maximum.	Continues to diminish and becomes equal to zero.	Becomes equal to MP and then begins to diminish.
Stage III		
Diminishes	Becomes negative.	Continues to diminish but will always be greater than zero.

ISOQUANT CURVE:

The relationships between changing input and output is studied in the laws of returns to scale, which is based on production function and isoquant curve. The term isoquant has been derived from a Greek word iso, which means equal. Isoquant curve is the locus of points showing different combinations of capital and labor, which can be employed to produce same output.

It is also known as equal product curve or production indifference curve. Isoquant curve is almost similar to indifference curve. However, there are two dissimilarities between isoquant curve and indifference curve. Firstly, in the graphical representation, indifference curve takes into account two consumer goods, while isoquant curve uses two producer goods. Secondly, indifference curve measures the level of satisfaction, while isoquant curve measures output.

Some of the popular definitions of isoquant curve are as follows:
According to Ferguson, "An isoquant is a curve showing all possible combinations of inputs physically capable of producing a given level of output."

According to Peterson, "An isoquant curve may be defined as a curve showing the possible combinations of two variable factors that can be used to produce the same total product"

From the aforementioned definitions, it can be concluded that the isoquant curve is generated by plotting different combinations of inputs on a graph. An isoquant curve provides the best combination of inputs at which the output is maximum.

Assumptions of isoquant curve:

i. Assumes that there are only two inputs, labor and capital, to produce a product

ii. Assumes that capital, labor, and good are divisible in nature

iii. Assumes that capital and labor are able to substitute each other at diminishing rates because they are not perfect substitutes

iv. Assumes that technology of production is known

On the basis of these assumptions, isoquant curve can be drawn with the help of different combinations of capital and labor. The combinations are made such that it does not affect the output.

Figure-4 represents an isoquant curve for four combinations of capital and labor:

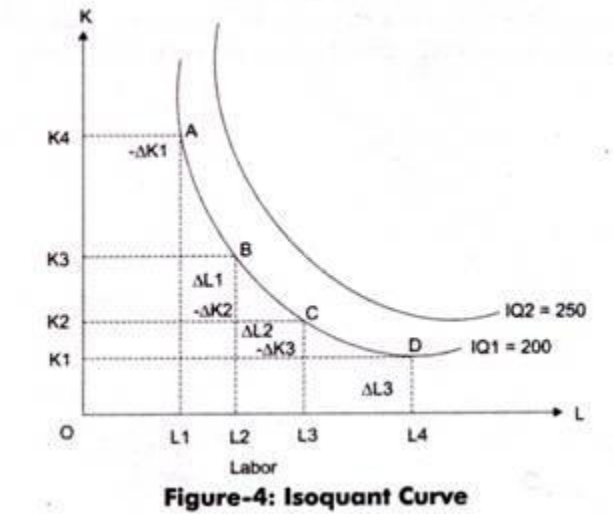


Figure-4: Isoquant Curve

Iso-quant Schedule:

Let us suppose that there are two factor inputs—labour and capital. An Iso-quant schedule shows the different combination of these two inputs that yield the same level of output as shown in table 1.

Table 1. Iso-Product Schedule.

Combination	Units of labour	Units of capital	Output of cloth (metres)
A	1	15	200
B	2	11	200
C	3	8	200
D	4	6	200
E	5	5	200

The table 1 shows that the five combinations of labour units and units of capital yield the same level of output, i.e., 200 metres of cloth. Thus, 200 metre cloth can be produced by combining.

