UNIT II- CONSUMER AND PRODUCER BEHAVIOUR

Market – Demand and Supply – Determinants – Market equilibrium – elasticity of demand and supply – consumer behaviour – consumer equilibrium – Approaches to consumer behaviour – Production – Short-run and long-run Production Function – Returns to scale – economies Vs diseconomies of scale – Analysis of cost – Short-run and long-run cost function – Relation between Production and cost function.

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2.1 Market

An actual or nominal place where forces of demand and supply operate, and where buyers and sellers interact (directly or through intermediaries) to trade goods, services, or contracts or instruments, for money or barter.

Markets include mechanisms or means for

(1) Determining price of the traded item,
(2) Communicating the price information,
(3) Facilitating deals and transactions, and
(4) Effecting distribution.

The market for a particular item is made up of existing and potential customers who need it and have the ability and willingness to pay for it.

Markets may come in the form of physical locations where transactions are made, which may exist as anything from thrift or boutique stores selling individual items to wholesale markets selling goods to other distributors. Yet, markets do not necessarily need to be a physical meeting place. Internet-based stores and auction sites are all markets in which transactions can take place entirely online and where the two parties do not ever need to physically meet. Technically speaking, a market is any medium through which two or more parties can engage in an economic transaction, even those that do not necessarily need to involve money. A market transaction may involve goods, services, information, currency or any combination of these things passing from one party to another in exchange for one of these or another combination.

Markets in Context

Markets establish the going rates for goods and other services, which sellers determine by creating supply and which buyers determine by creating demand. A market is a focal center for the distribution of goods and resources within a society, though they are not always deliberately created. Markets may emerge organically or as a means of enabling ownership rights over goods, services and information. When on a national or other more specific regional level, markets may often be categorized as “developed” markets or “developing” markets, depending on many factors including income levels and the nation or region’s openness to foreign trade.

Markets vary widely for a number of reasons, including the kinds of products sold, location, duration, size and constituency of the customer base, size, legality and many other factors.

2.2 Demand

Desire for certain good or service supported by the capacity to purchase it. The aggregate quantity of a product or service estimated to be bought at a particular price. The total amount of funds which individuals or organizations want to commit for spending on goods or services over a specific period. See also law of supply and demand.

Demand is the consumer's need or desire to own the product or experience the service. It's constrained by the willingness and ability of the consumer to pay for the good or service at the price offered.

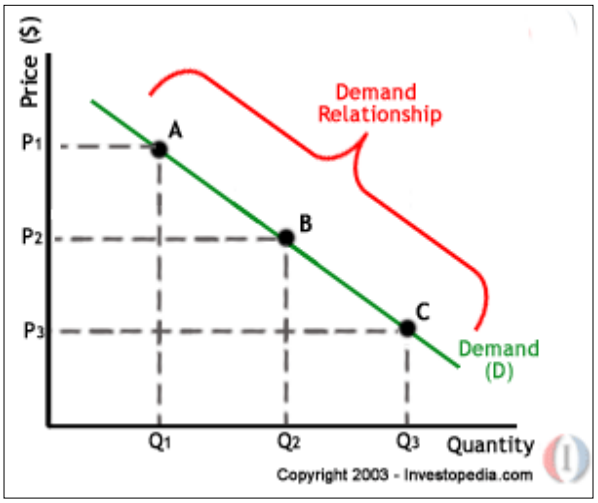
(5) Demand is the underlying force that drives everything in the economy. Fortunately for economics, people are never satisfied.
(6) They always want more. This drives economic growth and expansion. Without demand, no business would ever bother producing anything.

2.2.1 Law Of Demand

The law of demand is a microeconomic law that states, all other factors being equal, as the price of a good or service increases, consumer demand for the good or service will decrease, and vice versa. The law of demand says that the higher the price, the lower the quantity demanded, because consumers' opportunity cost to acquire that good or service increases, and they must make more tradeoffs to acquire the more expensive product.

The chart below depicts the law of demand using a demand curve, which is always downward sloping. Each point on the curve (A, B, C) reflects a direct correlation between quantity demanded (Q) and price (P). So, at point A, the quantity demanded will be Q1 and the price will be P1, and so on.

The law of demand is so intuitive that you may not even be aware of all the examples around you. When shirts go on sale, you might buy three instead of one. The quantity that you demand increases because the price has fallen.



When plane tickets become more expensive, you're less likely to travel by air and more likely to choose the less expensive options of driving or staying home. The amount of plane tickets that you demand decreases to zero because the cost has gone up.

The law of demand summarizes the effect price changes have on consumer behavior. For example, a consumer will purchase more pizzas if the price of pizza falls. The opposite is true if the price of pizza increases. John might demand 10 pizzas if they cost Rs 10 each, but only 7 pizzas if the price rises to Rs 12, and only 4 pizzas if the price rises to Rs 20.

The law of demand is one of the most fundamental concepts in economics. It works with the law of supply to explain how market economies allocate resources and determine the prices of goods and services.

2.2.2 Kinds of Demand

Some of the important kinds of demand are: 1. Price demand, 2. Income demand, 3. Cross demand, 4. Direct demand, 5. Derived demand or Indirect demand, 6. Joint demand and 7. Composite demand:

1. Price demand:

Price demand refers to the different quantities of the commodity or service which consumers will purchase at a given time and at given prices, assuming other things remaining the same. It is the price demand with which people are mostly concerned and as such price demand is an important notion in economics. Price demand has inverse relation with the price. As the price of commodity increases its demand falls and as the price decreases, its demand rises.

2. Income demand:

Income demand refers to the different quantities of a commodity or service which consumers will buy at different levels of income, assuming other things remaining constant. Usually the demand for a commodity increases as the income of a person increases unless the commodity happens to be an inferior product. For example, coarse grain is a cheap or inferior commodity. The demand for such commodities decreases as the income of a person increases. Thus, the demand for inferior or cheap goods is inversely related with the income.

3. Cross demand:

When the demand for a commodity depends not on its price but on the price of other related commodities, it is called cross demand. Here we take closely connected or related goods which are substitutes for one another.

For example, tea and coffee are substitutes for one another. If the price of coffee rises, the consumer will be induced to buy more of tea and, hence, the demand of tea will increase. Thus in case of substitutes, when the price of one related commodity rises, the demand of the other related commodity increases and vice-versa.

But in case of complimentary or joint demand goods, e.g., pen and ink, horses and carriages etc. when the price of one commodity rises, the demand for it will fall and as a result of it the demand for the other joint commodity also falls (even though its price remains the same). For example, if the price of horses increases, their demand will fall and as a result of it the demand for carriages will also fall even though their price does not change.

4. Direct demand:

Commodities or services which satisfy our wants directly are said to have direct demand. For example, all consumer goods satisfy our wants directly, so they are said to have direct demand.

5. Derived demand or Indirect demand:

Commodities or services demanded for producing goods which satisfy our wants directly are said to have derived demand. For example, demand for a factor of production (say labor) is a derived demand because labor is demanded to help in the construction of houses which will directly satisfy consumers' demand.

Thus, the demand for labor which helps us in making a house in a case of indirect or derived demand. The demand for labor is called derived demand because its demand is derived from the demand of a house.

6. Joint demand:

In finished products as in case of bread, there is need for so many things—the services of the flour mill, oven, fuel, etc. The demand for them is called joint demand. Similarly for the construction of a house we require land, labor, capital, organization and materials like cement, bricks, lime, etc. The demand for them is, thus, called a 'joint demand.'

7. Composite demand:

A commodity is said to have a composite demand when its use is made in more than one purpose. For example the demand for coal is composite demand as coal has many uses—as fuel for a boiler of a factory, for domestic fuel, for oven for steam-making in railways engine, etc.

2.2.3 Determinants of Demand for a Product

The demand of a product is influenced by a number of factors.

An organization should properly understand the relationship between the demand and its each determinant to analyze and estimate the individual and market demand of a product.

The demand for a product is influenced by various factors, such as price, consumer's income, and growth of population.

Following are the determinants of demand for a product:

i. Price of a Product or Service:

Affects the demand of a product to a large extent. There is an inverse relationship between the price of a product and quantity demanded. The demand for a product decreases with increase in its price, while other factors are constant, and vice versa.

For example, consumers prefer to purchase a product in a large quantity when the price of the product is less. The price-demand relationship marks a significant contribution in oligopolistic market where the success of an organization depends on the result of price war between the organization and its competitors.

ii. Income:

Constitutes one of the important determinants of demand. The income of a consumer affects his/her purchasing power, which, in turn, influences the demand for a product. Increase in the income of a consumer would automatically increase the demand for products by him/her, while other factors are at constant, and vice versa.

For example, if the salary of Mr. X increases, then he may increase the pocket money of his children and buy luxury items for his family. This would increase the demand of different products from a single family. The income-demand relationship can be analyzed by grouping goods into four categories, namely, essential consumer goods, inferior goods, normal goods, and luxury goods.

a. Essential or Basic Consumer Goods:

Refer to goods that are consumed by all the people in the society. For example, food grains, soaps, oil, cooking fuel, and clothes. The quantity demanded for basic consumer goods increases with increase in the income of a consumer, but up to a fixed limit, while other factors are constant.

b. Normal Goods:

Refer to goods whose demand increases with increase in the consumer's income. For example, goods, such as clothing, vehicles, and food items, are demanded in relatively increasing quantity with increase in consumer's income. The demand for normal goods varies due to .different rate of increase in consumers' income.

c. Inferior Goods:

Refer to goods whose demand decreases with increase in the income of consumers. For example, a consumer would prefer to purchase wheat and rice instead of millet and cooking gas instead of kerosene, with increase in his/her income. In such a case, millet and kerosene are inferior goods for the consumer.

However, these two goods can be normal goods for people having lower level of income. Therefore, we can say that goods are not always inferior or normal; it is the level of income of consumers and their perception about the need of goods.

d. Luxury Goods:

Refer to goods whose demand increases with increase in consumer's income. Luxury goods are used for the pleasure and esteem of consumers. For example, expensive jewellery items, luxury cars, antique paintings and wines, and air travelling.

iii. Tastes and Preferences of Consumers:

Play a major role in influencing the individual and market demand of a product. The tastes and preferences of consumers are affected due to various factors, such as life styles, customs, common habits, and change in fashion, standard of living, religious values, age, and sex.

A change in any of these factors leads to change in the tastes and preferences of consumers. Consequently, consumers reduce the consumption of old products and add new products for their consumption. For example, if there is change in fashion, consumers would prefer new and advanced products over old- fashioned products, provided differences in prices are proportionate to their income.

Apart from this, demand is also influenced by the habits of consumers. For instance, most of the South Indians are non-vegetarian; therefore, the demand for non- vegetarian products is higher in Southern India. In addition, sex ratio has a relative impact on the demand for many products.

For instance, if females are large in number as compared to males in a particular area, then the demand for feminine products, such as make-up kits and cosmetics, would be high in that area.

iv. Price of Related Goods:

Refer to the fact that the demand for a specific product is influenced by the price of related goods to a greater extent. Related goods can be of two types, namely, substitutes and complementary goods, which are explained as follows:

a. Substitutes:

Refer to goods that satisfy the same need of consumers but at a different price. For example, tea and coffee, jowar and bajra, and groundnut oil and sunflower oil are substitute to each other. The increase in the price of a good results in increase in the demand of its substitute with low price. Therefore, consumers usually prefer to purchase a substitute, if the price of a particular good gets increased.

b. Complementary Goods:

Refer to goods that are consumed simultaneously or in combination. In other words, complementary goods are consumed together. For example, pen and ink, car and petrol, and tea and sugar are used together. Therefore, the demand for complementary goods changes simultaneously. The complementary goods are inversely related to each other. For example, increase in the prices of petrol would decrease the demand of cars.

v. Expectations of Consumers:

Imply that expectations of consumers about future changes in the price of a product affect the demand for that product in the short run. For example, if consumers expect that the prices of petrol would rise in the next week, then the demand of petrol would increase in the present.

