MANAGERIAL ECONOMICS (18MBA101)

Course Objectives:

On completion of the course students will be able to:

1. To adopt the managerial economics concepts for business decision making. Also know law of demand and it exceptions to use different forecasting methods for predicting demand for various products and services.
2. To understand the different costs of production and how they affect short and long run decision.
3. To derive the equilibrium conditions for cost minimization and profit maximization. And the economic OD scale, diseconomies of scale and economics of scope and how each affects the cost of production.
4. To analyze different phases of business cycle, understand the impact of cyclical fluctuation on the growth business and lay policies to control business cycle.

Syllabus:

Module-I: Relevance of economics for business decisions, Role of Managerial Economist and Business decision making, Demand Analysis- individual market and firm demand, Determinations of demand, Elasticity measures and business decision making, Demand Estimation and demand forecasting, Supply Analysis.

Module-II: Production functions: Single variable- Variable Proportions, two variables Returns to scale; cost minimization and output maximization, various cost concepts cost functions, Economics of scale and economics of scope (simple numerical problems to be solved).

Module-III: Market morphology, price and output determination under different market conditions: perfect competition, monopoly, monopolistic competition, oligopoly, descriptive pricing approaches: Full cost pricing, product pricing; Price skimming, Penetration pricing. Input pricing; concept of consumption, saving, and investment, phases of business cycle, Inflation, Fiscal and Monetary policies.

MANAGERIAL ECONOMICS

UNIT-1

IMPORTANCE OF ECONOMICS FOR BUSINESS:

Introduction:

Economics is derived from the Greek word “Oikonomia”, which means management of a household. A household faces many decisions. It must decide which member of the household do which tasks and what each member gets in return: Who cooks dinner? Who does the laundry? Who clean the room? Who cares the children etc? In short household must allocate its scares resources among its various members, taking into account each member’s abilities, efforts, and desires. Economics as a social science studies human behavior as a relationship between various wants and scarce means having alternative uses. Like a household, a society faces many decision .A society must decide what jobs will be done and who will do them. So economics is called a social science. Its basic function is to study how people, individual, household, firms, and nations –maximize their gains from their limited resources and opportunities. Economics is logic of choice. It teaches the art of rational decision making to deal with the problem of scarcity. Economics is of significant use in modern business, as decision making is the core of business, and success in business depends on right decisions. A firm or business unit faces the problem of decision making in the course of alternative actions, in view of the constraint set by given resources ,which are relatively scarce. So in brief economics is called: A social science A science of choice

Economic problem arises because human wants are unlimited and the resources to fulfil it are limited and the resourses have alternative uses.Economics is a study that discusses how a society tries to solve the human problems of unlimited wants and scarce resources. It is the scientific study of the choices made by individuals and societies with regard to the alternative uses of scarce resources. Thus, in short, Economics is all about choice and decision making.

BASIC ECONOMIC CONCEPTS:

Types of Economic Analysis

•**Micro and Macro:** Micro economics looks at the smaller picture of the economy and is the study of the behaviour of small economic unit such as that of an individual consumer, a seller or a producer, or a firm or a product.

Macroeconomics is that branch of economic analysis that deals with the study of aggregates like aggregate demand, aggregate supply, national income, employment, inflation to name a few.

•**Positive and Normative:** Positive statements are factual by nature; normative statements involve some degree of value judgement, and cannot be verified by empirical study or logic.

Normative statements often imply a recommendation. Positive economics establishes a relationship between cause and effect, it analyses problems on the basis of facts. For example, a positive economic theory might describe the probable effect of an increase in price of petroleum on the price of cars, but it would not provide any instruction on what policy should be followed. Normative economics is concerned with questions involving value judgements about what the economy should be like. It looks at the desirability of

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certain aspects of the economy, say inflation is better than deflation, redistribution of wealth in the economy, etc. it is what "*ought to be"* in economic matters, as opposed to *"what is"* in positive economics.

•**Short run and Long run:** Short run is a time period not enough for consumers and producers to adjust completely to any new situation.

A long run is a planning horizon in which consumers and producers can adjust to any situation. In terms of accounting or finance, a short run would be any time period less than a year, and long run any be five to six years, or even as high as 20 years.

•**Partial and General Equilibrium**: Equilibrium is a state of balance that can occur in a model. Economic equilibrium example: balance between price and quantity of a commodity in a supply and demand model. Partial equilibrium developed by Augustin Cournot & Marshall studies the internal outcome of any policy action in a single market only.

General equilibrium analysis explains economic phenomena in an economy as a whole.

Kinds of Economic Decisions/ Fundamental Economic Problems

•What to produce?
•How to produce?
•For whom to produce?
•Are resources used economically?
•Are resources fully employed?
•Is the economy growing?

The fundamental problems faced by an economy can be summed tip as follows:

What to Produce?

The first major economic decision of any economy relates to the type and the range of goods to be produced. Since resources are limited. One must choose between different alternative combinations of goods and services that may be produced. Allocation of resources between the different types of goods. e.g.. consumer goods and capital goods, is another major concern to any economy. At final level, this decision would involve review of market demand and availability of raw materials and technology. This can also be referred to as the problem of choice.

How to Produce?

Having decided on what to produce, the economy must determine the techniques of production to be used. Generally there are 2 main methods of production (i)Capital intensive (where more capital and less labour are used)(ii)Labour intensive.(Where more labour and less capital are used)

This can also be viewed as the problem of efficiency: efficiency is maximized when the limited stock of resources yields the maximum possible volume of goods and services, or renders the maximum benefit to the society.

For whom to produce?

This means how the national product should be distributed. This is essentially the problem of distribution. Once the goods are produced, they need to be distributed

among the 'various economic agents. In a market economy such a distribution is done on the basis of "ability to pay" principle: this implies that those who have more in terms of wealth and income would have more of the commodities than those who have less, However, in a command economy such a distribution is done on the basis of "according to need" principle: this implies that people would be rewarded according to their needs and not their ability to pay.

Are Resources Used Economically/Efficiently?

In a world of scarcity, resources need to be efficiently employed. This is the problem of economic efficiency or welfare maximization, dealt with by the branch of economics known as welfare economics, the purpose of which is to explain how a socially efficient allocation of resources can bb identified and achieved. At this level, let us be contended with the idea that resources would be fully and efficiently employed if it is not possible to increase the output of one commodity without reducing the output of another commodity.

Are Resources fully employed?

An economy must endeavor to achieve the fullest possible use of its available resources, as unemployment of resources is equivalent to economic waste. The economy should be so organized as to keep all factors of production (including labour) fully employed.

Is the Economy Growing?

Another problem of any economy is to make sure that it keeps expanding or developing with time, and that its productive capacity continues to increase, so that it maintains conditions of stability. An economy seeks to achieve economic growth mainly to improve the standards of living of its people; it is through economic growth that an economy can get more of everything, without having less of anything. There are three major sources of growth: growth of labour force, capital formation and technological progress.

Managerial Economics:

Economics principles, theories and concepts have been used extensively for finding solutions to managerial situations.Managerial Economics is a discipline that combines economic theory with managerial practice. The subject offers powerful tools and techniques for managerial policy making. An integration of economic theory and tools of decision sciences works successfully in optimal decision making, in face of constraints. A study of managerial economics enriches the analytical skills, helps in the logical structuring of problems, and provides adequate solution to the economic problems.

"Managerial economics refers to the application of economic theory and the tools of analysis of decision science to examine how an organization can achieve its objectives most effectively."- Salvatore

"Managerial economics is the application of economic principles and methodologies to the decision making process within the firm or organization."- Douglas

Nature of Managerial Economics:

- Managerial economics is concerned with the analysis of finding optimal solutions to decision making problems of businesses/ firms (micro economic in nature).

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- Managerial economics is a practical subject therefore it is pragmatic.
- Managerial economics describes, what is the observed economic phenomenon (positive economics) and prescribes what ought to be (normative economics)
- Managerial economics is based on strong economic concepts. (conceptual in nature)
- Managerial economics analyses the problems of the firms in the perspective of the economy as a whole (macro in nature)
- It helps to find optimal solution to the business problems (problem solving)

Decision making

Decision making is the process of identifying alternative courses of action and selecting an appropriate alternative in a given decision situation. This definition presents two important parts:

- Identifying alternative courses of action
- Selecting an appropriate alternative

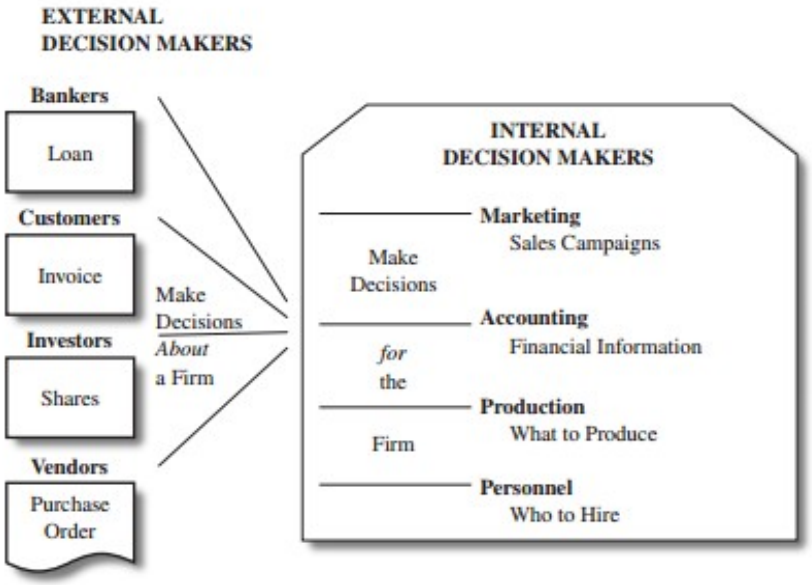
Most decisions include **opportunity costs**. (An opportunity cost is the reward we forego because we choose a particular alternative instead of another.) It also involves **trade-off between cost & benefits**

Decision making process

The five steps in the decision-making process are:

- ❖ Define the problem
- ❖ Determine the objectives
- ❖ Identify possible solutions
- ❖ Select the best possible solution
- ❖ Implement the decision

Economic decision making, refers to the process of making business decisions involving money. Economic decision makers are either internal or external. Internal decision makers are individuals within a company who make decisions on behalf of the company, while external decision makers are individuals or organizations outside a company who make decisions that affect the company.



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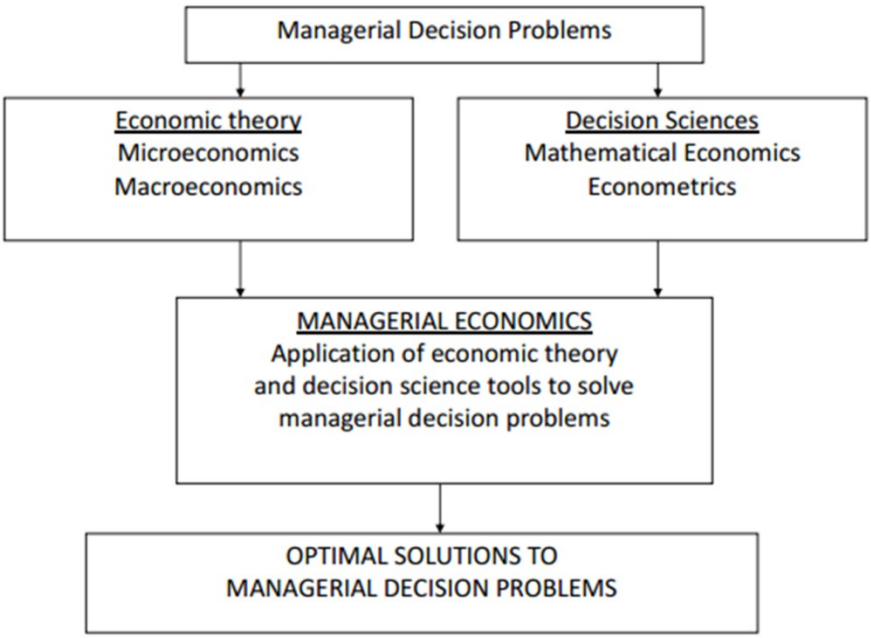

The best way to become acquainted with Managerial Economics is to come face to face with real world decision problems. Many companies have applied established principles of Managerial Economics to improve their profitability. In the past decade, a number of known companies have experienced successful changes in the economics of their business by using economic tools and techniques.

Role of Managerial Economist and Business decision making

A managerial economist helps the management by using his analytical skills and highly developed techniques in solving complex issues of successful decision-making and future advanced planning.

The **role of managerial economist** can be summarized as follows:

•He studies the economic patterns at macro-level and analysis it's significance to the specific firm he is working in.

•He has to consistently examine the probabilities of transforming an ever-changing economic environment into profitable business avenues.

•He assists the business planning process of a firm.

•He also carries cost-benefit analysis.

•He assists the management in the decisions pertaining to internal functioning of a firm such as changes in price, investment plans, type of goods /services to be produced, inputs to be used, techniques of production to be employed, expansion/ contraction of firm, allocation of capital, location of new plants, quantity of output to be produced, replacement of plant equipment, sales forecasting, inventory forecasting, etc.

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•In addition, a managerial economist has to analyze changes in macro- economic indicators such as national income, population, business cycles, and their possible effect on the firm's functioning.

•He is also involved in advicing the management on public relations, foreign exchange, and trade. He guides the firm on the likely impact of changes in monetary and fiscal policy on the firm's functioning.

•He also makes an economic analysis of the firms in competition. He has to collect economic data and examine all crucial information about the environment in which the firm operates.

•The most significant function of a managerial economist is to conduct a detailed research on industrial market.

•In order to perform all these roles, a managerial economist has to conduct an elaborate statistical analysis.

•He must be vigilant and must have ability to cope up with the pressures.

•He also provides management with economic information such as tax rates, competitor's price and product, etc. They give their valuable advice to government authorities as well.

•At times, a managerial economist has to prepare speeches for top management.

Explanation and Example of Law of Diminishing Marginal Utility:

This law can be explained by taking a very simple example. Suppose, a man is very thirsty. He goes to the market and buys one glass of sweet water. The glass of water gives him immense pleasure or we say the first glass of water has great utility for him. If he takes second glass of water after that, the utility will be less than that of the first one. It is because the edge of his thirst has been reduced to a great extent. If he drinks third glass of water, the utility of the third glass will be less than that of second and so on.

The utility goes on diminishing with the consumption of every successive glass water till it drops down to zero. This is the point of satiety. It is the position of consumer's equilibrium or maximum satisfaction. If the consumer is forced further to take a glass of water, it leads to disutility causing total utility to decline. The marginal utility will become negative. A rational consumer will stop taking water at the point at which marginal utility becomes negative even if the good is free.