(a) 1 units of labour and 15 units of capital

(b) 2 units of labour and 11 units of capital

(c) 3 units of labour and 8 units of capital

(d) 4 units of labour and 6 units of capital

(e) 5 units of labour and 5 units of capital

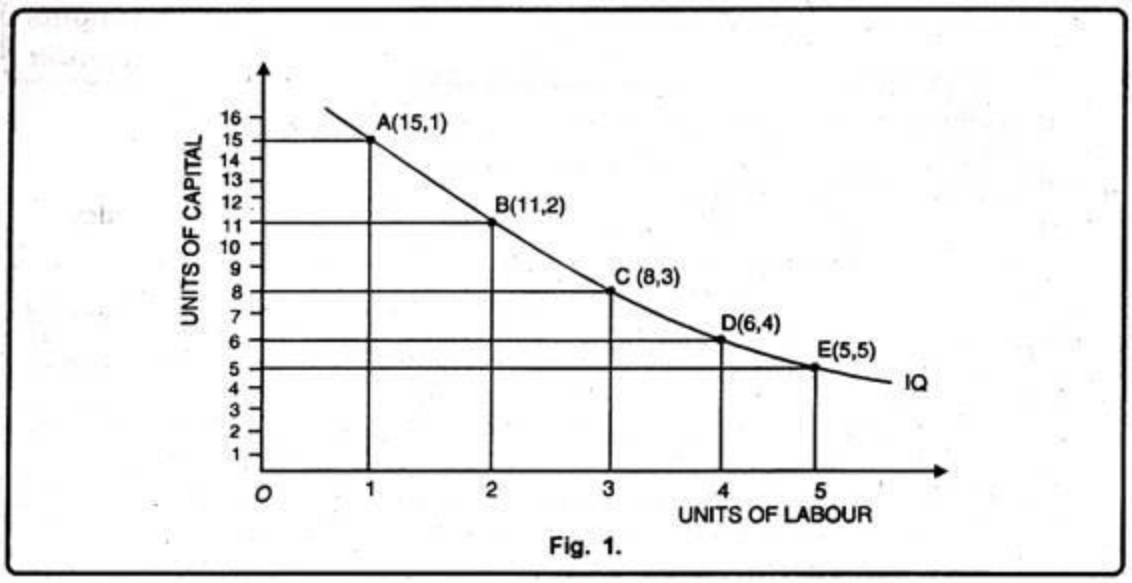


Fig. 1.

Properties of Iso-Product Curves:

The properties of Iso-product curves are summarized below:

1. Iso-Product Curves Slope Downward from Left to Right:

They slope downward because MTRS of labour for capital diminishes. When we increase labour, we have to decrease capital to produce a given level of output.

The downward sloping iso-product curve can be explained with the help of the following figure:

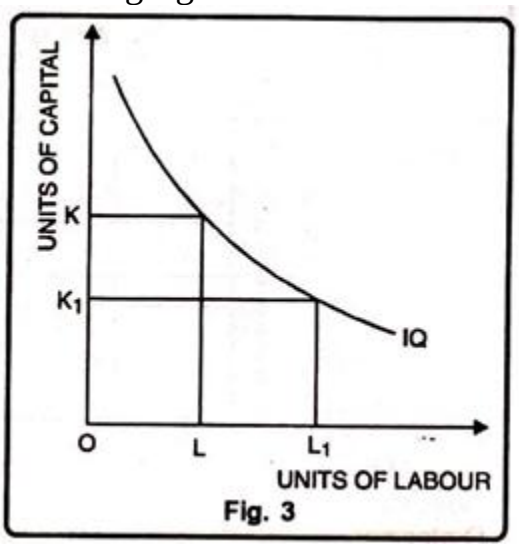


Fig. 3

The Fig. 3 shows that when the amount of labour is increased from OL to OL_1, the amount of capital has to be decreased from OK to OK_1, The iso-product curve (IQ) is falling as shown in the figure.

2. Isoquants are Convex to the Origin:

Like indifference curves, isoquants are convex to the origin. In order to understand this fact, we have to understand the concept of diminishing marginal rate of technical substitution (MRTS), because convexity of an isoquant implies that the MRTS diminishes along the isoquant. The marginal rate of technical substitution between L and K is defined as the quantity of K which can be given up in exchange for an additional unit of L. It can also be defined as the slope of an isoquant.