On the other hand, consumers would delay the purchase of products whose prices are expected to be decreased in future, especially in case of non-essential products. Apart from this, if consumers anticipate an increase in their income, this would result in increase in demand for certain products. Moreover, the scarcity of specific products in future would also lead to increase in their demand in present.

vi. Effect of Advertisements:

Refers to one of the important factors of determining the demand for a product. Effective advertisements are helpful in many ways, such as catching the attention of consumers, informing them about the availability of a product, demonstrating the features of the product to potential consumers, and persuading them to purchase the product. Consumers are highly sensitive about advertisements as sometimes they get attached to advertisements endorsed by their favorite celebrities. This results in the increase demand for a product.

vii. Distribution of Income in the Society:

Influences the demand for a product in the market to a large extent. If income is equally distributed among people in the society, the demand for products would be higher than in case of unequal distribution of income. However, the distribution of income in the society varies widely.

This leads to the high or low consumption of a product by different segments of the society. For example, the high income segment of the society would prefer luxury goods, while the low income segment would prefer necessary goods. In such a scenario, demand for luxury goods would increase in the high income segment, whereas demand for necessity goods would increase in the low income segment.

viii. Growth of Population:

Acts as a crucial factor that affect the market demand of a product. If the number of consumers increases in the market, the consumption capacity of consumers would also increase. Therefore, high growth of population would result in the increase in the demand for different products.

ix. Government Policy:

Refers to one of the major factors that affect the demand for a product. For example, if a product has high tax rate, this would increase the price of the product. This would result in the decrease in demand for a product. Similarly, the credit policies of a country also induce the demand for a product. For example, if sufficient amount of credit is available to consumers, this would increase the demand for products.

x. Climatic Conditions:

Affect the demand of a product to a greater extent. For example, the demand of ice-creams and cold drinks increases in summer, while tea and coffee are preferred in winter. Some products have a stronger demand in hilly areas than in plains. Therefore, individuals demand different products in different climatic conditions.

2.2.4 Elasticity of Demand

The extent of responsiveness of demand with change in the price is not always the same. The demand for a product can be elastic or inelastic, depending on the rate of change in the demand with respect to change in price of a product.

Elastic demand is the one when the response of demand is greater with a small proportionate change in the price. On the other hand, inelastic demand is the one when there is relatively a less change in the demand with a greater change in the price.

$$\text{price elasticity of demand} = \frac{\text{percentage change in quantity demanded}}{\text{percentage change in price}}$$

For better understanding the concepts of elastic and inelastic demand, the price elasticity of demand has been divided into five types.

Different Types of Price Elasticity of Demand

Let us discuss the different types of price elasticity of demand.

1. Perfectly Elastic Demand:

When a small change in price of a product causes a major change in its demand, it is said to be perfectly elastic demand. In perfectly elastic demand, a small rise in price results in fall in demand to zero, while a small fall in price causes increase in demand to infinity. In such a case, the demand is perfectly elastic or ep = 00.

The degree of elasticity of demand helps in defining the shape and slope of a demand curve. Therefore, the elasticity of demand can be determined by the slope of the demand curve. Flatter the slope of the demand curve, higher the elasticity of demand.

In perfectly elastic demand, the demand curve is represented as a horizontal straight line, which is shown in Figure-2:

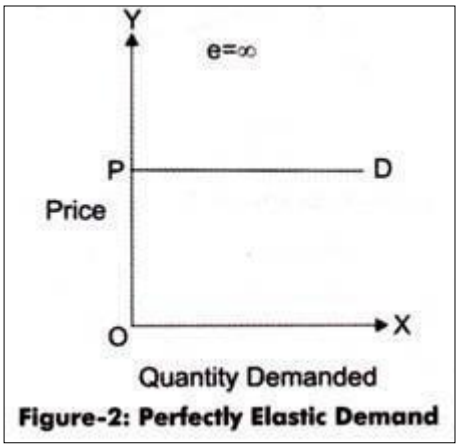


Figure-2: Perfectly Elastic Demand

From Figure-2 it can be interpreted that at price OP, demand is infinite; however, a slight rise in price would result in fall in demand to zero. It can also be interpreted from Figure-2 that at price P consumers are ready to buy as much quantity of the product as they want. However, a small rise in price would resist consumers to buy the product.

Though, perfectly elastic demand is a theoretical concept and cannot be applied in the real situation. However, it can be applied in cases, such as perfectly competitive market and homogeneity products. In such cases, the demand for a product of an organization is assumed to be perfectly elastic.

From an organization's point of view, in a perfectly elastic demand situation, the organization can sell as much as much as it wants as consumers are ready to purchase a large quantity of product. However, a slight increase in price would stop the demand.

2. Perfectly Inelastic Demand:

A perfectly inelastic demand is one when there is no change produced in the demand of a product with change in its price. The numerical value for perfectly inelastic demand is zero (ep=0).

In case of perfectly inelastic demand, demand curve is represented as a straight vertical line, which is shown in Figure-3:

It can be interpreted from Figure-3 that the movement in price from OP1 to OP2 and OP2 to OP3 does not show any change in the demand of a product (OQ). The demand remains constant for any value of price. Perfectly inelastic demand is a theoretical concept and cannot be applied in a practical situation. However, in case of essential goods, such as salt, the demand does not change with change in price. Therefore, the demand for essential goods is perfectly inelastic.

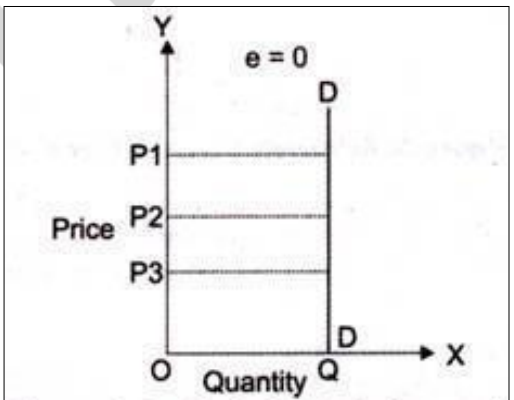


Figure-3: Perfectly Inelastic Demand

3. Relatively Elastic Demand:

Relatively elastic demand refers to the demand when the proportionate change produced in demand is greater than the proportionate change in price of a product. The numerical value of relatively elastic demand ranges between one to infinity.

Mathematically, relatively elastic demand is known as more than unit elastic demand (ep>1). For example, if the price of a product increases by 20% and the demand of the product decreases by 25%, then the demand would be relatively elastic.

The demand curve of relatively elastic demand is gradually sloping, as shown in Figure-4:

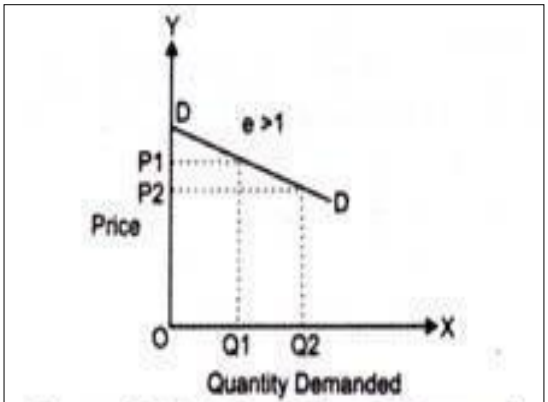


Figure-4: Relatively Elastic Demand

It can be interpreted from Figure-4 that the proportionate change in demand from OQ1 to OQ2 is relatively larger than the proportionate change in price from OP1 to OP2. Relatively elastic demand has a practical application as demand for many of products respond in the same manner with respect to change in their prices.

For example, the price of a particular brand of cold drink increases from Rs. 15 to Rs. 20. In such a case, consumers may switch to another brand of cold drink. However, some of the consumers still consume the same brand. Therefore, a small change in price produces a larger change in demand of the product.

4. Relatively Inelastic Demand:

Relatively inelastic demand is one when the percentage change produced in demand is less than the percentage change in the price of a product. For example, if the price of a product increases by 30% and the demand for the product decreases only by 10%, then the demand would be called relatively inelastic. The numerical value of relatively elastic demand ranges between zero to one (ep<1). Marshall has termed relatively inelastic demand as elasticity being less than unity.

The demand curve of relatively inelastic demand is rapidly sloping, as shown in Figure-5:

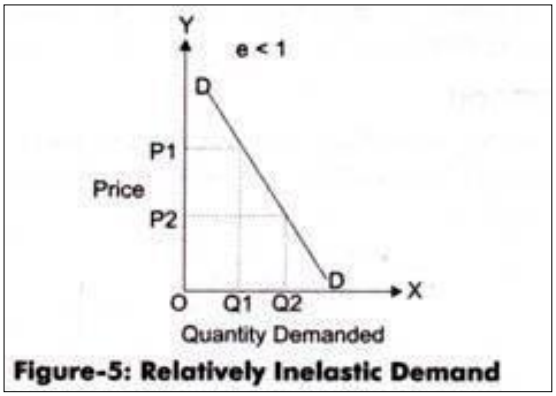


Figure-5: Relatively Inelastic Demand

It can be interpreted from Figure-5 that the proportionate change in demand from OQ1 to OQ2 is relatively smaller than the proportionate change in price from OP1 to OP2. Relatively inelastic demand has a practical application as demand for many of products respond in the same manner with respect to change in their prices. Let us understand the implication of relatively inelastic demand with the help of an example.

5. Unitary Elastic Demand:

When the proportionate change in demand produces the same change in the price of the product, the demand is referred as unitary elastic demand. The numerical value for unitary elastic demand is equal to one (ep=1).

The demand curve for unitary elastic demand is represented as a rectangular hyperbola, as shown in Figure-6:

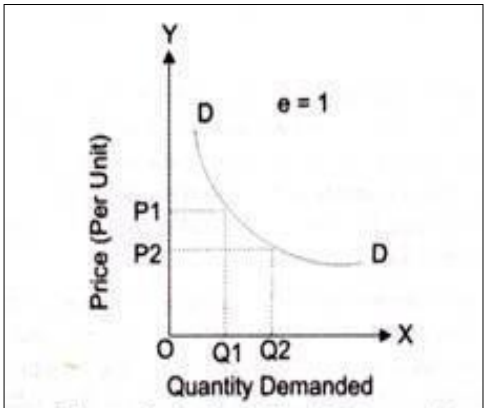


Figure-6: Unitary Elastic Demand

From Figure-6, it can be interpreted that change in price OP1 to OP2 produces the same change in demand from OQ1 to OQ2. Therefore, the demand is unitary elastic.