In short, the more we have of a thing, ceteris paribus, the less we want still more of that, or to be more precise. In given span of time, the more of a specific product a consumer obtains, the less anxious he is to get more units of that product" or we can say that as more units of a good are consumed, additional units will provide less additional satisfaction than previous units. The following table and graph will make the law of

diminishing marginal utility more clear.

Schedule of Law of Diminishing Marginal Utility:

Units	Total Utility	Marginal Utility
1st glass	20	20
2nd glass	32	12
3rd glass	40	8
4th glass	42	2
5th glass	42	0
6^{th} glass	39	-3

From the above table, it is clear that in a given span of time, the first glass of water to a thirsty man gives 20 units of utility. When he takes second glass of water, the marginal utility goes on down to 12 units; When he consumes fifth glass of water, the marginal utility drops down to zero and if the consumption of water is forced further from this point, the utility changes into disutility (-3). Here it may be noted that the utility of then successive units consumed diminishes not because they are not of inferior in quality than that of others. We assume that all the units of a commodity consumed are exactly alike. The utility of the successive units falls simply because they happen to be consumed afterwards.

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DEMAND ANALYSIS

Introduction

The concepts of demand and supply are useful for explaining what is happening in the market place.

Demand:

Demand means the ability and willingness to buy a specific quantity of a commodity at the prevailing price in a given period of time.

Therefore, demand for a commodity implies the desire to acquire it, willingness and the ability to pay for it.

Demand Function:

The demand function for a commodity describes the relationship between the quantity demanded of it and the factors that influence it. Individual's demand for a commodity depends on its own price, his income, prices of related commodities (either substitutes or complements), his tastes and preferences, and advertising expenditure made by the producers for the commodity in question.

$Q_d = f (P_x, Y, P_r, T, A)$

Where P_x = Own price of the commodity X

I = Income of the individual

P_r = Prices of related commodities

T = Tastes and preferences of the individual consumer

A = Advertising expenditure made by the producers of the commodity.

Linear Demand Function:

In the two-variable case the demand function can be expressed in a linearform: The specific demand function of a linear form is written as

$Q_d = a-b P_x$

Where a is a constant intercept term on the X- axis and b is the coefficient showing the slope of the demand curve. The coefficient of price (P) that is, (P) being negative implies that there is a negative relationship between price and quantity demanded of a commodity.

Law of demand:

It states that other things remaining constant, when the price of a commodity rises, the demand for that commodity falls and when the price of a commodity falls, the demand for that commodity rises. In other words, law of demand states that demand for a product is inversely proportional to price, ceteris paribus (i.e. other things remaining constant).

Hence demand is a negative function of price, ceteris paribus.

Reason behind the law of demand (why does demand curve slop downward?)

Price effect: This explains why a fall in price results in rise in demand and vice versa. Some commodities may have multiple uses, like electricity, milk, coal, steel, etc. A fall in the price of such a commodity would induce a consumer to put it to alternative uses, like electricity can be used for lighting, cooling, cooking, heating, running machines, etc. Iiii is cheap. People will use it for all possible purposes, whereas if its price rises, people start using it only for most important purposes and USC alternative modes of energy, like I.PG or kerosene for cooking, wood or coal for heating, etc.

This would imply that when price falls, such commodities are purchased in greater quantities. Besides, fall in the price of a commodity would induce those consumers to buy the product who could previously not afford the commodity. Similarly when price rises, sonic marginal consumers may switch over to cheaper substitutes and thus reduce the demand for this product.

Substitution Effect: When the price of a commodity falls, it becomes more easily

affordable and thus more attractive to the consumer; as also, its substitute become more expensive, assuming that its price has not changed. The consumer tries to substitute this particular commodity for other commodities. As a result, demand for the commodity rises. On the contrary, when price of this commodity raises, other substitute become less expensive.

Income Effect: You know that demand depends upon income of the consumer and law of demand assumes that income is given. When price of a particular commodity falls, the consumer's real income rises though money income remains the same. Thus, with fall in the price of the commodity, income remaining the same, purchasing power of the individual rises, inducing the consumer to buy more of that commodity. 1f you plan to spend ₹ 100 a month on fruits. You can buy 2 kilograms while price of fruits is ₹50 per kg. Now if price falls to ₹ 40 per kg, you may consume more of it, because your money income is ₹100 but real income in terms of fruits has increased from 2 kg lo 2.5 kg.

Law of Diminishing Marginal Utility: According to this law, as the consumer consumes successive units of a commodity, the utility derived from each additional unit (marginal unit) goes on falling. Hence, the consumer would purchase only if marginal utility of the commodity is equal to its price. If price falls, the consumer will be motivated to demand more units of the commodity. The reverse also holds good.

Demand schedule:

It is a table showing the quantities of a good that a consumer is willing and able to buy at the prevailing price in a given time period. (Table – 1)

Price *(₹ per cup)*	Demand *('000 cups)*
15	50
20	40
25	30
30	15
35	10

The above table gives the hypothetical demand schedule for coffee at a local coffee shop, showing different price levels of a cup of coffee and their corresponding quantities of cups demanded every month, ceteris paribus. Note that as price increases (say from ₹15 to ₹20 and so on), quantity demanded falls (say from 50 thousand cups to 40 thousand cups and so on).

Demand Curve:

A curve indicating the total quantity of a product that all consumers are willing and able to purchase at the prevailing price level, holding the prices of related goods, income and other variables as constant.

A demand curve is a graphical representation of a demand schedule. The demand curve shows the relationship between price of a good and the quantity demanded by consumers, ceteris paribus. You can see that when price of one cup of coffee is ₹30, demand is 15 thousand cups a month (point d on the demand curve), but as price falls, demand increases/expands and at the price ₹15, demand is 50 thousand cups (point a).

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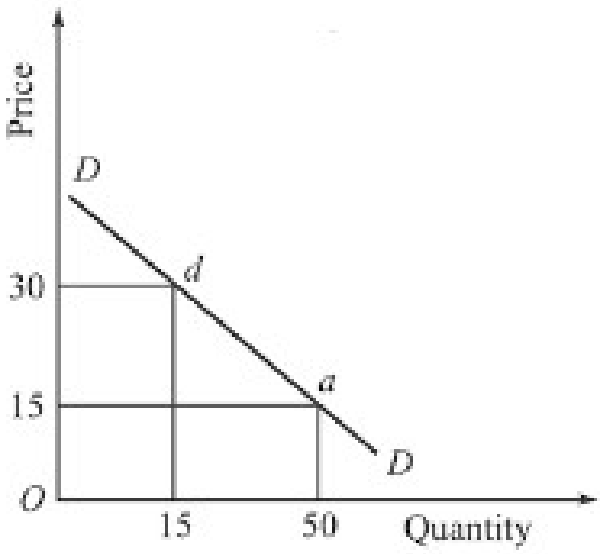

Shifts in Demand:

Shift of the demand curve occurs when any determinants of demand change other than price. When consumers' incomes are altered, the basic relationship between price and quantity demanded changes (shifts). The below given schedule shows this phenomenon, assuming that earlier monthly income of the consumer was ₹20,000 and now it has increased to ₹30,000.

This shifts the entire demand curve upward (rightward) and is called as increase in demand because more of that commodity is demanded at that price. The downward shift (leftward) is called as decrease in demand. The new demand curves D1D1 and D0D0can be seen in the Graph below.

Demand Schedule for Coffee with Increased Income

Price (₹ per cup)	*Demand ('000 cups) (Monthly income ₹ 20,000)*	*Demand ('000 cups) (Monthly income ₹ 30,000)*
15	50	60
20	40	50
25	30	40
30	15	25
35	10	15

Graph – Shift In Demand Curve

When the consumers' income increases from ₹20,000 to ₹30,000, it increases their purchasing power with no change in price. Now at the same price of ₹25, the consumer can buy more of coffee just because of increased income. So at the same price, quantity demanded increases from 30 to 40 thousand cups. This causes the demand curve to shift to the right from DD to D1D1 in the below figure Panel a. alternatively, if the income of the consumer falls, at the same price, the demand falls from 40 to 30 thousand cups. The demand curve for coffee shifts from DD to D2D2 (see panel b).

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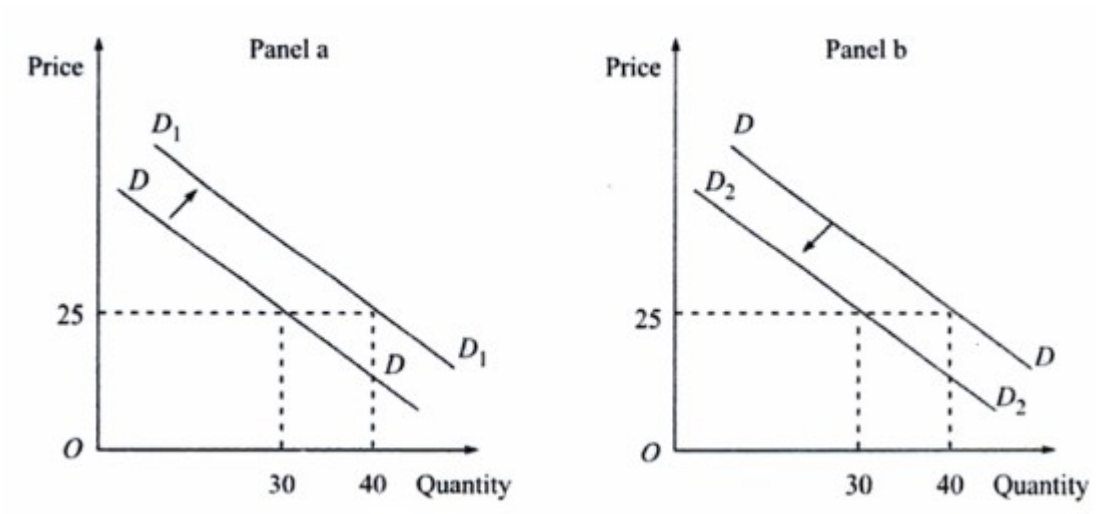
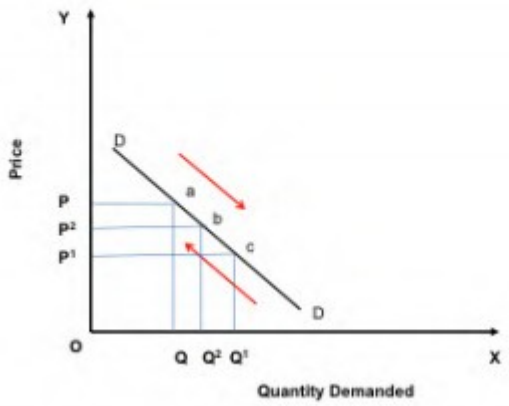


Therefore we understand that a shift in a demand curve may happen due to the changes in the variables other than price. The movement along a demand curve takes place (extension or contraction) due to price rise or fall.

Change in demand/ Extension and Contraction of Demand Curve:

When with a fall in price, more of a commodity is bought, and then there is an extension of the demand curve. When lesser quantity is demanded with a rise in price, there is a contraction of demand.

Graph –Extension And Contraction In Demand Curve



From the above graph we can understand that an increase in prices result in the contraction of demand. If the price increases from P2to P then the demand for the commodity fall from OQ2to OQ. Therefore the demand curve DD contracts from 'b' to 'a' on the other hand when there is a fall in price, it results in the extension of demand. Let us assume that the price falls from P2to P1then the quantity demanded OQ2 increases to OQ1 and the demand curve extends from point 'b' to 'c'.

Determinants of demand:

There are various factors affecting the demand for a commodity.

They are:

- Price of the good: The price of a commodity is an important determinant of demand. Price and demand are inversely related. Higher the price less is the demand and vice versa.
- Price of related goods: The price of related goods like substitutes and

complementary goods also affect the demand. In the case of substitutes, rise in price of one commodity lead to increase in demand for its substitute. In the case of complementary goods, fall in the price of one commodity lead to rise in demand for both the goods.

•Consumer's Income: This is directly related to demand. A change in the income of the consumer significantly influences his demand for most commodities. If the disposable income increases, demand will be more.

•Taste, preference, fashions and habits: These are very effective factors affecting demand for a commodity. When there is a change in taste, habits or preferences of the consumer, his demand will change. Fashions and customs in society determine many of our demands.

•Population: If the size of the population is more, demand for goods will be more . The market demand for a commodity substantially changes when there is change in the total population.

•Money Circulation: More the money in circulation, higher the demand and vice versa.

•Value of money: The value of money determines the demand for a commodity in the market. When there is a rise or fall in the value of money there may be changes in the relative prices of different goods and their demand.

•Weather Condition: Weather is also an important factor that determines the demand for certain goods.

•Advertisement and Salesmanship: If the advertisement is very attractive for a commodity, demand will be more. Similarly if the salesmanship and publicity is effective then the demand for the commodity will be more.

•Consumer's future price expectation: If the consumers expect that there will be a rise in prices in future, he may buy more at the present price and so his demand increases.

•Government policy (taxation): High taxes will increase the price and reduce demand, while low taxes will reduce the price and extend the demand.

•Credit facilities: Depending on the availability of credit facilities the demand for commodities will change. More the facilities higher the demand.

•Multiplicity of uses of goods: if the commodity has multiple uses then the demand will be more than if the commodity is used for a single purpose.

Types of demand:

•Direct and indirect demand (or) Producers' goods and consumers 'goods: demand for goods that are directly used for consumption by the ultimate consumer is known as direct demand (example: Demand for T shirts). On the other hand demand for goods that are used by producers for producing goods and services. (example: Demand for cotton by a textile mill)

•Derived demand and autonomous demand: when a consumer derives its usage from the use of some primary product it is known as derived demand. (example: demand for tyres derived from demand for car) Autonomous demand is the demand for a product that can be independently used. (example: demand for a washing machine)

•Durable and non-durable goods demand: durable goods are those that can be used more than once, over a period of time (example: Microwave oven) Non-durable goods can be used only once (example: Band-aid)

•Firm and industry demand: firm demand is the demand for the product of a particular firm. (example: Dove soap) The demand for the product of a particular industry is industry demand (example: demand for steel in India)

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- Total market and market segment demand: a particular segment of the markets demand is called as segment demand (example: demand for laptops by engineering students) the sum total of the demand for laptops by various segments in India is the total market demand. (example: demand for laptops in India)
- Short run and long run demand: short run demand refers to demand with its immediate reaction to price changes and income fluctuations. Long run demand is that which will ultimately exist as a result of the changes in pricing, promotion or product improvement after-market adjustment with sufficient time.
- Joint demand and Composite demand: when two goods are demanded in conjunction with one another at the same time to satisfy a single want; it is called as joint or complementary demand. (example: demand for petrol and two wheelers) A composite demand is one in which a good is wanted for several different uses. (example: demand for iron rods for various purposes)

Exceptions to the law of demand:

The law of demand does not apply in every case and situation. The circumstances when the law of demand becomes ineffective are known as exceptions of the law. Some of these important exceptions are as under.

