LECTURE

NOTESON

MANAGERIAL ECONOMICS

1st SEMESTER

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MODULE - I

Introduction to Managerial Economics

What is Economics?

The science of economics is concerned with the allocation of resources to alternative uses so as to achieve maximum possible satisfaction of the people.

To Adam Smith "Economics is a science of wealth"

To Marshall "Economics is a science of material welfare"

To Robbins "Economics is a science of scarcity"

"Economics is the study of the behaviour of human beings in producing, distributing and consuming material goods and services in a world of scare resources"

Why we Studying Economics?

Economics is the study of how societies use scare resources to produce valuable commodities and distribute them among different people. Behind this definition are two key ideas in economics: those goods are scare and that society must use its resources eff iciently. Indeed, economics is an important subject because of the fact of scarcity and the desire for efficiency.

But no society has reached a utopia of limitless possibilities. Ours is a world of scarcity, full of economic goods. A situation of **scarcity** is one in which goods are limited relative to desires.

Efficiency denotes the most effective use of a society's resources in satisfying people's wants and needs.

The essence of economics is to acknowledge the reality of scarcity and then figure out how to organize societies in a way which produces the most efficient use of resources. That is where economics makes its unique contribution.

So, economics is the study of behaviour of individual in production, consumption and distribution in the world of scare resources at individual level (micro) as well as at aggregate level (macro). The ultimate goal of economic science is to improve the living conditions of people in their everyday lives.

What is Management?

To Koontz and O'Donell, "management as the creation and maintenance of an internal environment in an enterprise where individuals, working together in groups, can perform efficiently and effectively towards the attainment of group goals."

"Management is the discipline of organizing and allocating a firm's scarce resources to achieve its desired objectives"

These two definitions clearly points, a close relationship between management and economics has led to the development of managerial economics.

What is Managerial Economics?

In simple terms, managerial economics is an application of that part of micro-economics and macroeconomics, which is directly related to decision making by a manager.

- To Mansfield, "Managerial economics is concerned with the application of economics concept and economics to the problems of formulating rational decision making"
- To Spencer and Seigelman, "Managerial economics is the integration of economic theory and practices for the purpose of facilitating decision making and forward planning by management"
- Managerial economics refers to the application of economic theory and methods of decision sciences to arrive at the optimal solution to the various decision-making problems faced by managers of business firms.

Difference between Managerial Economics and Economics

Managerial Economics	**Economics**
Managerial economics involves application of economic principles to the problem of the firm	Economics deals with the body of principles itself
Managerial economics deals with micro economics at large	Economics deals with both micro economics and macro economics
Managerial economics, though micro in character deals only with the firm and has nothing to do with an individuals economic problem	Micro economics as a branch of economics deals with both economics of the individual as well as economics of firm.
The scope of managerial economics is narrow in comparison to economics	The scope of economics is wider then managerial economics
Managerial economics adopts modifies and reformulates economic models to suit the specific conditions and serves the specific problem solving processes.	Economic theory hypothesizes economic Relationships and builds simplified economic models
Managerial economics introduces certain feedbacks such as objectives of the firm, environmental aspects and legal constraints.	Economic theory makes certain assumptions.

Scope of Managerial Economics

In general the scope of Managerial Economics comprehends all those economic concepts, theories and tools of analysis which can be used to analyze the business environment and to find solution to practical business problems. In other words Managerial Economics is the economics applied to the analysis of business problems and decision-making. Broadly speaking it is applied economics. The areas of business issues to which economic theories can be directly applied may be broadly divided into two categories A) Operational or internal issues and B) Environment or external issues.

(1) Demand Analysis and Forecasting: a business firm is an economic organism which transforms productive resources into goods that are to be sold in a market. A major part of managerial decision making depends on accurate estimates of demand. Before production schedules can be prepared and resources employed, a forecast future sales is essential. Demand analysis helps to identify the various factors influencing the demand for a firm's product and thus provides guidelines to manipulating demand. Demand analysis and forecasting therefore is essential for business planning and occupies a strategic place in managerial economics. It mainly consists of discovering the force determining sales and their measurement. The chief topic s covered are demand determinants, demand forecasting

(2) Cost Analysis: a study of economic costs, combined with the data drawn from the firms accounting records, can yield significant cost estimates that are useful for managerial decisions. The factors causing variations in costs must be recognized and allowed for if management is to arrive at cost estimates which are significant for planning purposes. The chief topics covered under cost concepts are: cost concept and classifications, cost -output relationships, economics and diseconomies of scale, and cost control and cost reduction.

(3) Production and Supply Analysis: production analysis is narrower in scope than cost analysis. Production analysis frequently proceeds in physical terms while cost analysis proceeds in monetary terms. Production analysis mainly deals with different production functions and their managerial uses. Supply analysis deals with various aspects of supply of a commodity. Certain important aspects of supply analysis are: supply schedule, curve and function, law of supply and its limitations. Elasticity of supply and factors influencing supply.

(4) Pricing Decisions, Policies and Practices: pricing is a very important area of managerial economics. In fact, price is the genesis of the revenue of a firm and as such the success of a business firm largely depends on the correctiveness of price decisions taken by it. The important aspects dealt with under this area are: price determination in various market forms, pricing methods, differential pricing, product line pricing and price forecasting.

(5) Profit Management: business firms are generally organized for the purpose of marking profit and, in the long-run; profits provide the chief measure of success. However, in a world of uncertainty, expectations are not always realized so that profit planning and measurement constitute the difficult area of managerial economics. The important aspects covered under this area are: nature and measurement of profit, profit policies and techniques of profit planning like break-even-analysis.

(6) Capital Management: the most complex problem is related to the firm's capital investment. Briefly capital management implies planning and control of capital expenditure. The main topics dealt with are: cost of capital, rate of return and selection of projects

Significance of Managerial Economics,

- It presents those aspects of traditional economics which are relevant for business decision - making in real life.
- It also incorporates useful ideas from other disciplines such as psychology, sociology etc.
- Managerial economics helps in reaching a variety of business decisions in a complicated environment.
- Managerial Economics makes a manager a more competent model builder.
- Managerial Economics serves as an integrating agent by coordinating the different functional areas such as finance, marketing, HR, production and bringing to bear on the decisions of each department or specialist the implications pertaining to other functional areas.
- Managerial Economics takes cognizance of the interaction between the firms and society and accomplishes the key role of business as an agent in the attainment of social and economic welfare.

Relevance of economics for business decisions:

1. **Studies Business Environment:** Managerial economics properly analyze the external environment within which the business operates. These factors influence the working of the business and therefore should be considered while taking any decisions and framing policies. Managerial economic studies all factors like economic scenario, government policies, price trends, national income growth, etc.

2. **Production Scheduling:** Managerial economics manages and prepare schedules for all production activities of business. It estimates all future demands using various quantitative tools which helps in making production plans.

3. **Control Cost:** Controlling the cost is vital for achieving the desired profitability and growth. Managerial economics estimates the cost of all business activities and identify all those factors that cause variations in cost from time to time. It aims at minimizing the cost through optimum utilization of all resources.

4. **Set Prices:** Setting the right price is a very challenging task for every business organization. Managerial economics helps management in fixing the correct price by supplying all information regarding competitors pricing methods.

5. **Bring Coordination:** Managerial economics brings coordination and flexibility in all operations of the business. It supports effective decision making by providing all relevant data using economic theories and tools.

6. **Investment Analysis:** Managerial economics ensures that all business funds are allocated to profitable means. It properly analyzes the profitability of all investment avenues before investing any amount into it.

Role of Managerial Economist in Business decision making:

Managerial economist is a person who manages business efficiently using various economic theories and methodologies. He supports the management team in better decision making through his analytical skills and specialized techniques.

A Managerial Economist is also termed as an economic advisor or business economist. He is responsible for analyzing various internal and external environmental forces that influence the functioning of business organizations. Managerial economist makes several successful business forecasts and updates the management team regarding the economic trends from time to time.

Managerial Economist always remains in touch with all the latest economic developments and environmental changes for informing the management. He has an efficient role in earning reasonable profits on invested capital as it supplies all relevant information which helps in making proper plans and strategies. Managerial economist has three important roles in every business organization: Demand analysis and forecasting, capital management and profit management.

Studies Business Environment

The managerial economist is responsible for analyzing the environment in which business operates. Proper study of all external factors that affect the functioning of organization is must for proper functioning. He studies various factors like growth of national income, competition level, price trends, phase of the business cycle and economy and updates the management regarding it from time to time.

Analyses Operations of Business

He analyses the internal operation of business and helps management in making better decisions in regard to internal workings. Managerial economist through his analytical and forecasting skills provides advice to managers for formulating policies regarding internal operations of the business.

Demand Forecasting and Estimation

Proper estimation and forecasting of future trends helps the business in achieving desired profitability and growth. Managerial economist through proper study of all internal and external forces makes successful forecasting of future uncertainties or trends.

Production Planning

Managerial economist is responsible for scheduling all production activities of business. He evaluates the capital budgets of organizations and accordingly helps in deciding timing and locating of various actions.

Economic Intelligence

He provides economic intelligence services by communicating all economic information to management. Managerial economist keeps management always updated of all prevailing economic trends so that they can confidently talk in seminars and conferences.

Performing Investment Analysis

A managerial economist analyzes various investment avenues and chooses the most appropriate one. He studies and discovers new possible fields of business for earning better returns.

Focuses on Earning Reasonable Profit

He assists management in earning a reasonable rate of profit on capital employed in the business. Managerial economist monitors activities of organizations to check whether all operations are running efficiently as per the plans and policies.

Maintaining Better Relations

A managerial economist maintains better relations with all internal and external individuals connected with the business. It is his duty to develop a peaceful and cooperative environment within the organization and aims to reduce any opposition taking place.

Demand Analysis: - Demand & Demand Function,

Demand condition for a firm's product has profound influence on its financial decisions, HR decisions, and marketing and operation decisions. If the demand for a product is quite large, then it may cause a large number of firms producing a product which may ensure a high level of competition in the industry.

What is Demand?

Quantities of goods and services that people are ready to buy at various prices with in some given time period, other factors besides price remains constant. Conceptually, **demand means desire for a commodity backed by the ability and willingness to pay for it.**

Why people demand goods and services?

People demand goods because they satisfy they want of the people. The utility means the amount of satisfaction which an individual derives from consuming a commodity. It also defined as want satisfying power of a commodity.

Utility is a subjective entity resides in the mind of the consumer. Being it subjective it varies with different

persons derive different amount of utility from a given a good. People know it by introspection. Thus, in economics the concept of utility is ethically neutral.

Demand analysis and Management (Decision Making)

Objective of business firm may differ but the basic objective is to produce and sell the goods or services which is demanded by the customers. As necessity is the mother of invention, demand is the mother of production. If the demand for a particular product increases, then there is good prospect of business in future.

Demand analysis is a necessary informational input into the business decision process since, in a sense, demand fundamentally determines what is to be produced and at what price. Accordingly, business economists use demand analysis to discover the various factors determining the demand for a given product or service.

E.g. increasing demand for computers and mobile phone in India has enlarged the business prospect for both home countries and foreign countries. On the other hand declining demand for B&W TV is forcing the companies to switch over modern substitutes or to go out of business. So, every manager should have the knowledge regarding the following aspect of demand.

- Who will demand how much?
- At which price
- Time period over which the product is demanded
- Market is in which the commodity is demanded.

So, for a business decision both quantities demanded statement with specific price at a particular period in a particular market is relevant. e.g. the annual demand of Hero Honda Glamour in Bhubaneswar at an average price of Rs 65,000 and quantity is 20,000.

Factors Determining Demand

- **The Price of a Product**: it is one of the most important determinants. The price of a product and its quantity demand are inversely related. Law of demand states that quantity demand of a product states that quantity demand of a product increases when its price falls and decreases when its price increases other factor remains constant. These other factors are income of consumer, prices of substitute and complementary good, consumer taste preference etc.
- **Income of the People:** Purchasing powers of the consumer also determine the demand of the product. People with higher income spend larger amount on consumer goods then those with lower income. It means if income increases, consumption demand increases, if income falls, consumption decline at a lower proportion. But the impact of income on demand of the product differs according to the nature of product, i.e.

Essential Consumer Goods: it is otherwise called basic needs e.g. food grains, salts, fuel, cloth& housing. In this type of goods as income increases the quantity demand increases up to a certain limit after that the proportion of income in demand become slow or remain constant.

Inferior Goods: in case of inferior goods demand for these good decreases with increase in consumers income beyond a certain level e.g. millet is inferior than wheat and rice, bidi is inferior than cigarette, kerosene is inferior than cooking gas and so on.

Luxury and Prestige Goods: beyond a certain level of consumer's income, consumption enters in to the area of luxury goods. Producer of such item should consider the income changes in richer section of the society e.g. AC car, diamond jewellery.

- **Price of the Related Goods**: demand for a commodity is also affected by the demand in the price of related goods. These related good may be substitute goods or complementary goods.

Substitute Goods: if change in price of one commodity affect the demand of other commodity in the same direction, then both the commodity are substitute to each other. It shows that there is positive relationship between demand and price of two substitute product e.g. tea & coffee, alcohol & drugs.

Complementary Goods: when the use of two goods goes together so that their demand changes simultaneously is called complement goods. Its means if the demand of one commodity increases, the demand for its complement goods will decrease even if at lower price. There is inverse relationship between the demand for goods and price of its complement. e.g. petrol & car, ink & pen, butter & bread, milk & tea. An increase in the price of milk causes in the decreases of demand of tea other thing remain same.

- **Taste and Preferences of Consumer:** taste and preference generally depend on life-style, social customers, religious values attached to a commodity, habit of the people age & sex of the consumer etc. change in these factors change consumers taste & preference as a result demand for goods or commodity increases or decreases. E.g. following the change in fashion people switch their consumption pattern. The change in demand for various goods occur due to the change in fashion and also due to the pressure of advertisements by the manufacturers and sellers of different products.
- **Advertisement Expenditure:** it increases the demand for the product in four ways.

- Informing consumer about availability
- Superiority of the product
- Influencing consumers
- Setting new fashion

With increases in the advertisement sales volume increases.

- **Number of Consumer in the Market:** the greater the number of consumers of a good, the greater the market demand for it. Another cause for the growth of number of consumers is the growth of population in India the demand for many essential goods, especially food grains, has increased because of the increase in the population of the country.
- **Consumers Expectation:** consumers expectation regarding the future prices, income and supply position of goods etc play an important role in determining demand. If the consumer expects the high rise in price, the consumer current demand increases even at high price and vice -versa. Similarly, with expectation of increases in income or scarcity of product in future leads increases in quantity demand in current period.
- **Demonstration Effect:** some of the people purchase commodity not because of necessity but because their neighbours have bought these goods. It is otherwise called as *Band-Wagon effect*. These effects have positive effect on demand. On the contrary, when the commodities are commonly used rich class people decrease the consumption. Or there are also consumers who like to behave differently from the others. This is known as Snob effect and it has negative effect on demand.
- **Credit Facility:** availability of credit to the consumers from the sellers, banks, friends encourage the consumer to buy more. It mostly affects the demand of durable commodity. So, manager of durable commodity should provide easy instalment facilities to sell his product.
- **Distribution of National Income**: if the national income is equitably distributed, demand for necessity goods increases but demand for luxury goods decreases.

Law of demand:

The demand schedule shows the quantity of goods that a consumer would be willing and able to buy at specific prices under the existing circumstances. Some of the more important factors affecting demand are the price of the good, the price of related goods, tastes and preferences, income, and consumer expectations. Economists record demand on a demand schedule and plot it on a graph as a demand curve that is usually

downward sloping. The downward slope reflects the relationship between price and quantity demanded: as price decreases, quantity demanded increases. This behaviour of the consumer is governed by a law as the law of demand

The law of demand explains the behavior of consumers, either a single consumer/household or all the consumers collectively. The law of demand states that other things remaining the same (ceteris paribus), the quantity demanded of a commodity is inversely related to its price. In other words, as price falls, the consumers buy more. Or, the demand for a commodity falls when its price rises. Thus:

(1) The concept of demand generally refers to the quantity demanded at a given time, which may be a point of time, a day or a week.

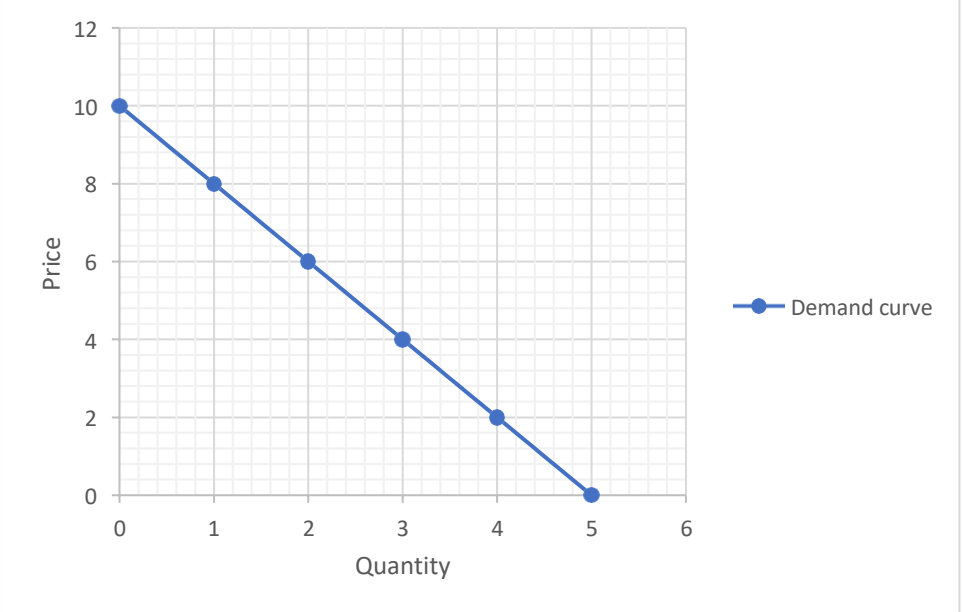
(2) The law of demand is based on the assumption that within the given time frame, there would be no change in the quality of the good in question. To put it differently, among the various determinants of demand, the price of the commodity is only variable.

(3) The term ceteris paribus associated with the law of demand implies that taste and preference, income, the prices of related goods and social status, all remain constant over the period in which the impact of price variation on the quantity demanded is being analyzed.

(4) The law of demand is a partial analysis of the relationship between demand and price, in the sense that it relates to the demand for only one commodity, say X, at a time or over a period of time.

Price (Rs.)	Quantity demanded (Units)
0	10
1	8
2	6
3	4
4	2
5	0

When we represent the above data in a graph, we get the demand curve.



Reason for the Law of Demand: why does demand curve slope downwards?

(1) Income effect: - as a result of the fall in the price of a commodity, consumers real income or purchasing power increases. This increase in real income induces the consumer to buy more of that commodity. This is one reason why a consumer buys more of a commodity whose price falls.

(2) Substitution effect: - when the price of a commodity falls, it becomes relative cheaper than other commodities. This induces the consumer to substitute the commodity whose price has fallen for other commodities which have now become relatively dearer. As a result of substitution effect, the quantity demanded of the commodity, whose price has fallen, rises. This substitution effect is more important than the income effect.

(3) New consumers: - when the price of commodity falls, many new consumer who were not consuming that commodity will start consuming the commodity.

(4) Several Uses: - some commodity can be put to several uses which leads to downward slope of the demand curve as prices falls

(5) Psychological effects: - when the price of a commodity falls people favour to buy more which is psychological.

(6) Law of Diminishing Marginal Utility: - It is the basic cause of the law of demand. The law of diminishing marginal utility states that as an individual consumes more and more units of a commodity, the utility derived from it goes on decreasing. So as to get maximum satisfaction, an individual purchase in such a manner that the marginal utility of the commodity is equal to the price of the commodity. When the price of commodity falls, a rational consumer purchases more so as to equate the marginal utility and the price level. Thus, if a consumer wants to purchase larger quantities, then the price must be lowered. This is what the law of demand also states.

Exception to the Law of Demand

(1) Goods having Prestige value: Veblen Effect. One exception to the law of demand is associated with the name of the economist, Thorstein Veblen who propounded the doctrine of conspicuous consumption. To Veblen, some consumers measure the utility of a commodity entirely by its price i.e., for them, greater the price of commodity, the greater it's utility. E.g. Diamond,
Luxury cars.

(2) Giffen goods: - another exception to the law of demand was pointed out by Sir Robert Giffen who observed that when price of bread increases, the low paid British workers in the early 19^{th} century purchased more bread and not less of it and this is contrary to the law of demand described above. The reason given for this is that these British workers consumed a diet of mainly bread and when the price of bread went up they were compelled to spend more on given quantity on bread. Therefore they could not afford to purchase as much meat as before. Thus they substituted even bread for meat in order to maintain their intake of food. It is important to note that with the rise in the price of giffen goods, its quantity demanded increases and with the fall in its price its quantity demanded decreases, the demand curve will slope upward to the right and not downward.

Relationship between demand function and demand curve

Demand Function

Demand function is a mathematical function showing relationship between the quantity demanded of a commodity and the factors influencing demand.

Dx = f (Px, Py, T, Y, A, Pp, Ep, U)

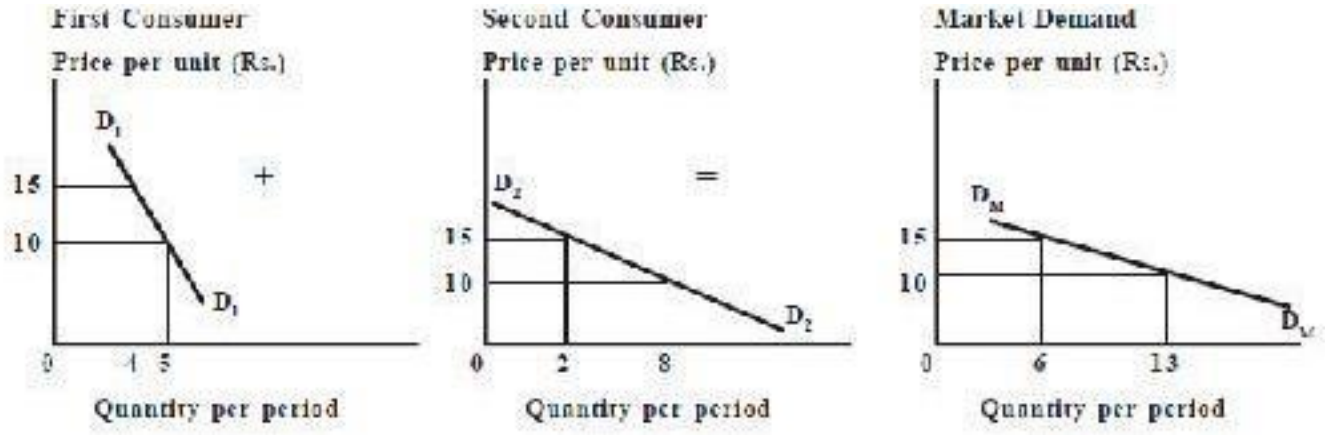
In the above equation,

Dx = Quantity demanded of a commodity
Px = Price of the commodity
Py = Price of related goods
T = Tastes and preferences of consumer
Y = Income level
A = Advertising and promotional activities
Pp = Population (Size of the market)
Ep = Consumer's expectations about future prices
U = Specific factors affecting demand for a commodity such as seasonal changes, taxation policy, availability of credit facilities, etc.

Market Demand Function

Market demand is the combined response of individual demand. Manager of a firm is more interested in the size of total market demand for the commodity and firm's share in it. This is because it will provide a basis of his pricing and output decision. Apart from the factors affecting individuals demand, market demand for a product depends on an additional factor namely number of consumers which in turns depend on the population of a region or a city or country. With this we write the market demand function as Qd = f (Px, I, Pr, T, A, N)

Where the additional factor is N which stands for the number of consumers or population.



Suppose there are two individual buyers of a good in the market. In the above diagram the fist consumer and second consumer shows the demand curve of the two independent individual buyers. Now the market demand curve can be obtained by adding together the amounts of the good which individuals wish to buy at each price (4+2=6 and 5+8=13).