2.2.5 Demand forecasting method

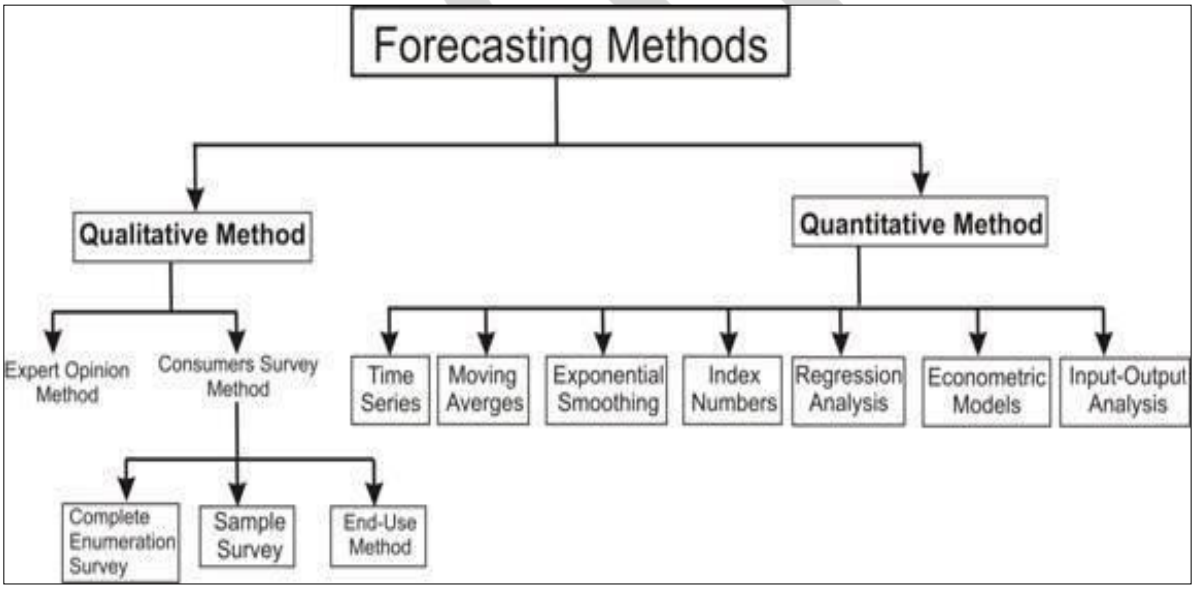


Table 2.15 Forecasting methods

Qualitative techniques	Quantitative techniques
1. Consumer survey method (a) Complete enumeration survey method (b) Sample survey method (c) End-use method 2. Sales force opinion method 3. Expert opinion method 4. Market experiments (a) Experimentation in laboratory (b) Test marketing	1. Mechanical extrapolation/Trend projection (a) Fitting trend line by observation (b) Time series analysis employing least squares method (linear and non-linear) (c) Forecasting by decomposing a time series (d) Smoothening methods: moving averages and exponential smoothening (e) ARIMA method 2. Barometric techniques 3. Statistical methods (a) Naïve models (b) Correlation and regression method 4. Econometric method 5. Simultaneous equation method

2.3-Supply

Supply is a fundamental economic concept that describes the total amount of a specific good or service that is available to consumers. Supply can relate to the amount available at a specific price or the amount available across a range of prices if displayed on a graph. This relates closely to the demand for a good or service at a specific price; all else being equal, the supply provided by producers will rise if the price rises because all firms look to maximize profits.

Supply and demand trends form the basis of the modern economy. Each specific good or service will have its own supply and demand patterns based on price, utility and personal preference. If people demand a good and are willing to pay more for it, producers will add to the supply. As the supply increases, the price will fall given the same level of demand. Ideally, markets will reach a point of equilibrium where the supply equals the demand (no excess supply and no shortages

2.3.1-Law of supply

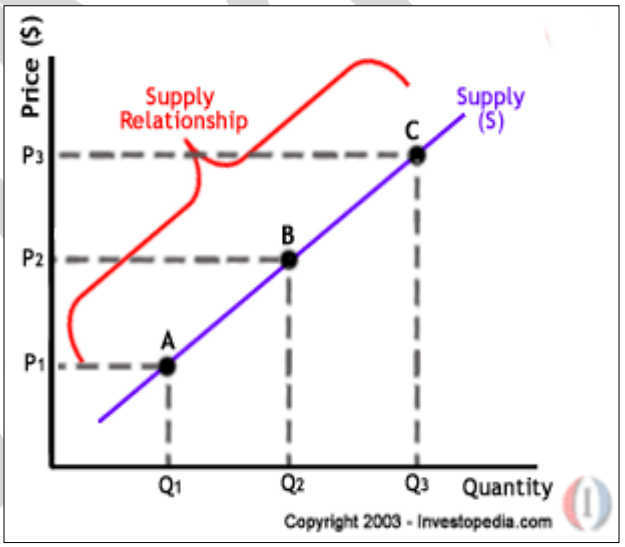
Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other. In other words, when the price paid by buyers for a good rises, then suppliers increase the supply of that good in the market.

The **law of supply** is a fundamental principle of economic theory which states that, all else equal, an increase in price results in an increase in quantity supplied. In other words, there is a direct relationship between price and quantity: quantities respond in the same direction as price changes. This means that producers are willing to offer more products for sale on the market at higher prices by increasing production as a way of increasing profits.

In short, Law of Supply is a positive relationship between quantity supplied and price and is the reason for the upward slope of the supply curve.

The chart below depicts the law of supply using a supply curve, which is always upward sloping. A, B and C are points on the supply curve. Each point on the curve reflects a direct correlation between quantity supplied (Q) and price (P). So, at point A, the quantity supplied will be Q1 and the price will be P1, and so on.

The law of supply is so intuitive that you may not even be aware of all the examples around you.



-When college students learn computer engineering jobs pay more than English professor jobs, the supply of students with majors in computer engineering will increase.

-When consumers start paying more for cupcakes than for donuts, bakeries will increase their output of cupcakes and reduce their output of donuts in order to increase their profits.

-When your employer pays time and a half for overtime, the number of hours you are willing to supply for work increases.

The law of supply summarizes the effect price changes have on producer behavior. For example, a business will make more video game systems if the price of those systems increases. The opposite is true if the price of video game systems decreases. The company might supply 1,000,000 systems if the price is $200 each, but if the price increases to $300, they might supply 1,500,000 systems.

The law of supply is one of the most fundamental concepts in economics. It works with the law of demand to explain how market economies allocate resources and determine the prices of goods and services.

Example of Law of Supply:

The law of supply is based on a moving quantity of materials available to meet a particular need. Supply is the source of economic activity. Supply, or the lack of it, also dictates prices. Cost of scarce supply goods increase in relation to the shortages. Supply can be used to measure demand. Over supply results in lack of customers. An over supply is often a loss, for that reason. Under supply generates a demand in the form of orders, or secondary sales at higher prices.

If ten people want to buy a pen, and there's only one pen, the sale will be based on the level of demand for the pen. The supply function requires more pens, which generates more production to meet demand.

Assumptions of Law of Supply:

1. **Nature of Goods.** If the goods are perishable in nature and the seller cannot wait for the rise in price. Seller may have to offer all of his goods at current market price because he may not take risk of getting his commodity perished.

2. **Government Policies.** Government may enforce the firms and producers to offer production at prevailing market price. In such a situation producer may not be able to wait for the rise in price.

3. **Alternative Products.** If a number of alternative products are available in the market and customers tend to buy those products to fulfill their needs, the producer will have to shift to transform his resources to the production of those products.

4. **Squeeze in Profit.** Production costs like raw materials, labor costs, overhead costs and selling and administration may increase along with the increase in price. Such situations may not allow producer to offer his products at a particular increased price.

2.3.2-Determinants of Supply:

When the supply of the commodity rises or falls due to non-price determinants, the supply is said to have **increased supply** or **decreased supply**. The increases or decrease or the rise or fall in supply may take place on account of various factors.

They are briefly stated as below:

1. **Changes in Factor Price.** The rise of fall in supply may take place due to changes in the cost of production of a commodity. If the prices of various factor of production used in the production of a particular commodity increase of it total cost of production. There will be reduction in the supply of that commodity at each price because the amount demanded decreases with a rise in price.

2. **Changes in Technique.** The supply of a commodity may also be affected by progress in technique. If an improvement in technique takes place in a particular industry, it will help in reducing its cost of production. This will result in greater production and so an increase in the supply of the commodity. The supply curve will shifts to the right of the original supply curve.

3. **Improvement in the Means of Transport.** The supply of the commodity may also increase due to improvement in the means of communication and transport. If the means of transport are cheep and fast, then supply of the commodity can be increased at a short notice at lower price.

4. **Climatic Changes in case of Agricultural Products**. The supply of agricultural products is directly affected by the weather conditions and the use of the better methods of production. If rain is timely plentiful well-distributed; and improve methods of cultivation are employed then other things remaining the same, there will be bumper crops. It would then be possible to increase the supply of the agriculture products.

5. **Political Changes**. The increase or decrease in supply may also place due to political disturbances in a country. If country wages wars against another country or some kind of political disturbances take place just as we had at the time of partition, then the channels of production are disorganized. It results in the decrease of certain goods the supply curve shifts to the left of originals curve.

6. **Taxation Policy.** If a government levies heavy taxes on the import of particular commodities, then the supply of these commodities is reduced at each price. The supply curve shifts to the left .conversely if the taxes on output in the country are low and government encourages the import of foreign commodities, then the supply can be increased easily. The supply curve shifts to the right of originals supply curve.

7. **Goals of firms.** If the firms expect higher profits in the future, they will take the risk and produce goods on large scale resulting in larger supply of the commodities. The supply curve shifts to the right.

2.3.3-Elasticity's of Supply

Elasticity of supply (PES or E_s) is a measure used in economics to show the responsiveness, or **elasticity**, of the quantity supplied of a good or service to a change in its price.

Different commodities respond differently to a given change in price. Depending upon the degree of responsiveness of the quantity supplied to the price change, there are five kinds of price elasticities of supply.

Supply elasticity is defined as the percentage change in quantity supplied divided by the percentage change in price. It is calculated as per the following formula:

Formula

$$\text{Supply elasticity} = \frac{\%\Delta \text{ in quantity supplied}}{\%\Delta \text{ in price}}$$

The calculation of elasticity of supply is comparable to the calculation of elasticity of demand, except that the quantities used refer to quantities supplied instead of quantities demanded.

1. Perfectly Elastic Supply:

When there is an infinite supply at a particular price and the supply becomes zero with a slight fall in price, then the supply of such a commodity is said to be perfectly elastic. In such a case Es = ∞ and the supply curve is a c horizontal straight line parallel to the X-axis, as shown in Fig:

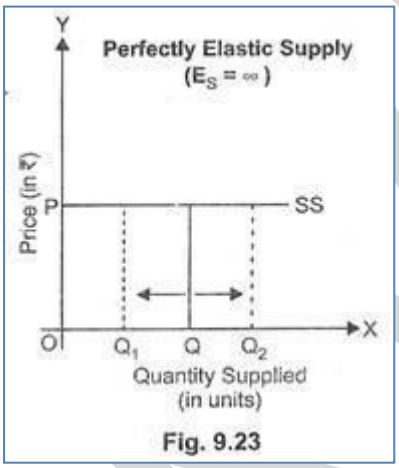


Fig. 9.23

Price (in Rs.)	Supply (in units)
30	100
30	200
30	300

Quantity supplied can be 100, 200 or 300 units at the same price of Rs. 30. As seen in the diagram, quantity supplied can be OQ or OQ1 or OQ2 at the same price of OP. It must be noted that perfectly elastic supply is an imaginary situation.

2. Perfectly Inelastic Supply:

When the supply does not change with change in price, then supply for such a commodity is said to be perfectly inelastic.

In such a case, Es = 0 and the supply curve (SS) is a vertical straight line parallel to the Y-axis as shown s in Fig.