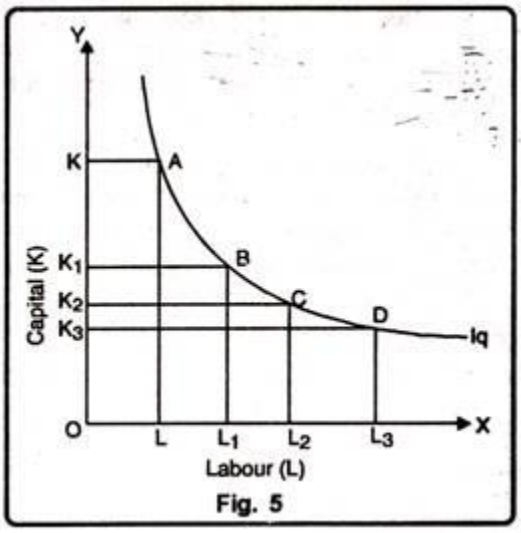


Fig. 5

3. Two Iso-Product Curves Never Cut Each Other:

As two indifference curves cannot cut each other, two iso-product curves cannot cut each other. In Fig. 6, two Iso-product curves intersect each other. Both curves IQ1 and IQ2 represent two levels of output. But they intersect each other at point A. Then combination A = B and combination A= C. Therefore B must be equal to C. This is absurd. B and C lie on two different iso-product curves. Therefore two curves which represent two levels of output cannot intersect each other

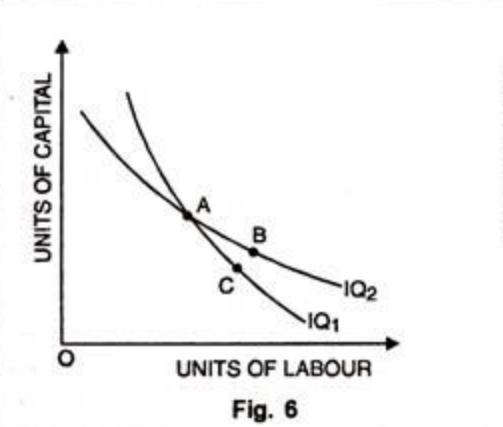


Fig. 6

4. Higher Iso-Product Curves Represent Higher Level of Output:

A higher iso-product curve represents a higher level of output as shown in the figure 7 given below:

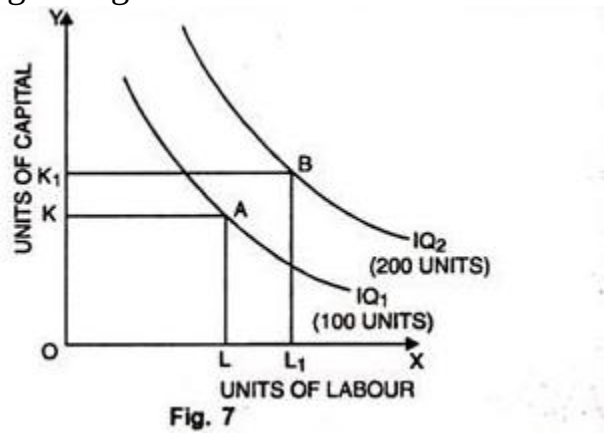


Fig. 7

In the Fig. 7, units of labour have been taken on OX axis while on OY, units of capital. IQ_1 represents an output level of 100 units whereas IQ2 represents 200 units of output.

5. Isoquants Need Not be Parallel to Each Other:

It so happens because the rate of substitution in different isoquant schedules need not be necessarily equal. Usually they are found different and, therefore, isoquants may not be parallel as shown in Fig. 8. We may note that the isoquants Iq_1 and Iq_2 are parallel but the isoquants Iq_3 and Iq4 are not parallel to each other.

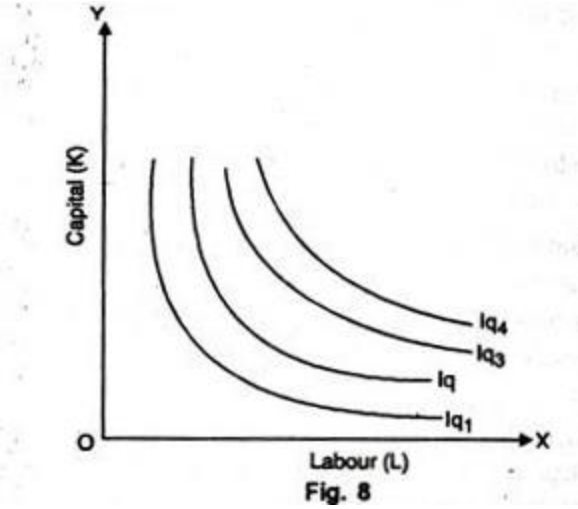


Fig. 8

6. No Isoquant can touch Either Axis:

If an isoquant touches X-axis, it would mean that the product is being produced with the help of labour alone without using capital at all. These logical absurdities for OL units of labour alone are unable to produce anything. Similarly, OC units of capital alone cannot produce anything without the use of labour. Therefore as seen in figure 9, IQ and IQ_1 cannot be isoquants.