The market demand curve slopes downward to the right since the individual demand curve whose lateral summation gives us the market curve, normally slopes downward to the right. Besides, as the price of the goods falls, it is very likely that the new buyers will enter the market and will further raise the quantity demanded of the good. This is another reason why the market demand curve slopes downward to the right.

Bandwagon Effect & Snob Effect;

Bandwagon Effect: - The bandwagon effect is a well-documented form of groupthink in behavioral science and has many applications. Some of the people purchase commodity not because of necessity but because their neighbours have bought these goods. It is otherwise called as *Band-Wagon effect*. These effects have positive effect on demand. The tendency to follow the actions or beliefs of others can occur because individuals directly prefer to conform, or because individuals derive information from others. In layman's term the bandwagon effect refers to people doing certain things because other people are doing them, regardless of their ow n beliefs, which they may ignore or override.

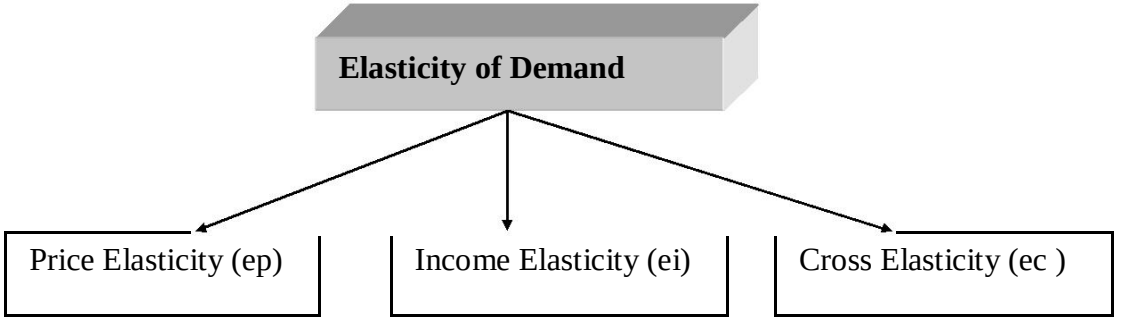
Snob Effect: - when the commodities are commonly used rich class people decrease the consumption. Or there are also consumers who like to behave differently from the others. This is known as Snob effect and it has negative effect on demand. This situation is derived by the desire to own unusual, expensive or unique goods.

Elasticity of demand and its uses for Managerial decision-making,

The law of demand shows the direction of change in quantity demanded due to change in its price. But it does not state the extent or degree of change in quantity demanded due to change in price. The elasticity of demand shows the degree or extent of commodity with reference to change in its price,

What is Elasticity of Demand?

The elasticity of demand refers to the degree of responsiveness of quantity demanded due to change in its price, consumer's income and price of related goods.



- Price Elasticity (e_p) is the degree of responsiveness of quantity demanded due to change in its price
- Income Elasticity (e_i) is the degree of responsiveness of quantity demanded due to change in consumers income
- Cross Elasticity (e_c) is the degree of responsiveness of quantity demanded due to change in price of related goods which may either a substitute for it or a complementary with it.

Price Elasticity of Demand (ep)

Price elasticity is a measure used in economics to show the responsiveness, or elasticity, of the quantity demanded of a good or service to a change in its price. More precisely, it gives the percentage change in quantity demanded in response to a percent change in price (holding constant all the other determinants of demand, such as income). It was devised by Alfred Marshall. More often the price elasticity is commonly known as elasticity of demand.

In general price elasticity of demand is the ratio of percentage change in quantity demanded due to percentage change in price

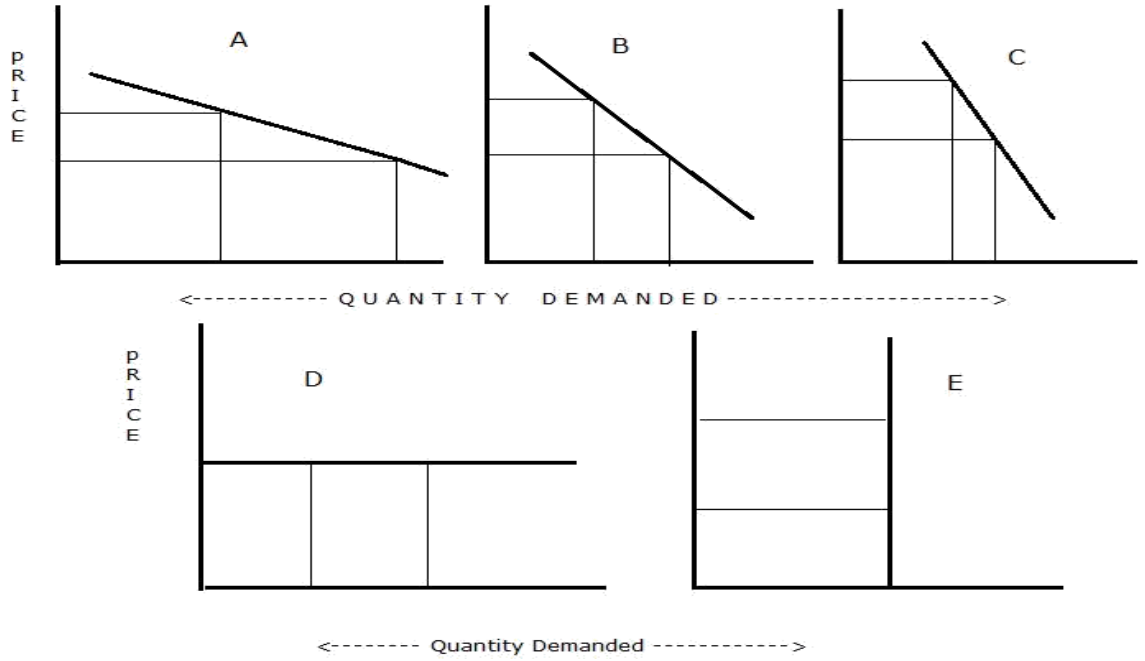
ep = **Percentage** change in quantity demanded / Percentage change in price

Measurement of Price Elasticity of Demand

The elasticity of demand can be measured with the following methods: - Gradient method, Percentage method, Total outlay method, Point method, Arc method.

Types of Price Elasticity of demand:

In gradient method elasticity of demand is measured with the gradient or slope of a demand curve. A flat curve shows elastic demand and steep curve less elastic demand. A curve in the nature of 45degree line from y axis shows unity elasticity. The gradient or slope of a curve is represent



(1) Unity Elastic: in diagram B, the elasticity of demand is unity because the percentage change in quantity demanded is equal to percentage change in price. So this is called unity elasticity of demand. |ep| or |Ep| $=\Delta Q/\Delta P = 1$, demand is unitarily elastic

(2) More Elastic: the diagram A, represents more elastic of demand. Here the change in quantity demanded ΔQ is greater than change in price ΔP. so elasticity of demand is more elastic

|ep| or |Ep| $= \Delta Q/\Delta P$ (where $\Delta Q > \Delta P$)

|ep| or |Ep |> 1, demand is elastic

(3) Less Elastic: in the figure C the elasticity of demand is less elastic because the change in quantity demanded is less than of the change in price; the ratio of change in quantity demanded to price is less then one

|ep| or |Ep| $= \Delta Q/\Delta P$ (where $\Delta Q < \Delta P$)

|ep| or |Ep| < 1, demand is inelastic

(4) Perfect Elastic: in figure D the demand curve is horizontal. It represents perfect elastic demand because here an insignificant change in price brings about a large change in quantity demanded of a good. |ep| or |Ep| $= \Delta Q/\Delta P = \infty$

(5) Perfect Inelastic: in figure E, the demand curve is vertical which represent perfectly inelastic demand.

Because here a large change in price brings no change in quantity demanded.
|ep| or |Ep| $= \Delta Q/\Delta P = 0$

Methods of Measuring Price Elasticity of demand:

Percentage Method

This is an important method of measurement of elasticity of demand. In this method elasticity of demand is measured as the ratio of the percentage changes in quantity demanded ($\%\Delta Q_d$) to the percentage change in price ($\%\Delta P$). of the commodity

$$E_d = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in price}} = \frac{\Delta Q_d/Q_d}{\Delta P/P}$$

$Ep = \Delta Q/Q \times P/\Delta P = \Delta Q/\Delta P \times P/Q$

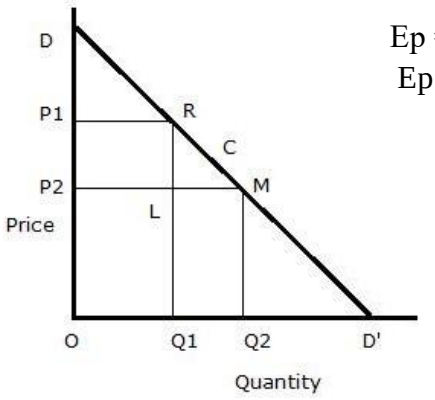
The above formula usually yields a negative value, due to the inverse nature of the relationship between price and quantity demanded, as described by the "law of demand". For example, if the price increases by 5% and quantity demanded decreases by 5%, then the elasticity at the initial price and quantity = −5%/5% = −1. However, it may be noted that a convention has been adopted in economics that price elasticity is expressed with a positive sign.

Total Outlay Method or Total Expenditure Method

In this method elasticity of demand is measured from the changes in the expenditure of the consumer on the commodity as a result of change in its price. This method was developed by Marshall. If total expenditure remains the same after a change in price then elasticity of demand is said to be equal to one or unity elastic. If total expenditure increases as a result of a fall in price then elasticity of demand is said to be more than one or more elastic. If total expenditure decline even after a fall in price of a commodity then elasticity of demand is called less elastic or less than one.

Arc Method (Mid-point Method)

Arc method is used to measure the elasticity of demand in case of large changes in price. In this method the average or original price and changed price is used in place of original price and average of original quantity and changed quantity is used in place original quantity where elasticity of demand is measured between two points on the demand curve. It is called arc elasticity.



$$Ep = (\Delta Q / Q1 + Q2) / (\Delta P / P1 + P2) = (\Delta Q / Q1 + Q2) * (P1 + P2 / \Delta P)$$
$$Ep = \Delta Q (P1 + P2) / \Delta P (Q1 + Q2)$$

In this diagram the area between R and M on demand curve DD' is an Arc which measures elasticity over a situation range of price and quantity. Therefore, the arc elasticity formula should be used when the change in price is somewhat large but not very large on the other hand when the two points on demand curve are very close.

Determinants of Price Elasticity of Demand

1. **Number of substitutes available:** If the number of substitutes available is large, then the demand for the good is elastic and vice-versa.
2. **Proportion of income spent on a good:** If the proportion of income spend on a good or service is large, then the demand for the good is elastic and vice-versa.
3. **Number of uses of a good:** If the number of uses of a good or service is more, then the demand for the good is elastic and vice-versa.
4. **Complementary relationship between good:** If there is a strong complementary relationship between goods, then the demand for the good is elastic and vice-versa.

Income Elasticity of demand:

Income elasticity of demand shows the degree of responsiveness of quantity demanded of a good to a small change in income of consumers. Thus more precisely the income elasticity of demand may be defined as the ratio of the proportionate change in the quantity purchased of a good to the proportionate change in income which includes the former.

Income Elasticity (e_i) = Proportionate change in purchase of a good / proportionate change in income

$$= (\Delta Q / \Delta M) * (M / Q)$$

Midpoint formula for measuring income elasticity of demand can be written as

$$e_i = (\Delta Q / \Delta M) * (M1 + M2 / Q1 + Q2)$$

For superior goods income elasticity is positive, whereas for inferior good it is negative. Positive income elasticity can assume three forms: greater than unity (one) elasticity, unity elasticity and less than unity elasticity.

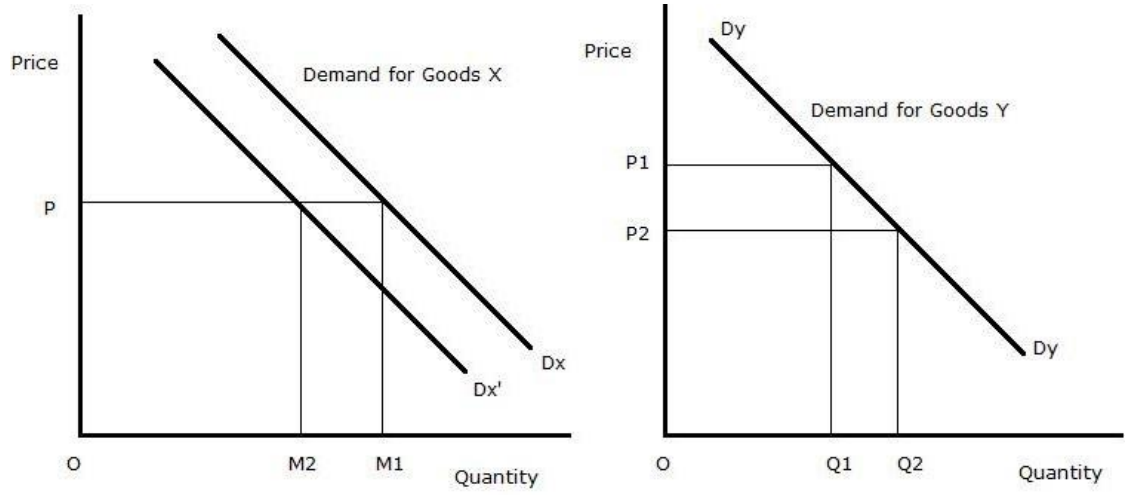
1. When a change in income results in a direct and more than proportionate change in the quantity demanded, the income elasticity is said to be positive and more than unity. Luxury goods are its

example.

2. When a change in income leads to a direct and proportionate change in the quantity demanded, then it is known as positive and unit income elasticity. Its examples include semi-luxury and comfort goods.
3. When an increase in income results in a less than proportionate increase in quantity demanded, then the elasticity is positive and less than unity. Necessary goods falls under this category.
4. The income elasticity is negative when an increase in income leads to a decrease in quantity demanded. Inferior quality goods came under this category. Knowledge of income elasticity of demand for various commodities is useful in determining the effects of changes in business activity on various industries.

Cross Elasticity (ec)

The sales volume of one product may be influenced by the price of either substitute or complementary products. Cross-price elasticity of demand provides a means to quantify that type of influence. Therefore, the degree of responsiveness of changes in the demand for one good in response to change in price of another good represents the cross elasticity of demand of one goods for the other.



Now suppose that the price of goods Y fall from OP1 to OP2, while price of goods X remains constant at OP. as a consequence of fall in price of goods y from OP1 to OP2, its quantity demanded rises from OQ1 to OQ2. In drawing the demand curve Dx for Goods X, it is assumed that the price of other goods including Goods Y remains the same. Now that the price of Goods Y has fallen and the as Goods Y is a substitute for goods, then as a result of the fall in price of Goods Y from OP 1 to OP2 the demand curve of Goods X will shift to the left, i.e. demand for Goods X will decrease. This is because the marginal utility curve of the substitute goods shifts to the left. As a result of fall in price of goods Y the demand curve of goods X shift from Dx to Dx'. So that now at price OP less quantity

OM2 of goods X is demanded. M1M2 of goods X has been substituted by Q1Q2 quantity of goods Y

Cross Elasticity of demand of X for Y (e_c) = Proportionate change in quantity demand of Goods X / Proportionate change in the price of Goods Y

$$ec = (\Delta Qx / \Delta Py) * (Py / Qx)$$

When the change in price is large, we should use midpoint method for estimating cross elasticity of demand. We can write the midpoint formula for measuring cross elasticity of demand as

$$ec = (\Delta Qx / \Delta Py) \times (Py1 + Py2 / Qx1 + Qx2)$$

If two goods are unrelated, a change in the price of one will not affect the sales of the other. The numerator of the cross-price elasticity ratio would be 0, and thus the coefficient of cross-price elasticity would be 0. In this case, the two commodities would be defined as independent. For example, consider the expected effect that a 10% increase in the price of eggs would have on the quantity of electronic calculator sales.

These relationships can be summarized as follows:

If $e_c > 0$, goods are substitutes

If $e_c < 0$, goods are complementary

If $e_c = 0$, goods are independent

Demand Forecasting

Demand forecasting is predicting the future demand for a product. The information regarding future demand is essential for planning and scheduling production, purchase of raw materials, acquisition of finance and advertising. The information regarding future demand is also essential for existing firms to be able to avoid under or over production.

Various methods to demand forecasting have been divided into two types: qualitative methods and quantitative methods. The techniques of forecasting are many but the choice of a suitable method is a matter of purpose, experience and expertise. To a large extent it also depends on the nature of the data available for the purpose.

Qualitative Methods of Demand Forecasting:

(1) Jury Method/Executive Opinion Method: The jury method is one of the commonly employed methods of sales forecasting. It is also known as executive opinion method. Judgment is the basis in this method. This is true for both the jury method and the percolated jury method. The difference that in the former the participants are limited to the top executives and in the latter, a large number of marketing and sales executive participate. In both, the participants exercise their judgment and give their opinions. The final forecast is arrived at by averaging these opinions. Evidently for the forecasts arrived at by this method is reliable, the executives participating must have versatile experience and sound knowledge of the business.

(2) Survey of Experts Opinion: This is yet another judgment-based method of sales forecasting but is somewhat different from the jury method. In this jury method, opinion of executives gives rise to the forecast. In survey of expert opinions, experts in the concerned field, inside or outside the organizations are approached for their estimates. This method is used more in developing total industry forecast than company sales forecast.

(3) The Delphi Method: It is a kind of survey of expert opinion method. It is used more for working out broad-based, futuristic estimates, rather than sales forecasts. In this method a panel of experts in the field is interrogated by a sequence of questionnaires. Any information that is available with any one member of the panel is passed on to others as well as enabling all members to have access to all the available information. The panel members are asked to react to a checklist of questions, which are significant to the forecast that is attempted. Their opinions and reactions are analyzed and where there is a sharp difference on an issue, interchanges are permitted and the final forecasts are presented.

(4) Sales Force Composite Method: Here the sales forecasting is done by the sales force. It is also judgment-based method. Each salesman develops the forecast for his respective territory, the territory wise forecasts are consolidated at branch/area/region level; and the aggregate of all these forecasts is taken as the corporate forecast. Composite method seeks to aggregate the judgment of entire sales force. It is a grassroot method; the forecasting originates at the grassroot level people who are close to the market place form the basis for the forecast.

(5) Survey of Buyer Intensions: Forecasting is the art of anticipating what buyers are likely to do under a given set of condition. The various surveys also enquire into a consumer's present and future personal finances and their expectation about the company. Buyer intension surveys are particularly useful in estimating demand for industrial products, consumer durables, product purchases where advanced planning is required and new products.

(6) Market Test: It is essentially a risk control method or it is experiential marketing at minimum cost and risk. When firm decides on full scale manufacturing and marketing of the product on the basis of results of experiment, it helps avoid costly business errors. This method is useful for new product, with the support of the chosen marketing mix, is actually launched and marketed in a few selected cities/ towns/ other territories. The selected test markets will be representative of the final market.

Quantitative Methods of Demand Forecasting

(1) Simple Projection Method: The simple projection method is the one in which the current year's forecast is arrived at by simply adding an assumed growth rate to last years sales; same firms go by the industry growth rate and project the sales; some others take the growth rate achieved by the No1 firm in the industry. Another formula, as shown below is also used by same firms

Next years sales = (This year's sales)^2 / Last years sales

Only where the year-by-year sales are stable and show an increasing trend, this formula will provide a reasonably reliable estimate

(2) Extrapolation Method: Extrapolation is a projection method, but is a bit more complex compared to the simple projection method. It involves the plotting of the sales figure for the past several years and stretching of the line or the curve as the case may be. The extrapolation will give the figures for the coming years. Extrapolation basically assumes that the variable well follows their previously established pattern. In other words, the assumption is that the past will show the future.

(3) Time Series Method:

It is also known as trend cycle analysis. A time series is a set of chronologically ordered raw data, for example, the monthly sales of given product for several continue years. Time series analysis helps to identify and explain:

- Systematic variation or seasonal variation, which arises due to seasonality in the series of data.
- Cyclical pattern that repeat themselves every two or every three years and soon.
- Trend in the data
- Growth rates of these trends

The main assumption in time series analysis is that the factors influencing sales will not changes very much over a period of time and that the future will reflect the past. In this sense this method is basically a projection method. Projections of future sales are made by studying the interaction of the basic and significant influence of sales. A through and systematic analysis of data is carried out. All the basic factors underlying the sales fluctuations are analyzed. The four main types of sales variations are as follows.

1. Long-term growth trends (Secular trends)
2. Cyclical changes

3. Seasonal variations
4. Irregular or random fluctuations -

Are isolated and measured using the statistical procedure. The trend lines for each type of variations are studied and sales estimates are made.

(A) Simple Moving Average Method: This method helps eliminate the effects of seasonality and other irregular trends in sales while forecasting future sales. The method delivers a time series of moving averages. Each point of the time series is the arithmetical or weighted average of a number of preceding consecutive points of the series. If seasonal effects are present in the demand pattern of the product, a minimum of two years sales history is needed for applying this model.

Example:

The table below shows the demand for a new after shave in a shop for each of the last 7 months.

```
Month:  1 2 3 4 5 6 7
Demand: 23 29 33 40 41 43 49
```

Calculate a two-month moving average for months two to seven. What would be your forecast for the demand in month 8?

The two-month moving average for months two to seven is given by:

$m_2 = (23 + 29)/2 = 26.0$
$m_3 = (29 + 33)/2 = 31.0$
$m_4 = (33 + 40)/2 = 36.5$
$m_5 = (40 + 41)/2 = 40.5$
$m_6 = (41 + 43)/2 = 42.0$
$m_7 = (43 + 49)/2 = 46.0$

The forecast for month 8 is just the moving average for the month before that i.e. the moving average for month 7 = $m_7 = 46$.

(B) Weighted Moving Average Method:

Weighted moving averages assign a heavier weighting to more current data points since they are more relevant than data points in the distant past. The sum of the weighting should add up to 1 (or 100%).

Suppose in the above example we want to calculate three-month weighted moving average: weight of last three month as: 0.6, 0.3, 0.1.

The weighted moving average for 8^{th} month = (0.6*46) + (0.3*42) + (0.1*40.5) = 27.6 + 12.6 + 4.05 = 44.25

(C) Exponential Smoothing: It is yet another projection method used for sales forecasting. It is similar to moving averages and is used fairly extensively. It too represents the weighted sums of all past numbers in a time series, with the heaviest weight placed on the most recent data or information. This method involves estimating the value of the 'smoothing constant' usually designated by symbol alpha and then using it to smooth the raw sales data. The assumption in this method is that actual sales are a function of environmental factors and the method helps to smooth out these factors. This can be represented symbolically as

$Ft = \alpha Xt\text{-}1 + (1 - \alpha) St\text{-}1$

Ft Refers to forecasted sales in period t

α is smoothing constant with a value between 0 to 1

At- 1 is actual sales in period t-1

Ft- 1 is smoothed sales in period t-1

This method is particularly useful when forecasts of a large number of items are made. It is not necessary here to keep a long history of past data.

Example:

The table below shows the demand for a new after shave in a shop for each of the last 7 months.

Month	1	2	3	4	5	6	7
Demand	23	29	33	40	41	43	49

Apply exponential smoothing with a smoothing constant of 0.1 to derive a forecast for the demand in month eight.

Solution

Applying exponential smoothing with a smoothing constant of 0.1 we get:

$F_1 = A_1 = 23$
$F_2 = 0.1A_2 + 0.9F_1 = 0.1(29) + 0.9(23) = 23.60$
$F_3 = 0.1A_3 + 0.9F_2 = 0.1(33) + 0.9(23.60) = 24.54$
$F_4 = 0.1A_4 + 0.9F_3 = 0.1(40) + 0.9(24.54) = 26.09$
$F_5 = 0.1A_5 + 0.9F_4 = 0.1(41) + 0.9(26.09) = 27.58$
$F_6 = 0.1A_6 + 0.9F_5 = 0.1(43) + 0.9(27.58) = 29.12$
$F_7 = 0.1A_7 + 0.9F_6 = 0.1(49) + 0.9(29.12) = 31.11$

As before the forecast for month eight is just the average for month 7 = $F_7 = 31.11 = 31$

(4) Regression Analysis: It is another analytical technique used for demand forecasting. This technique combines economic theory and statistical technique of estimation. Economic theory is employed to specify the determinants of demand (Demand function) and to determine the nature of relationship between the demand for a product and its determinants. Statistical techniques are employed to estimate the values of parameters in the estimated equation.