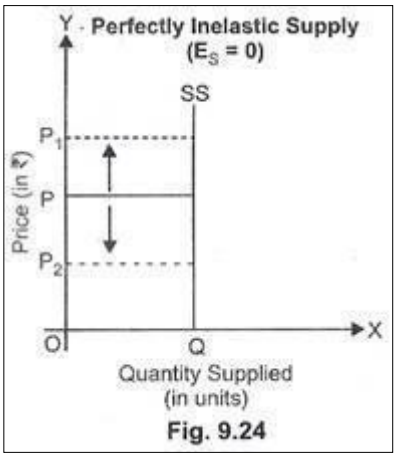


Fig. 9.24

Quantity supplied remains same at 20 units, whether the price is Rs. 20, Rs. 30 or 140. As seen in the diagram, quantity supplied remains the same at OQ, with change in price from OP to OP1 or OP2. It must be noted that perfectly inelastic supply is an imaginary situation.

3. Highly Elastic Supply:

When percentage change in quantity supplied is more than the percentage change in price, then supply for such a commodity is said to be highly elastic. In such a case, Es > 1 and the supply curve has an intercept on the Y-axis as shown in Fig.

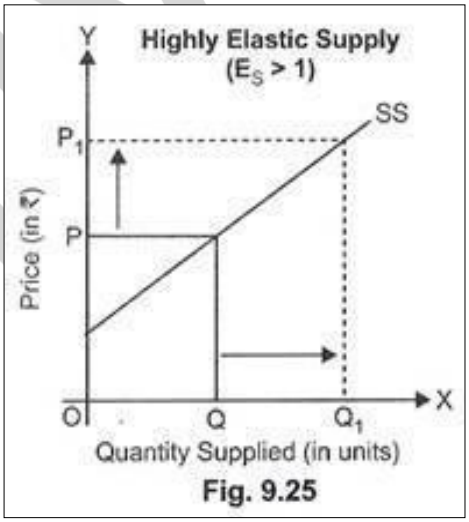


Fig. 9.25

As seen in the schedule, the quantity supplied rises by 100% due to a 50% rise in price. In Fig. 9.25, the quantity supplied rises from OQ to OQ1 with rise in price from OP to OP1. As QQ1 is proportionately more than PP1 elasticity of supply is more than 1.

4. Less Elastic Supply:

When percentage change in quantity supplied is less than the percentage change in price, then supply for such a commodity is said to be less elastic. In such a case, Es < 1 and the supply curve has an intercept on the X-axis as shown in Fig.

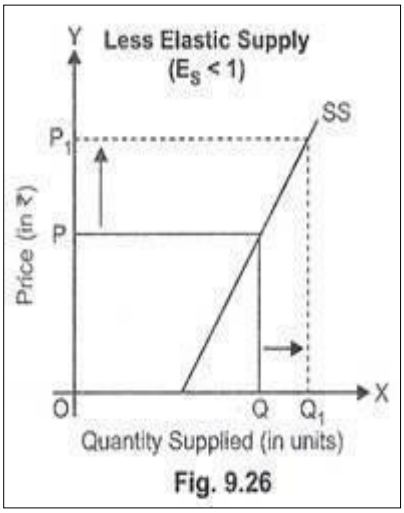


Fig. 9.26

The quantity supplied rises by 20 % due to 50% rise in price. In Fig. 9.26, the quan•tity supplied rises from OQ to OQ1 with rise in price from OP to OP1. As QQ1 is proportion•ately less than PP1, elasticity of supply is less than 1.

5. Unitary Elastic Supply:

When percentage change in quantity supplied is equal to percentage change in price, then supply for such a commodity is said to the unitary elastic. In such a case, Es = 1 and supply curve is a straight line passing through the origin as shown in Fig.

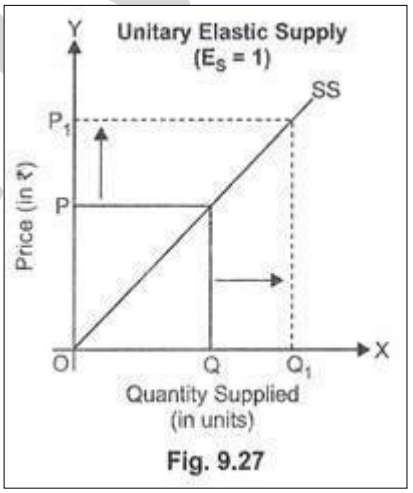


Fig. 9.27

The quantity supplied also rises by 50% due to 50% rise in price. In Fig. 9.27, the quantity supplied rises from OQ to OQ1 with rise in price from OP to OP1. As QQX is proportionately equal to PP1, elasticity of supply is equal to 1.

2.3.4-Factors Determining Elasticity of Supply:

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:

i. 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.

ii. 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.

iii. 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.

iv. 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.

v. Agricultural Products:

Act as a major determinant of elasticity of supply in case of agricultural products. The supply of agriculture products, such as fruits, vegetables, and food grains, depends on natural factors, including ram, humidity, and sunlight. Therefore, the production of agricultural products cannot be increased or decreased easily. Consequently, the supply of these products is relatively inelastic.

Improving PES

Because a high PES is desirable, it may be necessary for firms to undertake actions that improve their speed of response to changes in market conditions. Examples of these actions include:

1. Creating spare capacity
2. Using the latest technology
3. Keeping sufficient stocks
4. Developing better storage systems
5. Prolonging the shelf life of products
6. Developing better distribution systems
7. Providing training for workers
8. Having flexible workers who can do a range of jobs

2.4 Consumer behavior

Consumer behaviour is the study of individuals, groups, or organizations and the processes they use to select, secure, use, and dispose of products, services, experiences, or ideas to satisfy their needs and wants. It is also concerned with the social and economic impacts that purchasing and consumption behaviour has on both the individual consumer and on broader society.Consumer behaviour blends elements from psychology, sociology, social anthropology, marketing and economics, especially behavioural economics. It examines how emotions, attitudes and preferences affect buying behaviour.

Characteristics of individual consumers such as demographics, personality lifestyles and behavioural variables such as usage rates, usage occasion, loyalty, brand advocacy, willingness to provide referrals, in an attempt to understand people's wants and consumption are all investigated in formal studies of consumer behaviour. The study of consumer behaviour also investigates the influences, on the consumer, from groups such as family, friends, sports, reference groups, and society in general.

Consumer Behaviour is a branch which deals with the various stages a consumer goes through before purchasing products or services for his end use.

Why do you think an individual buys a product ?

- Need
- Social Status
- Gifting Purpose

Why do you think an individual does not buy a product ?

- No requirement
- Income/Budget/Financial constraints
- Taste

When do you think consumers purchase products ?

- Festive season
- Birthday
- Anniversary
- Marriage or other special occasions

There are infact several factors which influence buying decision of a consumer ranging from psychological, social, economic and so on. The study of consumer behaviour explains as to:

- Why and why not a consumer buys a product ?
- When a consumer buys a product ?
- How a consumer buys a product ?

During Christmas, the buying tendencies of consumers increase as compared to other months. In the same way during Valentines week, individuals are often seen purchasing gifts for their partners. Fluctuations in the financial markets and recession decrease the buying capacity of individuals.In a layman's language consumer behaviour deals with the buying behaviour of individuals.

The main catalyst which triggers the buying decision of an individual is need for a particular product/service. **Consumers purchase products and services as and when need arises**.

According to Belch and Belch, whenever need arises; a consumer searches for several information which would help him in his purchase.

Following are the sources of information:

- Personal Sources
- Commercial Sources
- Public Sources
- Personal Experience

Perception also plays an important role in influencing the buying decision of consumers.

Buying decisions of consumers also depend on the following factors:

- Messages, advertisements, promotional materials, a consumer goes through also called **selective exposure**.
- Not all promotional materials and advertisements excite a consumer. A consumer does not pay attention to everything he sees. He is interested in only what he wants to see. Such behaviour is called **selective attention**.
- **Consumer interpretation** refers to how an individual perceives a particular message.
- A consumer would certainly buy something which appeals him the most. He would remember the most relevant and meaningful message also called as **selective retention**. He would obviously not remember something which has nothing to do with his need.

2.4.1-Consumer Equilibrium

Consumers make choices about the quantity of goods and services to consume, it is presumed that their objective is to **maximize total utility.** In maximizing total utility, the consumer faces a number of **constraints**, the most important of which are the consumer's *income* and the *prices* of the goods and services that the consumer wishes to consume. The consumer's effort to maximize total utility, subject to these constraints, is referred to as the **consumer's problem.** The solution to the consumer's problem, which entails decisions about how much the consumer will consume of a number of goods and services, is referred to as **consumer equilibrium.**

2.4.2-Determination of consumer equilibrium.

Consider the simple case of a consumer who cares about consuming only two goods: good 1 and good 2. This consumer knows the prices of goods 1 and 2 and has a fixed income or budget that can be used to purchase quantities of goods 1 and 2. The consumer will purchase quantities of goods 1 and 2 so as to completely exhaust the budget for such purchases. The actual quantities purchased of each good are determined by the condition for consumer equilibrium, which is

$$\frac{\text{marginal utility of good 1}}{\text{price of good 1}} = \frac{\text{marginal utility of good 2}}{\text{price of good 2}} = \cdots = \frac{\text{marginal utility of good } N}{\text{price of good } N}$$

This condition states that the marginal utility per dollar spent on good 1 must equal the marginal utility per dollar spent on good 2. If, for example, the marginal utility per dollar spent on good 1 were higher than the marginal utility per dollar spent on good 2, then it would make sense for the consumer to purchase more of good 1 rather than purchasing any more of good 2. After purchasing more and more of good 1, the marginal utility of good 1 will eventually fall due to the law of diminishing marginal utility, so that the marginal utility per dollar spent on good 1 will eventually equal that of good 2. Of course, the amount purchased of goods 1 and 2 cannot be limitless and will depend not only on the marginal utilities per dollar spent, but also on the consumer's budget.

An example. To illustrate how the consumer equilibrium condition determines the *quantity* of goods 1 and 2 that the consumer demands, suppose that the price of good 1 is $2 per unit and the price of good 2 is $1 per unit. Suppose also that the consumer has a budget of $5. The marginal utility (*MU*) that the consumer receives from consuming 1 to 4 units of goods 1 and 2 is reported in Table .

Here, marginal utility is measured in fictional units called *utils*, which serve to quantify the consumer's additional utility or satisfaction from consuming different quantities of goods 1 and 2. The larger the number of utils, the greater is the consumer's marginal utility from consuming that unit of the good. Table also reports the ratio of the consumer's marginal utility to the price of each good. For example, the consumer receives 24 utils from consuming the first unit of good 1, and the price of good 1 is $2. Hence, the ratio of the marginal utility of the first unit of good 1 to the price of good 1 is 12.

TABLE 1 Illustration of Consumer Equilibrium. Price of good 1 = $2, Price of good 2 = $1, Budget = $5

Units of good 1	*MU* of good 1	*MU*/price of good 1	Units of good 2	*MU* of good 2	*MU*/price of good 2
1	24	12	1	9	9
2	18	9	2	8	8
3	12	6	3	5	5
4	6	3	4	1	1

The consumer equilibrium is found by comparing the marginal utility per dollar spent (the ratio of the marginal utility to the price of a good) for goods 1 and 2, subject to the constraint that the consumer does not exceed her budget of $5. The marginal utility per dollar spent on the first unit of good 1 is greater than the marginal utility per dollar spent on the first unit of good 2(12 utils > 9 utils). Because the price of good 1 is $2 per unit, the consumer can afford to purchase this first unit of good 1, and so she does. She now has $5 − $2 = $3 remaining in her budget. The consumer's next step is to compare the marginal utility per dollar spent on the *second* unit of good 1 with marginal utility per dollar spent on the *first* unit of good 2. Because these ratios are both equal to 9 utils, the consumer is *indifferent* between purchasing the second unit of good 1 and first unit of good 2, so she purchases both. She can afford to do so because the second unit of good 1 costs $2 and the first unit of good 2 costs $1, for a total of $3. At this point, the consumer has exhausted her budget of $5 and has arrived at the consumer equilibrium, where the marginal utilities per dollar spent are equal. The consumer's equilibrium choice is to purchase 2 units of good 1 and 1 unit of good 2.