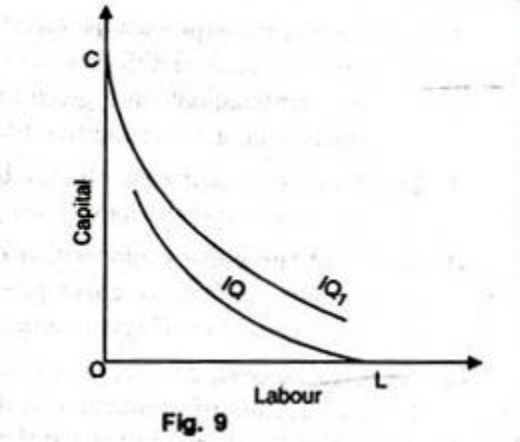


Fig. 9

Difference between Indifference Curve and Iso-Quant Curve:

The main points of difference between indifference curve and Iso-quant curve are explained below:

1. Iso-quant curve expresses the quantity of output. Each curve refers to given quantity of output while an indifference curve to the quantity of satisfaction. It

simply tells that the combinations on a given indifference curve yield more satisfaction than the combination on a lower indifference curve of production.

2. Iso-quant curve represents the combinations of the factors whereas indifference curve represents the combinations of the goods.

3. Iso-quant curve gives information regarding the economic and uneconomic region of production. Indifference curve provides no information regarding the economic and uneconomic region of consumption.

4. Slope of an iso-quant curve is influenced by the technical possibility of substitution between factors of production. It depends on marginal rate of technical substitution (MRTS) whereas slope of an indifference curve depends on marginal rate of substitution (MRS) between two commodities consumed by the consumer.

Long run production Function

The long run is a situation where all main factors of production are variable. The firm has time to build a bigger factory and respond to changes in demand. In the long run:

- We have time to build a bigger factory.
- Firms can enter or leave a market.
- Prices have time to adjust. For example, we may get a temporary surge in prices, but in the long-run, supply will increase to meet it.
- The long run may be a period greater than six months/year
- Price elasticity of demand can vary – e.g. over time, people may become more sensitive to price changes, in short run, people keep buying a good they are used to.

In the long run production function, the relationship between input and output is explained under the condition when both, labor and capital, are variable inputs. In the long run, the supply of both the inputs, labor and capital, is assumed to be elastic (changes frequently). Therefore, organizations can hire larger quantities of both the inputs. If larger quantities of both the inputs are employed, the level of production increases. In the long run, the functional relationship between changing scale of inputs and output is explained under laws of returns to scale. The laws of returns to scale can be explained with the help of isoquant technique.

Given that a firm can make all kinds of adjustments in its production process in long run, its production function can be written as,
$Q = f(L, K)$
It is also called as production with two variable factor inputs, labour (L) and capital (K) in particular.

Cobb-Douglas production function

The Cobb-Douglas Production Function, given by Charles W. Cobb and Paul H. Douglas is a linear homogeneous production function, which implies, that the factors of production can be substituted for one another up to a certain extent only. With the proportionate increase in the input factors, the output also increases in the same proportion. Thus, there are constant returns to a scale. In Cobb-Douglas production function, only two input factors, labor, and capital are taken into the consideration, and the elasticity of substitution is equal to one. It is also assumed that, if any, of the inputs, is zero, the output is also zero.