In regression technique of demand forecasting, the analysts estimate the demand function for a product. In the demand function, the quantity to be forecast is a 'dependent variable' and the variables that affect or determine the demands are 'independent variable' or 'explanatory variables'.

The simple regression technique is based on the assumptions (i) that independent variable will continue to grow at its past growth rate, and (ii) that the relationship between the dependent and independent variables will continue to remain the same in the future as in the past. The regression method, in general will give more accurate forecasts than the trend method since regression takes into account causal factor.

(5) Econometric Models: This model basically attempts to express economic theories in mathematical terms so that they can be verified by statistical methods and used to measure the impact of one economic variable upon another predicting future event. The econometric model is constituted by a set of interdependent equations that describe and simulate the total demand situation. The forecast is derived through this set of equations.

Econometric models are quite complex and expensive to develop. But they predict the turning points more accurately. Econometric models are used more in forecasting the demand of durable goods, industrial as well as consumer durables, where replacement demand is significant factor to be projected.

Significance of Demand Forecasting

Estimating and forecasting demand are crucial to the following types of decision-makers for knowing the

present level of demand and the expected increase in demand over time.

(i) Producers: A producer allocates various factors of production for maximization of profit, for which knowledge of both the present and future demands are important. Future demand estimates help the producer to plan the extent of expansion in scale of operations, so as to deal with the increased demand and earn higher profits.

(ii) Policy makers and planners: It helps government to formulate economic policies through the planning boards or planning commissions to allocate resources for economic development through production in the public, private and export sectors to achieve the targets set for a given time period. It also ensures adequate supply of inputs for achieving the objectives of industrial policy, import-export policies, credit policy, public distribution system, and other related policies, which involves forecasting of future demand.

(iii) Other groups of the society: Demand forecasts are also useful to researchers, social workers and others with futuristic approach, to understand the levels of future demand or supply, the gaps, and their expected impact on prices or the economy.

Demand Estimation:

Why Demand Estimation?

When running a small business, it is important to have an idea of what you should expect in the way of sales. To estimate how many sales a company will make, demand estimation is a process that is commonly used. With demand estimation, a company can measure how much to produce and make other important decisions.

What is Demand Estimation?

Demand estimation is a process that involves coming up with an estimate of the amount of demand for a product or service. The estimate of demand is typically confined to a particular period of time, such as a month, quarter or year.

Various Methods for Demand Estimation

There are a variety of ways that can be used to estimate demand, each of which has certain advantages and disadvantages

1. **Consumer Survey:** Survey is a method for collecting quantitative information about items in a population. Firms can obtain information regarding their demand functions by using interviews and questionnaires, asking questions about buying habits, motives and intention.

Advantages:

- They give up-to-date information reflecting the current business environment.
- Much useful information can be obtained that would be difficult to uncover in other ways.

Disadvantages:

- Validity: Consumers often find it difficult to answer hypothetical questions, and sometimes they will deliberately mislead the interviewer to give the answer they think the interviewer wants.
- Reliability: It is difficult to collect precise quantitative data by such means.
- Sample bias: Those responding to questions may not be typical consumers

1. **Market Experiments:** Market experiments seek to test consumer reactions to changes in variables in the demand function in a controlled environment. For example, consumers are normally given small amounts of money and allowed to choose how to spend this on different goods at prices that are varied by the investigator. However, such experiments have to be set up very carefully to obtain valid and reliable results.

Advantages:

- Direct observation of consumers' actual spending behavior is possible

Disadvantages:

- There is less control in this case, and greater cost.
- The number of variations in the variables is limited because of the limited number of market segments available.
- Experiments may have to be long-lasting in order to reveal reliable indications of consumer behavior.

2. **Regression Analysis:** Statistical techniques, especially regression analysis, provide the most powerful means of estimating demand functions. This is a statistical technique by which demand is estimated with the help of certain independent variable. Moreover, multiple regression analysis is used to estimate demand as a function of two or more independent variables that vary simultaneously.

Advantages:

- Regression techniques have become the most popular method of demand estimation
- software packages are available to use regression techniques

Disadvantages:

- They require a lot of data in order to be performed.
- They necessitate a large amount of computation.

Supply Analysis:

The supply of a product refers to the various quantities of the product, which a seller is willing and able to sell at different prices in a given period of time.

Factors affecting Supply

(a) Cost of production: Variations in cost of production occur due to changes in cost of labor, raw materials, capital, technological advancements, etc. An increase in the cost of production leads to a decrease in supply. If due to technological advancement and large -scale production, the cost of production decreases in the long run, there would be an increase in supply.

(b) Availability of other products: The supplier can switch over their production to any of their complementary or substitute product if their cost of production is less.

(c) Climatic changes: Climatic conditions also affect the supply of products. When the climatic condition is favorable, production is usually more, which may lead to fall in prices. For example, agricultural production is largely dependent on climatic conditions.

(d) Changes in government policies: A rise in direct or indirect taxes has an immediate effect on the prices of commodities. If a new tax is imposed or existing tax rates are increased, price of the product will go up resulting in decline of supply of the product.

The Law of Supply:

The law of supply states that other factors remaining constant, higher the price, greater the quantity supplied and lower the price, lower the quantity supplied. Hence, the price and quantities supplied are positively related. This explains the reason why the supply curve slopes upwards.

The law of supply takes into account only the most important determinant of supply i.e. the price of the product.

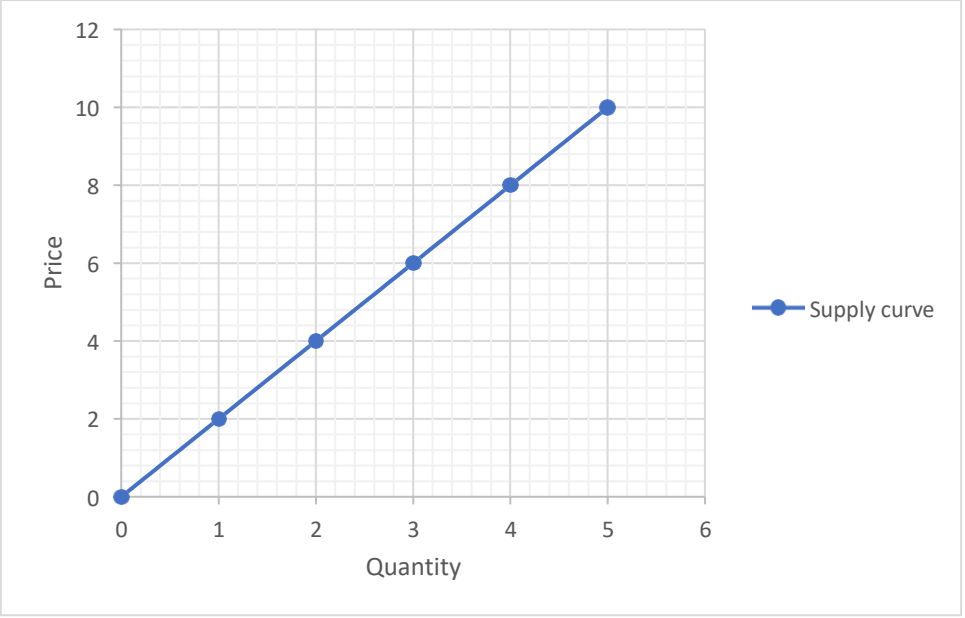
Assumptions:

- The input price should remain unchanged.
- Production technology should not change.
- There should not be any change in government policies.
- There should not be any change in foreign trade policies.
- There should not be any climatic changes.

Supply Schedule: The supply schedule refers to the quantity of products a producer or seller wishes to sell at a given price level. It explains the behavior of sellers at various price levels. The supply schedule can be represented in a tabular form where it depicts the quantity supplied and price of the product at a given period of time.

Price (Rs.)	Quantity Supplied (Units)
0	0
1	2
2	4
3	6
4	8
5	10

Supply Curve: When we represent the supply schedule in the form of a graph we get the supply curve.



When we represent the supply schedule in the form of a graph we get the supply curve. In Figure the above figure, we have plotted the data given in the table in the form of a supply curve. Here, it is a typical upward-sloping supply curve. At a very low price, the seller supplies smaller quantity of output. But as the price of the good increases the manufacturers find it more profitable to sell more goods. Thus, higher the price of the good, the greater the amount of goods supplied.

Market Equilibrium.

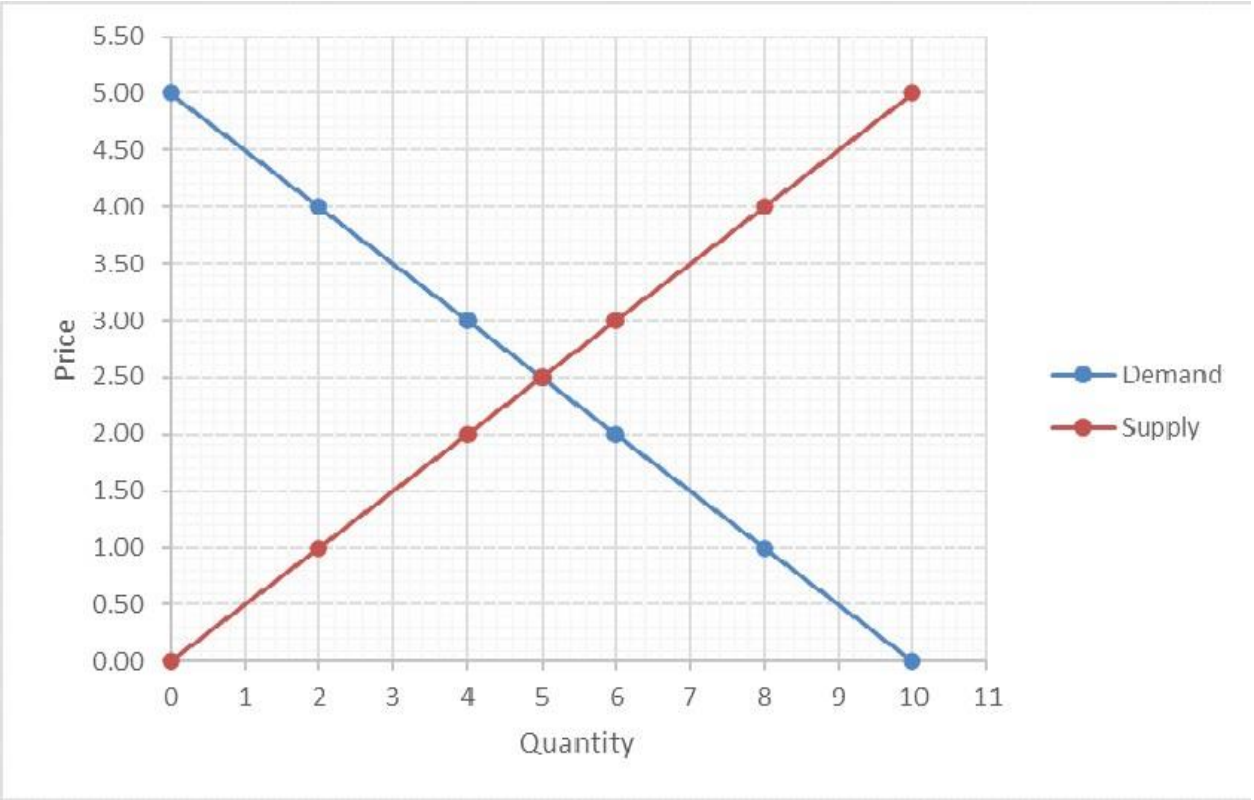
The market for a particular good or service consists of all buyers and sellers of that good or service. In economics, the word market always implies bringing together of demand and supply in relation to goods or services. The interaction of potential buyers and potential sellers establishes a market.

A market is an arrangement as well as an institution, where both buyers and sellers come closer for a predefined transaction.

Market equilibrium refers to a situation where quantity demanded for a commodity is equals to quantity supplied. We have seen that the demand and supply of any product depend on its price. The equilibrium price is that price at which the total demand for any product in the market is equal to the total supply of that product.

The market demand curve gives us an idea of the total quantity demanded by all the buyers in the market at different price levels. In the same way, each seller takes the price as given and decides to offer a certain quantity for sale in the market. Thus, each seller has a n individual supply curve and by summing up the individual supply curves of all the sellers in the market, we get the market supply curve. From the market supply curve we get to know the total supply by all sellers at different prices.

Price (Rs.)	Quantity demanded (Units)	Quantity supplied (Units)
0	10	0
1.00	8	2
2.00	6	4
2.50	5	5
3.00	5	5
4.00	2	8
5.00	0	10



	Demand and supply shifts	Effect on price and quantity
If demand rises…	The demand curve shifts to the right	Both price and quantity increases
If demand falls…	The demand curve shifts to the left	Both price and quantity falls
If supply rises…	The supply curve shifts to the right	Price falls but quantity increases
If supply falls…	The supply curve shifts to the left	Price increases and quantity decreases

MODULE: II

What is Production?

The relationship between input and resulting in output is called production. The word production in economics is not merely confined to physical transformation in the matter, it is creation and addition of value, therefore production in economics also covers the rendering of services. The theory of production provides a formal framework to help the managers of firms in deciding how to combine various factors or inputs most efficiently to produce the desired output of a product or service.

What is Production Function?

A production function expresses the technological or engineering relationship between the output of a commodity and its factor inputs. Traditionally, economic theory considers four factors of production, namely, land, labour, capital and organisation or management. Now, technology is also considered as an important determinant, as it contributes to output growth. Therefore, output is a positive function of the quantities of land, labour, capital, the quality of management, and the level of technology employed in its production. During this process every entrepreneur wants to maximize his profit as profit maximization is his prime motto. This relationship may be expressed as follows: -

$$Q = f (N, L , K, M, T)$$

Q = quantity of output, N = land employed in the production of X, L = labour employed, K = capital employed, M = management employed, T = technology used.

This function describes a general production function. For the production of different commodities, one or all the factor inputs may not be equally important for all commodities. The importance of a factor of production varies from product to product. For instance, while land is the most important factor in the case of an agricultural product, its importance is relatively lower in the case of a manufacturing product. Meanwhile, the significance of management and technology may be greater in the case of an industrial product, rather than for an agricultural product. Therefore, researchers modify the production function according to the product and the specific objectives analyzed.

Generally, for the analysis of production decision problems, labour and capital are the only two factor inputs considered for convenience. Then, the production function reduces to: - Q = f (L.K) For a given level of output Q, various combinations of L and K may be used, which is known as production process or technology. Further, these combinations would also vary with variations in the level of output Q. Usually for production, both labour and capital are necessary and they substitute each other. When an entrepreneur employs more of labour than capital, then the production proce ss is known as labour intensive production technique. Whereas, if more of capital is used in relation to labour, the production technique becomes capital intensive.

Production function carries the input and output relationship and according to economics the relationship is of two kinds when some inputs are fixed and some inputs are varied we call it short run period production function. When all inputs are varied and resulting output is called long run production function. The short run production function is also known as Law of Variable Proportion and the long run production function is known as Law of Returns to Scale.

Concepts of TP, AP & MP:

Total Product

The total product refers to the total amount (or volume) of output produced with a given amount of input during a period of time. Therefore, a firm wanting to increase its Total Product in the short run will have to increase its variable factors as the fixed factors remain unchanged (that is why they are 'fixed' in the short run).

In the long run, as we know that all factors become variable, the firm can increase its total product by increasing any of its factors as all factors become variable. The concept of Total Product helps us understand what is called the Marginal Product.

Marginal Product

The total product can be calculated by adding subsequent marginal returns to an input (also known as the marginal product). The increase in output per unit increase in input is called Marginal Product. Thus, if we were to assume Labour as the input used in the production process (say), then Marginal Product can be calculated as-

MP = Change in output/ Change in input (here, labour)

TP = ΣMP

Average Product

Average product, as the name suggests, refers to the per unit total product of the variable factor (here, labour). Hence, the calculation of Average Product is also very simple.

AP = Total Product/ units of variable factor input = TP/L

Note that Total Product can also, therefore, be calculated as TP = AP x L

Production Function with one variable inputs (Law of variable proportions)

The law of variable proportion is one of the fundamental laws in economics. Thus, law deals with the behavior of production function in the short run. This kind of input -output relation forms the subject matter of the law of diminishing marginal returns which is also called law of variable proportions and describes returns to a factor.

To S.J. Stigler, "as equal increments of one input are added; the input of other productive services being held constant, beyond a certain point the resulting increments of product will decrease, i.e., the marginal products will diminish."

To Samuelson, "an increase in some inputs relative to other fixed inputs will, in a given state of technology, causes output to increase; but after a point the extra output resulting from the same additions of extra inputs will become less and less."

In the short run factors of production are two types they are fixed factors and variable factors. In the short-run the volume of production can be changed by varying the variable factor only. This is because fixed factor like plant size, machinery etc. can't be changed in short period when the production function with one factor variable where other factors production are kept constant. Thus, the short -run two factor production function can be written as Q = f (L, K)

Where Q stands for output, L for labour and K for capital which is held constant in the short run

The ratio of variable factor to fixed factor in the production function increases. E.g. suppose in production function two factors are assumed that is land and labour. It also assumed that 10ac res of land is available. Suppose the labour is engaged the ratio would 1:10, if the same labour is increased to 15 the ratio would be 15:10 this variation in the ratio of various factors causes the change in the size of output. At first there will be increasing in returns there after there will be diminishing returns and finally there will be negative return.

Assumption of the Law

1. Constant technology: This law assumes that the techniques of production are constant. Because if there are any technological changes instead of diminishing of marginal and average product it goes on increasing.
2. Short run: This law specially operated in short run only because here some factor are fixed and some factor are variable. More over if it is a long run there is a cha nce that all the factors are variable.
3. Homogeneous factors: This law is based on the assumption that the variable resources are applied unit by unit and each factor unit is homogeneous or very much identical to each other both in quantity and quality.
4. Changeable input ratio: It is necessary to use various amounts of a variable factor with fixed factor of production.

Explanation of the Law

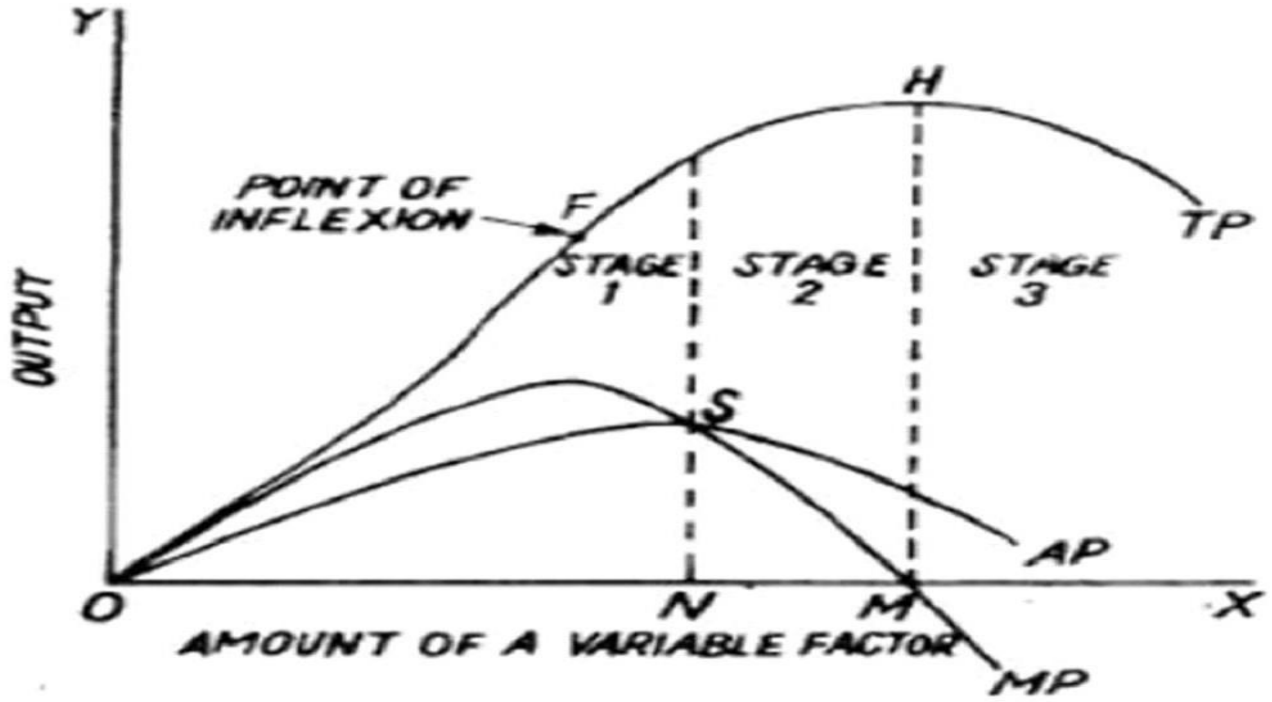
The short-run production function can be explained with the help of a table and diagram. Suppose a firm has 10 acres of land which is a fixed input and the variable input is labour. In order to increase his firm output, the producer can vary the quantity of labour inputs. There will be changes in the output or response of the output is shown on the table.

AP = TP/ Units of labour

MP = $\Delta Q/\Delta L$

K	L	TP	AP= TP/Q	MP=ΔTP/ΔQ	Stages
10	1	75	75	75	Increasing Return
10	2	160	80	85	
10	3	255	85	95	
10	4	360	90	105	
10	5	430	86	70	Decreasing Return
10	6	490	82	60	
10	7	505	72	15	
10	8	505	63	0	
10	9	492	55	-13	Negative Return
10	10	475	48	-17	

According the above table when the labour is increased from the one to two the MP as well as AP increases that is called Stage- I. But as more men are employed first the MP starts to fall and then AP starts to fall this stage we call it Stage – II. As we increase more and more labour MP goes negative that is stage-II. TP increases at a diminishing rate whereas the stage -III TP starts to diminishing because here MP is negative these stages can be shown on diagram.



Stage I: Increasing Returns

We characterize this stage with the total output increasing at an increasing rate with each additional unit of the variable input. The MP curve rises upto the point corresponding to the point F on the TP curve, also known as the point of inflexion.

After point F, the TP curve continues to rise but now at a decreasing rate. The end of this stage sees the maximum point of the average product, where the AP and MP curves intersect.

Causes of increasing return:

- **Effective utilization of fixed factor:** We get increasing returns in the first stage because initially, the fixed factors are abundant relative to the variable factor. The introduction of additional units of the variable factor leads to the effective utilization of the fixed factors. Evidently, production increases at an increasing rate.

For example, if a machine requires four workers for its optimum utilization, and in the current scenario is two workers are operating the machine, the factor would be underutilized. Addition of another worker would definitely lead to an increase in the output. Further addition of a worker would lead to optimum utilization and hence production would increase.

- **Indivisibility of fixed factor:** Now we cannot divide the fixed factor (here the machine) to suit the availability of the variable factor (here the workers) because generally the fixed factors are indivisible. Indivisibility of a fixed factor means that due to technological requirements, a minimum amount of the factor must be employed whatever the level of output.

- **Specialization and division of labour:** Another reason for rising returns is the increase in the efficiency of the variable factor itself. This is because, with a sufficient quantity of variable factor,

the introduction of specialization and division of labour becomes possible which leads to higher productivity.

Stage II: Diminishing Returns

Throughout the stage of diminishing returns, the total product keeps on increasing. However, unlike the stage of increasing returns, here the total product increases at a diminishing rate. This happens because the marginal product falls and becomes less than the average product, which also sees a downwards slope.Thus, this stage is known as the stage of diminishing returns. The end of this stage is marked by the total product attaining its maximum value and the marginal product becoming zero. Further, this stage is very important because the firm will seek to produce in its range.