The condition for consumer equilibrium can be extended to the more realistic case where the consumer must choose how much to consume of many different goods. When there are $N > 2$ goods to choose from, the consumer equilibrium condition is to equate all of the marginal utilities per dollar spent, subject to the constraint that the consumer's purchases do not exceed her budget.

$$\frac{\text{marginal utility of good 1}}{\text{price of good 1}} = \frac{\text{marginal utility of good 2}}{\text{price of good 2}} = \cdots = \frac{\text{marginal utility of good } N}{\text{price of good } N}$$

2.4.3-Approaches to Consumer Behaviour

The most popular approaches to consumer behaviour can be divided into cognitive, behaviourist and psychodynamic categories. Cognitive approach to consumer behaviour focuses on information processing capabilities of consumers (Schmitt, 2003). Specifically, according to ***cognitive approach*** environment and social experiences provide individuals with abundant information to be processed, and the outcome of information processing results in individuals behaving in certain ways as consumers.

For example, individuals may receive information about forecasted economic downturn in a national level and this information can serve as a stimulus to behave in certain manners. Specifically, according to cognitive approach although the forecasted economic downturn has not happened yet, nevertheless consumers may reduce levels of their spending budgets as a response to the stimulus.

Behaviourist approach to consumer behaviour, on the other hand, is associated with the impact of external events. Lantos (2010) link this approach to infamous experiments of Russian scientist Ivan Pavlov and these experiments involved developing certain behavioural patterns via external factors. Practical implementation of this approach in the field of marketing can be observed in relation to Nescafe products. Specifically, integrated marketing strategy of Nescafe attempts to foster a specific pattern of behaviour amongst target customer segment whereby consumption of a cup of Nescafe coffee has to be the first thing to do in the morning.

psychodynamic approach "includes all theories in psychology that see human functioning based upon the interaction of drivers and forces within the person, particularly unconscious, and between the different structures of the personality" (McLeod, 2007, online).

Within the boundaries of consumer behaviour in particular, psychodynamic approach relates to behavioural approach to a certain extent, however, the former approach covers greater scope compared to the latter.

Moreover, consumer behaviour can be categorised on the basis of the nature of purchase. East et al. (2013) divide type of purchases into two categories: routine and impulse. There are some differences in marketing techniques applied to affect consumer behaviour in relation to these two alternative purchase patterns.

Routine purchases relate to products and services consumed regularly with varied frequency according to their nature. For example, consumption of grocery products, as well as, transportation and hairdressing services belong to routine purchases. Specific consumer behaviour traits related to routine purchases are marked with very little time spent on decision-making and high levels of customer loyalty. Sales promotions, discounts and coupons are the most popular marketing techniques employed in relation to products and services purchased in a routine manner.

Impulse purchases, on the other hand, relate to purchases that were not pre-planned. Effective appeal to customer wants at psychological levels and effective point of sales displays play an important role in terms of triggering impulse purchases. However, in certain instances an impulse purchase of a product or service may result in the same product or service to be purchased in a routine manner.

2.5 -Production

The processes and methods used to transform tangible inputs (raw materials, semi-finished goods, subassemblies) and intangible inputs (ideas, information, knowledge) into goods or services. Resources are used in this process to create an output that is suitable for use or has exchange value.
According to Bates and Parkinson:

"Production is the organised activity of transforming resources into finished products in the form of goods and services; the objective of production is to satisfy the demand for such transformed resources".

According to J. R. Hicks:

"Production is any activity directed to the satisfaction of other peoples' wants through exchange". This definition makes it clear that, in economics, we do not treat the mere making of things as production. What is made must be designed to satisfy wants.

2.5.1-Short-run and Long-run production function

Production function classified into two:

1. Short-run production function which is studied through Law of Variable Proportions

2. Long-run production function which is explained by Returns to Scale

Short-run production function - The law of variable proportion

The law examines the relationship between one variable factor and output, keeping the quantities of other factors fixed.

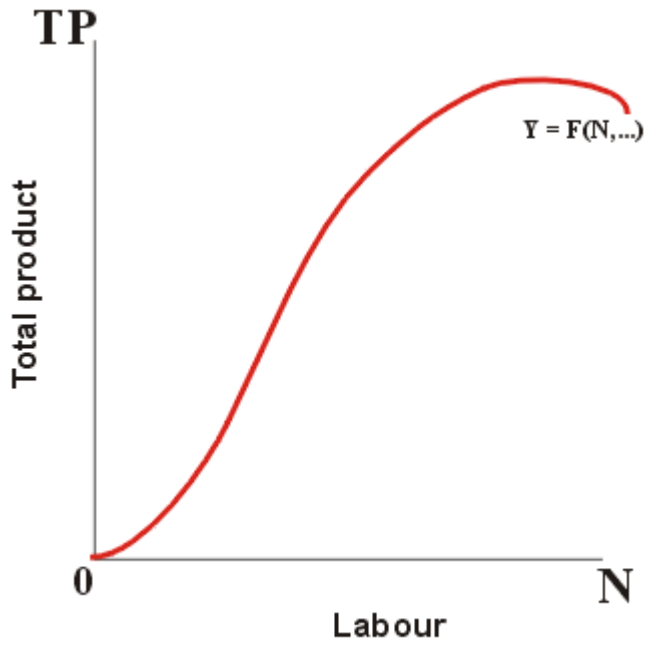
As the proportion of one factor in a combination of factors is increased, after a point, first the marginal and then the average product of that factor will diminish.

Assumptions of the law

The law is based on the following assumption

1. Only one factor is made variable and other factors are kept constant.
2. This law does not apply in case all factors are proportionately varied. i.e. where the factors must be used in rigidly fixed proportions to yield a product.
3. The variable factor units are homogenous i.e. all the units of variable factors are of equal efficiency.
4. Input prices remain unchanged
5. The state of technology does not change or remains the same at a given point of time.
6. The entire operation is only for short-run, as in the long-run all inputs are variable.

The short-run production function diagram



A production function shows the relationship between the quantity of inputs and the maximum output that can be produced with these inputs within a given time period using a given technology.

The short run is defined as the period during which at least one of the inputs is fixed. According to the following short-run production function, labour is the only variable input while the rest of the inputs are regarded as fixed.

Y = F(N,...)

As more labour is employed the total product (TP or Y) increases until a maximum is reached and then it begins to decline.

Three ranges can be distinguished:

- a range where the total product increases at an increasing rate;
- a range where the total product increases at a diminishing rate;
- a range where total product is unchanged and then begins to decline.

(more)

Three stages of law

The behaviour of the output when the varying quantity of one factor is combined with a fixed quantity of the other can be divided into three stages. They are

1. Increasing returns stage.
2. Decreasing returns stage.
3. Negative returns stage

Stage I: Stage of increasing returns

Stage I ends where the average product reaches its highest (maximum) point. During this stage, the total product, the average product and the marginal product are increasing. It is notable that the marginal product in this stage increases but in a later part it starts declining. Though marginal product starts declining, it is greater than the average product so that the average product continues to rise.

Stage II: Stage of decreasing returns

Stage II ends at the point where the marginal product is zero. In the second stage, the total product continues to increase but at a diminishing rate. The marginal product and the average product are declining but are positive. At the end of the second stage, the total product is maximum and the marginal product is zero.

Stage III: Stage of negative returns

In this stage the marginal product becomes negative. The total product and the average product are declining.

The stage of Operation

In stage I the fixed factor is too much in relation to the variable factor. Therefore in stage I, marginal product of the fixed factor is negative. On the other hand, in stage III the marginal product of the variable factor is negative. Therefore a rational producer will not choose to produce in stages I and III. He will choose only the second stage to produce where the marginal product of both the fixed factor and variable factor are positive. At this stage the total product is maximum. The particular point at which the producer will decide to produce in this stage depends upon the prices of factors. The stage II represents the range of rational production decisions.

2.5.2-Long-run production function - Returns to Scale

In the long run, all factors can be changed. Returns to scale studies the changes in output when all factors or inputs are changed. An increase in scale means that all inputs or factors are increased in the same proportion.

Three phases of returns to scale

The changes in output as a result of changes in the scale can be studied in 3 phases. They are

1. Increasing returns to scale
2. Constant returns to scale
3. Decreasing returns to scale

Increasing returns to scale

If the increase in all factors leads to a more than proportionate increase in output, it is called increasing returns to scale. For example, if all the inputs are increased by 5%, the output increases by more than 5% i.e. by 10%. In this case the marginal product will be rising.

Constant returns to scale

If we increase all the factors (i.e. scale) in a given proportion, the output will increase in the same proportion i.e. a 5% increase in all the factors will result in an equal proportion of 5% increase in the output. Here the marginal product is constant.

Decreasing returns to scale

If the increase in all factors leads to a less than proportionate increase in output, it is called decreasing returns to scale i.e. if all the factors are increased by 5%, the output will increase by less than 5% i.e. by 3%. In this phase marginal product will be decreasing.

Figure explains the different phases of returns to scale. When marginal product increases (AB), total product increases at an increasing rate. So there is increasing returns to scale. When Marginal Product remains constant (BC), Total Product increases at a constant rate and this stage is called constant returns to scale. When Marginal Product decreases (CMP), Total Product increases at a decreasing rate and it is called decreasing returns to scale.

Long-Run Production Function (With Diagram)

Production in the short run in which the functional relationship between input and output is explained assuming labor to be the only variable input, keeping capital constant.

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.

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 work 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.

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.

Following are the 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.

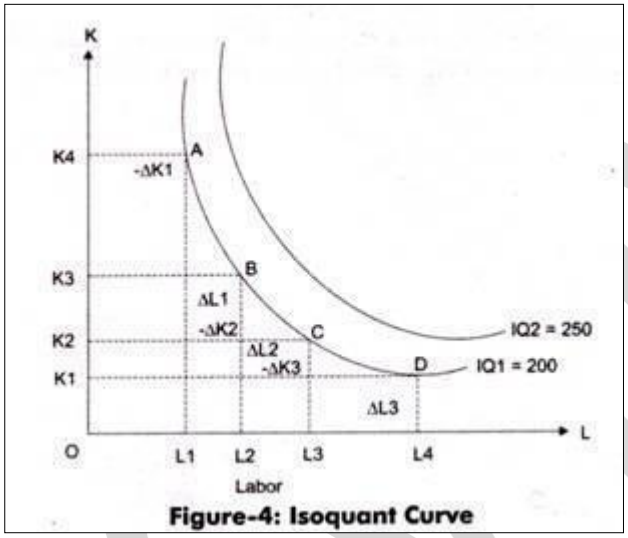


Figure-4: Isoquant Curve

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

Table-4: Relationship between Input and Output in Isoquant Curve

Points	Input combinations			Output
	K	+	L	
A	OK4	+	OL1	200
B	OK3	+	OL2	200
C	OK2	+	OL3	200
D	OK1	+	OL4	200

Isoquant Curve

In Figure-4, IQ1 is the output for four combinations of capital and labor. Figure-4 shows that all along the curve for IQ1 the quantity of output is same that is 200 with the changing combinations of capital and labor. The four combinations on the IQ1 curve are represented by points A, B, C, and D.