- **Giffen Goods**: Some special varieties of inferior goods are termed as Giffen goods. Cheaper varieties millets like bajra, cheaper vegetables like potato etc come under this category. Sir Robert Giffen of Ireland first observed that people used to spend more of their income on inferior goods like potato and less of their income on meat. After purchasing potato the staple food, they did not have surplus to buy meat. So the rise in price of potato compelled people to buy more potato and thus raised the demand for potato. This is against the law of demand. This is also known as Giffen paradox.
- **Conspicuous Consumption / Veblen Effect**: This exception to the law of demand is associated with the doctrine propounded by Thorsten Veblen. A few goods like diamonds etc are purchased by the rich and wealthy sections of society. The prices of these goods are so high that they are beyond the reach of the common man. The higher the price of the diamond, the higher its prestige value. So when price of these goods falls, the consumers think that the prestige value of these goods comes down. So quantity demanded of these goods falls with fall in their price. So the law of demand does not hold good here.

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- **Ignorance:** A consumer's ignorance is another factor that at times induces him to purchase more of the commodity at a higher price. This is especially true, when the consumer believes that a high-priced and branded commodity is better in quality than a low-priced one.
- **Emergencies**: During emergencies like war, famine etc, households behave in an abnormal way. Households accentuate scarcities and induce further price rise by making increased purchases even at higher prices because of the apprehension that they may not be available. . On the other hand during depression, , fall in prices is not a sufficient condition for consumers to demand more if they are needed.
- **Future Changes in Prices**: Households also act as speculators. When the prices are rising households tend to purchase large quantities of the commodity out of the apprehension that prices may still go up. When prices are expected to fall further, they wait to buy goods in future at still lower prices. So quantity demanded falls when prices are falling.
- **Change in Fashion**: A change in fashion and tastes affects the market for a

commodity. When a digital camera replaces a normal manual camera, no amount of reduction in the price of the latter is sufficient to clear the stocks. Digital cameras on the other hand, will have more customers even though its price may be going up. The law of demand becomes ineffective.

•**Snob Effect**: Some buyers have a desire to own unusual or unique products to show that they are different from others. In this situation even when the price rises the demand for the commodity will be more.

•**Bandwagon Effect /Demonstration Effect**: This effect is shown when the demand of certain good increased, based on the assumption or knowledge that other consumers are also consuming that same good. This effect is most easily described using the example of fashion or clothing. People most often like to have the latest fashions, and wear what is in style. They look to people whom they admire, or see what their favorite celebrities, or even their friends are wearing. The individual's desire (demand) to also own and wear the latest fashions will be increased, because they have observed those fashions as what is popular. This is a very simple way to explain the bandwagon effect, and it is an example that most people have witnessed or experienced themselves.

• **Speculative Goods/ Outdated Good/Fear of rise in Price**: Speculative goods such as shares do not follow the law of demand. Whenever the prices rise, the traders expect the price to rise further so they buy more. Goods that go out of use due to advancement in the underlying technology are called outdated goods. The demand for such goods does not rise even with fall in prices

•**Seasonal Goods:** Goods which are not used during the off-season (seasonal goods) will also be subject to similar demand behaviour.

• **Goods In Short Supply**: Goods that are available in limited quantity or whose future availability is uncertain also violate the law of demand.

ELASTICITY MEASURES AND BUSINESS DECISION MAKING

In ***economics***, ***elasticity*** is the measurement of how responsive an ***economic*** variable is to a change in another. It gives answers to questions such as: "If I lower the price of a product, how much more will sell?" "If I raise the price of one good, how will that affect sales of this other good?" Thus, Elasticity refers to percentage change in one variable relative to a percentage change in another.

Elasticity = % Change in Quantity / % Change in Price

Recall, the law of demand, which shows the inverse relation between price of a commodity and its quantity demanded. When price of a commodity increases (or decreases), its quantity demanded will fall (or rise). But the law does not indicate as to how responsive the demand for a good is to its price. This is to say that the law of demand gives only the direction of change of quantity demanded in response to a given change in the price of a commodity, but not the magnitude of such a change. In order to ascertain this magnitude, we need to know another concept, that of ELASTICITY OF DEMAND.

Elasticity of demand measures the degree of responsiveness of the quantity demanded of a commodity to a given change in any of the determinants of demand. Mathematically, it means the percentage change in quantity demanded of a commodity to a percentage change in any of the (independent) variables that determine demand for the commodity.

The elasticity of demand may be as follows:

- Price Elasticity
- Income Elasticity and
- Cross Elasticity

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- Promotional Elasticity

Price Elasticity

The response of the consumers to a change in the price of a commodity is measured by the price elasticity of the commodity demand.

The responsiveness of changes in quantity demanded due to changes in price is referred to as price elasticity of demand. The price elasticity of demand is measured by dividing the percentage change in quantity demanded by the percentage change in price.

Price Elasticity= Proportionate change in the Quantity Demanded / Proportionate change in price

Formula:

The formula for measuring price elasticity of demand is:

Price Elasticity of Demand = - Percentage change in Quantity

Percentage Change in Price

$$E_{pd} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}}$$

$$= \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$$

ΔQ = change in quantity demanded
ΔP = change in price
P = price
Q = quantity demanded

For example:

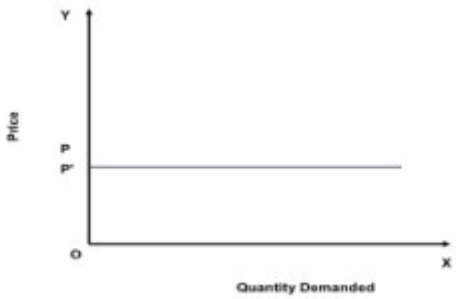
Quantity demanded is 20 units at a price of Rs.500. When there is a fall in price to Rs. 400 it results in a rise in demand to 32 units. Therefore the change in quantity demanded is12 units resulting from the change in price of Rs.100.

The Price Elasticity of Demand is = 500 / 20 x 12/100 = 3

Degrees of price elasticity

The following are the possible combination of changes in Price and Quantity demanded. The slope of each combination is depicted in the following graphs.

1.Perfectly Elastic Demand (Ed= ∞) at a given price the quantity demanded by an infinite amount



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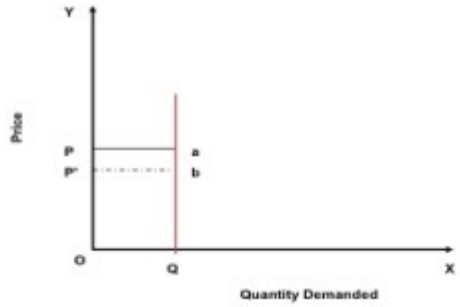
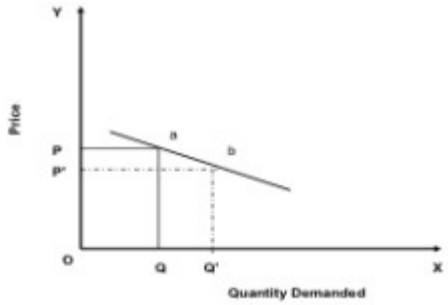
2.Perfectly Inelastic Demand (Ed= 0) the quantity demanded does not change regardless of the percentage change in price.



3.Relatively Elastic Demand (Ed>1): a small percentage change in price leading to a larger change in Quantity demanded.



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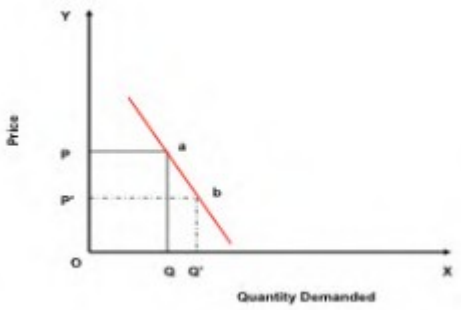
4.Relatively Inelastic Demand (Ed< 1) a greater change in price leads to a smaller percentage change in quantity demanded.



5.Unit Elasticity of Demand (Ed=1) the percentage change in quantity demanded is the same as the percentage change in price that caused it.

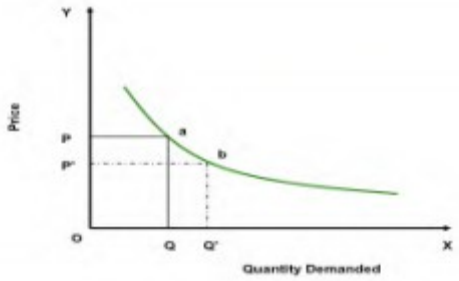


Table: Range of value for Price Elasticity of Demand

|PED|	Demand	Interpretation
>1	Elastic	Consumers responsive to price changes
<1	Inelastic	Consumers not very responsive to price changes
=1	Unit elastic	Intermediate case
∞	Perfectly elastic	Infinitely responsive (buy nothing if price rises)
0	Perfectly inelastic	Totally unresponsive (buy the same if price rises)

Use & Applications: Firms want to know the PED for their products in order to charge the right price and to make forecasts. The 'right' price is the price that achieves the firm's objectives, for example profit maximization or revenue maximization.

Measurement of Price Elasticity

•Ratio (or Percentage) Method

•Point Elasticity of Demand

•Arc Elasticity Method

•Total Outlay Method

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These three methods are now discussed in brief:

Ratio (or Percentage) Method

•In ratio method price elasticity of demand is expressed as the ratio of proportionate

$$E_p = \frac{\%\text{ change in } q}{\%\text{ change in } p} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

•change in quantity demanded and proportionate change in the price of the commodity.

•Since price and quantity demanded of a commodity are inversely related for a normal good, they would move in the opposite direction. Hence ep will always be negative for a normal good. Whereas incase of inferior goods ep will always be positive.

Point Elasticity of Demand

•The concept of point elasticity is used when we want to know relative price elasticity of demand at a given point on the demand curve to make some decisions about price variation.

•Dominick Salvatore defines point elasticity of demand as: "The price elasticity of demand at a particular point on the demand curve."

•To simplify the concept, we take mid-point of the demand curve as a point (C) where elasticity is unity (Ed=1). Elasticity of demand decreases (Ed<1) when we move to the right direction from point C and increases (Ed>1) the other way around. The elasticity is measured by placing points on a given graph that's why it is also called graphic method.

•There are a number of ways to calculate it. We can calculate price elasticity of demand on different points of linear or non-linear demand curves.

The **formula** applied for measuring the elasticity at any point on the straight line demand curve is:lower segment/Upper segment

$$E_d = \frac{\text{Lower Segment}}{\text{Upper Segment}}$$

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In the figure (6.9) AG is the linear demand curve (1). Elasticity of demand at its mid point D is equal to unity. At any point to the right of D, the elasticity is less than unity ($E_d < 1$) and to the left of D, the elasticity is greater than unity ($E_d > 1$).

(1) Elasticity of demand at point D = $\frac{DG}{DA} = \frac{400}{400} = 1$ (Unity).

(2) Elasticity of demand at point E = $\frac{GE}{EA} = \frac{200}{600} = 0.33$ (<1).

(3) Elasticity of Demand at point C = $\frac{GC}{CA} = \frac{600}{200} = 3$ (>1).

(4) Elasticity of Demand at point C is infinity.

(5) At point G, the elasticity of demand is zero.

Summing up, the elasticity of demand is different at each point along a linear demand curve. At high prices, demand is elastic. At low prices, it is inelastic. At the midpoint, it is unit elastic.

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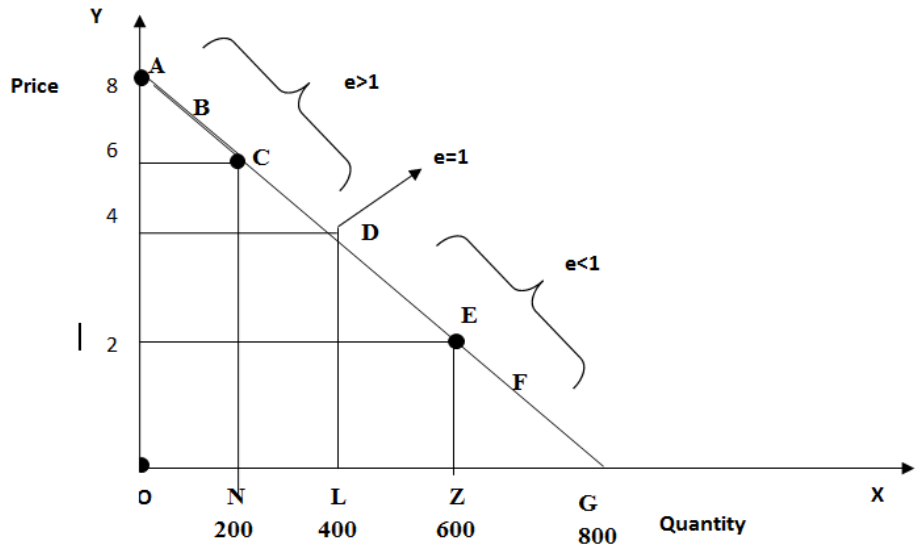
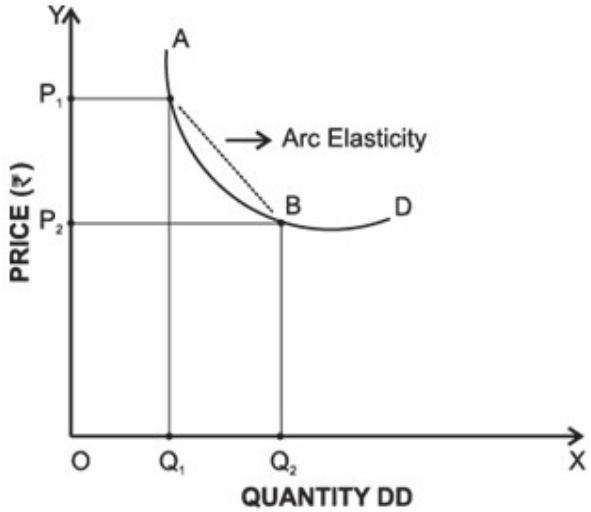


Arc Elasticity Method

•A segment of a demand curve between two points is called arc. Arc Elasticity measures elasticity at the midpoint of an arc between any two points on a demand curve, by taking the average of the prices and quantities. On most curves the elasticity of a curve varies depending upon where you are. Therefore elasticity needs to measure a certain sector of the curve.



Arc elasticity is calculated by using the following formula:

Ed= ∆q /∆px(p 1 +p 2) /(q 1 +q 2)

Where, ∆q denotes change in quantity.