Causes of decreasing return:

After the addition of a certain amount of variable inputs which lead to the optimum and efficient utilization of fixed input, the output starts diminishing. This is because any further addition to the variable factor after the point of efficient utilization renders the fixed factor inadequate relative to variable factor. Again, this is the reason why the marginal and average product decline at this stage.

In other words, the contribution of extra variable inputs is actually nil. This further means that the fixed indivisible factor is being worked too hard.

Another reason for the law of diminishing returns is the lack of availability of a perfect substitute of factors of production. It means that one factor of production cannot **be substituted** for another factor. **Substitute** for every factor of production is not always available.

In case of the availability of a perfect substitute, an increase in its quantity would have made up for the scarcity of the fixed factor. This, in turn, would have prevented the ineffective utilization.

Stage III: Negative Returns

The origin of stage 3 starts from the maximum point of the TP curve. In this stage, the TP curve now starts to decline. Moreover, the MP curve becomes negative coupled with a fall in the AP curve.

Causes of negative return:

The excessive addition of variable inputs leads to negative returns at this stage. This is because of the crowding of the variable factors. The variable and fixed factors now start getting into each other's ways. Effectively, there is no coordination and hence the output falls.

Ideal Stage of Operation

A major dilemma in the world of the law of diminishing returns is deciding the stage where a rational producer would look to operate. Let's examine each of these stages from his perspective.

The stage of negative returns or stage III is probably not a stage of the producer's choice. This is because the fixed factors here are over utilized. Thus, a rational producer would know that he is not having optimum production.

Further, production can be increased by decreasing the number of variable inputs. Effectively, even if the inputs are free of cost, the producer would stop before the advent of stage III.

Stage I or the stage of increasing returns is a better stage, to start with. However, a rational producer would again not operate in this stage. This is because he would know that he is not making efficient utilization of the fixed inputs. In simpler words, the fixed inputs are underutilized.

Furthermore, the producer would have an opportunity to increase production by employing more variable inputs and hence firing production on all engines. Eventually, even if the fixed factor is free of cost in this stage, a rational producer would continue adding more units of the variable factor.

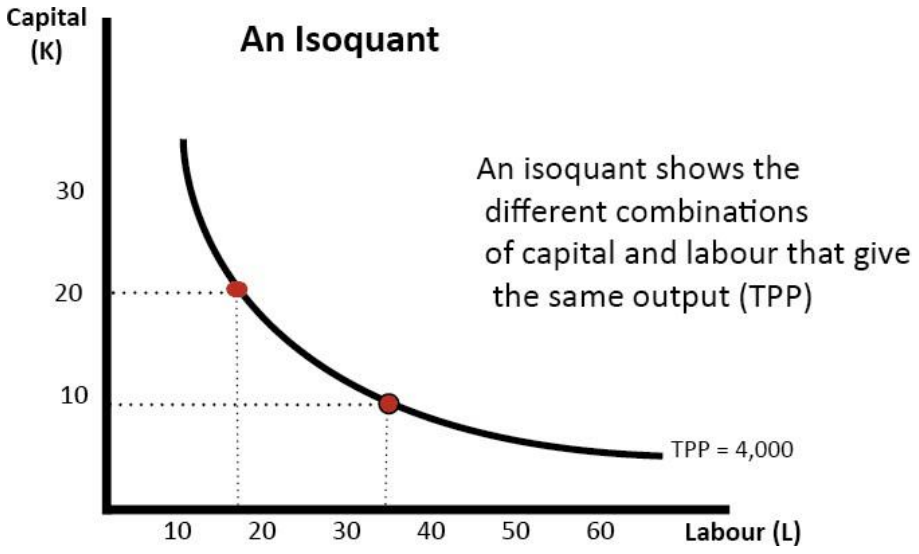
So now we understand that both stage I and stage III are not viable stages of production. Evidently, they are also known as the stages of economic absurdity or economic non-sense.

This brings us to the conclusion that a rational producer would operate in the second stage of production, where both average and marginal products tend to decline. At which particular point in this stage, the producer decides to produce depends upon the prices of the factors.

Production Function with two variable inputs

Concept of Isoquant:

An isoquant shows all the combination of two factors that produce a given output.



In this diagram, the isoquant shows all the combinations of labour and capital that can produce a total output (Total Physical Product **TPP**) of 4,000. In the above isoquant, this could be

- 20 capital and 18 labour.
- 9 capital and 35 labour.

An isoquant is usually shaped concave because of the law of diminishing returns. With fixed capital employing extra workers gives a declining increase in the marginal product (MP)

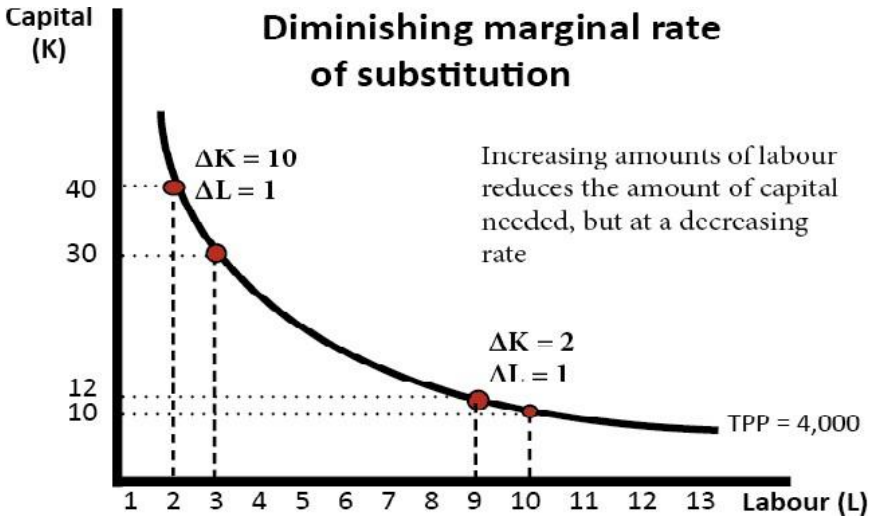
Marginal rate of factor substitution

$$MRS = \frac{\Delta K}{\Delta L}$$

The marginal rate of substitution is the amount of one factor (e.g. K) that can be replaced by one factor (e.g. L). If 2 units of capital could be replaced with one-factor labour, the MRS would be 2

$$MRS = \frac{\Delta K}{\Delta L} = \frac{2}{1} = 2$$

Diminishing marginal rate of substitution



If the firm employs 2 L and 40 K. Then employing one extra worker can enable it to save 10K. This is quite an efficient saving. The firm only has to pay one extra worker but can save more by saving 10 K.

However, at a combination of 9 Labour, employing an extra worker enables a saving of only 2 capital. Therefore, the more that workers are employed, there is a diminishing rate at which you can substitute the other factor. There comes a point, where employing more workers barely saves any capital at all. This is when diminishing returns of labour is very high – workers effectively get in each other's way.

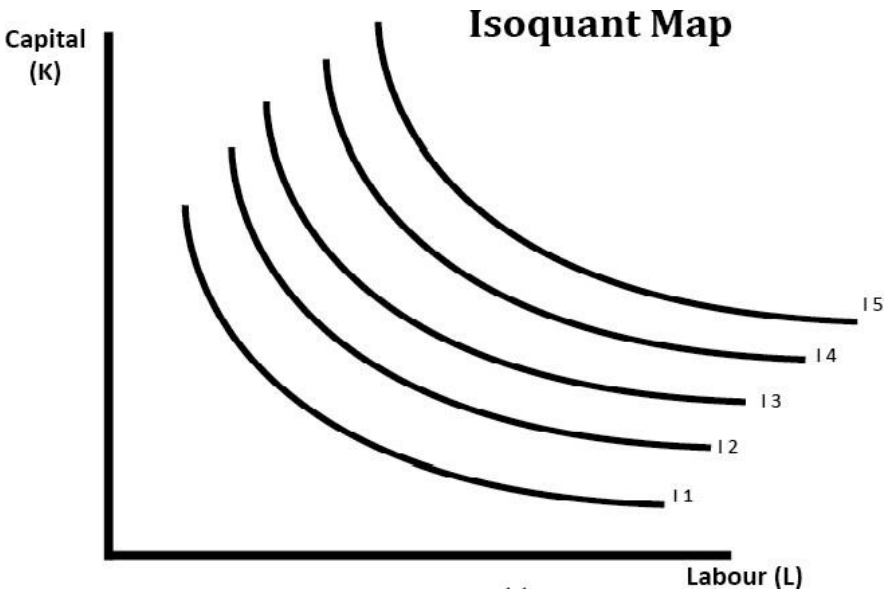
As one moves down the isoquant, output remains the same. Therefore the output gained from employing more labour must equal the output lost from employing more capital.

MPP (L) x ΔL = MPP (K) x ΔK

This equation gives us

$$\frac{MPP(L)}{MPP(K)} = \frac{\Delta K}{\Delta L} = MRS$$

Isoquant map



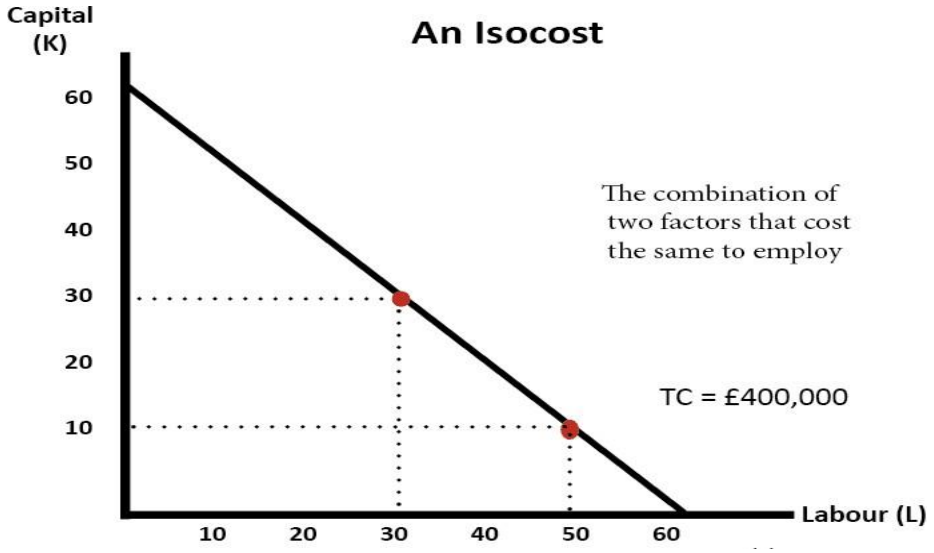
An isoquant map shows different levels of output. For example

- I1 may show the combinations of capital and labour that can produce 4,000 TPP.
- I2 may show the combinations of capital and labour that can produce 5,000 TPP.
- I5 is a higher output than I4

In the short-term, a firm faces a trade-off along one particular isoquant. But, in the long-term, a firm can invest in increasing capital stock and produce at a higher output for the same quantity of labour.

Concept of Iso-cost line:

An Iso-cost line shows all the combination of factors that cost the same amount to employ.

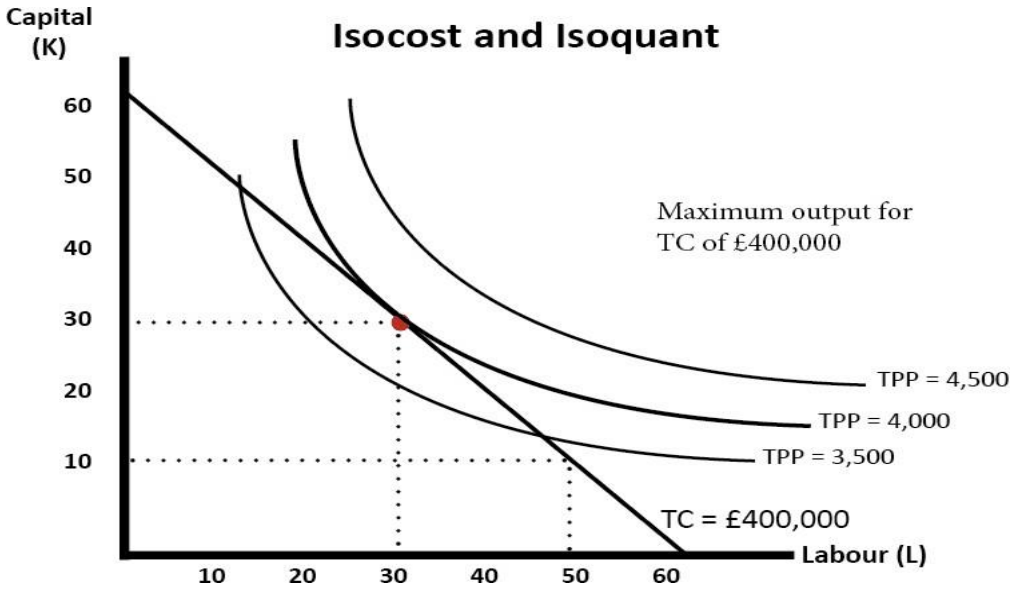


In this example, a unit of labour and capital cost £6.666 each.

- If we employ 30K and 30L, the total cost will be £200,000 + £200,000
- If we employ 10 K and 50L, the total cost will be £66,666 + £333,333 = £400,000

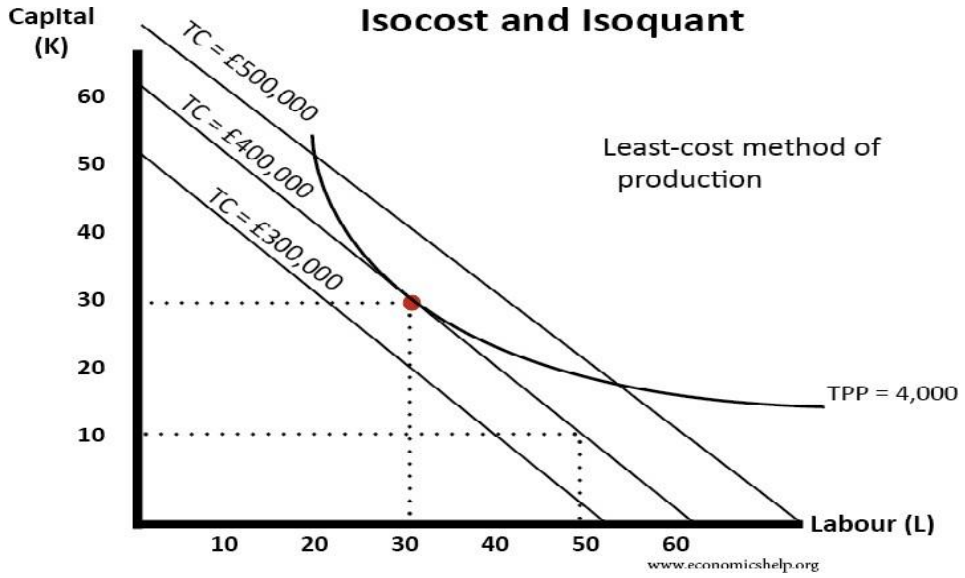
Cost minimization and output maximization (Optimum combination)

To maximize profits, a firm will wish to produce at the point of the highest possible isoquant and minimum possible Iso-cost.



In this example, we have one Iso-cost and three isoquants. With the Iso-cost of £400,000 the maximum output a firm can manage would be a TPP of 4,000. If it produced at say 13 K and 48 Labour, it would only be able to produce a TPP of 3,500.

A total TPP of 4,500 is currently not possible without increasing costs beyond £400,000.



Another way of seeking to maximize profits is to target an output of say 4,000 and then find the Iso-cost with the lowest possible cost. In this case, the Iso-cost which touches the tangential point of the TPP is a TC of £400,000.

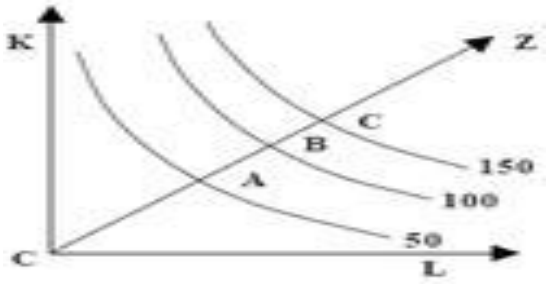
Law of Returns to scale

The law of returns to scale explains the proportional change in output with respect to proportional change in inputs. In other words, the law of returns to scale states when there is a proportionate change in the amounts of inputs, the behavior of output also changes. The degree of change in output varies with change in the amount of inputs. For example, an output may change by a large proportion, same proportion, or small proportion with respect to change in input.

On the basis of these possibilities, law of returns can be classified into three categories:

1. Increasing Returns to Scale:

If the proportional change in the output of an organization is greater than the proportional change in inputs, the production is said to reflect increasing returns to scale. For example, to produce a particular product, if the quantity of inputs is doubled and the increase in output is more than double, it is said to be an increasing returns to scale. When there is an increase in the scale of production, the average cost per unit produced is lower. This is because at this stage an organization enjoys high economies of scale.



Panel B

IRS: OA > AB > BC

Increasing Returns to Scale

Reasons for increasing returns to scale:

i. Technical and managerial indivisibility:

This implies that there are certain inputs, such as machines and human resource, used for the production process are available in a fixed amount. These inputs cannot be divided to suit different level of production. For example, an organization cannot use the half of the machine for small scale of production.

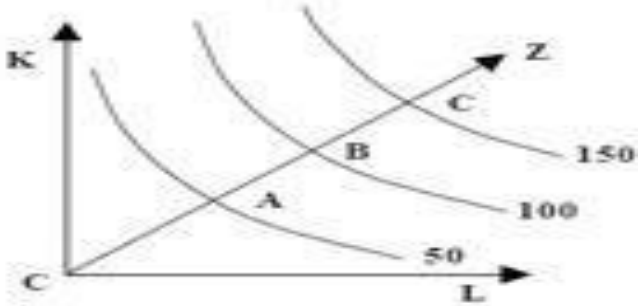
Similarly, the organization cannot use half of a manager to achieve small scale of production. Due to this technical and managerial indivisibility, an organization needs to employ the minimum quantity of machines and managers even in case the level of production is much less than their capacity of producing output. Therefore, when there is increase in inputs, there is exponential increase in the level of output.

ii. Specialization:

This implies that high degree of specialization of man and machinery helps in increasing the scale of production. The use of specialized labor and machinery helps in increasing the productivity of labor and capital per unit. This results in increasing returns to scale.

2. Constant Returns to Scale:

The production is said to generate constant returns to scale when the proportionate change in input is equal to the proportionate change in output. For example, when inputs are doubled, so output should also be doubled, then it is a case of constant returns to scale.



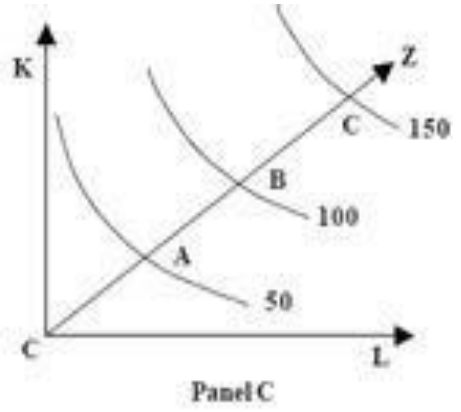
Panel A

CRS: OA = AB = BC

Constant Returns to Scale

3. Diminishing Returns to Scale:

Diminishing returns to scale refers to a situation when the proportionate change in output is less than the proportionate change in input. For example, when capital and labor is doubled but the output generated is less than doubled, the returns to scale would be termed as diminishing returns to scale.



Panel C

DRS: OA < AB < BC

Reasons for decreasing returns to scale:

Diminishing returns to scale is due to diseconomies of scale, which arises because of the managerial inefficiency. Generally, managerial inefficiency takes place in large-scale organizations. Another cause of diminishing returns to scale is limited natural resources. For example, a coal mining organization can increase the number of mining plants, but cannot increase output due to limited coal reserves.

Cost concepts:

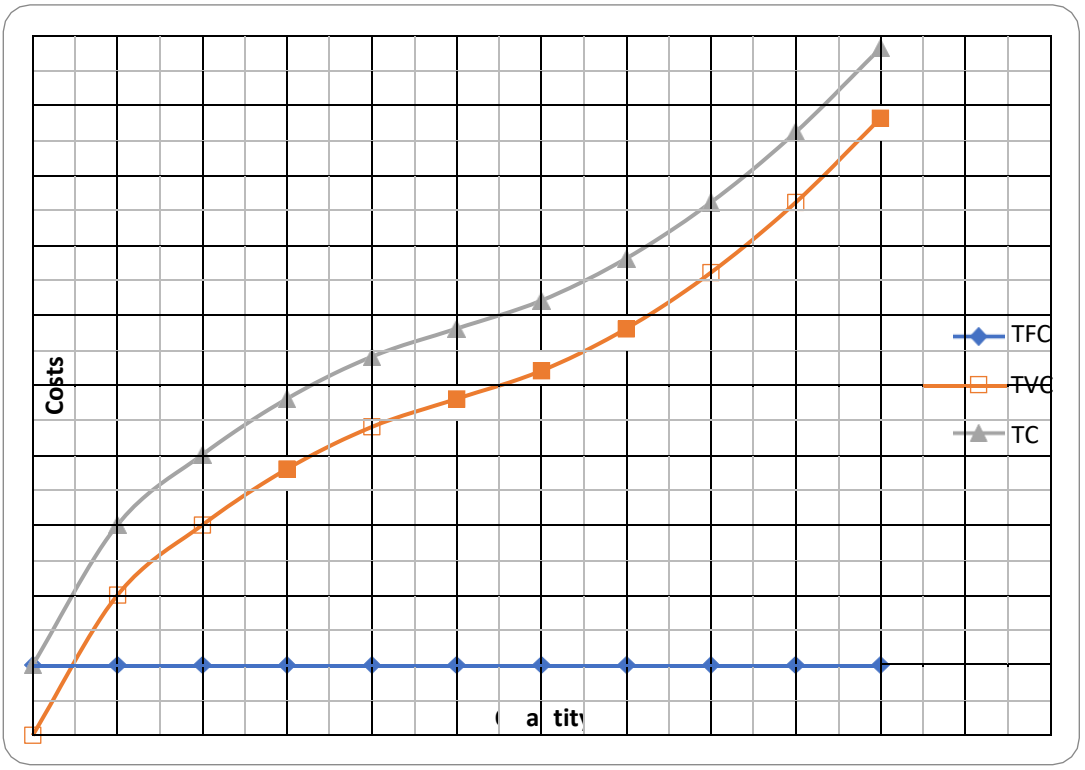
The followings are the different cost concepts:

Fixed Costs (FC) The costs which don't vary with changing output. Fixed costs might include the cost of building a factory, insurance and legal bills. Even if your output changes or you don't produce anything, your fixed costs stay the same. In the above example, fixed costs are always £1,000.

Variable Costs (VC) Costs which depend on the output produced. For example, if you produce more cars, you have to use more raw materials such as metal. This is a variable cost.

Semi-Variable Cost. Labour might be a semi-variable cost. If you produce more cars, you need to employ more workers; this is a variable cost. However, even if you didn't produce any cars, you may still need some workers to look after an empty factory.

Total Costs (TC) = Fixed + Variable Costs



Marginal Costs – Marginal cost is the cost of producing an extra unit. If the total cost of 3 units is 1550, and the total cost of 4 units is 1900. The marginal cost of the 4th unit is 350.

Opportunity Cost – Opportunity cost is the next best alternative foregone. If you invest £1million in developing a cure for pancreatic cancer, the opportunity cost is that you can't use that money to invest in developing a cure for skin cancer.

Economic Cost. Economic cost includes both the actual direct costs (accounting costs) plus the opportunity cost. For example, if you take time off work to a training scheme. You may lose a weeks pay of £350, plus also have to pay the direct cost of £200. Thus the total economic cost = £550.

Accounting Costs – this is the monetary outlay for producing a certain good. Accounting costs will include your variable and fixed costs you have to pay.