Table-4 shows the relationship between input and output for IQ1 curve:

Relationship between Input and Output in Isoquant Curve

In Table-4, as we move from A to D, capital starts decreasing with the increase in labour. This shows that capital is substituted by labor, while keeping the output unaffected.

As discussed earlier, isoquant curve is almost similar to indifference curve. The properties of isoquant curve can be explained in terms of input and output.

Some of the properties of the isoquant curve are as follows:

i. Negative Slope:

Implies that the slope of isoquant curve is negative. This is because when capital (K) is increased, the quantity of labor (L) is reduced or vice versa, to keep the same level of output. As shown in Table-4, when the quantity of labor is increased from one unit to two units, the quantity of capital is decreased from four to three, to keep the level of output constant, which is 200.

ii. Convex to Origin:

Shows the substitution of inputs and diminishing marginal rate of technical substitution (which is discussed later) in economic region. This implies that marginal significance of one input (capital) in terms of another input (labor) diminishes along with the isoquant curve. For example, in Table-4, it can be seen when more and more units of capital are used to produce 200 units of output, less or less units of labor are used.

iii. Non-intersecting and Non-tangential:

Implies that two isoquant curves (as shown in Figure-4) cannot cut each other.

Figure-5 shows the intersection of two isoquant curves:

Intersecting Isoquant Curves. In Figure-5, the two isoquant curves intersect at point A. The point B on isoquant having Q2 = 300 and point C on isoquant curve having Q1 = 200 with the same amount of labor that is OL2. However, the capital is different that is BL2 in case of point B and CL2 in case of point C. A is the common point of isoquant for B and C points.

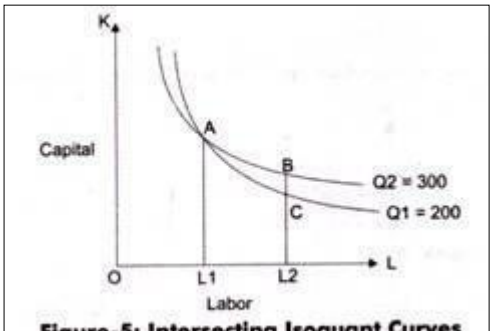


Figure-5: Intersecting Isoquant Curves

Now, according to isoquant definition, the output produced at A is the same as produced on B and C points. On isoquant curve Q1, the output produced at A and C is 200 while on Q2 curve the output priced at A and B is 300.

To make the input at point B and C equal, the following formula is used:

OL2 + BL2 = OL2 + CL2

BL2 = CL2

However according to Figure-5, BL2 > CL2 but the intersection of two isoquants implies that BL2 and CL2 are equal with respect to their output, which is not possible. Therefore, it is stated that isoquant curves cannot intersect; otherwise the law of production would not be applicable.

iv. Upper isoquant have high output:

Implies that upper curve of the isoquant curve produces more output than the curve beneath. This is because of the larger combination of input result in a larger output as compared to the curve that s beneath it. For example, in Figure-5 the value of capital at point B is greater than the capital at point C. Therefore, the output of curve Q2 is greater than the output of Q1.

Marginal Rate of Technical Substitution:

Marginal Rate of Technical Substitution (MRTS) is the quantity of one input (capital) that is reduced to increase the quantity of the other input (L), so that the output remains constant.

Table-5 shows the marginal rate of technical substitution:

Table-5: MRTS of L for K

Combination	Input L	Input K	Output	MRTS of L for K
P	1	15	150	
Q	2	11	150	4:1
R	3	8	150	3:1
S	4	6	150	2:1
T	5	5	150	1:1

Table-5 shows that how much labor is required to replace one unit of capital while keeping the output same for all combinations of capital and labor, which is 150.

In such a case, MRTS can be calculated with the help of the following formula:

MRTS = ΔK/ΔL

Where, ΔK = Change in Capital

ΔL= Change in Labor

For example, in Table-5 at point Q MRTS can be calculated as follows:

ΔK = new capital – old capital

ΔK= 15 – 11

ΔK = 4

ΔL = 2 – 1

ΔL= 1

Therefore, MRTS at point Q would be:

MRTS = ΔK/ΔL

MRTS = 4/1 or 4:1

Similarly, we can calculate MRTS at different points, which are R, S, and T.

Figure-6 shows the curve of MRTS:

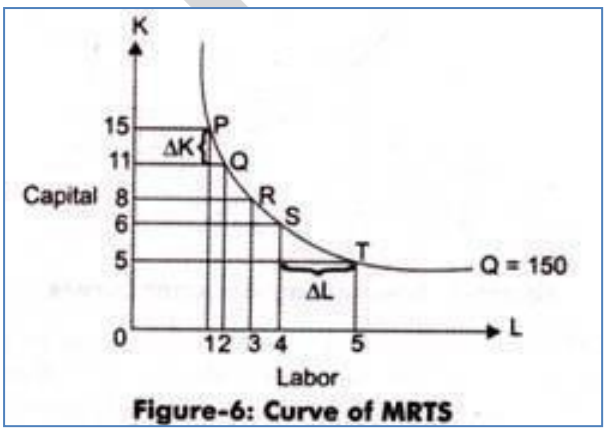


Figure-6: Curve of MRTS

Forms of Isoquants:

The shape of an isoquant depends on the degree to which one input can be substituted by the other. Convex isoquant represents that there is a continuous substitution of one input variable by the other input variable at a diminishing rate.

However, in economics, there are other forms of isoquants, which are as follows:

i. Linear Isoquant:

Refers to a straight line isoquant. Linear isoquant represents a perfect substitutability between the inputs, capital and labor, of the production function. It implies that a product can be produced by using either capital or labor or using both, if capital and labor are perfect substitutes of each other. Therefore, in a linear isoquant, MRTS between inputs remains constant.

The algebraic form of production function in case of linear isoquant is as follows:

$Q = aK + BL$

Here, Q is the weighted sum of K and L.

Slope of curve can be calculated with the help of following formula:

$MPK = \Delta Q/\Delta K = a$

$MPL = \Delta Q/\Delta L = b$

$MRTS = MPL/MPK$

$MRTS = -b/a$

However, linear isoquant does not have existence in the real world.

Figure-7 shows a linear isoquant:

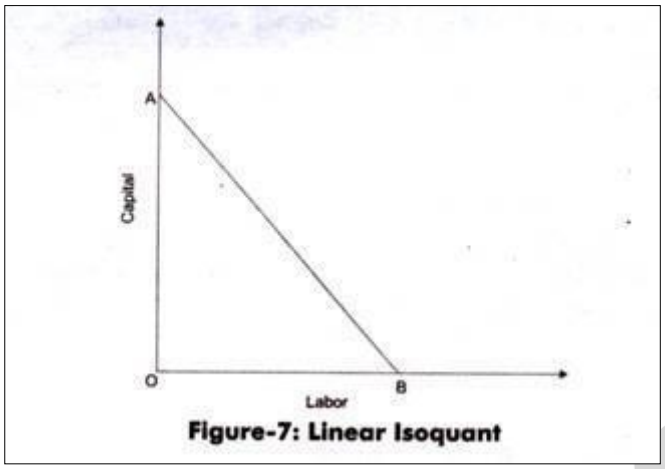


Figure-7: Linear Isoquant

Linear Isoquant

ii. L-shaped Isoquant:

Refers to an isoquant in which the combination between capital and labor are in a fixed proportion. The graphical representation of fixed factor proportion isoquant is L in shape. The L-shaped isoquant represents that there is no substitution between labor and capital and they are assumed to be complementary goods.

It represents that only one combination of labor and capital is possible to produce a product with affixed proportion of inputs. For increasing the production, an organization needs to increase both inputs proportionately.

Figure-8 shows an L-shaped isoquant:

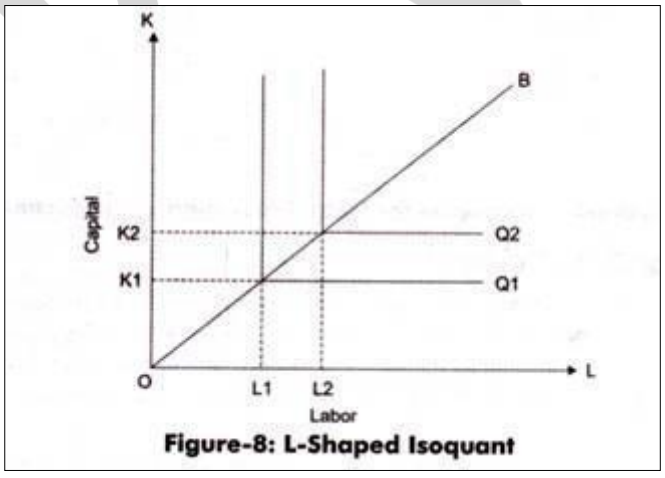


Figure-8: L-Shaped Isoquant

L-Shaped Isoquant

In Figure-8, it can be seen OK1 units of capital and OL1 units of labor are required for the production of Q1. On the other hand, to increase the production from Q1 to Q2, an organization needs to increase inputs from K1 to K2 and L1 to L2 both.

This relationship between capital and labor can be expressed as follows:

Q = f (K, L) = min (aK, bL)

Where, min = Q equals to lower of the two terms, aK and bL

For example, in case aK > bL, then Q = bL and in case aK < bL then, Q = aK.

L-shaped isoquant is applied in many production activities and techniques where labor and capital is in fixed proportion. For example, in the process of driving a car, only one machine and one labor is required, which is a fixed combination.

iii. Kinked Isoquant:

Refers to an isoquant that represents different combinations of labor and capital. These combinations can be used in different processes of production, but in fixed proportion. According to L-shaped isoquant, there would be only one combination between capital and labor in a fixed proportion. However, in real life, there can be several ways to perform production with different combinations of capital and labor.

For example, there are two machines in which one is large in size and can perform all the processes involved in production, while the other machine is small in size and can perform only one function of production process. In both the machines, combination of capital employed and labor used is different.

Let us understand kinked isoquant with the help of another example. For example, to produce 100 units of product X, an organization has used four different techniques of production with fixed-factor proportion.

The combination between inputs and their ratio is provided in Table-6:

Table-6: Production Techniques Used for Producing Product X

S. No.	Technique	Capital	+	Labor	Capital/labor
1	OA	10	+	2	10:2
2	OB	6	+	3	6:3
3	OC	4	+	6	4:6
4	OD	3	+	10	3:10

Production Technique Used for Producing Product X

In Table-6, OA, OB, OC, and OD represents the four production techniques. The fixed capital-labor ratio for OA technique is 10:2, for OB it is 6:3, for OC 4:6, and for OD is 3:10. Therefore, different production techniques use different fixed combinations of capital and labor.