∆p denotes change in price.

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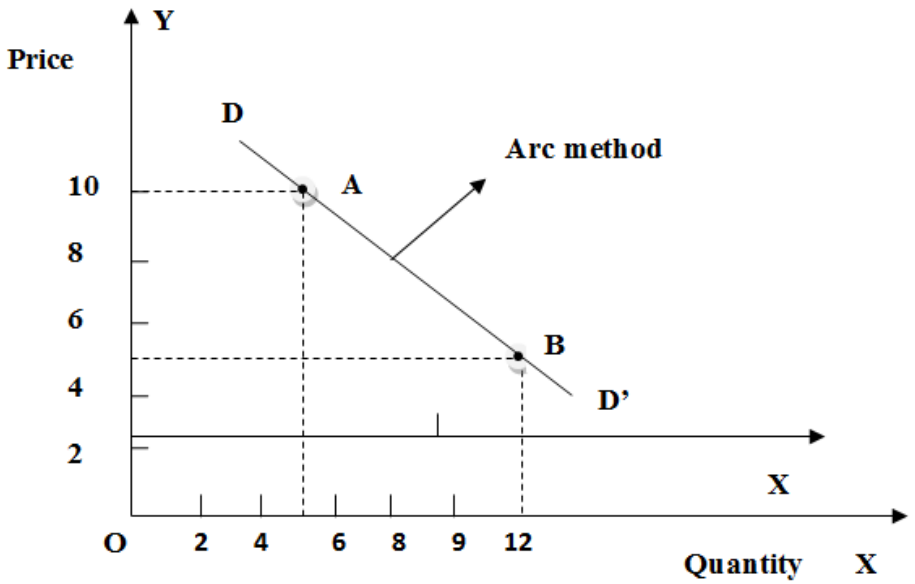
q^1 signifies initial quantity.

q^2 denotes new quantity.

P^1 stands for initial price.

P^2 denotes new price.



In the above figure, it is shown that at a price of Rs10, the quantity of demanded of apples is 5 kg. per day. When its price falls from Rs10 to Rs5, the quantity demanded increases to 12 Kgs of apples per day. The arc elasticity of AB part of demand curve DD/ can be calculated as under:

E_d = 7 X 10 + 5 = 7 X 15 = 7 X 15 = 21 = 1.2

5 x 5 + 12 = 5x 17= 5x 17=17

The arc elasticity is more than unity.

Total Outlay Method

•This method is also known as Total Expenditure method. We can measure elasticity through a change in expenditure on commodities due to a change in price. With this method, we cannot find out the exact and precise coefficient of elasticity. We can only know whether elasticity is equal to, greater than or lesser than 1. If demand is elastic, total outlay or expenditure increases for a fall in price and decreases with rise in price. If demand is inelastic, total outlay or expenditure falls for a fall in price and rise with rise in price. If elasticity of demand is unitary, total expenditure does not change for a fall or rise in price.

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Changes in price	Types of elasticity of demand		
	ep = 1	ep < 1	ep > 1
Fall in price	Total outlay remains constant	Total outlay falls	Total outlay rises
Rise in price	Total outlay remains constant	Total outlay rises	Total outlay falls

Price of pen (P) (₹)	Quantity demanded (Q)	Total outlay (PxQ)	Elasticity of demand (e)
5	2,000	10,000	>1 Relatively elastic
4	3,000	12,000	
2	7,000	14,000	
5	2,000	10,000	=1 Unitary Elastic
4	2,500	10,000	
2	5,000	10,000	
5	2,000	10,000	< 1 Relatively inelastic
4	2,250	9,000	
2	3,100	6,200	

Determinants of Price Elasticity of Demand

•**Nature of commodity**: By nature of commodity is a necessity or a luxury and comforts. (i) A necessity that has no close substitute (salt, newspaper, polish etc.) will have an inelastic demand because its consumptions cannot be postponed. Moreover, consumers purchase almost a fixed amount of a necessity per unit °f time whether the price" is somewhat higher or lower. (ii) Demand of luxuries is relatively more elastic because consumption of luxuries (TV. sets, decoration items, etc.) can be dispensed with or postponed when their prices rise. (iii) Comforts have more elastic demand than necessities and less elastic in comparison to luxuries. Commodities arc also classified as durable and perishable. Demand for durable goods is more elastic than perishable goods (non-durable) because when the price of former increases, people either get the old one repaired or buy a second hand.

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•**Availability and proximity of substitution:** A commodity has elastic demand if there are close substitutes of it. A small rise in the price of a commodity having close substitute will force the buyers to reduce the consumption of the commodity in favour of substitutes. If no substitutes are available, demand for goods tends to be inelastic. Demand for salt is highly inelastic because it has no substitute.

•**Alternative uses of the commodity:** Larger the number of uses of a commodity, the higher is its elasticity of demand. The demand in each single use of such commodities may be inelastic, but the demand in all uses taken together is elastic. Consider electricity, it is used for various purposes; when it is relatively cheap, it is used for all possible purposes, otherwise its use is restricted to the most immediate purpose.

•**Proportion of income spent on the commodity:** The demand for such goods is inelastic on which a small portion of income is spent, items like toothpaste, shoe polish, electric bulbs have inelastic demand as we spend a small portion of our income on these items.

If the prices of these items rise, the consumer budget is not affected much. On the other hand clothes and durable items take away a large portion of the income. Therefore, the demand for such commodities is elastic.

•**Time**: In the short-run the demand is inelastic while in the long-run demand is elastic. The reason is that in the long-run consumer can change their habits and consumption pattern. For example if the price of electricity goes up, it is very difficult to cut back its consumption in the short run. However, if the rise in price persists, people will plan substitution gas heater, fluorescent bulbs etc. so that they use less electricity. So the electricity of demand will be greater (E_d = > 1) in the long run than in the short run.

•**Durability of the commodity**: perishable commodities like eatables are relatively price inelastic in comparison to durable items like consumer electronic appliances, cars, etc. we can explain this by the logic of postponement of purchase, which is applicable to durables, and not to perishable ones.

•**Items of addiction:** Items of intoxication and addiction are relatively price inelastic. Consider the example of cigarettes, if their price rises, smokers may not be able to promptly cut down their consumption of cigarettes and may thus not respond instantly to an increase in price. :

Income Elasticity

Income elasticity of demand measures the responsiveness of quantity demanded to a change in income. It is measured by dividing the percentage change in quantity demanded by the percentage change in income. If the demand for a commodity increases by 20% when income increases by 10% then the income elasticity of that commodity is said to be positive and relatively high. If the demand for food were unchanged when income

increases, the income elasticity would be zero. A fall in demand for a commodity when income raises results in a negative income elasticity of demand.

Formula:The formula for measuring the income elasticity of demand is the percentage change in demand for a good divided by the percentage change in income. Putting this in symbol gives.

$$E_y = \frac{\text{Percentage Change in Demand}}{\text{Percentage Change in Income}}$$

Simplified formula:

$$E_y = \frac{\Delta q}{\Delta I} \times \frac{I}{Q}$$

Where Δq=change in demand=initial demand, I=initial income, ΔI=change in income

Example:

A simple example will show how income elasticity of demand can be calculated. Let us assume that the income of a person is $4000 per month and he purchases six CD's per month. Let us assume that the monthly income of the consumer increase to $6000 and the quantity demanded of CD's per month rises to eight. The elasticity of demand for CD's will be calculated as under:

$\Delta q = 8 - 6 = 2$

$\Delta p = \$6000 - \$4000 = \$2000$

Original quantity demanded = 6

Original income = $4000

$$E_y = \Delta q / \Delta I \times I / Q = 2 / 200 \times 4000 / 6 = 0.66$$

The income elasticity is 0.66 which is less than one.

Degrees of Income Elasticity of Demand

- Positive Income Elasticity

(a)Income Elasticity greater than unity ($E_Y > 1$)
(b)Income Elasticity equal to unity ($E_Y = 1$)
(c)Income Elasticity less than unity ($E_Y < 1$)

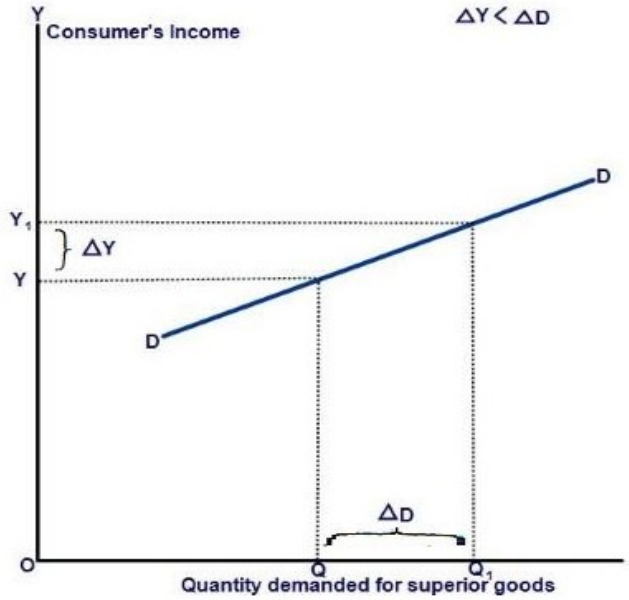
- Negative Income Elasticity ($E_Y < 0$)
- Zero Income Elasticity ($E_Y = 0$)

(a)Positive Income Elasticity

•**Income Elasticity greater than unity** ($E_Y > 1$)

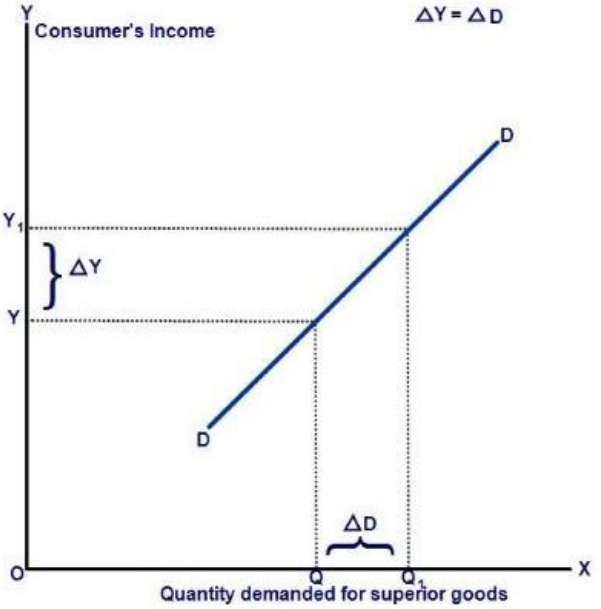
The income elasticity is greater than unity when percentage change in demand is greater

than percentage change in income. Eg: Luxurious goods



•Income Elasticity equal to unity (E_Y =1)

There is unity income elasticity of demand when percentage change in demand is equal to the percentage change in income.



•Income Elasticity less than unity (E_Y <1)

The income elasticity is less than unity when percentage change in demand is less than percentage change in income. Eg: Essential goods

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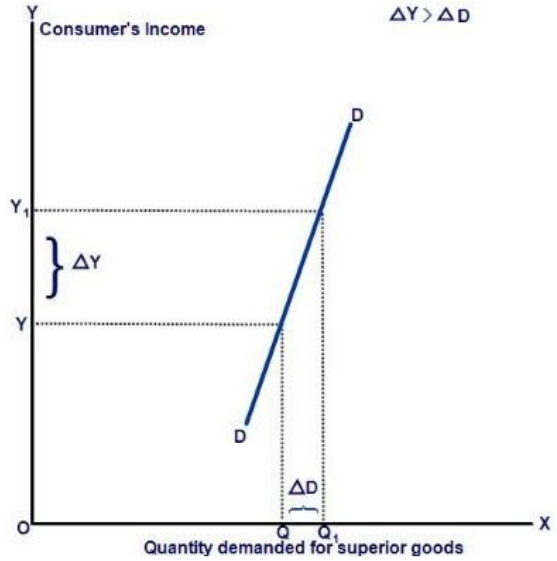
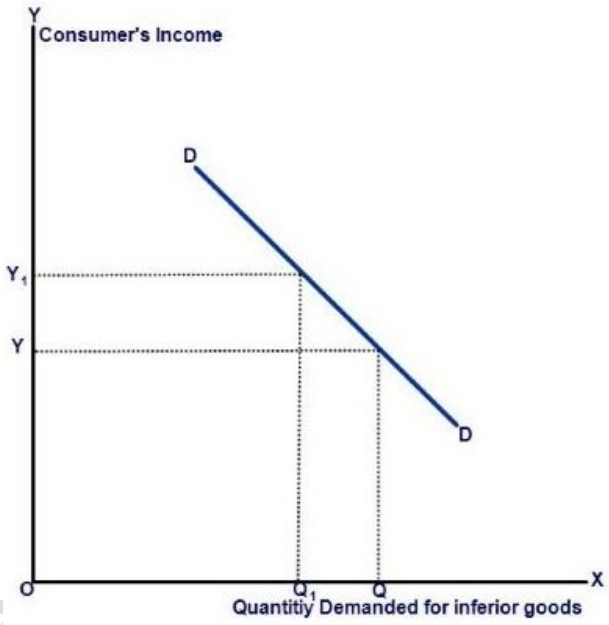


(a)Negative Income Elasticity

If there is inverse relationship between income of the consumer and demand for the commodity, then income elasticity will be negative. That is, if the quantity demanded for a commodity decreases with the rise in income of the consumer and vice versa, it is said to be negative income elasticity of demand. For example: As the income of consumer increases, they either stop or consume less of inferior goods.



(b)Zero Income Elasticity

If the quantity demanded for a commodity remains constant with any rise or fall in income of the consumer and, it is said to be zero income elasticity of demand. For example: In case of basic necessary goods such as salt, match box, kerosene etc. there is zero income elasticity of demand.

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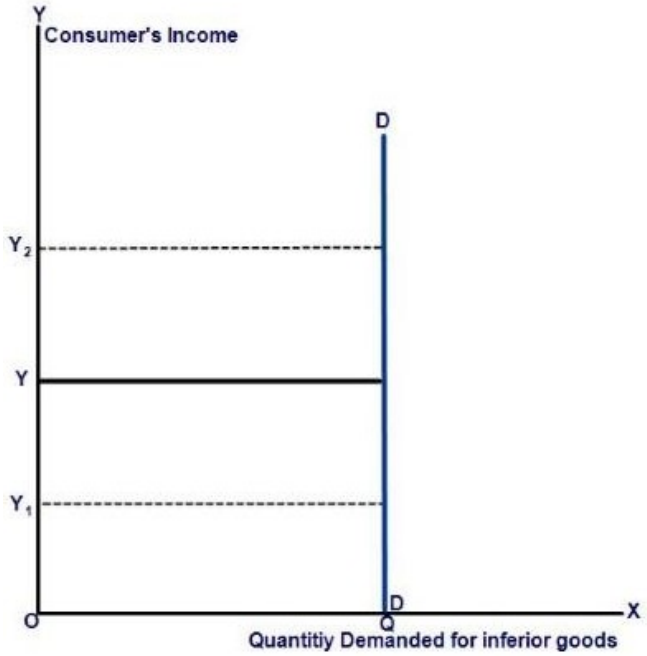


Table: Range of value for Income Elasticity of Demand

YED	Demand	Interpretation
> 1	Income elastic	Luxury products
0< *YED*< 1	Income inelastic	Staple products
<0	Negative elasticity	Inferior products

Use & Applications: Firms want to know the income elasticities for their products in order to select target markets and make forecasts. Note that income is not truly a controllable variable, but a firm can gain an element of control by selecting from different target markets with different levels of average income.