Sunk Costs. These are costs that have been incurred and cannot be recouped. If you left the industry, you could not reclaim sunk costs. For example, if you spend money on advertising to enter an industry, you can never claim these costs back. If you buy a machine, you might be able to sell if you leave the industry. See: Sunk cost fallacy

Avoidable Costs. Costs that can be avoided. If you stop producing cars, you don't have to pay for extra raw materials and electricity. Sometimes known as an escapable cost.

Explicit costs – these are costs that a firm directly pays for and can be seen on the accounting sheet. Explicit costs can be variable or fixed, just a clear amount.

Implicit costs – these are opportunity costs, which do not necessarily appear on its balance sheet but affect the firm. For example, if a firm used its assets, like a printing press to print leaflets for a charity, it means that it loses out on revenue from producing commercial leaflets.

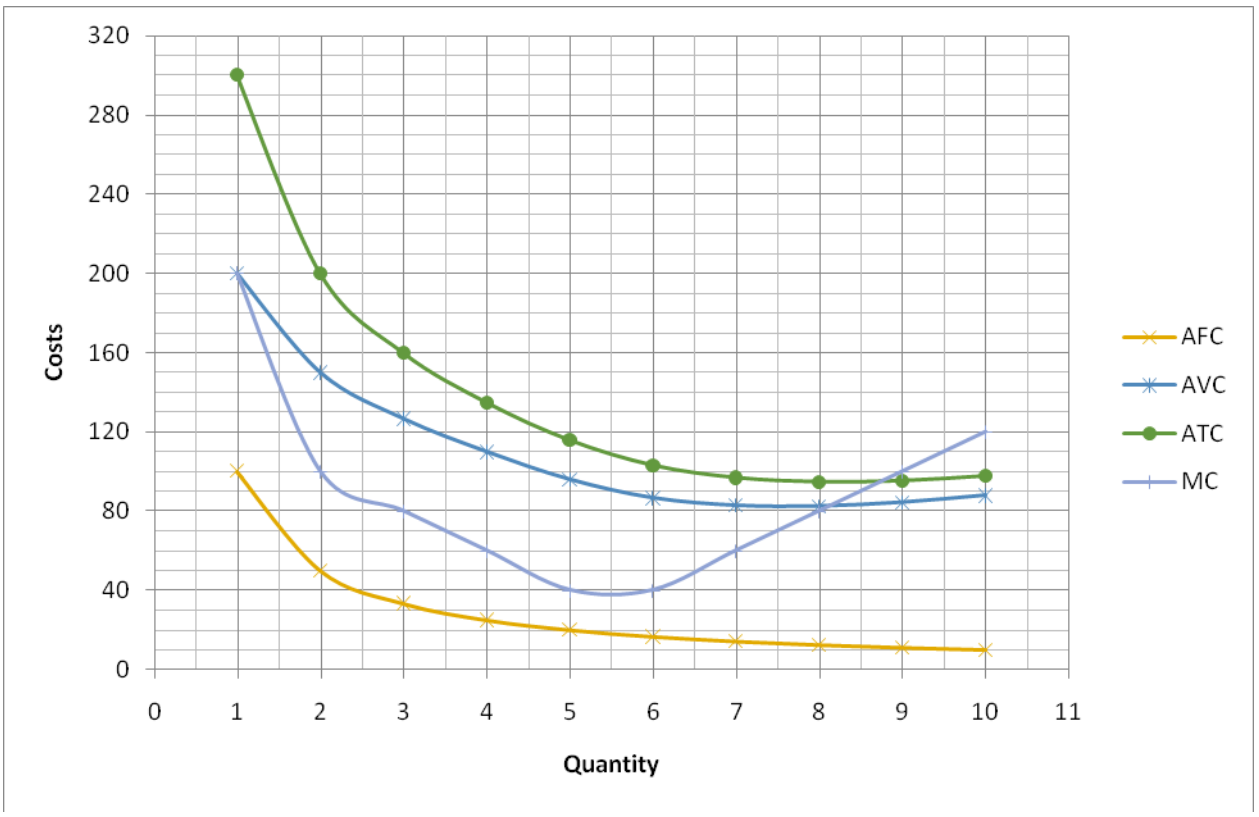
Average Cost Concepts:

Average Fixed Cost (AFC) = TFC / Q

Average Variable Cost (AVC) = TVC / Q

Average Total cost (TC) = TFC + TVC

Q	TFC	TVC	TC = TFC + TVC	AFC = TFC / Q	AVC = TVC / Q	ATC = TC / Q	MC = ΔTC / ΔQ
0	100	0	100				
1	100	200	300	100.00	200.00	300.00	200
2	100	300	400	50.00	150.00	200.00	100
3	100	380	480	33.33	126.67	160.00	80
4	100	440	540	25.00	110.00	135.00	60
5	100	480	580	20.00	96.00	116.00	40
6	100	520	620	16.67	86.67	103.33	40
7	100	580	680	14.29	82.86	97.14	60
8	100	660	760	12.50	82.50	95.00	80
9	100	760	860	11.11	84.44	95.56	100
10	100	880	980	10.00	88.00	98.00	120



Because the short run marginal cost curve is sloped like this, mathematically the average cost curve will be U shaped. Initially, average costs fall. But, when marginal cost is above the average cost, then average cost starts to rise.

Marginal cost always passes through the lowest point of the average cost curve.

Example: A biscuit producing company has the following variable cost function:

$TVC = 200Q + 9Q^2$ if the company's fixed costs are equal to Rs.150 lakhs find out Total cost function, MC function, AVC function, AC function and at what output levels AVC and MC will be minimum.

Solution:

since the TC is the sum of TFC and TVC, we get the TC function as under:

$$TC = 150 + 200Q + 9Q^2$$

To determine MC we take the first derivative of the TVC function with respect to output Q. Thus,

$$MC = \partial TC / \partial Q = 200 - 18Q$$

To derive the AC and AVC we derive the respective TC by the output level.

$$AC = TC/Q = (150 + 200Q + 9Q^2) / Q$$

$$= 150/Q + 200 – 9Q$$

$$AVC = TVC / Q$$

$$= (200Q + 9Q^2) / Q$$

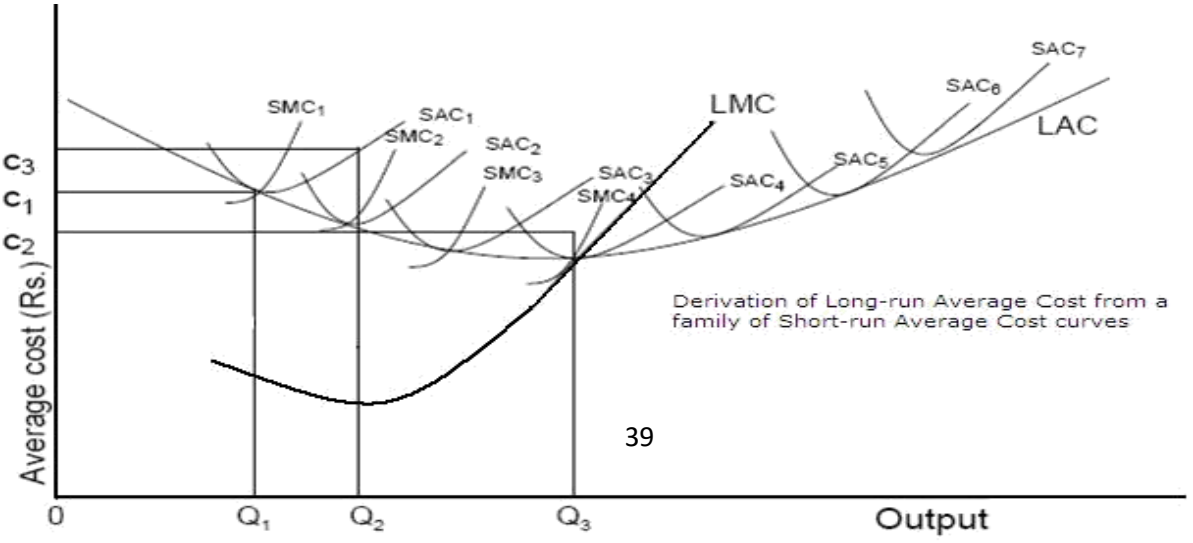
$$= 200 – 9Q$$

Long run Cost Function

Long-run is defined as the period in which all factors of production are variable. While, in the short-run some costs are fixed and others vary (variable costs), in the long-run all the costs are variable. Hence, the long run cost reflects the returns to scale. When a manager decides to increase all the factors of production, it is known as a change in the scale of a firm's operation. In response to the change in the scale, the firm may experience increasing, constant and/or diminishing returns to scale. These changes in returns may be expressed in terms of cost conditions as decreasing costs, and constant costs and/or increasing costs. Long-run is a composed of series of short-run. So Long-run curves are composed of short-run curves

Derivation of LAC from SAC: In every short-run Total cost curve there is one short-run average cost curve i.e. SAC1 , SAC2 , SAC3 every SAC has its minimum point the LAC curve are derived from the SAC curves by joining the minimum point, or diminishing point or increasing point, depending upon STCs.

The relation between LTC & LAC is at the initial stage, LTC increases at diminishing rate and later it increases at an increasing rate. So the LAC in first instances it declines then it increases



Derivation of Long-run Average Cost from a family of Short-run Average Cost curves

At the initial short-run average cost SAC1, the firm produces OQ1 units of output at the per unit cost OC1. When the manager plans to increase output to OQ2 units, the average cost would be OC3 on the rising part of the SAC1 cost curve if the same plant is used. On the other hand, if an additional plant is installed, the cost would fall to OC2 (OC2 < OC1). Thus, the installation of a new plant decreases the cost per unit of output. The diagram shows that average cost will successively fall till the installation of the fourth plant. The lowest AC level is reached at output level OQ3. This level is known as the optimum level of output, at which the long run average cost (LAC) is minimum and the LMC cuts it from below. Here, the long run equilibrium condition of LAC = LMC and LMC cutting LAC from below have been reached. If output increases beyond OQ3, the LAC would rise for every additional plants installed. No rational manager would install new plant beyond it, as they wish to make at least normal profits in the long run. The long run average cost curve (LAC) is also known as envelope curve as it envelopes several average cost curves corresponding to different plant size. Further, it is also known as a planning curve, as it guides the manager in planning the future expansion of plant and output.

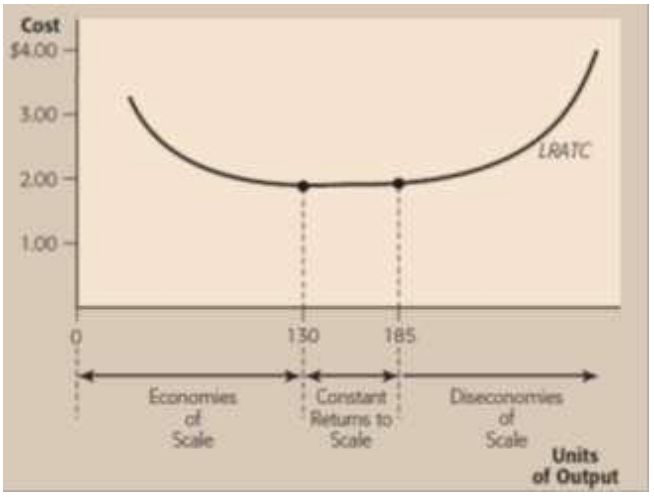
Economies of scale

- **Commercial economies:** Bulk buying of materials through long-term contracts.
- **Managerial economies:** Increasing the specialization of managers.
- **Financial economies:** Obtaining lower-interest charges when borrowing from banks and having access to a greater range of financial.
- **Marketing economies:** Spreading the cost of advertising over a greater range of output in media markets.
- **Technological economies:** Taking advantage of returns to scale in the production function.

Each of these factors reduces the long run average costs (LRAC) of production by shifting the short - run average total cost (SRATC) curve down and to the right. Economies of scale are also derived partially from learning by doing.

Economies of scale is a practical concept that is important for explaining real world phenomena such as patterns of international trade, the number of firms in a market, and how firms get "too big to fail". The exploitation of economies of scale helps explain why companies grow large in some industries. Economies of scale also play a role in a "natural monopoly."

Long-run average total cost increases as output increases. While economies of scale are more likely at low levels of output, diseconomies of scale are more likely at higher output levels. In Figure, you can see that the firm does not experience diseconomies of scale until its output reaches more than 185 units.



Economies of Scope

Economies of scope is a term that refers to the reduction of per-unit costs through the production of a wider variety of goods or services.

Economies of scope are cost advantages that result when firms provide a variety of products rather than specializing in the production or delivery of a single product or service. Economies of scope also exist if a firm can produce a given level of output of each product line more cheaply than a combination of separate firms, each producing a single product at the given output level. Economies of scope can arise from the sharing or joint utilization of inputs and lead to reductions in unit costs. Scope economies are frequently documented in the business literature and have been found to exist in sectors like healthcare, banking, publishing, distribution, and telecommunications.

Economies of Scope (S) = $[C(q_a) + C(q_b) – C(q_a + q_b)] / C(q_a + q_b)$

- **$C(q_a)$** is the cost of producing quantity q_a of good a separately
- **$C(q_b)$** is the cost of producing quantity q_b of good b separately
- **$C(q_a+q_b)$** is the cost of producing quantities q_a and q_b
- **S** is the percentage cost saving when the goods are produced together. Therefore, S would be greater than 0 when economies of scope exist.

Example of Economies of Scope

For example, a restaurant produces both burgers and sandwiches. The cost of separately producing 10,000 burgers is Rs. 20 each. Likewise, if 40,000 sandwiches are produced separately, the cost is $10 each. If 10,000 burgers and 40,000 sandwiches are produced together (by using the same preparation and storage facility), the total cost is $1,500,000.

To determine the economies of scope:

1. Determine $C(q_a) = 10,000 * 20 = \$200,000$
2. Determine $C(q_b) = 40,000 * 10 = \$400,000$
3. Determine $C(q_a+q_b) = \$500,000$
4. Plug the numbers into the Economies of Scope formula

($200,000 + $400,000 – $500,000) / $500,000 = 20%. Therefore, the cost of producing burgers and sandwiches together is 20% less than the cost of producing them separately.

How to Achieve Economies of Scope?

1. Flexible Manufacturing

If multiple products can be produced using the same manufacturing systems and inputs. For example, using the same preparation and storage facilities when making hamburgers and fries as opposed to separate facilities.

2. Related Diversification

If a company is able to use its operational expertise, resources, and capabilities across their organization. For example, hiring designers and marketers who can use their skills across different product lines allows for the production of a wide range of products.

3. Mergers

If a company is able to share research and development expenses to reduce costs and diversify its product portfolio or knowledge. For example, pharmaceutical companies combining their research and development expenses to create new products.

Economies of Scope vs. Economies of Scale

Economies of scope are often confused with economies of scale. The former refers to the decrease in the average total cost of production when there is an increasing **variety of goods produced.** On the other hand, economies of scale refer to the cost savings achieved from increasing the **scale of production of the same goods.**

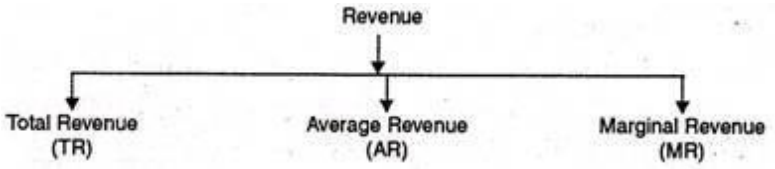
Economies of scope: Savings in cost due to the increased production of distinct products using the same operations. Economies of scope reduce the average cost of producing multiple products.

Economies of scale: Savings in cost due to the increased production of the same product. Economies of scale reduce the average cost of producing one product.

Concept of Revenue:

The term revenue refers to the income obtained by a firm through the sale of goods at different prices. In other words, the revenue of a firm is its sales, receipts or income.

The revenue concepts are concerned with Total Revenue, Average Revenue and Marginal Revenue.



Total Revenue:

The income earned by a seller or producer after selling the output is called the total revenue. In fact, total revenue is the multiple of price and output. The behavior of total revenue depends on the market where the firm produces or sells.

Total revenue at any output is equal to price per unit multiplied by quantity sold.

Thus,

$$TR = AR \times Q$$

where TR = Total Revenue
AR = Average Revenue or Price per Unit
Q = Output

For example if the price of a commodity is Rs. 100 and total units sold are 20 in that case total revenue will be

$$TR = 100 \times 20 = 200$$
$$TR = 2000$$

2. Average Revenue:

Average revenue refers to the revenue obtained by the seller by selling the per unit commodity. It is obtained by dividing the total revenue by total output.

"The average revenue curve shows that the price of the firm's product is the same at each level of output." Stonier and Hague

Thus :

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

where AR = Average Revenue
TR = Total Revenue
Q = Output

According to **McDonnell**, "Average Revenue is the per unit revenue received from the sale of one unit of a commodity."

$$TR = \text{Price} \times \text{Output}$$
$$TR = Pq$$
$$AR = \frac{Pq}{q} = P$$

and $P = f(Q)$ is an average curve which shows that price is a function of quantity demanded. It is also a demand curve.

3. Marginal Revenue:

Marginal revenue is the net revenue obtained by selling an additional unit of the commodity. "Marginal revenue is the change in total revenue which results from the sale of one more or one less unit of output." Ferguson. Thus, marginal revenue is the addition made to the total revenue by selling one more unit of the good. In algebraic terms, marginal revenue is the net addition to the total revenue by selling n units of a commodity instead of n – 1.

Therefore,

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

$$MR_n = TR_n - TR_{n-1}$$

Whereas

TR_n = Total Revenue of 'n' units

TR_{n-1} = Total Revenue from $(n - 1)$ units

$MR_{(nth)}$ = Marginal revenue from nth unit

n = Any given number

A. Koutsoyiannis, "The marginal revenue is the change in total revenue resulting from selling an additional unit of the commodity."

If total revenue from (n) units is 110 and from (n – 1) units is 100.

in that case

$MR_{nth} = TR_n - TR_{n\_1} = 110 - 100$

$MR_{nth} = 10$

MR in mathematical terms is the ratio of change in total revenue to change in output

$MR = \Delta TR/\Delta q$ or $dR/dq = MR$

The relation of total revenue, average revenue and marginal revenue can be explained with the help of table and fig.

Table Representation:

The relationship between TR, AR and MR can be expressed with the help of a table 1.

Table 1

Unit (q)	TR/q AR or Price	(Pq) TR	($TR_n - TR_{n-1}$) MR
1	10	10	10
2	9	18	8
3	8	24	6
4	7	28	4
5	6	30	2
6	5	30	0
7	4	28	– 2
8	3	24	– 4
9	2	18	– 6
10	1	10	– 8

From the table 1 we can draw the idea that as the price falls from Rs. 10 to Re. 1, the output sold increases from 1 to 10. Total revenue increases from 10 to 30, at 5 units. However, at 6th unit it becomes constant and ultimately starts falling at next unit i.e. 7th. In the same way, when AR falls, MR falls more and becomes zero at 6th unit and then negative. Therefore, it is clear that when AR falls, MR also falls more than that of AR: TR increases initially at a diminishing rate, it reaches maximum and then starts falling.

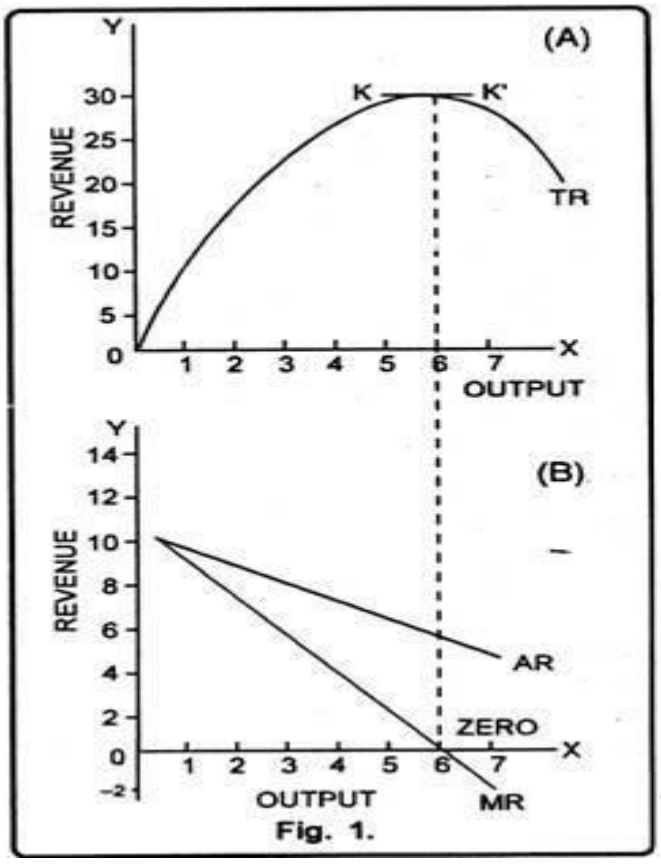


Fig. 1.

In fig. 1 three concepts of revenue have been explained. The units of output have been shown on horizontal axis while revenue on vertical axis. Here TR, AR, MR are total revenue, average revenue and marginal revenue curves respectively.

In figure 1 (A), a total revenue curve is sloping upward from the origin to point K. From point K to K' total revenue is constant. But at point K' total revenue is maximum and begins to fall. It means even by selling more units total revenue is falling. In such a situation, marginal revenue becomes negative.

Similarly, in the figure 1 (B) average revenue curves are sloping downward. It means average revenue falls as more and more units are sold.

In fig. 1 (B) MR is the marginal revenue curve which slopes downward. It signifies the fact that MR with the sale of every additional unit tends to diminish. Moreover, it is also clear from the fig. that when both AR and MR are falling, MR is less than AR. MR can be zero, positive or negative but AR is always positive.

MODULE: III

Market Morphology

- Market refers to an arrangement as well an institution, where both buyer and seller get interacted through a medium for a pre-defined transaction.
- In a simple sense market can be defined as the interaction between seller and buyers of a good or service at a mutually agreed upon price
- Market morphology is otherwise called market structure refers to the competitive environment in which buyer and seller co-exist in an economy.
- Knowledge of market structure is very important to study the behavior of firms in an economy. The type of decisions a firm makes and the potential of the firm to earn profits in the short run and long run, depends on the type of market structure in which the firm operates.
- Market structure can be broadly categorized in to three types as perfect competition, monopoly and imperfect competition.

Type of Market	Number of Firm	Nature of product	Number of buyers	Freedom of entry and exit	Examples
Perfect competition	Very large	Homogeneous	Very large	Unrestricted	Agricultural commodities, share market
Monopoly	Single	Unique	Large	Restricted	Indian railway, Microsoft, Intel Processor
Monopolistic competition	Many	Differentiated	Large	Unrestricted	Retail Stores
Oligopoly	Few	Differentiated unique	Large	Restricted	Cars, Telecom Service provider
Duopoly	Two	Differentiated unique	Large	Restricted	Pepsi Vs Coke

Price and Output Determination under Different Markets

Perfect Competition

In perfect competition, firm is the part of the whole industry and industry is the aggregation of many firm. In such market the price is determined by the decided by the industry and the firms are price takers again there is free entry and free exit of the firm.

Perfect competition is that sort of market structure, where there is large number of buyer and large number of seller, buying and selling homogeneous product. Where the price is determined by the industry and all the firms have to follow the price.

Mrs Jhon Robinson "Perfect competition prevails when the demand for output of each producer is perfectly elastic"

To Marshall "the price in perfect competition is determined by the interaction of demand and supply" he compared the demand and supply with two blades of a scissor, but it is uncertain to say which blade actually works. Therefore, in short we can say price is that point where both demand curve and supply curve interact to each other.

Characteristics of perfect competition

(a) Large number of buyers and sellers: - A perfectly competitive market is basically formed by a large number of buyers and sellers. Their number is sufficiently large and the size of each seller and buyer is relatively small in terms of market. So, the individual seller's buyer's and supply and demand are negligible in terms of market supply and demand. Hence, individual seller and buyer do not have a control over supply and demand of the market.