Likewise, in the linear homogeneous production function, the expansion path generated by the cobb-Douglas function is also a straight line passing through the origin. The CD function can be expressed as follows:

$$\mathbf{Q = AL^{\alpha}K^{\beta}}$$

Where, Q = output
A = positive constant
K = capital employed
L = Labor employed
α and β = positive fractions shows the elasticity coefficients of outputs for inputs labor and capital, respectively.
B = 1-α

This algebraic form of Cobb-Douglas function can be changed in a log linear form, with the help of regression analysis:

$$\mathbf{\log Q = \log A + \alpha \log L + \beta \log K}$$

The homogeneity of the Cobb-Douglas production function can be checked by adding the values of α and β. If the sum of these parameters is equal to one, then it shows that the production function is linearly homogeneous, and there are constant returns to a scale. If the sum of these parameters is less or more than one, then there is a decreasing and increasing return to a scale respectively.

Criticisms of C-D Production Function:

1. The C-D production function considers only two inputs, labour and capital, and neglects some important inputs, like raw materials, which are used in production. It is, therefore, not possible to generalize this function to more than two inputs.

2. In the C-D production function, the problem of measurement of capital arises because it takes only the quantity of capital available for production. But the full use of the available capital can be made only in periods of full employment. This is unrealistic because no economy is always fully employed.

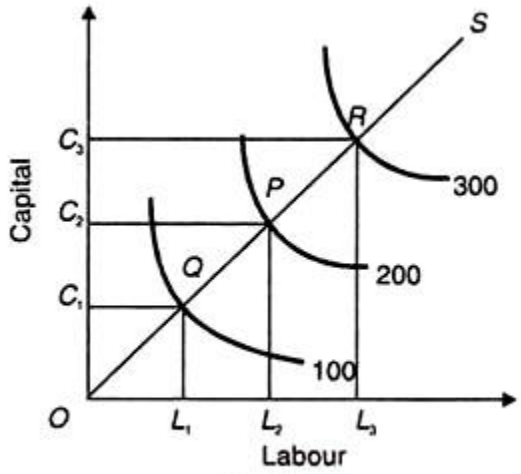


Fig. 20

3. The C-D production function is criticized because it shows constant returns to scale. But constant returns to scale are not an actuality, for either increasing or decreasing returns to scale are applicable to production.

4. The C-D production function is based on the assumption of substitutability of factors and neglects the complementarily of factors.

5. This function is based on the assumption of perfect competition in the factor market which is unrealistic. If, however, this assumption is dropped, the coefficients α and β do not represent factor shares.

Importance of C-D Production Function:

1. It has been used widely in empirical studies of manufacturing industries and in inter-industry comparisons.

2. It is used to determine the relative shares of labour and capital in total output.

3. It is used to prove Euler's Theorem.

4. Its parameters a and b represent elasticity coefficients that are used for inter-sectoral comparisons.

5. This production function is linear homogeneous of degree one which shows constant returns to scale, If $\alpha + \beta = 1$, there are increasing returns to scale and if $\alpha + \beta < 1$, there are diminishing returns to scale.

COST OUTPUT FUNCTION

A proper understanding of the nature and behavior of costs is a must for regulation and control of cost of production. The cost of production depends on money forces and an understanding of the functional relationship of cost to various forces will help us to take various decisions. Output is an important factor, which influences the cost. The cost-output relationship plays an important role in determining the optimum level of production. Knowledge of the cost-output relation helps the manager in cost control, profit prediction, pricing, promotion etc. The relation between cost and its determinants is technically described as the cost function.

C= f (S, O, P, T ….)

Where;

- C= Cost (Unit or total cost)
- S= Size of plant/scale of production

- O= Output level
- P= Prices of inputs
- T= Technology

Considering the period the cost function can be classified as (1) short-run cost function and (2) long-run cost function. In economics theory, the short-run is defined as that period during which the physical capacity of the firm is fixed and the output can be increased only by using the existing capacity allows to bring changes in output by physical capacity of the firm.

1. Cost-Output Relationship in the Short-Run

The cost concepts made use of in the cost behavior are Total cost, Average cost, and cost. Total cost is the actual money spent to produce a particular quantity of output. Total Cost is the summation of Fixed Costs and Variable Costs.