Cross Elasticity of Demand

•Cross elasticity of demand is a measure of the responsiveness of the quantity demanded of a particular good to a change in the price of another related good, ceteris paribus.

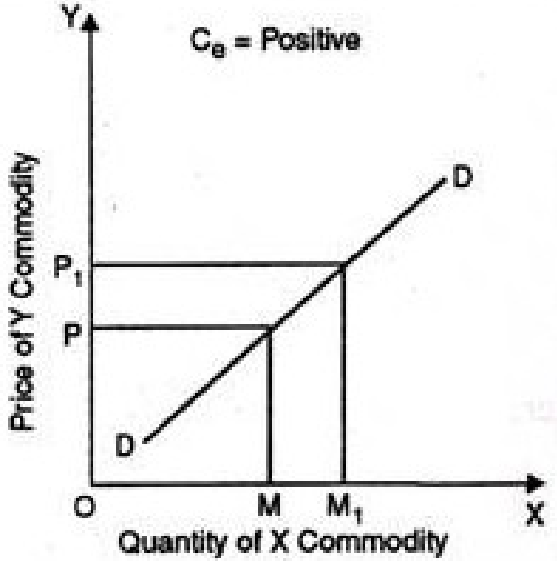
•Cross elasticity of demand can be defined as the ratio of the percentage change in the quantity demanded of good X, to the percentage change in the price of good Y.

$$E_C = \frac{\Delta q_x}{\Delta p_y} \times \frac{p_y}{q_x}$$

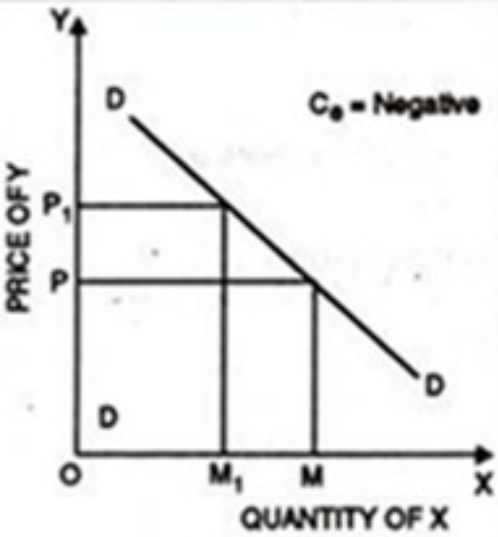
Types of Cross Elasticity of Demand

•Positive Cross Elasticity: When goods are substitute of each other then cross elasticity of demand is positive. In other words, when an increase in the price of Y leads to an increase

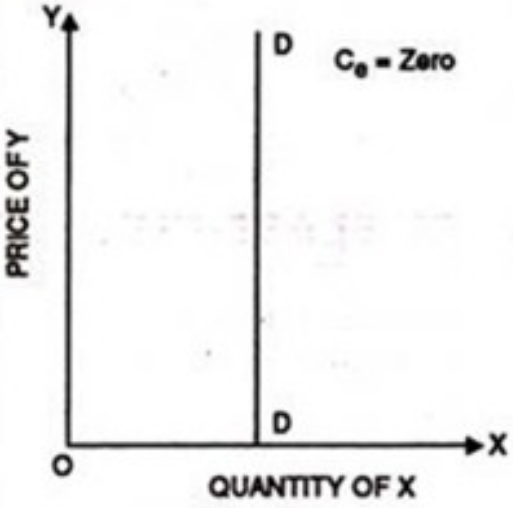
in the demand of X. For instance, with the increase in price of tea, demand of coffee will increase.



•**Negative Cross Elasticity**: In case of complementary goods, cross elasticity of demand is negative. A proportionate increase in price of one commodity leads to a proportionate fall in the demand of another commodity because both are demanded jointly.



•**Zero Cross Elasticity:** Cross elasticity of demand is zero when two goods are not related to each other. For instance, increase in price of car does not effect the demand of cloth. Thus, cross elasticity of demand is zero.



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In short,
• **E_{XY} > 0**: In such a situation, the two goods X and Y are **substitutes**.
•**E_{XY} = 0**: In such a situation, the two goods X and Y are **independent goods**.
•**E_{XY} < 0**: In such a situation, the two goods X and Y are **complements**.

Promotional/ Advertising Elasticity
•Promotional/ Advertisement elasticity is a measure of the responsiveness of the quantity demanded of a particular good to a change in advertising expenditure, ceteris paribus.
•Some goods (like consumer goods) are more responsive to advertising than others (like heavy capital equipment).
•Advertisement elasticity can be defined as the ratio of the percentage change in the quantity demanded of good or sales to the percentage change in advertising.
•$E_A = \frac{\Delta Q}{\Delta A} \times \frac{A}{Q}$

Where Q=Quantity of Sales
A=Amount of Advertisement Expenditure

Example: An Initial Advertisement Expenditure of Rs 50,000 the Demand for Firm's Product Is 80,000 Units. When the Advertisement Budget Is Increased To Rs 60,000 The Sales Volume Increased To 90,000 Units.
The Advertising Elasticity of Demand Is Measured As:
A_1=Rs 50,000, A_2=Rs 60,000
Q_1=Rs80, 000, Q_2=Rs90, 000
ΔQ=Rs10, 000, ΔA=Rs10, 000

$$E_A = \frac{\Delta Q}{\Delta A} \times \frac{A}{Q} = \frac{10,000}{10,000} \times \frac{50,000}{80,000} = 0.63$$

In other words, the percentage by which sales will increase after a 1% increase in advertising expenditure assuming all other factors remain equal (*ceteris paribus*). AED is usually positive. Negative advertising may, however, result in a negative AED.

Value of AED	Type of elasticity	Effectiveness of Advertising campaign
1	Unit	Neutral
>1	Relatively Elastic	Effective Advertising
<1	Relatively Inelastic	Ineffective Advertising
=0	Perfectly Inelastic	No effect on demand or sales

LAW OF SUPPLY
Supply means the goods offered for sale at a price during a specific period of time. It is the capacity and intention of the producers to produce goods and services for sale at a specific price. The supply of a commodity at a given price may be defined as the amount of it which is actually offered for sale per unit of time at that price.
The law of supply establishes a direct relationship between price and supply. Firms will supply less at lower prices and more at higher prices. "Other things remaining the same,

as the price of commodity rises, its supply expands and as the price falls, its supply contracts".

Supply schedule and supply curve

A supply schedule is a statement of the various quantities of a given commodity offered for sale at various prices per unit of time. With the help of the supply schedule, a supply curve can be drawn.

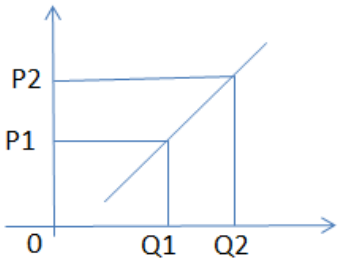
Individual supply schedule and curve

Individual supply schedule is a list of prices and quantities of a given commodity offered for sale by an individual seller or producer.

Table Supply Schedule

Price (in Rs.)
4
6
8
10
12

Figure Supply Curve



It is seen that when the price is Rs.4 three dozens are offered for sale. As the price increases, the quantity supplied also increases. With the help of the supply schedule, we can construct supply curve. On the basis of the schedule, supply curve SS is drawn. It has a positive slope. It moves upward to the right. The price of the product and quantity supplied are directly related to each other.

Market supply schedule and curve

By adding up the quantity supplied at various prices by all sellers in the market, we can get market supply schedule. Market supply curve is the lateral summation of the individual supply curves of all the producers in the market.

Movement along the supply curve or expansion and contraction of supply curve

When more units are supplied at a higher price, it is called 'expansion of supply'. When fewer units are supplied at a lower price, it is called 'contraction in supply'. It is illustrated in figure as above. When the price is OP1, OA is supplied. When price increases to OP2, the producer will supply OB units. The movement from OA to OB shows the expansion in supply. Original price is OP2 and original supply is OB. When price falls to OP1 the producer will supply OA units. The supply has contracted from OB to OA.

Shifts in supply (or) increase or decrease in supply

Increase or decrease in supply causes shifts in the supply curve. A shift in the supply curve is due to a change in other factors i.e., other than the price of the commodity. It is explained in the figure.

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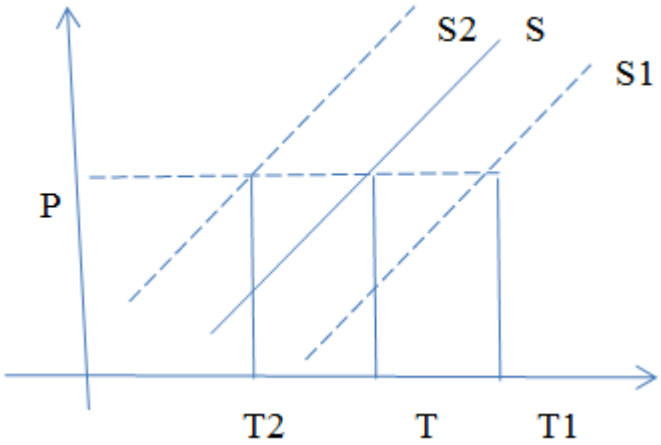

At price OP, SS is the supply curve before the change in other factors. S1 S1 shows an increase in supply because at the same price OP or TE more is offered for sale ie. OT1. S2 S2 shows decrease in supply because at the same price OP or TE, less is offered for sale ie. OT2.

Why Does the Supply Curve Slope Upwards?

The reasons behind the positive relationship between the price and the quantity supplied of a good are:

•An increase in production and thus an increased supply can only occur at a higher price because of the law of diminishing returns.

•By selling at a higher price, the producer is able to make greater profits.

•Thus with an increase in price he increases the quantity supplied.

Factors determining supply

1. Production technology

State of production technology affects the supply function. If advanced technology is used in the country, large scale production is possible. Hence supply will increase. Old technology will not increase the supply.

2. Prices of factors

When the prices of factors rise, cost of production will increase. This will result in a decrease in supply.

3. Prices of other products

Any change in the prices of other products will influence the supply. An increase in the price of other products will influence the producer to shift the production in favour of that product. Supply of the original product will be reduced.

4. Number of producers or firms

If the number of producers producing the product increases, the supply of the product will increase in the market.

5. Future price expectations

If producers expect that there will be a rise in the prices of products in future, they will not supply their products at present.

6. Taxes and subsidies

If tax is imposed by the government on the inputs of a commodity, cost of production will go up. Supply will be reduced. When subsidy is given to the producer, it will encourage them to produce and supply more. Subsidy means a part of the cost of a commodity will be borne by the government.

7. Non-economic factors

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Non-economic factors like, war, political climate and natural calamities create scarcity in supply.

Elasticity of Supply

The law of supply tells us that quantity supplied will respond to a change in price. The concept of elasticity of supply explains the rate of change in supply as a result of change in price. It is measured by the formula mentioned below

Elasticity of supply = Proportionate change in quantity supplied/Proportionate change in price

Elasticity of supply may be defined as "the degree of responsiveness of change in supply to change in price on the part of sellers".

Types of elasticity of supply

There are five types of elasticity of supply.

1. Perfectly elastic supply

The coefficient of elasticity of supply is infinity. (eS is infinite). For a small change or no change in price, there will be infinite amount of supply. (SS1 in Figure)

2. Relatively elastic supply

The coefficient of elastic supply is greater than 1(es > 1). Quantity supplied changes by a larger percentage than price. (SS2 in figure)

3. Unitary elastic supply

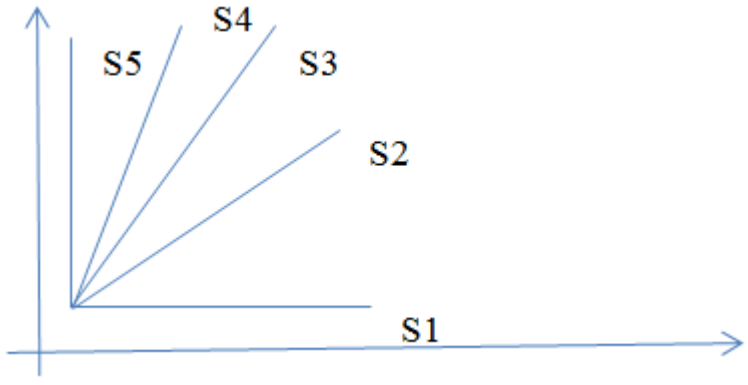
The coefficient of elastic supply is equal to 1 (es = 1). A change in price will cause a proportionate change in quantity supplied. (SS3 in figure)

4. Relatively inelastic supply

The coefficient of elasticity is less than one (es < 1). Quantity supplied changes by a smaller percentage than price. (SS4 in figure)

5. Perfectly inelastic supply

The coefficient of elasticity is equal to zero (es = 0). A change in price will not bring about any change in quantity supplied. (SS5 in figure)



Factors determining elasticity of supply

1. Changes in cost of production
2. Behavior pattern of producers
3. Availability of facilities for expanding output.
4. Supply in the short and long period.

MARKET EQUILIBRIUM

•**Equilibrium** refers to a state of balance that can occur in a model showing a tendency of no change.

•**Equilibrium price**: the price that equates the quantity demanded with the quantity supplied.