(b) Homogeneous Product: - The commodity supplied by each firm in a perfectly competitive market is homogeneous. It means all firms in the industry produce identical products. The products are identical in terms of quality , variety , colour , design, packing and other selling conditions of the product.

(c) Free entry and exit of firms: - New firms are not having any legal, technological, economic, and financial or any other barrier to their entry in the industry. Similarly, existing firms are free to quit the market. There are no barriers to entry or exit of firms. Entry or exit may take t ime, but firms have the freedom to move in or move out of the industry .

(d) Perfect knowledge of market conditions: - Perfect competition requires that all the buyers and sellers must possess perfect knowledge about the existing market conditions such as market price, quantities and sources of supply and demand. The perfect knowledge ensures transactions in a perfectly competitive market at a uniform price.

(e) Non-intervention of the Government: - A perfect competition also implies that there is no government intervention in the working of market economy. This means that there are no tariffs, subsidies, rationing of goods, control on supply raw materials and licensing policy.

(f) Absence of transport costs element:-It is essential that competitive position of no firm is adversely affected by the transport cost differences. Hence, it is assumed that there is absence of Transport cost as all firms are closer to the markets.

(g) Perfect mobility of factors of production:- it implies that various factors of production should be free to move in to any use which they consider profitable for themselves. Similarly, they are also free to come out from the industry whenever they consider their remuneration is inadequate.

Example of Perfectly competitive market are Agricultural products like Local vegetable market

Condition for equilibrium

As explained earlier, under perfect competition the firm is a price taker and it any way can't influence the price by its individual action. Thus, the demand curve or average revenue curve of the firm is a horizontal straight line or perfectly elastic at the level of prevailing price. It implies a perfectly competitive firm sells additional units of output at the same price, MR curve coincides with the AR curve. That the MR of a perfectly competitive firm equals price or AR can be mathematically shown as under.

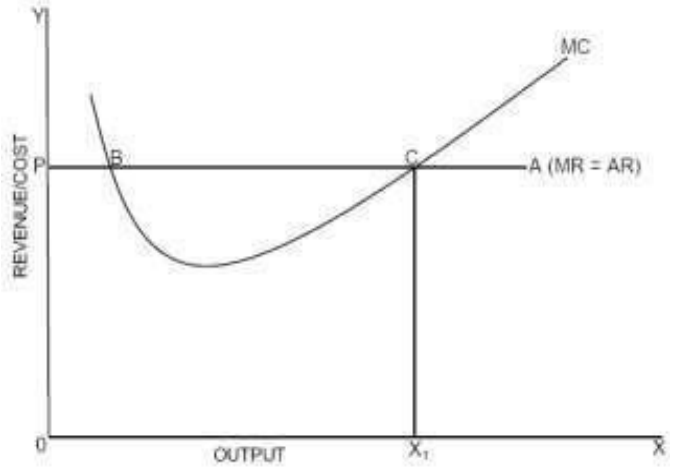


Fig. 1 Conditions of Equilibrium Under Perfect Competition

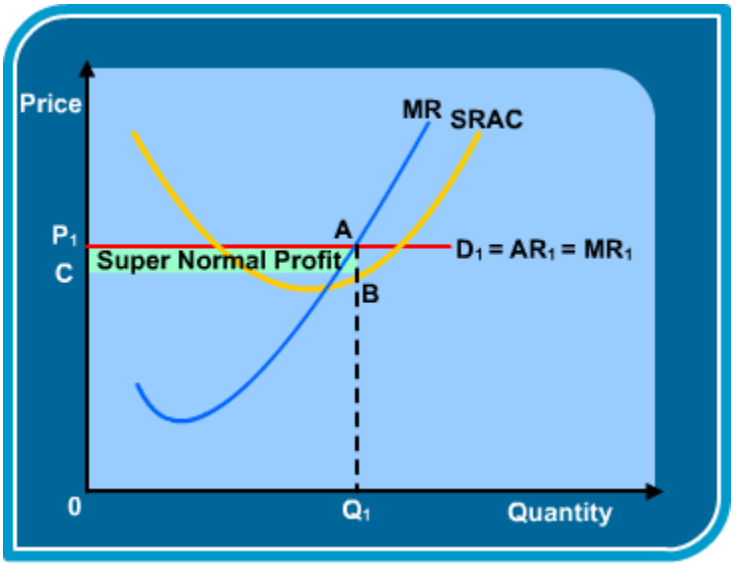
Price for an individual firm under perfect competition is given. It cannot influence the price by its own action. Hence, the demand curve or average revenue curve facing a firm under perfect competition is perfectly elastic at the ruling price. Perfectly competitive firm can sell as much as it wishes without affecting the price, and the marginal revenue is equal to the price (average revenue) of the commodity. So, the average revenue (or demand) curve, (AR) and marginal revenue curve (MR) must coincide with each other for a firm under perfect competition.

If price prevailing in the market is OP, then PA is both the average and marginal revenue curve. MC is the marginal cost curve. It may be noted that under perfect competition, a firm's upwards rising position of MC curve is also its supply curve. Given the price OP, the firm will fix its output where its profits are maximum. Profits are the greatest at the level of output for which marginal cost is equal to marginal revenue and marginal cost curve cuts the marginal revenue curve from below. In point B MC is equal to MR but MC is cutting MR from above rather than from below. Therefore, B cannot be a position of equilibrium. At point C or output OX1, the marginal cost equals MR and marginal cost curve is also cutting MR curve from below. Hence, at the output OX1, the profits would be maximum and the firm would be in equilibrium position. Thus, the conditions of firm's equilibrium under perfect competition are: -

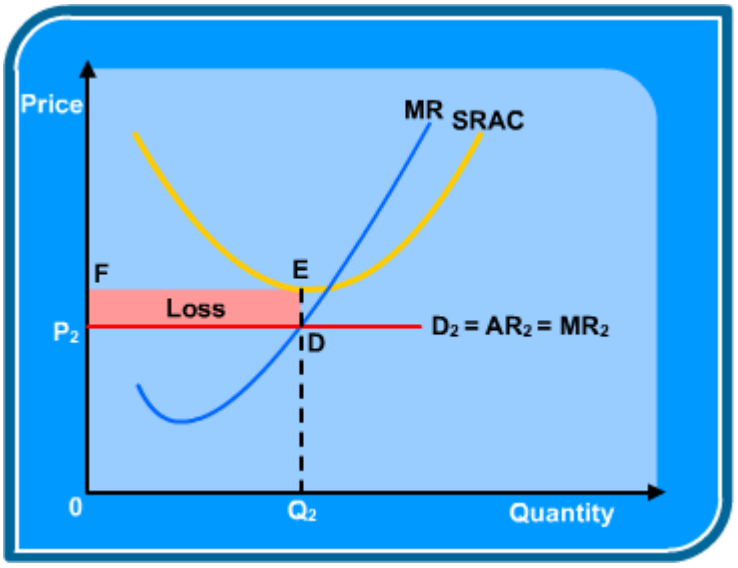
(i) MC =MR = Price
(ii) MC must cut MR from below.

Equilibrium of firms and industry in Short period

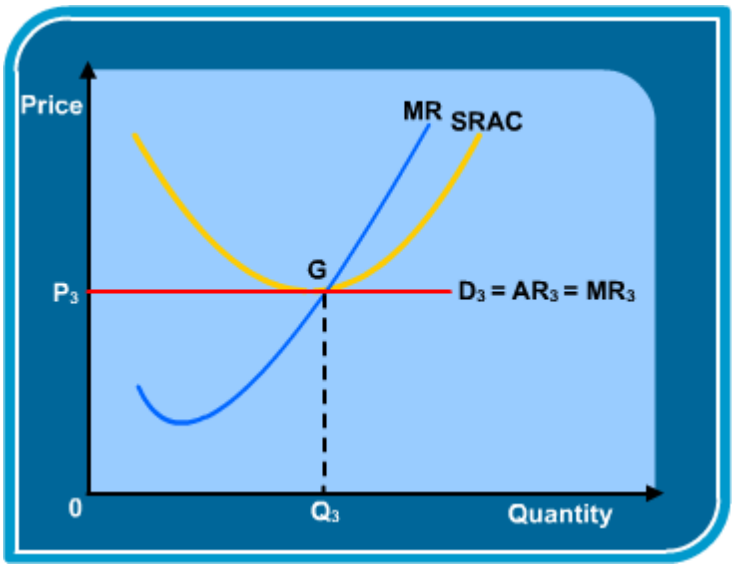
The short run has been defined as a period of time sufficient to allow the firm to adjust its output by increasing or decreasing the amount of variable input and fixed factors of production remains constant. Thus, in the short run, the size and kind of plant cannot be changed, nor can new firms enter the industry. The industry would be in equilibrium where there will be equilibrium in all the firms.
In short run, the firms can carn super normal profit , normal profit, or incur loss as shown in the following figure.



In the above diagram, the given price is P1. The firm wants to maximize profits, so it produces at the level of output where MC = MR. This occurs at point A. Drop a vertical line to find the firm's output (Q1). At Q1, AR > AC and the difference between average revenue and average cost is the distance AB. This is the profit per unit. To find the total super normal profit, we must multiply the profit per unit per the number of units. In the diagram, this is the area ABCP1.



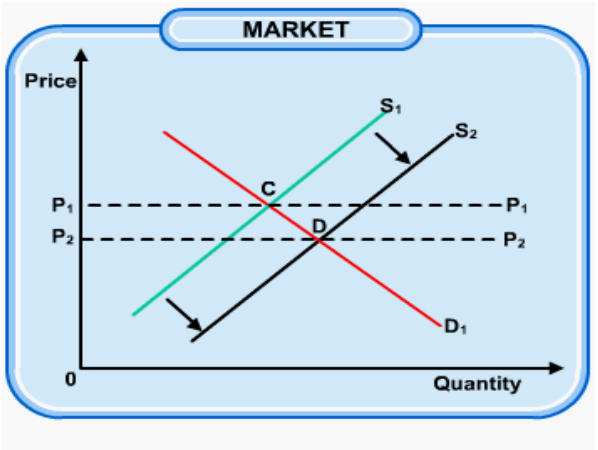
In the above diagram, the given price is P2. In this case, the AC curve is above the AR curve at all levels of output. The equilibrium occurs at point D giving output Q2. At Q2, AR < AC and the difference between average revenue and average cost is the distance DE. This is the loss per unit. To find the total losses, we must multiply the loss per unit per the number of units. In the diagram, this is the area DEFP2.

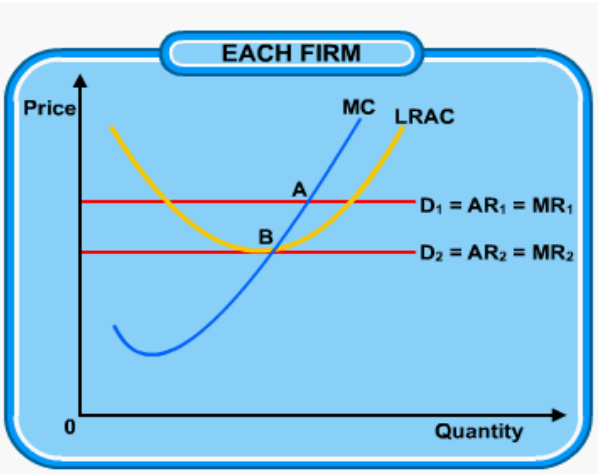


In the above diagram, the given price is P_3. Again, the firm will produce the level of output for which MC = MR. This occurs at point G, giving a level of output of Q_3. Notice that at this point, AR = AC, so the firm is making normal profit.

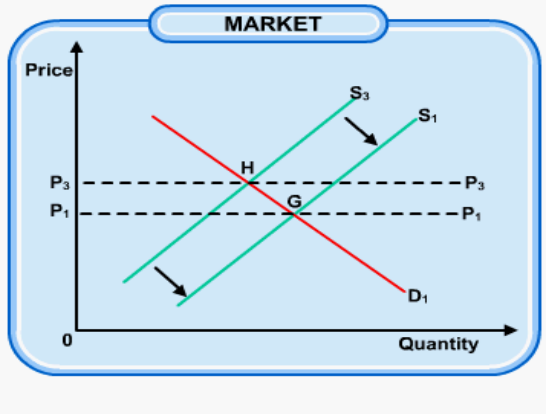
So, in the short run, a perfectly competitive firm could be making super normal profit, or a loss, or just normal profit, depending on the given market price. Note that if the firm's losses get too big in the short run (i.e. AR < AVC) then it will have to shut down.

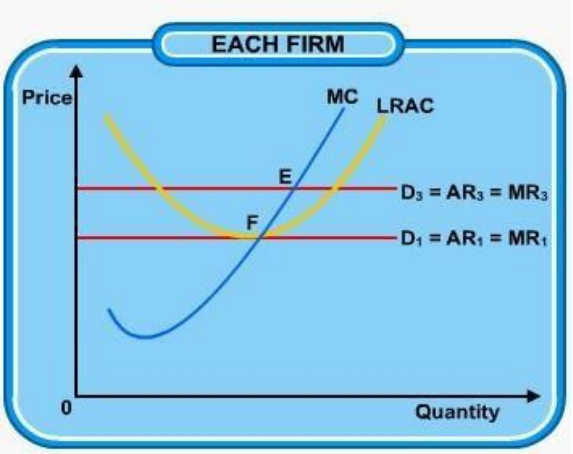
Equilibrium of firms and industry in Long period:





In the diagrams above, the initial price is P_1, due to the fact that the initial demand and supply curves, D_1 and S_1, cross at point C. This given price means that each firm's demand curve is D_1. MC = MR occurs at point A. AR > AC, so each firm is making super normal profits. But what will happen as we move towards the long run? Remember that there are **no** barriers to entry **or** exit in a perfectly competitive market. This means that new firms will be attracted, in quite large numbers, into the market. This will increase market supply, shifting the supply curve to the right. This will keep happening until the given price is such that all firms in the market earn only normal profit. All of the super normal profit will have been competed away. Once the supply curve has shifted all the way to S_2, with a given price of P_2, then every firm in the industry will be earning normal profit and there will be **no** incentive for any firm to enter or leave the industry. This is, therefore, the long run equilibrium.





In the diagrams above, each firm is making a loss at the initial price P_1. MC = MR occurs at point F, where AR < AC. As we said earlier, firms can take a reasonable sized loss in the short run, but this is not sustainable as we move into the long run. Again, there are **no** barriers to exit, so some firms will leave the industry, causing the market supply curve to shift to the left. This will keep happening until the given price is such that all firms in the market earn only normal profit. Once the supply curve has shifted all the way to S_3, with a given price of P_3, then every firm in the industry will be earning normal profit and there will be **no** incentive for any firm to enter or leave the industry. This is, therefore, the long run equilibrium.

Monopoly

Meaning of Monopoly

Monopoly is a word derived from the Latin word mono and poly. Mono means single and poly means seller. Therefore, monopoly is form of market organization where only seller of the commodity available moreover there is no close substitute for the commodity. Since the seller being the only seller. He has full control over the supply of commodity. In such situation the seller dictates the price to the consumer. Thus monopolist is the price maker. Under the monopoly form of market there is no much difference between the firm and industry.

Main Features of Monopoly:

(1) One seller and large number of buyers:- There is only one seller of a particular good or service. The monopolist may be a single person or a partnership firm or a corporate body. Again in monopoly the number of buyers is large and the demand for the monopolist is the market demand. As there is no difference between industry and firm in monopoly.

(2) No close substitute: - Rivalry from the producers of substitutes insignificant. This implies that the cross-elasticity of demand between the monopolists' product and any other product is small or zero

(3) The monopolist is price maker:- The monopolist is in a position to set the price himself. The strength of a monopolist lies in his power to raise his prices without frightening away all his customers. How much he can raise them depends on the elasticity of demand for his particular product. This, in turn, depends on the extent to which substitutes for his products are available. And in most cases, there is rather an infinite series of closely competing substitutes. Even exclusive monopolies like railways or telephones must take account of potential competition by alternative services. An undue increase in rates may lead to substitution of railways by motor transport and of telephone calls by telegrams. The closer the substitute and the greater

the elasticity, therefore, of the demand for a given manufacturing's product, the less he can raise his price without frightening away his customers. In fact, two conditions are necessary to make a monopolist strong: (i) A gap in the chain of substitutes, and (ii) Possibility of securing control over all the close substitutes. In fact, it is very difficult to draw a line between what is and what is not a monopoly.

(4) Restriction on the entry of new firm:- in simple monopoly there is a strict barrier on the entry of new firms hence monopolist faces no competition.

(5) Nature of demand curve:- in monopoly, as there is one firm the aggregate demand for all buyers is the demand curve for the monopolist. It slopes downward from left to right. According to

this demand curve it is clear that monopolist can sale more of his output at lower price a nd vice-versa. The downward sloping demand curve also tells that the AR curve or the price goes on falling as sales are increased. Therefore both AR and MR curve slopes downward from left to right. It is also note worthy that AR remains higher then MR.

Causes of Monopoly

(i) The Government may grant a license to any particular person or persons for operating public utilities like a gas company or an electricity undertaking.

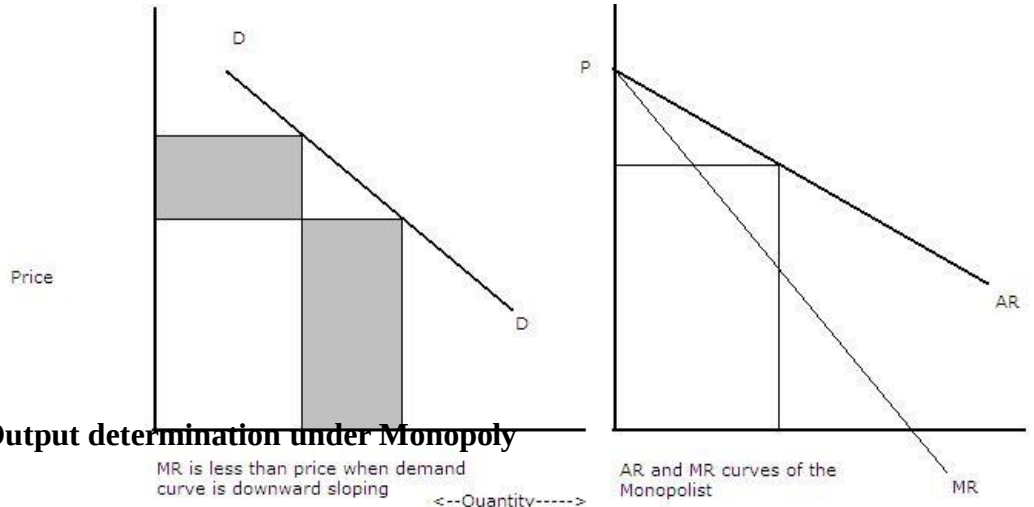
(ii) A producer may possess certain scarce raw materials, patent rights, secret methods of production, or specialized skill which might give him monopoly power. For example, Hoechst held a

monopoly for some time in oral medicines for diabetes because they were the first to find out the methods of reducing blood sugar by an oral dose.

(iii) The necessity of having large resources, as is the case where the minimum efficient scale of operations is very large, may often create monopoly. For example, it is so f or making some chemicals.
(iv) Ignorance, laziness and prejudice of the buyers may create monopoly in favour of a particular producer.

The Nature of Demand and Marginal Revenue Curve

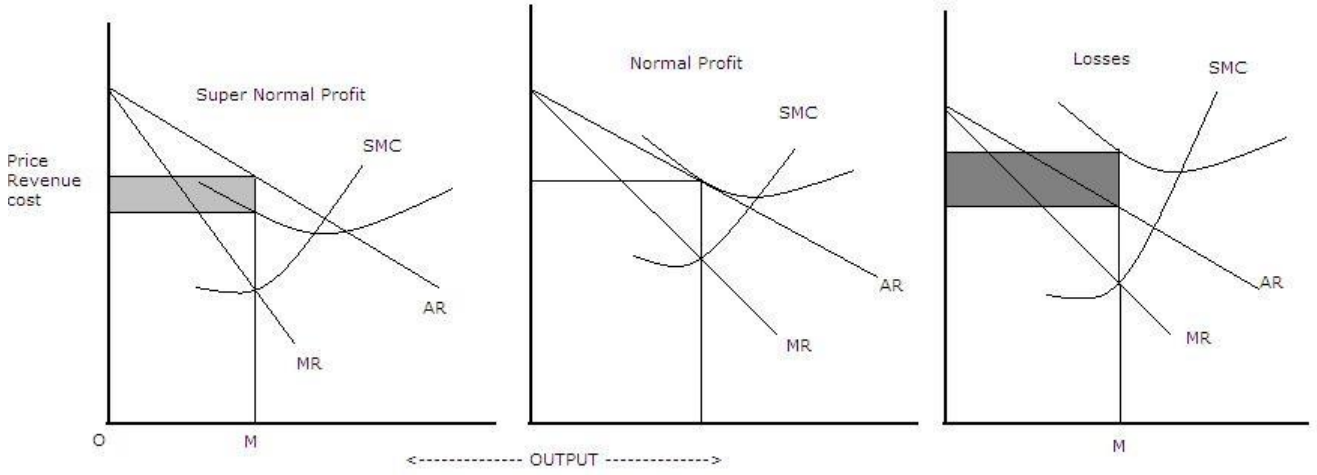
Average Revenue. If a monopolist raises his price slightly, he will sell less, but there will still be some buyers of his product. He can increase his sales only by reducing his price. His average revenue (demand) curve will slopes downwards to the right. It shows that larger quantities can be sold at lower prices, whereas smaller quantities can be sold at higher prices.



Price and Output determination under Monopoly

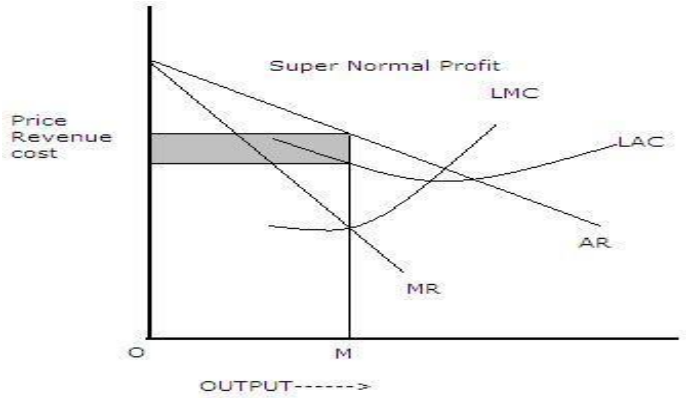
(1) Price and output determination in short-run:- short period is a time period in which there are two types of factors of production namely fixed factors and variable factors. Hence in the short - run production can be changed only by changing the variable factors of production i.e. existing machine and plants and new factories can't be installed. The aim of the monopolist is to earn maximum profit or suffer minimum

losses. Since monopolist is the single seller he can fix up his price equal to or above or less then AC. Thus in the short -run he may earn normal profit or super normal profit or even losses. This depends upon the nature of the demand for his product and the consumer surplus of the society because a monopolist has to fix up the price with in the consumer surplus otherwise he may loose the market. In order to maximize profit and minimize losses the monopolist obviously compares his MR and MC. If MR exceeds the MC the monopolist can minimize his profit by increasing his output.



In the first figure the monopolist is in equilibrium at the point E because at this point MC intersects MR from its below at that point the output is OM. In such situation he is earring supernormal prof it as shown in the shaded area PQRS. In the second figure E is the point of equilibrium where MR=MC. At this point price = SAC hence the firm is earning normal profit. The last figure shows the firm is incurring losses where is AC is higher than the AR and the monopolist firm is incurring losses in the shaded area of PQRS

Price and output determination in Long-run: - The long run is a period which is long enough to permit changes in the variable as well as in the fixed factors of input. Hence, firms ca n change their output by increasing their fixed equipment. They can enlarge the old plants or replace them by new plants or add new plants.