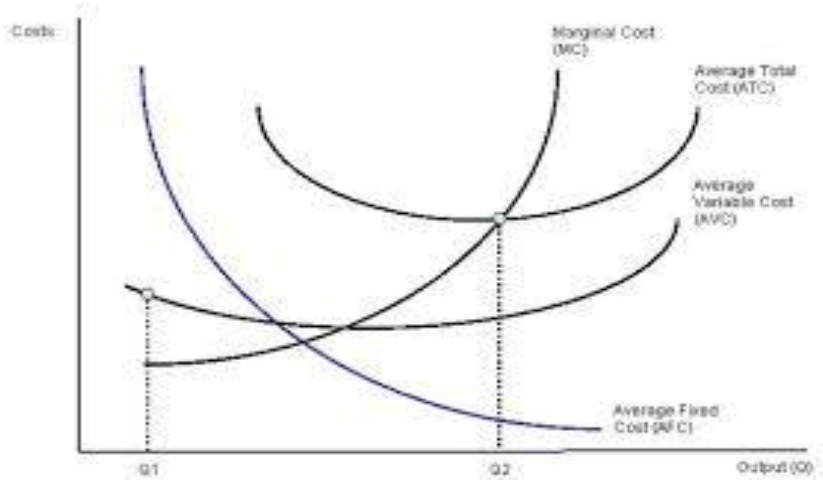
TC=TFC+TVC

Up to a certain level of production Total Fixed Cost i.e., the cost of plant, building, equipment etc, remains fixed. But the Total Variable Cost i.e., the cost of labor, raw materials etc., vary with the variation in output. Average cost is the total cost per unit. It can be found out as follows.

AC=TC/Q

The total of Average Fixed Cost (TFC/Q) keep coming down as the production is increased and Average Variable Cost (TVC/Q) will remain constant at any level of output. Marginal Cost is the addition to the total cost due to the production of an additional unit of product. It can be arrived at by dividing the change in total cost by the change in total output.

In the short-run there will not be any change in Total Fixed C0st. Hence change in total cost implies change in Total Variable Cost only.

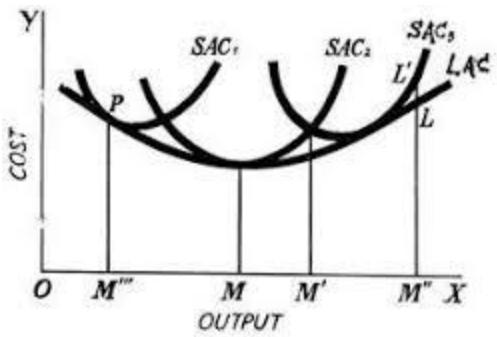


2. Cost-output Relationship in the Long-Run

Long run is a period, during which all inputs are variable including the one, which are fixes in the short-run. In the long run a firm can change its output according to its demand. Over a long period, the size of the plant can be changed, unwanted buildings can be sold staff can be increased or reduced. The long run enables the firms to expand and scale of their operation by bringing or purchasing larger quantities of all the inputs. Thus in the long run all factors become variable.

The long-run cost-output relations therefore imply the relationship between the total cost and the total output. In the long-run cost-output relationship is influenced by the law of returns to scale. In the long run a firm has a number of alternatives in regards to the scale of operations. For each scale of production or plant size, the firm has an appropriate short-run average cost curves. The short-run average cost (SAC) curve applies to only one plant whereas the long-run average cost (LAC) curve takes in to consideration many plants.

The long-run cost-output relationship is shown graphically with the help of "LCA' curve.



LAC Curve : An Envelope

ECONOMIES OF SCALE

Economies of scale are defined as the cost advantages that an organization can achieve by expanding its production in the long run. In other words, these are the advantages of large scale production of the organization. The cost advantages are achieved in the form of lower average costs per unit. It is a long term concept. Economies of scale are achieved when there is an increase in the sales of an organization. As a result, the savings of the organization increases, which further enables the organization to obtain raw materials in bulk. This helps the organization to enjoy discounts. These benefits are called as economies of scale.

100- 1000rs
200- 1800rs

The economies of scale are divided in to internal economies and external economies discussed as follows:

i. Internal Economies:

Refer to real economies which arise from the expansion of the plant size of the organization. These economies arise from the growth of the organization itself.