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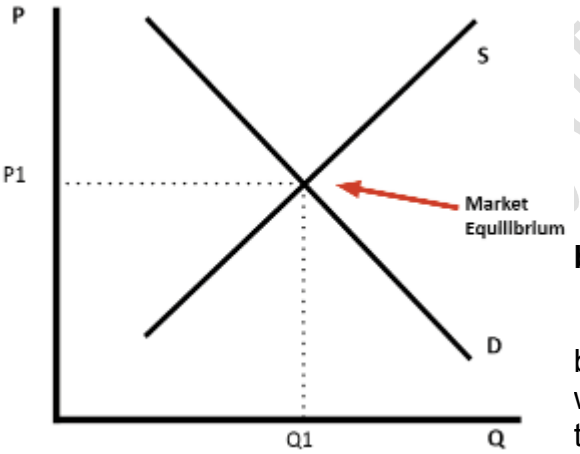
•**Equilibrium quantity**: the amount that people are willing to buy and sellers are willing to offer at the equilibrium price level.
•Taking the market demand curve and the market supply curve, we try to strike an equilibrium price where both the players, that is, the consumers on the one hand and the producers on the other, are satisfied.
•Equilibrium in the market occurs when that price is reached where the demand for and the supply of a commodity are equal to each other.
•**Shortage**: a market situation in which the quantity demanded exceeds the quantity supplied
→ shortage occurs at a price *below* the equilibrium level
•**Surplus**: a market situation in which the quantity supplied exceeds the quantity demanded
→ surplus occurs at a price *above* the equilibrium level
Market equilibrium occurs where supply = demand. At this point, there is no tendency for prices to change. We say the market clearing price has been achieved.

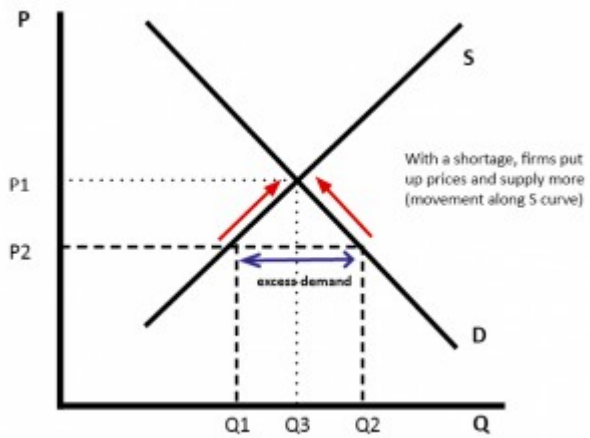
In the diagram below, the equilibrium price is Pe. The equilibrium quantity is Qe.



If price is below the equilibrium

•If price was below the equilibrium at P2 then demand would be greater than the supply. Therefore there is a shortage of (Q2 – Q1)

•If there is a shortage, firms will put up prices and supply more. As price rises there will be a movement along the demand curve and less will be demanded.



If price is above the equilibrium

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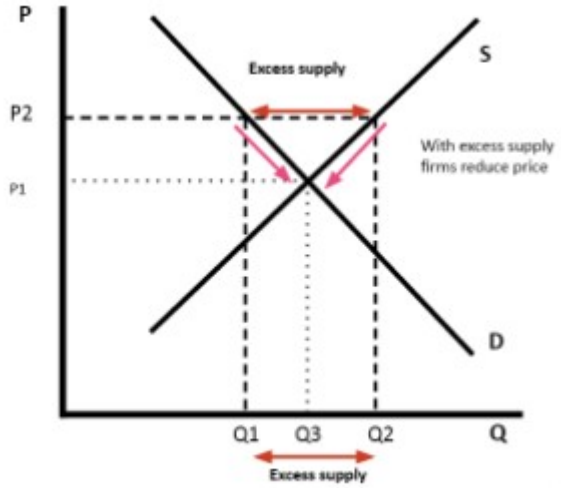
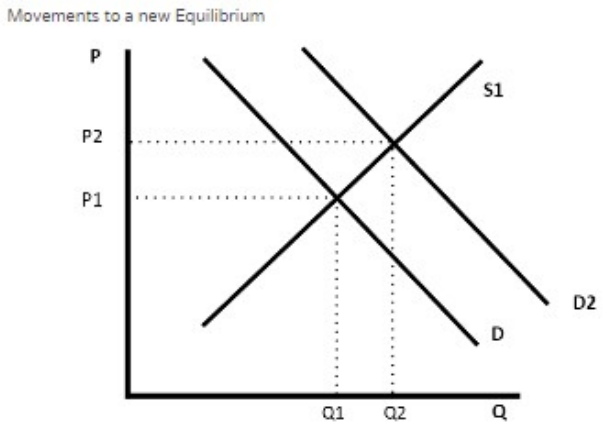
- If price was above the equilibrium (e.g. P1), then supply (Q1) would be greater than demand (Q3) and therefore there is too much supply. There is a surplus.

- Therefore firms would reduce price and supply less. This would encourage more demand and therefore the surplus will be eliminated. The market equilibrium will be at Q2 and Pe.





If there was an increase in income the demand curve would shift to the right (D1 to D2). Initially there would be a shortage of the good, therefore the price and quantity supplied will increase leading to a new equilibrium at Q2

An increase in supply would lead to a lower price and more quantity sold.

DEMAND FORECASTING

Introduction

Often when firms are planning on their production for future, a major problem faced by them is how much good needs to be produced. To solve this crucial problem, firms have to forecast the future demand for their good.

Demand forecasting involves predicting of future demand for a good. It is the tool to

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scientifically predict the likely demand of a product in future. It is the process of determining how much of which product is needed when and where. It involves estimation of the level of demand,; extent and magnitude of demand; responsiveness of demand (elasticity) to a propose change in price, income of consumer, price of other goods (complements or substitutes) and other determinants.

The aim of economic forecasting is to reduce the risk that the firm faces in its short term operational decision making and in planning for its long term growth. So demand forecasting is predicting the future demand for firm's product. The knowledge about the future demand for the product helps a great deal in the following areas of business decision making.

- Planning and scheduling production
- Acquiring inputs (labour, raw material and capital)
- Making provision for finance
- Formulating pricing strategy
- Planning Advertisement.

Steps in demand forecasting:

The objective of demand forecasting is achieved only when forecast is made systematically and scientifically and when it is fairly reliable. The following steps are generally taken to make systematic demand forecasting.

(i)**Specifying the objective:** The objective or the purpose of demand forecasting must be clearly specified. It may be specified in term of short term or long term demand, firms market share, the over all demand for a product or for firms own product..

(ii)**Determining the time prospective:** Depending on the firm's objective, demand may be forecast for a short period, i.e, for the next 2-3 years, or for a long period**.**

(iii)**Making choice of methods for demand forecasting:** There are different kinds of methods are available. However all methods are not suitable for all kinds of demand forecasting because the purpose of forecasting ,data requirement of a method ,availability of data and time frame of forecasting vary from method to method.the demand forecaster

has therefore to choose a suitable method keeping in view his purpose and requirements.

(iv)**Collection of data and data adjustment:** once method of demand forecasting is decided on, the next step is to collect the required data –primary or secondary or both.

(v)**Estimation and interpretation results:** once required data is collected and forecasting method is finalized, the final step in demand forecasting is to make the estimate of demand for the predetermined years or the periods.

Techniques/ Methods of Forecasting Demand

Subjective Methods

- **Consumers' opinion survey**: In this method consumers' are asked about their future buying intentions of products. A survey can be conducted in two ways: census method and sample method.
- **Sales force composite**: In this method the salespersons' are asked about their estimated sales target in their respective sales territories in a given period of time. The sum total of such estimates forms the basis of forecasted demand.
- **Experts' opinion method:** Here demand forecasting is based on the opinion of experts, either internal or external to the firm. Some of the major types of opinion method are:
  - **Group discussion**
  - **Delphi technique**
- **Market simulation**: In this method firm may create an 'artificial market' in which the consumers are instructed to shop with some money. This kind of 'laboratory experiment' can be useful in ascertaining consumers' reactions to changes in price, packaging and even location of the product in the shop. The Garbor-Granger test is a popular technique of market simulation.
- **Test marketing**: In test marketing, the product is actually sold in certain segment of the market. It involves real markets in which consumers actually buy a product without the consciousness of being observed.
- Demand is forecasted on the basis of actual sales of the product in the test market and the product is launched in the entire market on the basis of the results of the sales in the test area.

Quantitative method

- **Trend projection**

  Often referred to as a "classical method", trend projection is a powerful statistical tool that is frequently used to predict future values of a variable on the basis of time series data. Time series data are composed of: secular trend, seasonal trend, cyclical trend & random events.
- Time series data can be represented as:

  $Y_t = f(T_t, C_t, S_t, R_t)$

  Y_t = actual value of the data at time t

  T_t = trend component at t

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C_t = cyclical component at t
S_t = seasonal component at t
R_t = random component at t

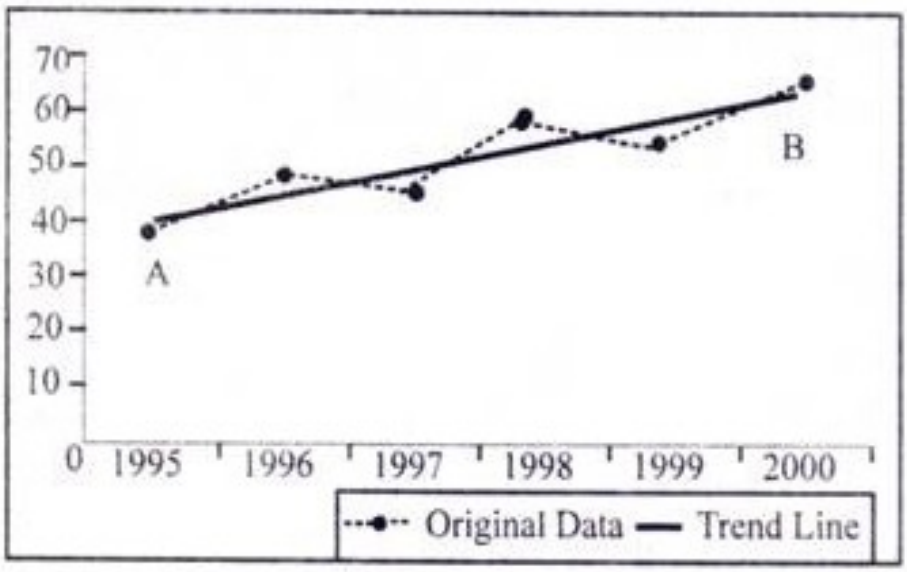
Methods of trend projection

- Graphical method
- Least square method
- ARIMA (Box Jenkins) method

(Auto Regressive Integrated Moving Average)

Graphical method

This method helps in forecasting the future sales of an organization with the help of a graph. The sales data is plotted on a graph and a line is drawn on plotted points.



Least square method

It is a powerful tool to estimate the coefficients of a linear function(Y = a + b X). This equation describes a straight line, where Y represents sales and X represents time. In this method, we fit the data on demand and time in the form of equations and then project the demand for the future period. These equations are termed as "normal equations" and the task of least square method is to find out the values of the coefficients in these equations.

The normal equations in this model would be:

$\Sigma Y = na + b\Sigma X$.....(1)

$\Sigma XY = a\Sigma X + b\Sigma X^2$.....(2)

By the principle of least square the value of the coefficients are:

$a = \bar{Y} - b\bar{X}$

$$b = \frac{\Sigma(Y-\bar{Y})(X-\bar{X})}{\Sigma(X-\bar{X})^2}$$

ARIMA (Box Jenkins) method

- The Auto Regressive Integrated Moving Average (ARIMA) method has been given by Box and Jenkins, therefore the method is also known as Box Jenkins method. It is considered to be the most sophisticated technique of forecasting as it combines moving average and auto regressive techniques.

Smoothing techniques:

Most of the series do not show a continuous trend, some increase and decrease in values

can be seen in any time series. Smoothing technique includes:

- moving average,
- weighted moving average,
- exponential smoothing

Moving average: The simple moving average method forecasts on the basis of demand values during the recent past. Such a method is applicable to a time series that does not have any pronounced behavioural pattern of fluctuations.

Formula to calculate simple moving average

$$D_n = \frac{\sum_{i=1}^{n} D_i}{n}$$

Where Di= demand in the i^{th} period, n= number of period in the moving average

Weighted moving average: In weighted moving average method we forecast the future value on the basis of weights of the most recent observations.

Formula to calculate weighted moving average**:**

$$D_n = \sum_{i=1}^{n} w_i D_i$$

Where Di= demand in the i^{th} period, wi= weight for the i^{th} period, n= number of period in the moving average

Exponential smoothing: Exponential smoothing method assigns greater weights to the more recent data. Exponential smoothing forecast is calculated using the following equation:

$$F_{t+1} = aD_t + (1 - a)F_t$$

where F_{t+1}= forecast for the next period, D_t = actual demand in the present period, F_t = previously determined forecast for the present period, and a = weighting factor, termed as smoothing constant.

Barometric techniques: In this technique we construct an index of relevant economic indicators and forecast future trends on the basis of these indicators. This model usually search for patterns among different variables over a period of time.

Econometric methods: This method statistical tools on economic theories to estimates economic variables. There are two popular econometric methods like: regression analysis and simultaneous equations method.

(i) **Regression Analysis**: It relates a dependent variable to one or more independent variables in the form of a linear equations.

Dx= a1+a2Px+a3Y+a4Py+a5A+a6t+a7Vn

Where Dx= quantity demanded of X,

Px= price of X, Py=price of Y, A= advertising expenditure, t= tastes, Vn=other variables

Regression Analysis is a procedure commonly used by economists to estimate consumer demand with available data. It relates a dependent variable to one or more independent variables in the form of a linear equations.

Two types of regression:

- cross-sectional: analyze several variables for a single period of time
- time series data: analyze a single variable over multiple periods of time
- Regression equation: linear, additive

eg: $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4$

Y: dependent variable

a: constant value, y-intercept

X_n: independent variables, used to explain Y

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b_n: regression coefficients (measure impact of independent variables)

Interpreting the regression results:

coefficients:

◦negative coefficient shows that as the independent variable (X_n) changes, the variable (Y) changes in the opposite direction

◦positive coefficient shows that as the independent variable (X_n) changes, the dependent variable (Y) changes in the same direction

◦magnitude of regression coefficients is a measure of elasticity of each variable

(ii) **Simultaneous Equation Method**: This method is based on the guiding principle that in any economic decision every variable influences every other variable.

endogenous variables: dependent variables that may influence other dependent variables

exogenous variables: from outside the system, truly independent variables

Limitations of demand forecasting

- Change in fashion
- Consumers' psychology
- Uneconomical
- Lack of Experts
- Lack of past data

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MODULE - 2

PRODUCTION ANALYSIS

Introduction

Production process involves the transformation of inputs into output. The inputs could be land, labour, capital, entrepreneurship etc. and the output could be goods or services.
Factors of production include resource inputs used to produce goods and services. Economist categorizes input factors into four major categories such as land, labour, capital and organization.
Land: Land is heterogeneous in nature. The supply of land is fixed and it is a permanent factor of production but it is productive only with the application of capital and labour.
Labour: The supply of labour is inelastic in nature but it differs in productivity and efficiency and it can be improved.
Capital: is a manmade factor and is mobile but the supply is elastic.It refers to the wealth which is used to produce further wealth.(Money+ Machine)
Organization: Management

Production Function

Suppose we want to produce apples. We need land, seedlings, fertilizer, water, labour, and some machinery. These are called inputs or factors of production. The output is apples. In general a given output can be produced with different combinations of inputs. **A production function is the functional relationship between inputs and output. In general, we can represent the production function for a firm as: Q = f (x1, x2, ….,xn)**

Where Q is the maximum quantity of output, x1, x2, ….,xn are the quantities of various inputs, and f stands for functional relationship between inputs and output.
For the sake of clarity, let us restrict our attention to only one product produced using either one input or two inputs. If there are only two inputs, capital (K) and labour (L), we write the production function as: Q = f (L, K) This function defines the maximum rate of output (Q) obtainable for a given rate of capital and labour input.