In the Long-run the monopolist firm is in equilibrium where MC=MR and MC intersects from below. The long run equilibrium of firm under monopoly can be explained in the side diagram the firm is in equilibrium at the point E where the LMC intersects MR from below. At this point OM is the output firm is earning super normal profit equal to PQRS as AR is higher then AC by PQ. In the long run monopolist firm always enjoys supernormal profit thus they are called monopoly profit.

In the Long-run monopoly prices affected by the laws of returns to scale. The law of returns to scale refers to the behavior of AC and MC.

Monopolistic Competition

Meaning of Monopolistic competition

Monopolistic competition is mostly found in the present world. Monopolistic competition refers to a market situation in which there are many producers producing goods which are close substitutes of one another.

The distinguishing features of monopolistic competition which makes it as a blending of competition and monopoly is the differentiation of the product. This means that the products of various firms are not homogeneous but differentiation though they are closely related to each other.

As defined by Joe S.Bain 'Monopolistic competition is found in the industry where there are a large number of sellers, selling differentiated but close substitute products'.

Monopolistic competition is said to be the combination of perfect competition as well as monopoly because it has the features of both perfect competition and monopoly.

Characteristics of Monopolistic competition

(1) Large number of sellers:- the number of sellers in monopolistic competition market structure is sufficiently large and each firms acts independently without caring others.

(2) Product differentiation:- there is large number of buyers in monopolistic competition who are offered differentiated products and consequently have preference for the product of particular seller. To initiate preferences different seller resort different method of advertisement for their' own product may be real or fancied. Moreover differentiation of product may be linked with the condition of the sale that means location of his soap the courteous and smiling disposition of its salesman. E.g there is various manufacturer of toothpaste which produces different brands such as Colgate, Binaca, Forhans, Pepsodent, Signals, Neem etc.

(3) Unrestricted entry:- entry to the industry is unrestricted. New firms are able to commence production of very close substitute for the existing brands of the products.

(4) Selling cost:- every firm tries to promote its own product through different types of expenditure on advertisement. The effect of this advertisement expenditure or the selling cost may be attached to the consumer. In this way the selling cost of the different product differ from each other.

(5) Price policy of firm:- in Monopolistic competition the firm takes the decision of price policy where as in perfect competition a firm is only a price taker.

Price-output Determination under Monopolistic Competition

Under monopolistic competition, different firms, produce different varieties of the product.

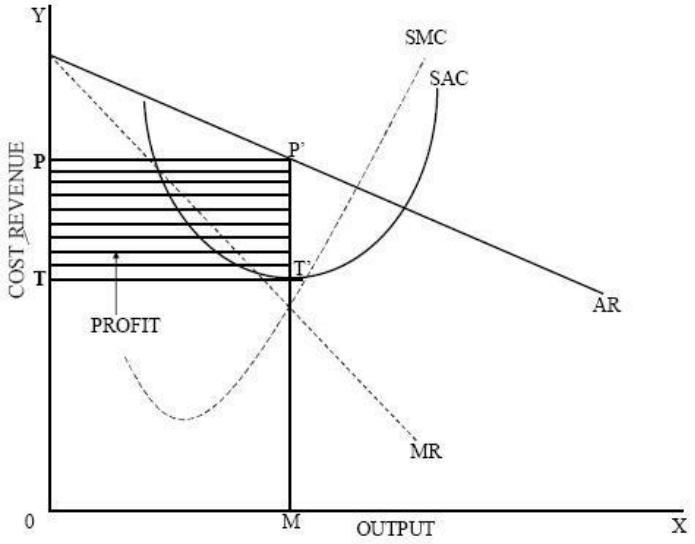
Therefore, different prices for them will be determined in the market depending upon their respective demand and cost conditions. Each firm under monopolistic competitions seeks to achieve equilibrium or profit-maximizing position as regards (1) price and output, (2) product adjustment and (3) adjustment of selling costs. In other words, the producer, under monopolistic competition, must make optimal adjustments not only in the price charged and as regards the quantity of output sold but also in the design of the product and the way in which he promotes the sales.

Short-run Equilibrium

In the short run, the firm will be in equilibrium when it is maximizing its profit, i.e.,

(i) Marginal Revenue = Marginal Cost, and

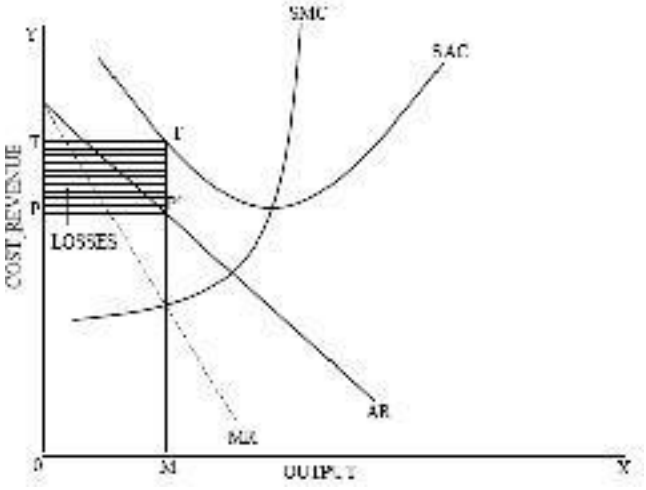
(ii) Slope of marginal cost > Slope of marginal revenue.



In this, AR is average revenue curve, MR is marginal revenue curve, SAC is the short -run average cost curve, and SMC is the short run marginal cost curve. In these figures, marginal revenue curve

(MR) and marginal cost curve (SMC) intersects each other at the output OM at which price is OP'. the firms is earning supernormal profits. Supernormal profit per unit of output is the difference between average revenue and average cost at the equilibrium point. In this case, in equilibrium, the average revenue is MP and average cost is MT'. Therefore, PT is the supernormal profit per unit of output. Total supernormal profit will be measured by the area of t he rectangle PTT'P', i.e., output multiplied by supernormal profit per unit of output. However, if the demand and cost situation are less favorable, then the monopolistically competitive firm will be realizing losses in the short run as illustrated in following figure. Here, the price is OP' (=MP) which is less than the average cost MT. TP is the loss per unit of the output OM (=PP'). Hence, the total loss is represented by the shaded area TPP'T'. Thus, in the short run, the monopolistically competitive firm may either realize profits or suffer losses, or neither profit nor loss. Besides, the conditions for equilibrium under monopolistic competition are: -

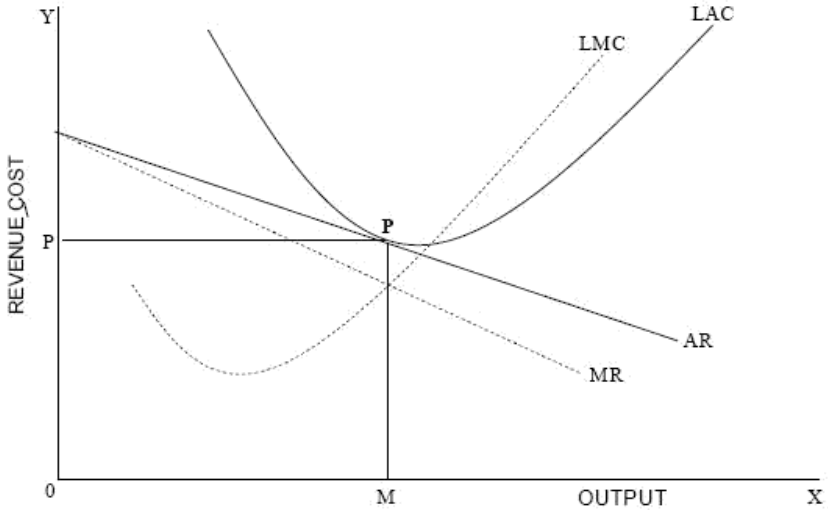
(i) MC = MR(ii) Slope of MC > Slope of MR



Long-run Equilibrium of Firm and Group Equilibrium.

The firms under monopolistic competition can earn only normal profits in the long run. This is because we assume that entry is free and new firms will enter the industry, if the existing firms are making supernormal profits. As new firms enter and start production, supply will increase and the price will fall, i.e., average revenue curve faced by the firm will shift to the left, and therefore, the supernormal profits will be competed away and the firms will be earning only normal profits. In, the long run, firms which are realizing losses, will leave the industry so that the remaining firms will be earning normal profits. Another point which is to be noted in this context is that average revenue curve in the long run will be more elastic, due to large number of available substitutes. Hence, in the long run, equilibrium is established when firms are earning only normal profits. Therefore, the equilibrium in the long run under monopolistic competition is when MC equals with MR and MC intersects the MR from its below. But the firm under monopolistic competition in long run only enjoys normal profit. So, another distinguishing feature is AR = AC or Price = AC.

Average Revenue = Average Cost.



In the above figure, average revenue curve (AR) is a tangent to the average cost curve (LAC) at P. Hence, the equilibrium output in the long run is OM and the corresponding price is MP. At this point, average cost and average revenue is MP. Therefore, there are only the normal profits which form part of the cost of production. Thus in the long run, the firm is in equilibrium when output is OM, and the price is MP.

Oligopoly

Market in which the number of seller is small but greater then one present new problem. A market with two sellers is a duopoly, and a market with a small number greater than two is an oligopoly.

In oligopoly we are dealing with a market structure where there few firms in the industry producing either homogeneous good or differentiated goods. Or it is market from where there exist two or more firms.

However, it is not the number of firms which is important but the nature of interdependence in decision making. In an oligopoly industry the firms are 'strategically interdependent' in decision making. This implies that no firm can take any policy decision or action be it pricing, quality, advertising etc. without taking into account how the rival firms would respond or react and what kind of decisions or actions they in turn take to its own decisions and actions. It is interdependence in decision making which is the main characteristic of an oligopoly situation.

Characteristics of Oligopoly

- **Few firms: -** Oligopoly is a market situation in which there are few firms selling homogeneous or differentiated products. Imperfect oligopoly (differentiated product)
- Automobiles, soaps, TVs, detergents. Perfect oligopoly (homogeneous) :- Aluminum, cement, copper, steel, zinc.
- **Interdependence: -** there is a complete interdependence among the sellers with regard to their price output policies.
- **Advertisement: -** Boumol says under oligopoly advertisement can become a life -and-death matter.
- **Competition :-** each seller is always on the alert and keeps a close watch over the moves of its rivals in order to have a countermove.
- **Barriers to entry of firms :-** as there is keen competition, there will be no barriers to entry or exit.
- **Lack of uniformity:-** firms differ considerably in size.

Oligopoly Models

In oligopoly the rival firm indulge in an action, reaction and counter action showing a variety of behavioural pattern. In oligopoly rivals may decide to get together and cooperate in the pursuit of their objectives, or at the other extreme may try to fight each other to the death. Even if they enter in an agreement it may last or it may breakdown.

So in oligopoly it is very difficult to study the behavior of firm. So different economist view different models these models are;

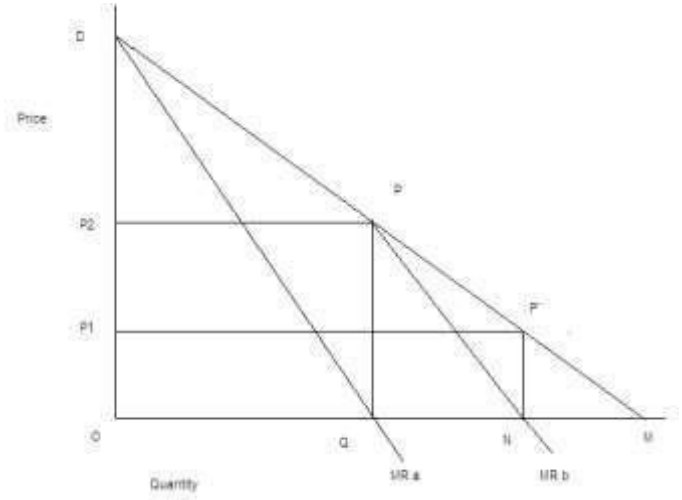
1. Cournot's duopoly model, 2. Sweezy's Kinked demand curve model, 3. Price leadership model, 4. Collusive model, 5. The game model.

1. Cournot's Model of Duopoly: This model is called duopoly model because it is a limited case of oligopoly and propounded by Augustine Cournet a French economist.

Assumption

-> Two firm ->Zero marginal cost -> One will not react with other

According to this model as there is two firm each produce 1/3 of the product and rest 1/3 product remain unsupplied. As supply is 2/3rd and demand is 1, it means supply is less than demand. So price is above zero i.e. cost.



In the diagram, by assumption MC=0, if there is only one firm-A, firm A's MR curve cuts MC curve at point Q. so output is OQ and price is OP2. suppose firm-B enters in the market. The market remains to firm-B in OM. But the firm will only produce QN as

MRb cuts MC at point N. so the firm B's price =OP and output = QN.

When B's price is less, A will reduce its price by reducing its output from OQ to less than OQ. This adjustment will continue till both produce equal number of output i.e. 1/3rd each and rest 1/3 can't be supplied. The formula for determining the share of each

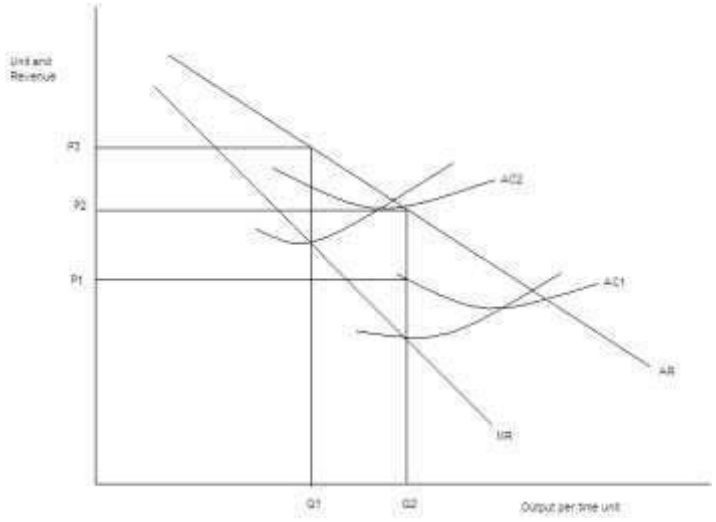
seller in an oligopolistic market is Q / (n + 1) where Q is market size and n is the number of seller.

Determinants of market share

Period	Seller A	Seller B
I	½	½(1/2)=1/4
II	½(1-1/4)=3/8	½(1-3/8)=5/16
III	½(1-5/16)=11/32	½(1-11/32)=21/64
IV	½(1-21/64)=43/128	½(1-43/128)=85/256
…	….	…….
…	….	……
N	½(1-1/3)=1/3	½(1-1/3)=1/3

In the above analysis, it is concluded that the firm A will reduce its quantity and firm B will increase its quantity till both will produce 1/3 of total output.

2. Price Leadership Model: -Price leadership may arise out of technical reason or out of process efficiency or due to explicit agreement for leaders etc. in price leadership model the leading role played by the dominant firm. The large firm will make the price and other will follow that the price leadership may be barometric in this leadership any one of the firm lead to announce any change in price. The price leadership arises out of two reasons



A) Price leadership by low-cost firm suppose all the firm faces identical revenue curve i.e. AR and MR, but they have different cost curve. Suppose large firm has the cost curve is AC1 and MC1 and all other small firm faces the cost curve is AC2 and MC2.

It is because large firm enjoy economies of scale given the cost and revenue condition, the low cost firm will maximize its profit at OP2 price and OQ2 quantity. But the high cost firm will maximize their profit at OP3 price and OQ1 quantity. But if they charge higher price they will loose some customer. So large firm forced to accept price OP2. If the low cost firm charge OP1 price, it will eliminate small firm and enjoy only normal profit. But due to fear of anti-monopoly laws the low cost firm charge OP2 price and other firm will follow that price.

B) Price Leadership by dominant firm: Dominant firm are those firm which enjoys large market share. The dominant firm can cut its price to eliminate its entire rival firm. The firm may enjoy monopoly power. But legal problem may arise. To avoid this problem the dominant firm will compromise with small firm. The small firm just like complete market accepts the price set by the dominant firm.

3. Collusion Model (Cartel):- cartel is an association of business firm formed by an explicit agreement between them under this the firm jointly decide -> Price and output -> Production quota -> Supervision of market activities.

The main objective of cartel group are:

- To reduce competition and resulting monopoly profit.
- Eliminating uncertainty surrounding in the market.

Full Cost Pricing:

Full cost plus pricing is a price-setting method under which you add together the direct material cost, direct labor cost, selling and administrative costs, and overhead costs for a product, and add to it a markup percentage (to create a profit margin) in order to derive the price of the product. The pricing formula is:

(Total production costs + Selling and administration costs + Markup) ÷ Number of units expected to sell

This method is most commonly used in situations where products and services are provided based on the specific requirements of the customer; thus, there is reduced competitive pressure and no standardized product being provided. The method may also be used to set long-term prices that are sufficiently high to ensure a profit after all costs have been incurred.

The Full Cost-Plus Calculation

ABC Co. Ltd. expects to incur the following costs in its business in the upcoming year:

- Total production costs = Rs.2,500,000
- Total sales and administration costs = Rs.1,000,000

The company wants to earn a profit of $100,000 during that time. Also, ABC expects to sell 200,000 units of its product. Based on this information and using the full cost-plus pricing method, ABC calculates the following price for its product:

(2,500,000 + 1,000,000 + $100,000) ÷ 200,000

= Rs.18 Price per unit

Advantages of Full Cost-Plus Pricing

The following are advantages to using the full cost-plus pricing method:

- *Simple*. It is quite easy to derive a product price using this method, since it is based on a simple formula. Given the use of a standard formula, it can be derived at almost any level of an organization.
- *Likely profit.* As long as the budget assumptions used to derive the price turn out to be correct, a company is very likely going to earn a profit on sales if it uses this method to calculate prices.
- *Justifiable*. In cases where the supplier must persuade its customers of the need for a price increase, the supplier can show that its prices are based on costs, and that those costs have increased.

Disadvantages of Full Cost-Plus Pricing

The following are disadvantages of using the full cost-plus pricing method:

- *Ignores competition*. A company may set a product price based on the full cost plus formula and then be surprised when it finds that competitors are charging substantially different prices.
- *Ignores price elasticity*. The company may be pricing too high or too low in comparison to what buyers are willing to pay. Thus, it either ends up pricing too low and giving away potential profits, or pricing too high and achieving minor revenues.

- *Product cost overruns*. Under this method, the engineering department has no incentive to prudently design a product that has the appropriate feature set and design characteristics for its target market. Instead, the department simply designs what it wants and launches the product.
- *Budgeting basis*. The pricing formula is based on budget estimates of costs and sales volume, both of which may be incorrect.
- *Too simplistic*. The formula is designed to calculate the price of only a single product. If there are multiple products, then you need to adopt a cost allocation methodology to decide on which costs are to be assigned to which product.

Price Skimming:

Under this strategy a high introductory price is charged for an innovative product and later on the price is reduced when more marketers enter the market with same type of product for example, Sony, Philips etc. when they introduce a new technology then a high price is charged for the product.

When the same technology is used by other electronic companies in their product also then the price is reduced. Generally, innovators use price skimming strategy to get reward for their research and development.

The price skimming strategy cannot be used by every marketer. For using this strategy following conditions are must:

(a) The product must be highly distinctive and demand for that product must be very inelastic:

The high introductory price can be charged only for unique products and the products for which easy substitutes are not available customers pay high price for the product for its novelty and uniqueness e.g., Rolex watches, Rolls Royce.

(b) The company must be able to maintain its uniqueness for some time:

If the product can be copied easily then price skimming will not bring revenue for a longer time.

(c) Presence of class market segment:

To use price skimming strategy there must be customers in the market who value the uniqueness of the product and are ready to pay high price.

Penetration Pricing:

This strategy means using lower initial price to capture a large market. These forces the customers to buy the product and company can capture a very big share and leave very small share for competitors. Penetration pricing is attractive when following conditions are satisfied:

(i) The price elasticity of demand is high and easy substitutes of that product are available.

(ii) The firm can increase its production capacity with increase in demand.

(iii) When customers are highly price sensitive which means customers easily shift to another brand if it is available at low price.

(iv) When company has to face high competition while launching the product.

The Reliance Company followed penetration pricing strategy when it introduced mobile phone. It offered it at so low price that it captured big share of mobile phone market.

Basic Macroeconomic Concepts

Nature of Macro Economics

Macroeconomics is the study of aggregates or averages covering the entire economy, such as total employment, national income, national output, total investment, total consumption, total savings, aggregate supply, aggregate demand and general price level, wage level and cost structures.
Professor Ackley "Macroeconomics deals with economic affairs in the large"

Macroeconomics is also known as the theory of income and employment or simply income analysis. It is concerned with the problems of unemployment, economic fluctuations, inflation and deflation, international trade or economic growth.

It is the study of the cause of unemployment and the various determinants of employment.

Micro Economics Vs Macro Economics

For understanding we can say Macroeconomics studies the character of the forest separately of the trees which compose it. It means in the forest is compose of trees. Studying about the individual trees is known as micro economies and studying about the forest is known as macroeconomics. What is not important for micro economics is important for macroeconomics e.g. giving an additional tax of 1 paisa will not matters in micro sense but in macro sense it is a big difference.

Micro economics is the study of the economic actions of individuals and small groups on individuals e.g. study of particular firms, particular households, individual prices, wages, incomes, individual industries, particular commodities. But Macroeconomics deals with aggregates of these quantities not with individual income but with national income, not with individual price but with price levels, not with individual output but with national output.

Both Micro economics and Macroeconomics involve the study of aggregates. But aggregates in micro economics are different from that in macroeconomics. Thus, micro economics uses aggregates relating to individual households, firms and industries, while macroeconomics uses aggregates which relate them to the economy-wide-total.

Concepts of consumption, saving, and investment:

Consumption:

Consumption is the value of goods and services bought by people. Consumption are of two types:

- **Autonomous consumption expenditure (C_A)** occurs when income levels are zero. Such consumption does not vary with changes in income. If income levels are actually zero, this consumption is financed by borrowing or using up savings.
- **Induced consumption (C_I)** describes consumption expenditure by households on goods and services which varies with income. Consumption is considered *induced* by income.
- ***The marginal propensity to consume*** *(MPC)* is the extra amount that people consume when they receive an extra unit of income.

$$MPC = \Delta C / \Delta Y$$

MPC is the first derivation of consumption function.
Induced consumption can be described by formula:

$$C_I = MPC \cdot Y$$

The consumption function shows the relationship between the level of consumption expenditure and the level of income.

$$C = f(Y)$$

If autonomous and induced consumption is identified then: $C = C_A + C_I$

$$C = C_A + MPC \cdot Y$$

Determinants of Consumption:

- Current Income
- Cumulated Savings in the Past
- Expectations of Future Income

Some of the more important determinants are:

- **Interest Rates:** Higher interest rates discourage the borrowing used to finance some types of consumption expenditures (such as automobiles and furniture) and it increases the return on income diverted as saving into the financial markets. As such, consumption decreases and saving increases. Lower interest rates work in the opposite manner.

- **Consumer Confidence**: If people have more confidence about the state of the economy, they are more likely to boost their spending. However, because this extra spending is not the result of extra income, it must come from saving. As such, consumption increases and saving decreases. A drop-in consumer confidence works in the opposite manner.

- **Wealth:** Wealth affects consumption in one of two ways. An increase in financial wealth (including stocks, bonds, and especially money) motivates the household sector to increase consumption and decrease saving. Consumption increases and saving decreases. Alternatively, an increase in physical wealth (including cars, furniture, and appliances) reduces the need to buy these goods and thus motivates the household sector to decrease consumption and increase saving.

- **Taxes:** Government collects taxes to pay for government activities. These taxes come from household income, specifically disposable income. An increase in taxes means a reduction in disposable income, and consequently a decrease in consumption. Because total or national income is not changing, these taxes also reduce saving. As such, unlike other determinants both consumption and saving decrease. A reduction in taxes work in the opposite direction.

Savings:

Income received by a consumer that is not spent on the output of firms through consumption expenditure.