The graphical representation of kinked isoquant is shown in Figure-9:

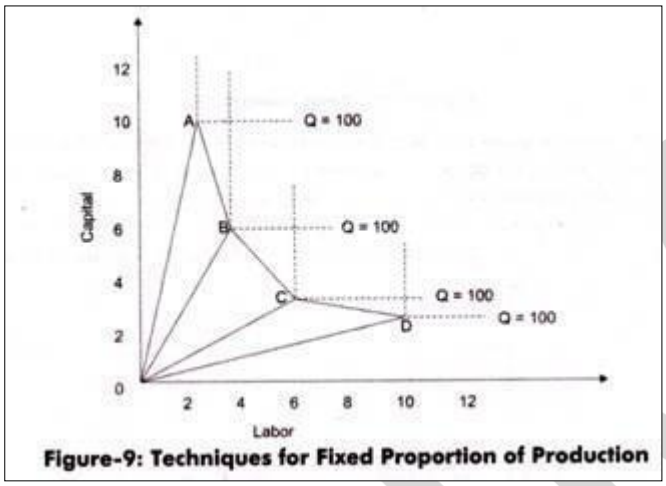


Figure-9: Techniques for Fixed Proportion of Production

2.5.3-Return to scale

In the long run all factors of production are variable. No factor is fixed. Accordingly, the scale of production can be changed by changing the quantity of all factors of production.

Definition: "The term returns to scale refers to the changes in output as all factors change by the same proportion." Koutsoyiannis

"Returns to scale relates to the behaviour of total output as all inputs are varied and is a long run concept". Leibhafsky

Returns to scale are of the following three types:

1. Increasing Returns to scale.

2. Constant Returns to Scale

3. Diminishing Returns to Scale

Explanation:

In the long run, output can be increased by increasing all factors in the same proportion. Generally, laws of returns to scale refer to an increase in output due to increase in all factors in the same proportion. Such an increase is called returns to scale.

Suppose, initially production function is as follows: P = f (L, K)

Now, if both the factors of production i.e., labour and capital are increased in same proportion i.e., x, product function will be rewritten as.

$$P_1 = f(xL, xK)$$

1. If P_1 increases in the same proportion as the increase in factors of production i.e., $\frac{P_1}{P} = x$, it will be constant returns to scale.

2. If P_1 increases less than proportionate increase in the factors of production *i.e.*, $\frac{P_1}{P} < x$, it will be diminishing returns to scale.

3. If P_1 increases more than proportionate increase in the factors of production, *i.e.*, $\frac{P_1}{P} > x$, it will be increasing returns to scale. Returns to scale can be shown with the help of table 8.

Table 8. Showing different stages of return to scale

Units of Labour	Units of capital	%age increase in Labour & Capital	Total Product	%age increase in TP	Returns to scale
1	3	–	10	–	
2	9	100%	30	200%	Increasing
3	9	50%	60	100%	
4	12	33%	80	33%	Constant
5	15	25%	100	25%	
6	18	20%	120	10%	Decreasing
7	21	16.6%	130	8.3%	

Table Showing Different Stages of Return to Scale

The above stated table explains the following three stages of returns to scale:

1. Increasing Returns to Scale:

Increasing returns to scale or diminishing cost refers to a situation when all factors of production are increased, output increases at a higher rate. It means if all inputs are doubled, output will also increase at the faster rate than double. Hence, it is said to be increasing returns to scale. This increase is due to many reasons like division external economies of scale. Increasing returns to scale can be illustrated with the help of a diagram 8.

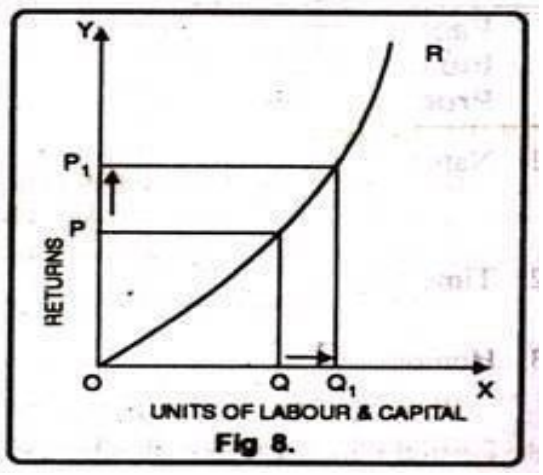


Fig 8.

In figure 8, OX axis represents increase in labour and capital while OY axis shows increase in output. When labour and capital increases from Q to Q1, output also increases from P to P1 which is higher than the factors of production i.e. labour and capital.

2. Diminishing Returns to Scale:

Diminishing returns or increasing costs refer to that production situation, where if all the factors of production are increased in a given proportion, output increases in a smaller proportion. It means, if inputs are doubled, output will be less than doubled. If 20 percent increase in labour and capital is followed by 10 percent increase in output, then it is an instance of diminishing returns to scale.

The main cause of the operation of diminishing returns to scale is that internal and external economies are less than internal and external diseconomies. It is clear from diagram 9.

In this diagram 9, diminishing returns to scale has been shown. On OX axis, labour and capital are given while on OY axis, output. When factors of production increase from Q to Q1 (more quantity) but as a result increase in output, i.e. P to P1 is less. We see that increase in factors of production is more and increase in production is comparatively less, thus diminishing returns to scale apply.

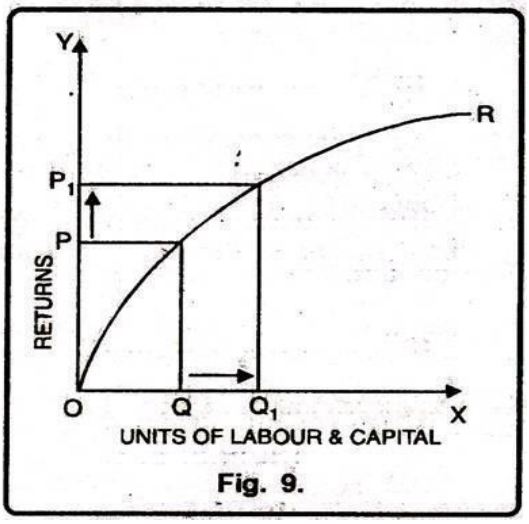


Fig. 9.

3. Constant Returns to Scale:

Constant returns to scale or constant cost refers to the production situation in which output increases exactly in the same proportion in which factors of production are increased. In simple terms, if factors of production are doubled output will also be doubled.

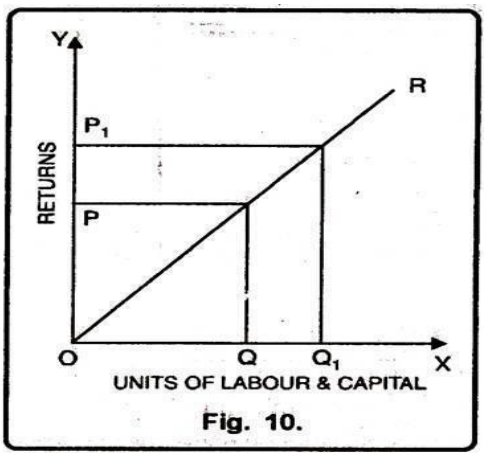


Fig. 10.

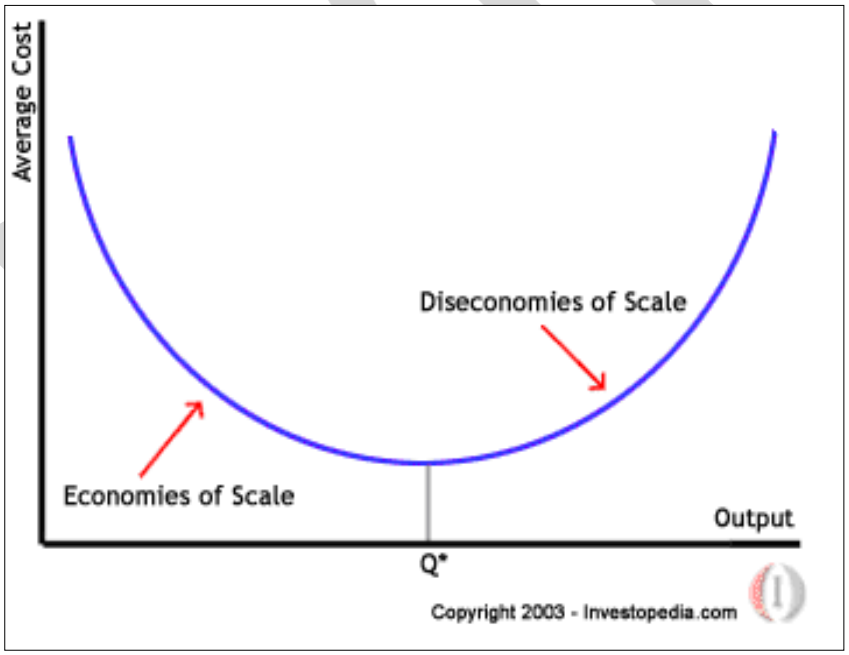
In this case internal and external economies are exactly equal to internal and external diseconomies. This situation arises when after reaching a certain level of production, economies of scale are balanced by diseconomies of scale. This is known as homogeneous production function. Cobb-Douglas linear homogenous production function is a good example of this kind. This is shown in diagram 10. In figure 10, we see that increase in factors of production i.e. labour and capital are equal to the proportion of output increase. Therefore, the result is constant returns to scale.

2.5.4-Economies and Diseconomies 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.



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.

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.

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.

2.6-Cost Analysis:

Concept of Cost of Production:

By ***"Cost of Production"*** is meant the total sum of money required for the production of a specific quantity of output. In the word of **Gulhrie and Wallace.** Continue reading.

Concepts of Economic Costs:

The cost of production from the point of view of an individual firm is split up into the following parts.

2.6.1-Short Run Cost of Production:

Short run is a period of time over which at least one factor must remain fixed. For most of the firms, the fixed resource or factors which cannot be increased to meet the rising demand of the good is capital i.e., plant and machinery.

Average Cost:

The entrepreneurs are no doubt interested in the total costs but they are equally concerned in knowing the cost per unit of the product.

Short Run and Long Run Average Cost Curves:

In the short run, the shape of the average total cost curve (ATC) is U-shaped. The, ***short run average cost curve*** falls in the beginning, reaches a minimum and then begins to rise.

Marginal Cost:

Marginal Cost is an increase in total cost that results from a one unit increase in output. It is defined as "the cost that results from a one unit change in the production rate".

In economics, "short run" and "long run" are not broadly defined as a rest of time. Rather, they are unique to each firm.

Long Run Costs

Long run costs are accumulated when firms change production levels over time in response to expected economic profits or losses. In the long run there are no fixed factors of production. The land, labor, capital goods, and entrepreneurship all vary to reach the the long run cost of producing a good or service. The long run is a planning and implementation stage for producers. They analyze the current and projected state of the market in order to make production decisions. Efficient long run costs are sustained when the combination of outputs that a firm produces results in the desired quantity of the goods at the lowest possible cost. Examples of long run decisions that impact a firm's costs include changing the quantity of production, decreasing or expanding a company, and entering or leaving a market.

Short Run Costs

Short run costs are accumulated in real time throughout the production process. Fixed costs have no impact of short run costs, only variable costs and revenues affect the short run production. Variable costs change with the output. Examples of variable costs include employee wages and costs of raw materials. The short run costs increase or decrease based on variable cost as well as the rate of production. If a firm manages its short run costs well over time, it will be more likely to succeed in reaching the desired long run costs and goals.