Economic Efficiency and Technical Efficiency

We say that a firm is technically efficient when it obtains maximum level of output from any given combination of inputs.
On the other hand, we say a firm is economically efficient, when it produces a given amount of output at the lowest possible cost for a combination of inputs provided that the prices of inputs are given.

Short Run and Long Run

All inputs can be divided into two categories: i) fixed inputs and ii) variable inputs.

A fixed input is one whose quantity cannot be varied during the time under consideration. Such inputs are classified as fixed and include plant and equipment of the firm.
On the other hand, a variable input is one whose amount can be changed during the relevant period. For example, in the construction business the number of workers can be increased or decreased on short notice. Many ‘builder’ firms employ workers on a daily wage basis and frequent change in the number of workers is made depending upon the need. The amount of milk that goes in the production of butter can be altered quickly and easily and

is thus classified as a variable input in the production process. Whether or not an input is fixed or variable depends upon the time period involved

In contrast, the long run is that period over which all the firms' inputs are variable. In other words, the firm has the flexibility to adjust or change its environment. In the long run, input proportions can be varied considerably..

Long-run production function shows the maximum quantity of output that can be produced by a set of inputs, assuming the firm is free to vary the amount of all the inputs being used.

Production Function with One Variable Input

Consider the simplest two input production process - where one input with a fixed quantity and the other input with is variable quantity. Suppose that the fixed input is the service of machine tools, the variable input is labour, and the output is a metal part. The production function in this case can be represented as: Q = f (K, L) Where Q is output of metal parts, K is service of five machine tools (fixed input), and L is labour (variable input). The variable input can be combined with the fixed input to produce different levels of output Total, Average, and Marginal Products.

The concept of Average, Marginal & Total Product

- **Total Product**: It is the total output resulting from the efforts of all the factors of production combined together at any time.
- **Average Product**: It is the total product per unit of variable factor or ratio of total product to the total quantity of an input used to produce the product.
- **Marginal Product**: It is the change in total product per unit due to change in the quantity of variable factors. Marginal product (MP)
- Marginal product (MP) = change in output (Total Product) resulting from a unit change in a variable input
- $$MP_X = \frac{\Delta Q}{\Delta X}$$

- Average product (AP) = Total Product per unit of input used

$$AP_X = \frac{Q}{X}$$

Relationship between TP, MP and AP Curves

Both average product and marginal product are derived from the total product. Average product is obtained by dividing total product by the number of units of variable factor and marginal product is the change in total product resulting from a unit increase in the quantity of variable factor.

The various points of relationship between average product and marginal product can be summed up as follows: (i) when average product rises as a result of an increase in the quantity of variable input, marginal product is more than the average product. (ii) When average product falls, marginal product is less than the average product. (iii) when average product is maximum, marginal product is equal to average product. In other words, the marginal product curve cuts the average product curve at its maximum.

In short:

- When AP rises, MP > AP
- When AP falls, MP < AP
- When AP is maximized, MP=AP

The Law of Variable Proportion

The law of variable proportions or the law of diminishing returns examines the production function with one factor variable, keeping quantities of other factors fixed. In other words, it

refers to input-output relationship, when the output is increased by varying the quantity of one input. This law operates in the short run 'when all the factors of production cannot be increased or decreased simultaneously (for example, we cannot build a plant or shift a plant in the short run).

Assumptions of the Law

- The state of technology is assumed to be given and unchanged.
- There must be some inputs whose quantity is kept fixed.
- It is assumed that all variable factors are equally efficient.
- The law is not applicable when two inputs are used in a fixed proportion
- The law states that as we increase the quantity of one input which is combined with other fixed inputs, the output of the variable factor may increase more than proportionately in the initial stage of production but finally, it will not increase proportionately. Which means the marginal physical productivity of the variable input eventually decline. In other words, as additional units of a variable input are combined with a fixed input, after some point the additional output (i.e., marginal product) starts to diminish.

Explanation: Given these assumptions, let us illustrate the law with the help of a Table, where on the fixed input land, units of variable input labour are employed and the resultant output is obtained. The average product and marginal product columns are derived from the total product columns. An analysis of the table shows that the total, marginal and average product increase at first, reach a maximum and then start declining. The total product reaches its maximum when 7 units of labour are used and then it declines. The average product continue to rise till the 4^{th} unit while marginal product reaches its maximum at the 3^{rd} unit of labour, then it falls. It should be noted that the point of falling output is not the same for total, average and marginal product.

The marginal products start declining first, the average product following it and the total product is the last to fall. This observation points out that the tendency to diminishing returns is ultimately found in the three productivity concepts.

Production Schedule

Number of workers (L)	Total output (TP) (thousands per year) (Q)	Marginal product ($MP_L = \Delta Q/\Delta L$)	Average product ($AP_L = Q/L$)
0	0	—	—
1	10	10	10
2	28	18	14
3	54	26	18
4	76	22	
5	90	14	18
6	96	6	16
7	96	0	13.5
8	92	–4	11.5

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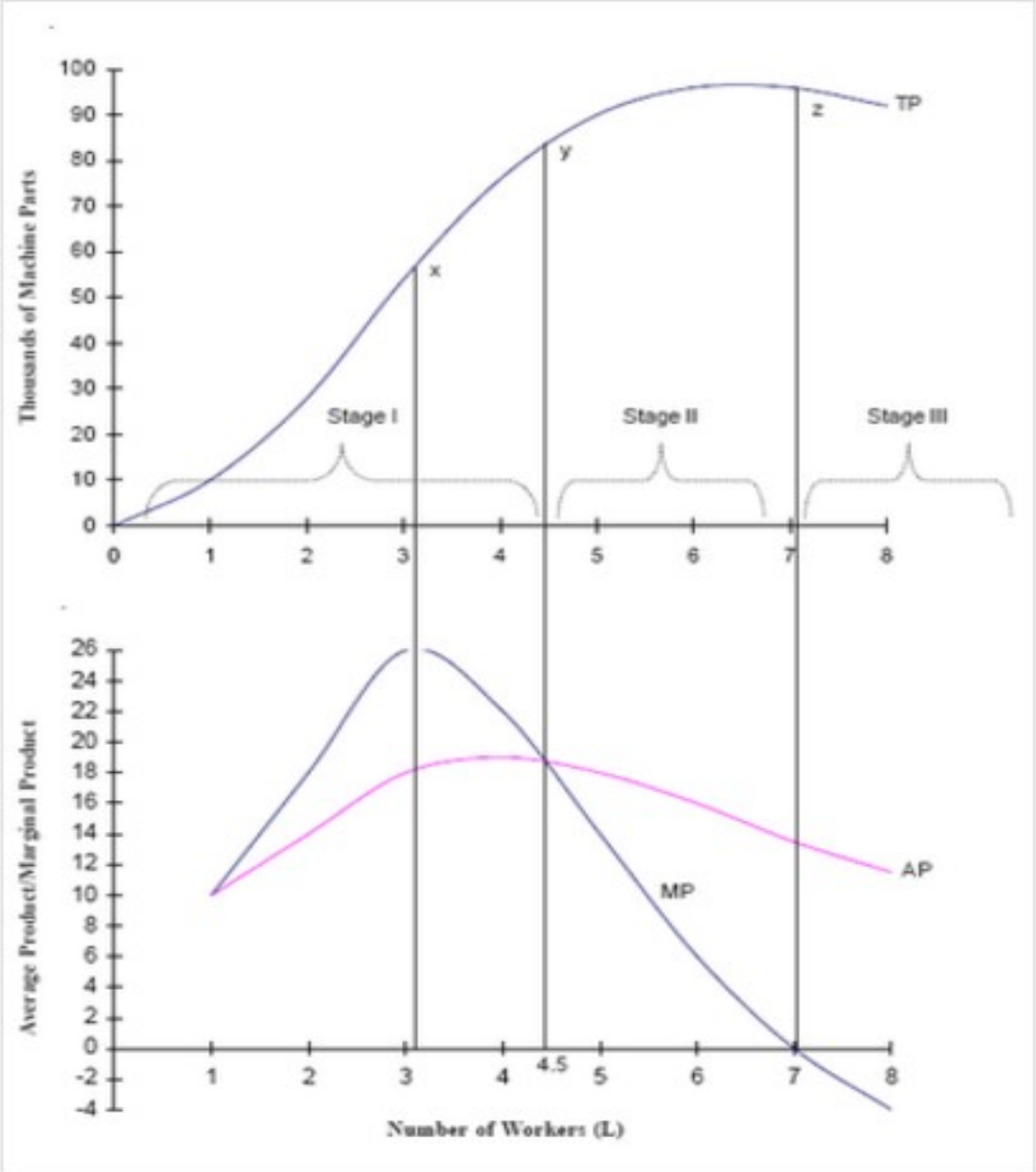
The law of variable proportion is presented diagrammatically in the following figure. The TP curve first rises at an increasing rate up to point X where its slope is the highest. From point X upwards, the total product increases at a diminishing rate till it reaches its highest point Z and then it starts falling.

- As long as TP curve is convex, MP is increasing. When TP curve is Concave , MP is decreasing.
- The point X on TP curve is called as point of inflexion. MP will be maximum corresponding to this point of the TP curve.
- AP is maximum at the point Y, and also AP = MP.
- Corresponding to the maximum point of the TP curve, point Z, MP is equal to Zero.
- To the left of Point Z, total product is increasing and marginal product is positive. To the right of point Z, TP curve is decreasing and marginal product is negative.



<u>Three stages of production</u>:

Stage I: Stage of Increasing Returns

AP is increasing and the MP is greater than the AP. Up to point Y on the TP curve Stage I exist. AP is increasing, but MP is increasing first up to point X then decreasing.

Causes of Initial Increasing Returns:

The phase of increasing returns starts when the quantity of a fixed factor is abundant relative to the quantity of the variable factor. As more and more units of the variable factor are added to the constant quantity of the fixed factor, it is more intensively and effectively used. This causes the production to increase at a rapid rate. Another reason of increasing returns is that the fixed factor initially taken is indivisible. As more units of the variable factor are employed to work on it, output increases greatly due to fuller and effective utilization of the variable factor.

Stage II: Stage of Decreasing Returns

Both AP and MP is decreasing. But MP is positive.

The portion of TP curve between Y and Z represents this stage.

Causes of Diminishing Returns:

The 2nd phase of the law occurs when the fixed factor becomes inadequate relative to the quantity of the variable factor. As more and more units of a variable factor are employed, the marginal and average product decline. Another reason of diminishing returns in the production function is that the fixed indivisible factor is being worked too hard. It is being used in non-optima! proportion with the variable factor, Mrs. J. Robinson still goes deeper and says that the diminishing returns occur because the factors of production are imperfect substitutes of one another.

Stage III: Stage of Negative Returns

TP is diminishing and the MP is negative.

The portion of TP curve which lies to the right of point Z represents this stage.

Causes of Negative Returns:

The 3rd phases of the law starts when the number of a variable, factor becomes, too excessive relative, to the fixed factors, A producer cannot operate in this stage because total production declines with the employment of additional labor.

A rational producer will always seek to produce in stage 2 where MP and AP of the variable factor are diminishing. At which particular point, the producer will decide to produce depends upon the price of the factor he has to pay. The producer will employ the variable factor (say labor) up to the point where the marginal product of the labor equals the given wage rate in the labor market.

Briefly, In the short run, rational firms should be operating only in Stage II

Q: Why not Stage III? →firm uses more variable inputs to produce less output

Q: Why not Stage I? →underutilizing fixed capacity, so can increase output per unit by increasing the amount of the variable input

As far as the applicability of the law of variable proportions is concerned, it has been found to be more relevant to agriculture.

Importance:

The law of variable proportions has vast general applicability. Briefly:

(i) It is helpful in understanding clearly the process of production. It explains the input output relations. We can find out by-how much the total product will increase as a result of an increase in the inputs.

(ii) The law tells us that the tendency of diminishing returns is found in all sectors of the economy which may be agriculture or industry.

(iii) The law tells us that any increase in the units of variable factor will lead to increase in the total product at a diminishing rate. The elasticity of the substitution of the variable factor for the fixed factor is not infinite.

From the law of variable proportions, it may not be understood that there is no hope for raising the standard of living of mankind. The fact, however, is that we can suspend the operation of diminishing returns by continually improving the technique of production through the progress in science and technology.

Production Function with Two Variable Inputs

In the long run, a firm has enough time to change the amount of *all* its inputs. In the long run, supply of both the inputs is supposed to be elastic and firms can hire larger quantities of both labour and capital. With larger employment of capital and labour, the scale of production increases. The technological relationship between changing scale of inputs and output is explained under the law of returns to scale. The laws of return to scale can be explained through the production function and isoquant curve technique.

Isoquant Curves

An isoquant (from the Greek word 'ios' means equal and 'quant' meaning quantity) is the locus of all technically efficient combinations (or all possible factors of production) for producing a given level of output. Isoquants are similar in concepts to indifference curves.
It is also known as Equal product curve or production indifference curve. The shape of an Iso-quant reflects the ease with which a producer can substitute among inputs while maintaining the same level of output. From the graph we can understand that the iso-quant curve indicates various combinations of capital and labour usage to produce 100 units of motor pumps. The points a, b or any point in the curve indicates the same quantum of production. If the production increases to 200 or 300 units definitely the input usage will also increase therefore the new iso-quant curve for 200 units (Q1) is shifted upwards. Various iso-quant curves presented in a graph is called as iso- quant map.
The long-run production function can be written as :X= f (L, K)

The concept of isoquants can be easily explained with the help of the table given below:
Table 1: An Isoquant Schedule

Combinations of Labor and Capital	Units of Labor (L)	Units of Capital (K)	Output of Cloth (meters)
A	5	9	100
B	10	6	100
C	15	4	100
D	20	3	100

The above table is based on the assumption that only two factors of production, namely, Labor and Capital are used for producing 100 meters of cloth.