- ***Saving*** is that part of income that is not consumed. Saving equals income minus consumption***: S = Y – C***
- ***Income*** is the sum of consumption and savings: Y = C + S

The marginal propensity to save is defined as the fraction of an extra unit of income that goes to extra saving.

$$MPS = \Delta S / \Delta Y$$

MPC + MPS = 1 because the part of each unit of income that is not consumed is necessarily saved.
Like consumption ***saving*** is also the function of income: S = f(Y)

- If autonomous consumption exists then autonomous saving exists as well and saving function is: $S = -C_A + MPS.Y$

- ***Saving*** is a source for investment**.**

Determinants of Saving:

Income level: Income level is the main source of saving. Saving is positively related with income i.e. higher the income tends to higher level of saving and vice-versa. Hence, possibility of saving increases as income increases of the people. When income becomes very low, then people can't save because they can't cover even their minimum basic requirement. So, saving is unable to imagine without adequate level of income.

Price level: General price level is also an important determinant of saving. When price rises, then amount of saving starts to decline to those people who are mainly depends on fixed income. Hence, we can say that the condition of inflation is not favourable for saving.

Rate of interest: Rate of interest is also an important determination of saving. It takes positive relation with saving i.e: higher the rate of interest results the higher level of saving and vice-versa. When the rate of interest increases then people reduce their normal consumption and try to save. On the contrary, people used to save less, when the rate of interest decreases.

Fiscal policy of government: The income and expenditure policy and process of government also changes the ratio of saving in the country. The government can adopt two types of fiscal policies i.e. expansion and contraction fiscal year. Expansionary fiscal policy helps to rise saving, where government reduced rate of tax and increases government expenditure. Both of these helps to increase income and when income increases then saving automatically increases.

On the other hand, the contractionary fiscal policy reduces the ratio of saving, where government imposes high tax system and also reduces the government expenditure. So contractionary fiscal policy reduce income of the people and then saving.

Distribution of income: Distribution of income is one of the responsible factor to determine the level of savings. In some countries and societies, income are distributed equally whereas in come sectors income is distributed unequally.

In case of unequal distribution of income, few people have large amount of income. So they can save more because most of their wants are already fulfilled and they have low MPC. As a result additional consumption of these people with additional income does not increase rapidly. So, we can say consumption is typically the function of poor and saving is typically the function of rich people.

Social security system: Social security system is based on economic growth and development. The rate of saving will be very low in the place where various social security system are fully developed like old age pension, medical insurance, unemployment allowance etc. When social and economic security systems are appropriately found then people will not be worried about their future and try to enjoy with higher level of consumption, which reduce saving.

Besides, these determinants of saving, development of banking and financial institutions, growth and development of economic structure of the economy are also responsible for determining saving.

Investments:

Investment is defined as a purchase of capital goods (not consumed but used in future production). Investment leads to capital accumulation (it increases the nation's potential output and promotes economic growth in the long run).

Determinants of Investments:

Some of the important determinants are:

- **Interest Rates:** Higher interest rates increase the cost of the borrowing used to finance most types of investment expenditures (such as factories, delivery vehicles, and sewing machines). If the cost of borrowing increases, the business sector is less likely to undertake the resulting expenditures on capital goods. As such, investment expenditures decrease and the investment line shifts down. Lower interest rates work in the opposite manner, causing an upward shift of the investment line.

- **Expectations:** If business firms are optimistic about future economic prospects and expect an improving economy, then they are more likely to increase investment expenditures in the present, even if current income is unchanged or falling. The result is an increase in investment expenditures and an upward shift of the investment line. Pessimistic expectations of a declining economy are then likely to cause a reduction in investment expenditures and a downward shift of the investment line.

- **Capital Assets:** The accumulation of capital assets--factories, buildings, tools, and machinery--is the goal of investment. An increase in the existing stock of business capital goods that results from past investment means that further investment expenditures and purchases are not needed. Why building another factory, when a brand new one was just completed? This causes a decrease in investment expenditures and a downward shift of the investment line. Of course, a reduction in the stock of capital assets, such as what might occur through depreciation, has the opposite effect, investment expenditures increase and the investment line shifts upward.

- **Technology:** Technology is the body of knowledge that the economy possesses about production techniques. An advance in technology is embodied in the goods produced or the capital used for production. This invariably triggers the need for a wide range of capital goods for production, distribution, and consumption. This causes an increase in investment expenditures and an upward shift of the investment line, even if current income is constant or declining. A drop off in technology, although less likely, then causes a decrease in investment expenditures and a downward shift of the investment line.

- **Capital Prices:** Like any good, the demand for capital is governed by the law of demand. A lower price of capital leads to an increase in the quantity demanded of capital. This is another way of saying that investment expenditures for capital increases and thus the investment line shifts up. An increase in the capital prices then causes a decrease in the quantity demanded, a decline in investment expenditures, and a downward shift of the investment line.

Inflation:

Inflation is defined as a sustained upward trend in the general level of prices level and decrease in value of money. Inflation reduces the purchasing power of money.

While measuring inflation, we take into account a large number of goods and services used by the people of a country and then calculate average increase in the prices of those goods and services over a period of time. A small rise in prices or a sudden rise in prices is not inflation since they may reflect the short term workings of the market.

It is to be pointed out here that inflation is a state of disequilibrium when there occurs a sustained rise in price level. It is inflation if the prices of most goods go up. Such rate of increases in prices may be both slow and rapid. However, it is difficult to detect whether there is an upward trend in prices and whether this trend is sustained. That is why inflation is difficult to define in an unambiguous sense.

Types of Inflation:

As the nature of inflation is not uniform in an economy for all the time, it is wise to distinguish between different types of inflation. Such analysis is useful to study the distributional and other effects of inflation as well as to recommend anti-inflationary policies. Inflation may be caused by a variety of factors. Its intensity or pace may be different at different times. It may also be classified in accordance with the reactions of the government toward inflation.

Thus, one may observe different types of inflation in the contemporary society:

A. On the Basis of Causes:

(i) Currency inflation:

This type of inflation is caused by the printing of currency notes.

(ii) Credit inflation:

Being profit-making institutions, commercial banks sanction more loans and advances to the public than what the economy needs. Such credit expansion leads to a rise in price level.

(iii) Deficit-induced inflation:

The budget of the government reflects a deficit when expenditure exceeds revenue. To meet this gap, the government may ask the central bank to print additional money. Since pumping of additional money is required to meet the budget deficit, any price rise may be called the deficit-induced inflation.

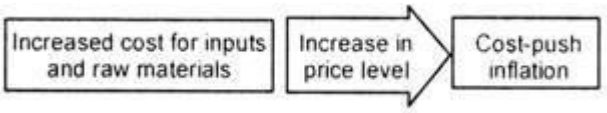
(iv) Demand-pull inflation:

An increase in aggregate demand over the available output leads to a rise in the price level. Such inflation is called demand-pull inflation (henceforth DPI).

(v) Cost-push inflation:

Inflation in an economy may arise from the overall increase in the cost of production. This type of inflation is known as cost-push inflation (henceforth CPI). Cost of production may rise due to an increase in the prices of raw materials, wages, etc. Often trade unions are blamed for wage rise since wage rate is not completely market-determinded. Higher wage means high cost of production. Prices of commodities are thereby increased.

A wage-price spiral comes into operation. But, at the same time, firms are to be blamed also for the price rise since they simply raise prices to expand their profit margins. Thus, we have two important variants of CPI wage-push inflation and profit-push inflation.



B. On the Basis of Speed or Intensity:

(i) Creeping or Mild Inflation:

If the speed of upward thrust in prices is slow but small then we have creeping inflation. What speed of annual price rise is a creeping one has not been stated by the economists. To some, a creeping or mild inflation is one when annual price rise varies between 2 p.c. and 3 p.c. If a rate of price rise is kept at this level, it is considered to be helpful for economic development. Others argue that if annual price rise goes slightly beyond 3 p.c. mark, still then it is considered to be of no danger.

(ii) Walking Inflation:

If the rate of annual price increase lies between 3 p.c. and 4 p.c., then we have a situation of walking inflation. When mild inflation is allowed to fan out, walking inflation appears. These two types of inflation may be described as 'moderate inflation'.

Often, one-digit inflation rate is called 'moderate inflation' which is not only predictable, but also keep people's faith on the monetary system of the country. Peoples' confidence get lost once moderately maintained rate of inflation goes out of control and the economy is then caught with the galloping inflation.

(iii) Galloping and Hyperinflation:

Walking inflation may be converted into running inflation. Running inflation is dangerous. If it is not controlled, it may ultimately be converted to galloping or hyperinflation. It is an extreme form of inflation when an economy gets shattered."Inflation in the double or triple digit range of 20, 100 or 200 p.c. a year is labelled "galloping inflation".

Causes of Inflation:

Inflation is mainly caused by excess demand/ or decline in aggregate supply or output. Former leads to a rightward shift of the aggregate demand curve while the latter causes aggregate supply curve to shift left-ward. Former is called demand-pull inflation (DPI), and the latter is called cost-push inflation (CPI). Before describing the factors, that lead to a rise in aggregate demand and a decline in aggregate supply, we like to explain "demand-pull" and "cost-push" theories of inflation.

(i) Demand-Pull Inflation Theory:

There are two theoretical approaches to the DPI—one is classical and other is the Keynesian.

According to classical economists or monetarists, inflation is caused by an increase in money supply which leads to a rightward shift in negative sloping aggregate demand curve. Given a situation of full employment, classicists maintained that a change in money supply brings about an equi-proportionate change in price level.

That is why monetarists argue that inflation is always and everywhere a monetary phenomenon. Keynesians do not find any link between money supply and price level causing an upward shift in aggregate demand.

According to Keynesians, aggregate demand may rise due to a rise in consumer demand or investment demand or government expenditure or net exports or the combination of these four components of aggregate demand. Given full employment, such increase in aggregate demand leads to an upward pressure in prices. Such a situation is called DPI. This can be explained graphically.

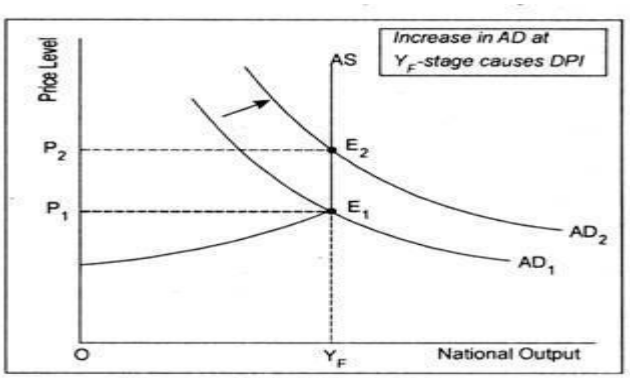


Fig. 4.3: DPI: Shifts in AD Curve

Just like the price of a commodity, the level of prices is determined by the interaction of aggregate demand and aggregate supply. In Fig. 4.3, aggregate demand curve is negative sloping while aggregate supply curve before the full employment stage is positive sloping and becomes vertical after the full employment stage is reached. AD_1 is the initial aggregate demand curve that intersects the aggregate supply curve AS at point E_1.

The price level, thus, determined is OP_1. As aggregate demand curve shifts to AD_2, price level rises to OP_2. Thus, an increase in aggregate demand at the full employment stage leads to an increase in price level only, rather than the level of output. However, how much price level will rise following an increase in aggregate demand depends on the slope of the AS curve.

(ii) Causes of Demand-Pull Inflation:

DPI originates in the monetary sector. Monetarists' argument that "only money matters" is based on the assumption that at or near full employment excessive money supply will increase aggregate demand and will, thus, cause inflation.

An increase in nominal money supply shifts aggregate demand curve rightward. This enables people to hold excess cash balances. Spending of excess cash balances by them causes price level to rise. Price level will continue to rise until aggregate demand equals aggregate supply.

Keynesians argue that inflation originates in the non-monetary sector or the real sector. Aggregate demand may rise if there is an increase in consumption expenditure following a tax cut. There may be an autonomous increase in business investment or government expenditure. Government expenditure is inflationary if the needed money is procured by the government by printing additional money.

In brief, increase in aggregate demand i.e., increase in (C + I + G + X – M) causes price level to rise. However, aggregate demand may rise following an increase in money supply generated by the printing of additional money (classical argument) which drives prices upward. Thus, money plays a vital role. That is why Milton Friedman argues that inflation is always and everywhere a monetary phenomenon.

There are other reasons that may push aggregate demand and, hence, price level upwards. For instance, growth of population stimulates aggregate demand. Higher export earnings increase the purchasing power of the exporting countries. Additional purchasing power means additional aggregate demand. Purchasing power and, hence, aggregate demand may also go up if government repays public debt.

Again, there is a tendency on the part of the holders of black money to spend more on conspicuous consumption goods. Such tendency fuels inflationary fire. Thus, DPI is caused by a variety of factors.

(iii) Cost-Push Inflation Theory:

In addition to aggregate demand, aggregate supply also generates inflationary process. As inflation is caused by a leftward shift of the aggregate supply, we call it CPI. CPI is usually associated with non-monetary factors. CPI arises due to the increase in cost of production. Cost of production may rise due to a rise in cost of raw materials or increase in wages.

However, wage increase may lead to an increase in productivity of workers. If this happens, then the AS curve will shift to the right- ward not leftward—direction. We assume here that productivity does not change in spite of an increase in wages.

Such increases in costs are passed on to consumers by firms by raising the prices of the products. Rising wages lead to rising costs. Rising costs lead to rising prices. And, rising prices again prompt trade unions to demand higher wages. Thus, an inflationary wage-price spiral starts. This causes aggregate supply curve to shift leftward.

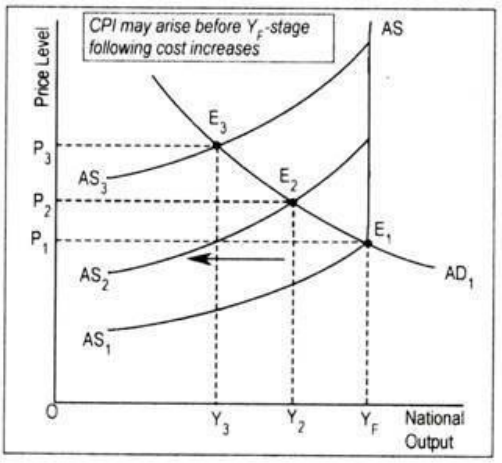


Fig. 4.4: CPI: Shifts in AS Curve

This can be demonstrated graphically where AS_1 is the initial aggregate supply curve. Below the full employment stage this AS curve is positive sloping and at full employment stage it becomes perfectly inelastic.

Intersection point (E_1) of AD_1 and AS_1 curves determine the price level (OP_1). Now there is a leftward shift of aggregate supply curve to AS_2. With no change in aggregate demand, this causes price level to rise to OP_2 and output to fall to OY_2. With the reduction in output, employment in the economy declines or unemployment rises. Further shift in AS curve to AS_3 results in a higher price level (OP_3) and a lower volume of aggregate output (OY_3). Thus, CPI may arise even below the full employment (Y_F) stage.

(iv) Causes of Cost-Push Inflation:

It is the cost factors that pull the prices upward. One of the important causes of price rise is the rise in price of raw materials. For instance, by an administrative order the government may hike the price of petrol or diesel or freight rate. Firms buy these inputs now at a higher price. This leads to an upward pressure on cost of production.

Not only this, CPI is often imported from outside the economy. Increase in the price of petrol by OPEC compels the government to increase the price of petrol and diesel. These two important raw materials are needed by every sector, especially the transport sector. As a result, transport costs go up resulting in higher general price level.

Again, CPI may be induced by wage-push inflation or profit-push inflation. Trade unions demand higher money wages as a compensation against inflationary price rise. If increase in money wages exceed labour productivity, aggregate supply will shift upward and leftward. Firms often exercise power by pushing prices up independently of consumer demand to expand their profit margins.

Fiscal policy changes, such as increase in tax rates also leads to an upward pressure in cost of production. For instance, an overall increase in excise tax of mass consumption goods is definitely inflationary. That is why government is then accused of causing inflation.

Finally, production setbacks may result in decreases in output. Natural disaster, gradual exhaustion of natural resources, work stoppages, electric power cuts, etc., may cause aggregate output to decline. In the midst of this output reduction, artificial scarcity of any goods created by traders and hoarders just simply ignite the situation.

Inefficiency, corruption, mismanagement of the economy may also be the other reasons. Thus, inflation is caused by the interplay of various factors. A particular factor cannot be held responsible for any inflationary price rise.

Measures for Controlling Inflation

Inflation is considered to be a complex situation for an economy. If inflation goes beyond a moderate rate, it can create disastrous situations for an economy; therefore, is should be under control.

It is not easy to control inflation by using a particular measure or instrument.

The main aim of every measure is to reduce the inflow of cash in the economy or reduce the liquidity in the market.

The different measures used for controlling inflation. The two important methods are:

1. Monetary Measures:

The government of a country takes several measures and formulates policies to control economic activities. Monetary policy is one of the most commonly used measures taken by the government to control inflation.

In monetary policy, the central bank increases rate of interest on borrowings for commercial banks. As a result, commercial banks increase their rate of interests on credit for the public. In such a situation, individuals prefer to save money instead of investing in new ventures.

This would reduce money supply in the market, which, in turn, controls inflation. Apart from this, the central bank reduces the credit creation capacity of commercial banks to control inflation.

The monetary policy of a country involves the following:

(a) Rise in Bank Rate:

Refers to one of the most widely used measure taken by the central bank to control inflation.

The bank rate is the rate at which the commercial bank gets a rediscount on loans and advances by the central bank. The increase in the bank rate results in the rise of rate of interest on loans for the public. This leads to the reduction in total spending of individuals.

(b) Open Market Operations (OMO):

Refers to one of the important method used by the central bank to reduce the credit creation capacity of commercial banks. The central bank issues government securities to commercial banks and certain private businesses.

In this way, the cash with commercial banks would be spent on purchasing government securities. As a result, commercial bank would reduce credit supply for the general public.

(c) Changing Reserve Ratios:

Involves increase or decrease in reserve ratios by the central bank to reduce the credit creation capacity of commercial banks. For example, when the central bank needs to reduce the credit creation capacity of commercial banks, it increases Cash Reserve Ratio (CRR). As a result, commercial banks need to keep a large amount of cash as reserve from their total deposits with the central bank. This would further reduce the lending capacity of commercial banks. Consequently, the investment by individuals in an economy would also reduce.

2. Fiscal Measures:

Apart from monetary policy, the government also uses fiscal measures to control inflation. The two main components of fiscal policy are government revenue and government expenditure. In fiscal policy, the government controls inflation either by reducing private spending or by decreasing government expenditure, or by using both.

It reduces private spending by increasing taxes on private businesses. When private spending is more, the government reduces its expenditure to control inflation. However, in present scenario, reducing government expenditure is not possible because there may be certain on-going projects for social welfare that cannot be postponed.

Besides this, the government expenditures are essential for other areas, such as defence, health, education, and law and order. In such a case, reducing private spending is more preferable rather than decreasing government expenditure. When the government reduces private spending by increasing taxes, individuals decrease their total expenditure.

For example, if direct taxes on profits increase, the total disposable income would reduce. As a result, the total spending of individuals decreases, which, in turn, reduces money supply in the market. Therefore, at the time of inflation, the government reduces its expenditure and increases taxes for dropping private spending.

Phases of business cycle:

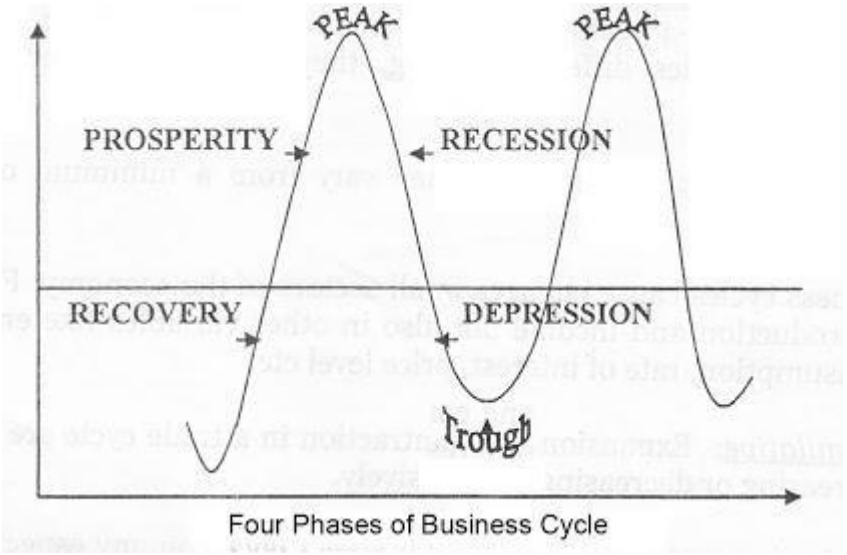
The business cycle is the natural rise and fall of economic growth that occurs over time. The cycle is a useful tool for analysing the economy. It can also help you make better financial decisions.

Four Phases of Business Cycle:

Business Cycle (or Trade Cycle) is divided into the following four phases: -

1. **Prosperity Phase**: Expansion or Boom or Upswing of economy.
2. **Recession Phase**: from prosperity to recession (upper turning point).
3. **Depression Phase**: Contraction or Downswing of economy.

4. **Recovery Phase**: from depression to prosperity (lower turning Point).



Four Phases of Business Cycle

The business cycle starts from a trough (lower point) and passes through a recovery phase followed by a period of expansion (upper turning point) and prosperity. After the peak point is reached there is a declining phase of recession followed by a depression. Again, the business cycle continues similarly with ups and downs.

1. Prosperity Phase

When there is an expansion of output, income, employment, prices and profits, there is also a rise in the standard of living. This period is termed as Prosperity phase.

The features of prosperity are: -

1. High level of output and trade.
2. High level of effective demand.
3. High level of income and employment.
4. Rising interest rates.
5. Inflation.
6. Large expansion of bank credit.
7. Overall business optimism.
8. A high level of MEC (Marginal efficiency of capital) and investment.

Due to full employment of resources, the level of production is Maximum and there is a rise in **GNP** (Gross National Product). Due to a high level of economic activity, it causes a rise in prices and profits. There is an upswing in the economic activity and economy reaches its **Peak**. This is also called as a **Boom Period**.

2. Recession Phase

The turning point from prosperity to depression is termed as Recession Phase.

During a recession period, the economic activities slow down. When demand starts falling, the overproduction and future investment plans are also given up. There is a steady decline in the output, income, employment, prices and profits. The businessmen lose confidence and become pessimistic (Negative). It reduces investment. The banks and the people try to get greater liquidity, so credit also contracts. Expansion of business stops, stock market falls. Orders are cancelled and people start losing their jobs. The increase in unemployment causes a sharp decline in income and aggregate demand. Generally, recession lasts for a short period.

3. Depression Phase

When there is a continuous decrease of output, income, employment, prices and profits, there is a fall in the standard of living and depression sets in.

The **features of depression** are: -

1. Fall in volume of output and trade.
2. Fall in income and rise in unemployment.
3. Decline in consumption and demand.
4. Fall in interest rate.
5. Deflation.
6. Contraction of bank credit.
7. Overall business pessimism.
8. Fall in MEC (Marginal efficiency of capital) and investment.

In depression, there is under-utilization of resources and fall in GNP (Gross National Product). The aggregate economic activity is at the lowest, causing a decline in prices and profits until the economy reaches its **Trough** (low point).

4. Recovery Phase

The turning point from depression to expansion is termed as Recovery or **Revival** Phase.

During the period of revival or recovery, there are expansions and rise in economic activities. When demand starts rising, production increases and this causes an increase in investment. There is a steady rise in output, income, employment, prices and profits. The businessmen gain confidence and become optimistic (Positive). This increases investments. The stimulation of investment brings about the revival or recovery of the economy. The banks expand credit, business expansion takes place and stock markets are activated. There is an increase in employment, production, income and aggregate demand, prices and profits start rising, and business expands. Revival slowly emerges into prosperity, and the business cycle is repeated.

Thus, we see that, during the expansionary or prosperity phase, there is inflation and during the contraction or depression phase, there is a deflation.

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