2.6.2-Long run and short run cost functions

In the **long run**, the firm can vary all its inputs. In the **short run**, some of these inputs are fixed. Since the firm is constrained in the short run, and not constrained in the long run, the long run cost TC(y) of producing any given output y is no greater than the short run cost STC(y) of producing that output:

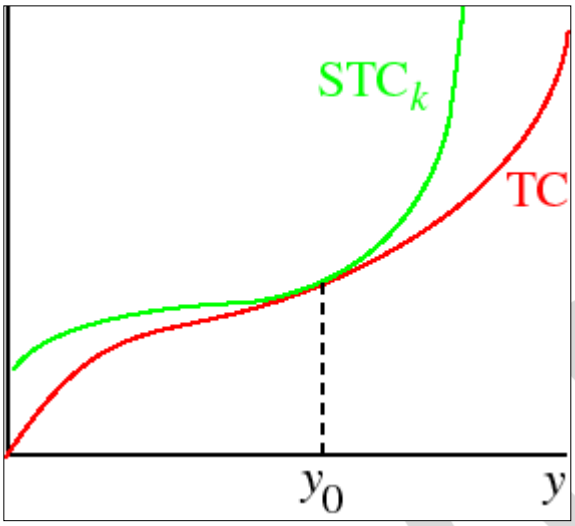
$TC(y) \leq STC(y)$ for all y.

Now consider the case in which in the short run exactly *one* of the firm's inputs is fixed. For concreteness, suppose that the firm uses two inputs, and the amount of input 2 is fixed at k. For many (but not all) production functions, there is *some* level of output, say y_0, such that the firm would *choose* to use k units of input 2 to produce y_0, even if it were free to choose any amount it wanted. In such a case, for this level of output the short run total cost when the firm is constrained to use k units of input 2 is equal to the long run total cost: $STC_k(y_0) = TC(y_0)$. We generally assume that for any level at which input 2 is fixed, there is some level of output for which that amount of input 2 is appropriate, so that for any value of k,

$TC(y) = STC_k(y)$ for some y.

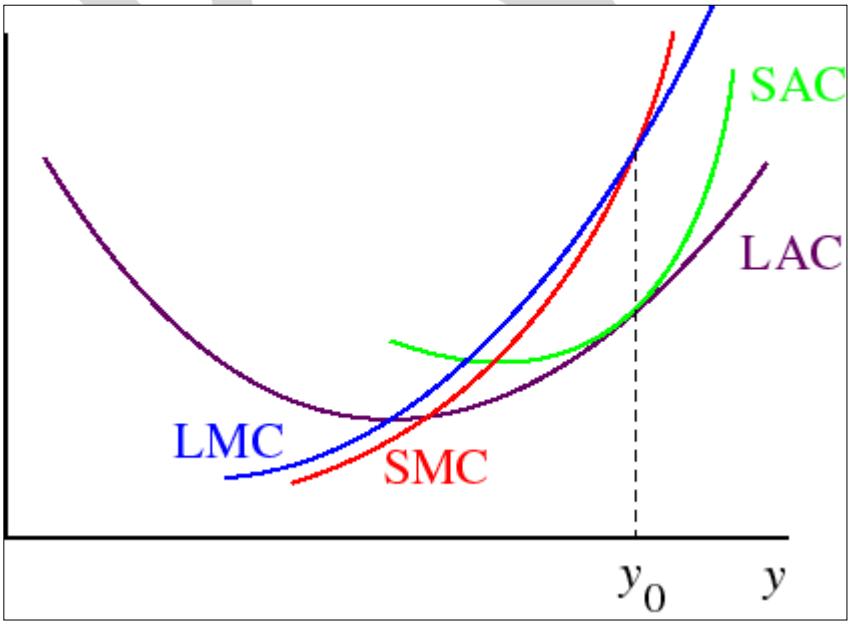
(There are production functions for which this relation is not true, however: see the example of a production function in which the inputs are perfect substitutes.)

For a total cost function with the typical shape, the following figure shows the relations between STC and TC.



Long run and short run average cost functions

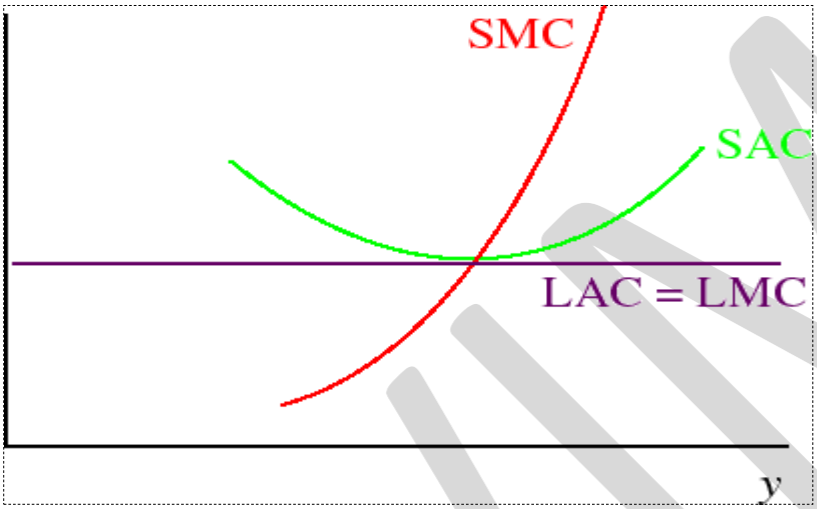
Given the relation between the short and long run total costs, the short and long run average and marginal cost functions have the forms shown in the following figure.



Note:

- The SMC goes through the minimum of the SAC and the LMC goes through the minimum of the LAC.
- When SAC = LAC we must have SMC = LMC (since slopes of total cost functions are the same there).

In the case that the production function has CRTS, the LAC is horizontal, as in the following figure.



Differences

The main difference between long run and short run costs is that there are no fixed factors in the long run; there are both fixed and variable factors in the short run . In the long run the general price level, contractual wages, and expectations adjust fully to the state of the economy. In the short run these variables do not always adjust due to the condensed time period. In order to be successful a firm must set realistic long run cost expectations. How the short run costs are handled determines whether the firm will meet its future production and financial goals.

2.6.3-Production and Production Costs

- How do firms decide what to produce and how much to produce?
- What factors constitute a firms costs?
- How do firms determine what price(s) to charge
- What determines a firm's profit?

- What determines the shape and the position of a (firms) supply curve?

Business Firm

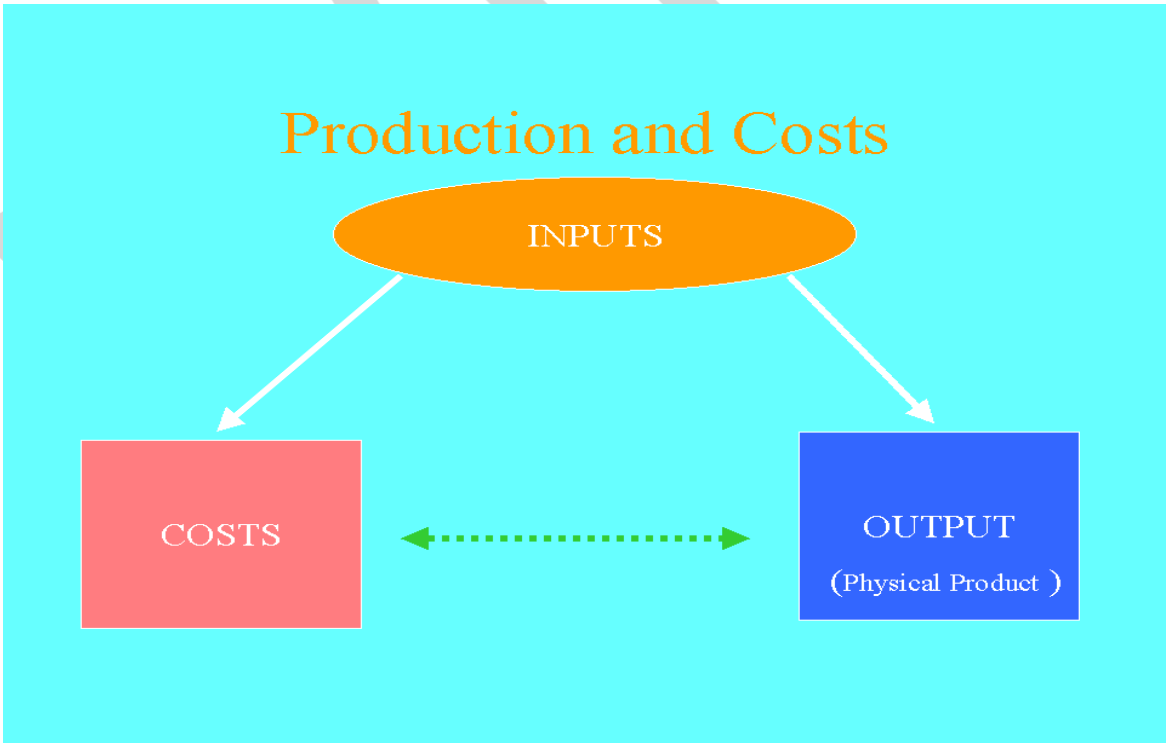
A business firm is an economic unit engaged in the production of one of more economic goods or services.

Applying the technology available to it, a business firm combines economic resources (factors of production) to produce one or more goods for the purpose of making profits.
A business firm buys economic resources (inputs) and sells the goods it produces (outputs).

Production and Costs

To produce a good or a service a firm needs economic resources or *factors* of production. In economics, the factors of production used by a firm in the production of a good or a service are generally referred to as ***inputs.*** What a firm produces is called ***output***. A firm has to pay for the inputs it needs. Therefore, inputs, on the one hand, generate ***costs*** and, on the other hand, generate ***output.***

We first study the relationship between inputs and the output; that is "production function". Then we look at the relationship between the *output* and *costs;* that is cost function.



Note: Studying the relationship between costs and inputs without regard to the output produced from the inputs is not useful. That is why we study the relationship between costs and output.

Inputs: Factors of Production

Factors of production:

The primary factors of production are land and labor. Capital is another important factor of production. In economics we distinguish between physical capital and financial capital. Physical capital: tools, machinery, equipment, buildings Note: Non-physical assets such as copy rights and patent rights are functionally similar to physical capital.

Financial capital: Financial assets representing physical capital (stocks) or used to acquire physical capital are financial capital.

In addition to land, labor and capital businesses often use intermediate goods (raw materials and supplies) in the production process. Entrepreneurial Services: In market economies the function of entrepreneurs is also very important. The function of an entrepreneur is to acquire and combine all the needed factors of production to produce a good. An entrepreneur takes chances (risks) in the hope of making profits.

Cost of production is simply the sum of the costs of all inputs used in production.

Production Costs = Costs of Inputs

Production in the Short Run versus Production in the Long Run

In the theory of the firm the distinction between short run and long run is *not* necessarily based on the length of time. It is rather based on the degree of the variability of inputs.

In the short run at least one of the factors of production remains unchanged (fixed). In the long run all factors of production are variable. In a two-input production process, in the short run, only one input is variable.

In a two-input production model, in the short run, the changes in the output (physical product) are the result of changes in the variable input.

Production in the Long Run

In the long run all inputs used in the production process by the firm are variable. In a two-input production model, in the long run, both inputs (say, capital and labor) are variable.

In the long run the level of the output of a firm can change as a result of changes in any or all inputs.

A Short-Run Production (Function) Analysis

Our model:

A firm using two inputs:

Capital (K); Fixed Input

Labor (L); Variable input

We examine the relationship between the variable input (labor) and the output. We examine how changes in labor (the variable input) affect the out put.

Output Measures

i. **Total (Physical) Product (output), TPP**: The total amount of output produced by the firm over a certain period
ii. **Average (Physical) Product (of the variable input), APP**: Total (Physical) Product divided by the number units of the variable input
iii. **Marginal (Physical) Product (of the variable input), MPP**: The change in total product resulting from employing one additional unit of the variable input

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