The examples of internal economies of scale are as follows:

a. Technical economies of scale:

Occur when organizations invest in the expensive and advanced technology. This helps in lowering and controlling the costs of production of organizations. These economies are enjoyed because of the technical efficiency gained by the organizations. The advanced technology enables an organization to produce a large

number of goods in short time. Thus, production costs per unit falls leading to economies of scale.

b. Marketing economies of scale:
Occur when large organizations spread their marketing budget over the large output. The marketing economies of scale are achieved in case of bulk buying, branding, and advertising. For instance, large organizations enjoy benefits on advertising costs as they cover larger audience. On the other hand, small organizations pay equal advertising expenses as large organizations, but do not enjoy such benefits on advertising costs.

c. Financial economies of scale:
Take place when large organizations borrow money at lower rate of interest. These organizations have good credibility in the market. Generally, banks prefer to grant loans to those organizations that have strong foothold in the market and have good repaying capacity.

d. Managerial economies of scale:
Occur when large organizations employ specialized workers for performing different tasks. These workers are experts in their fields and use their knowledge and experience to maximize the profits of the organization. For instance, in an organization, accounts and research department are created and managed by experienced individuals, SO that all costs and profits of the organization can be estimated properly.

e. Commercial economies:
Refer to economies in which organizations enjoy benefits of buying raw materials and selling of finished goods at lower cost. Large organizations buy raw materials in bulk; therefore, enjoy benefits in transportation charges, easy credit from banks, and prompt delivery of products to customers.

ii. External economies:
Occur outside the organization. These economies occur within the industries which benefit organizations. When an industry expands, organizations may benefit from

better transportation network, infrastructure, and other facilities. This helps in decreasing the cost of an organization.

Some of the examples of external economies of scale are discussed as follows:

a. Economies of Concentration:

Refer to economies that arise from the availability of skilled labor, better credit, and transportation facilities.

b. Economies of Information:

Imply advantages that are derived from publication related to trade and business. The central research institutions are the source of information for organizations.

c. Economies of Disintegration:

Refer to the economies that arise when organizations split their processes into different processes.

DISECONOMIES OF SCALE

Diseconomies of scale occur when the long run average costs of the organization increases. It may happen when an organization grows excessively large. In other words, the diseconomies of scale cause larger organizations to produce goods and services at increased costs.

As firms get larger, they grow in complexity. Such firms need to balance the economies of scale against the diseconomies of scale. For instance, a firm might be able to implement certain economies of scale in its marketing division if it increased output. However, increasing output might result in diseconomies of scale in the firm's management division.

100- 1000rs
200- 2200rs

There are two types of diseconomies of scale, namely, internal diseconomies and external diseconomies, discussed as follows:

i. Internal diseconomies of scale:

Refer to diseconomies that raise the cost of production of an organization. The main factors that influence the cost of production of an organization include the lack of decision, supervision, and technical difficulties.

ii. External diseconomies of scale:
Refer to diseconomies that limit the expansion of an organization or industry. The factors that act as restraint to expansion include increased cost of production, scarcity of raw materials, and low supply of skilled laborer.

There are a number of causes for diseconomies of scale.

Some of the causes which lead to diseconomies of scale are as follows:
i. Poor Communication:
Act as a major reason for diseconomies of scale. If production goals and objectives of an organization are not properly communicated to employees within the organization, it may lead to overproduction or production. This may lead to diseconomies of scale.

Apart from this, if the communication process of the organization is not strong then the employees would not get adequate feedback. As a result, there would be less face-to-face interaction among employees- thus the production process would be affected.

ii. Lack of Motivation:
Leads to fall in productivity levels. In case of a large organization, workers may feel isolated and are less appreciated for their work, thus their motivation diminishes. Due to poor communication network, it is harder for employers to interact with the employees and build a sense of belongingness. This leads to fall in the productivity levels of output owing to lack of motivation. This further leads to increase in costs of the organization.

iii. Loss of Control:
Acts as the main problem of large organizations. Monitoring and controlling the work of every employee in a large organization becomes impossible and costly. It is harder to make out that all the employees of an organization are working

towards the same goal. It becomes difficult for managers to supervise the sub-ordinates in large organizations.

iv. Cannibalization:

Implies a situation when an organization faces competition from its own product. A small organization faces competition from products of other organizations, whereas sometimes large organizations find that their own products are competing with each other.