Combination A = 5L + 9K = 100 meters of cloth

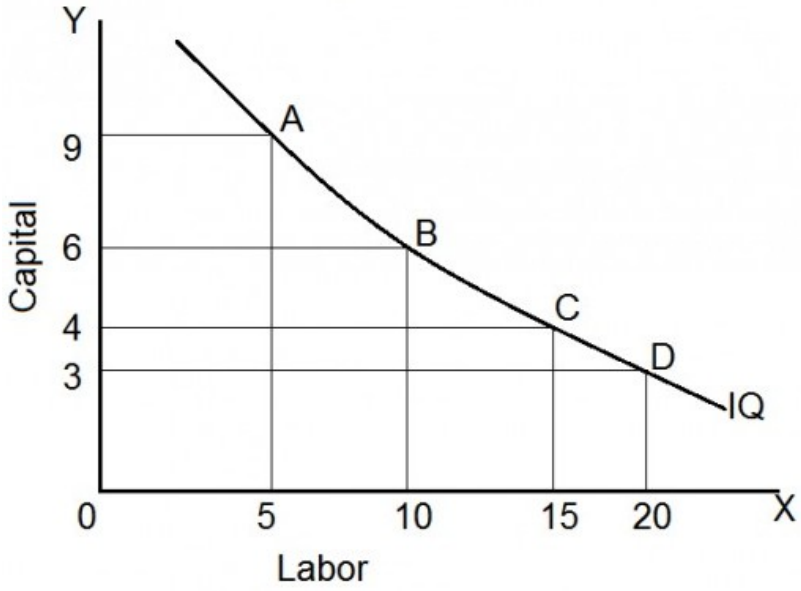
Combination B = 10L + 6K = 100 meters of cloth

Combination C = 15L + 4K = 100 meters of cloth

Combination D = 20L + 3K = 100 meters of cloth

The combinations A, B, C and D show the possibility of producing 100 meters of cloth by applying various combinations of labor and capital. Thus, an isoquant schedule is a schedule of different combinations of factors of production yielding the same quantity of output.

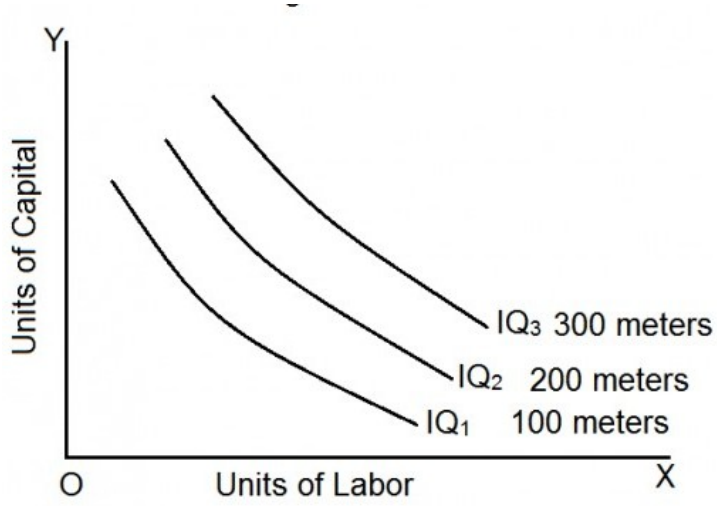
An iso-product curve is the graphic representation of an iso-product schedule.



Thus, an isoquant is a curve showing all combinations of labor and capital that can be used to produce a given quantity of output.

Isoquant Map

An isoquant map is a set of isoquants that shows the maximum attainable output from any given combination inputs.



Properties of Isoquants

1. An isoquant lying above and to the right of another isoquant represents a higher level of output.

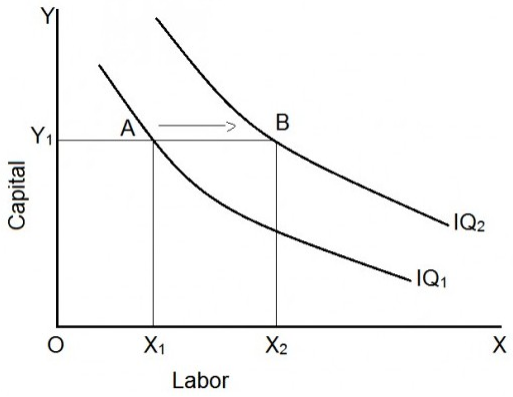
This is because of the fact that on the higher isoquant, we have either more units of one factor of production or more units of both the factors. This has been illustrated in figure 3. In figure 3, points A and B lie on the isoquant IQ_1 and IQ_2respectively.

At point A we have = OX_1 units of Labor and OY_1 units of capital.

At point B we have = OX_2 units of Labor and OY_1 units of capital.

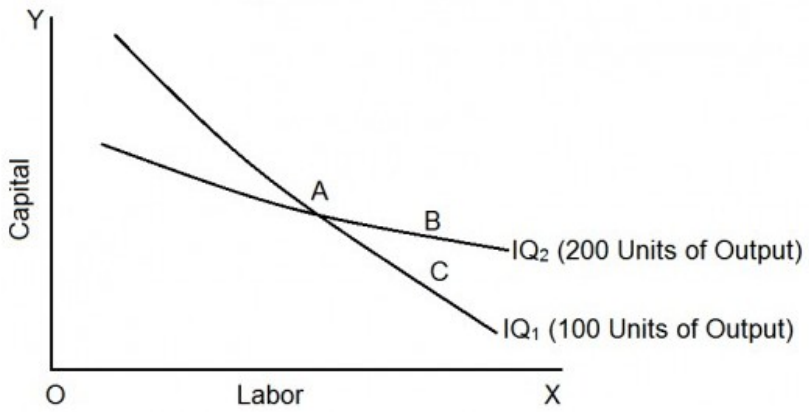
Though the amount of capital (OY_1) is the same at both the points, point B is having X_1X_2 units of labor more. Therefore, it will yield a higher output.

Hence, it is proved that a higher isoquant shows a higher level of output.



2. Two isoquants cannot cut each other

Just as two indifference curves cannot cut each other, two isoquants also cannot cur each other. If they intersect each other, there would be a contradiction and we will get inconsistent results. This can be illustrated with the help of a diagram as in figure 4.



In figure 4, the isoquant IQ_1 shows 100 units of output produced by various combinations of labor and capital and the curve IQ_2 shows 200 units of output,

On IQ_1, we have A = C, because they are on the same isoquant.

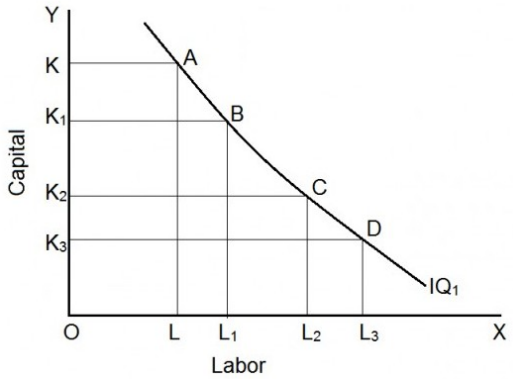
On IQ_2, we have A = B

Therefore B = C

This is however inconsistent since C = 100 and B = 200. Therefore, isoquants cannot intersect.

3. Isoquants are convex to the origin

An isoquant must always be convex to the origin. This is because of the operation of the principle of diminishing marginal rate of technical substitution. MRTS is the rate at which marginal unit of an input can be substituted for another input making the level of output remain the same.



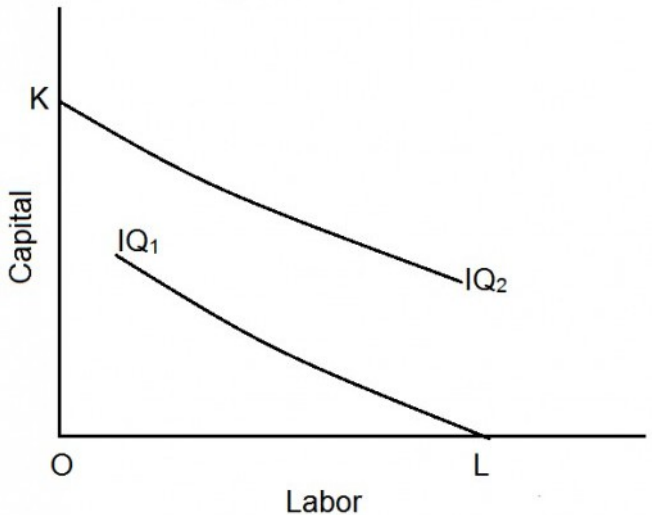
In figure 5, as the producer moves from point A to B, from B to C and C to D along an isoquant, the marginal rate of technical substitution (MRTS) of labor for capital diminishes. The MRTS diminishes because the two factors are not perfect substitutes. In figure 5, for every increase in labor units by (ΔL) there is a corresponding decrease in the units of capital (ΔK).

It cannot be concave as shown in figure 6. If they are concave, MRTS of labor for capital increases. But this is not true of isoquants.

Since MRTS must diminish, the isoquants must be convex to the origin.

4. No isoquant can touch either axis

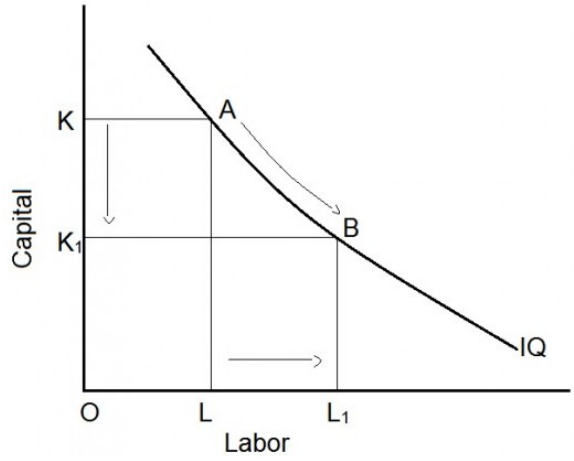
If an isoquant touches the X-axis it would mean that the commodity can be produced with OL units of labor and without any unit of capital.



Point K on the Y-axis implies that the commodity can be produced with OK units of capital and without any unit of labor. However, this is wrong because the firm cannot produce a commodity with one factor alone.

5. Isoquants are negatively sloped

An isoquant slopes downwards from left to right. The logic behind this is the principle of diminishing marginal rate of technical substitution. In order to maintain a given output, a reduction in the use of one input must be offset by an increase in the use of another input.



The above Figure shows that when the producer moves from point A to B, the amount of labor increases from OL to OL_1, but the units of capital decreases from OK to OK_1, to maintain the same level of output.

The impossibility of horizontal, vertical or upward sloping isoquants can be shown with the help of the following diagrams.

Marginal Rate of Technical Substitution

Prof. R.G.D. Alien and J.R. Hicks introduced the concept of MRS (marginal rate of substitution) in the theory of demand. The similar concept is used in the explanation of producers equilibrium and is named as ***marginal rate of technical substitution (MRTS).***
The marginal rate of technical substitution (MRTS) is a measure of the degree of substitutability between two inputs. More specifically, the MRTS of X for Y corresponds to the rate at which one input (X) can be substituted for another (Y), while maintaining total output constant.
MRTS measures the reduction in one input, due to unit increase in the other input that is just sufficient to maintain the same level of output.

Explanation:

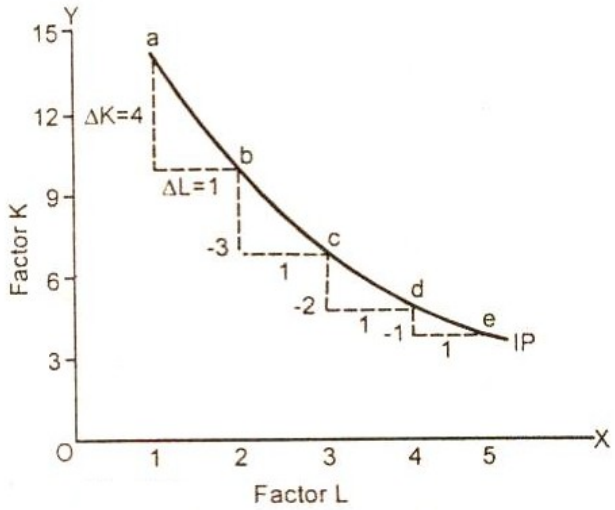
The concept of MRTS can be explained easily with the help of the table and the graph, below:

Factor Combinations	Units of Labor	Units of Capital	Units of Output of Commodity X	MRTS of Labor for Capital
A	1	15	150	-
B	2	11	150	4:1
C	3	8	150	3:1
D	4	6	150	2:1
E	5	5	150	1:1

It is clear from the above table that all the five different combinations of labor and capital that is A, B, C, D and E yield the same level of output of 150 units of commodity X, As we move down from factor A to factor B, then 4 units of capital are required for obtaining 1 unit of labor without affecting the total level of output (150 units of commodity X).

The MRTS is 4:1. As we step down from factor combination B to factor combination C, then 3 units of capital are needed to get 1 unit of labor. The MRTS of labor for capital 3:1. If we further switch down from factor combination C to D, the MRTS of labor for capital is 2:1. From factor D to E combination, the MRTS of labor for capital falls down to 1:1.
Formula: MRTSLK= -ΔK/ΔL
It means that the marginal rate of technical substitution of factor labor for factor capital (K) ($MRTS_{LK}$) is the number of units of factor capital (K) which can be substituted by one unit of factor labor (L) keeping the same level of output. In the figure 12.8, all the five combinations of labor and capital which are A, B, C, D and E are plotted on a graph.

Diagram/Graph:



The points A, B, C, D and E are joined to form an isoquant. The iso-product curve shows the whole range of factor combinations producing 150 units of commodity X. It is important to point out that ail the five factor combination of labor and capital on an iso-product curve are technically efficient combinations. The producer is indifferent towards these, combinations as these produce the same level of output.

Diminishing Marginal Rate of Technical Substitution:

The decline in MRTS along an isoquant for producing the same level of output is named as diminishing marginal rates of technical education. As we have seen in Fig. 12.8, that when a

firm moves down from point (a) to point (b) and it hires one more labor, the firm gives up 4 units of capital (K) and yet remains on the same isoquant at point (b). So the MRTS is 4. If the firm hires another labor and moves from point (b) to (c), the firm can reduce its capital (K) to 3 units and yet remain on the same isoquant. So the MRTS is 3. If the firm moves from point (C) to (D), the MRTS is 2 and from point D to e, the MRTS is 1. The decline in MRTS along an isoquant as the firm increases labor for capital is called ***Diminishing Marginal Rate of Technical Substitution.***

Elasticity of substitution

Unlike MRTS which is a measure of a degree of substitution of factors, another measure introduced independently by John Hicks and Joan Robinson, is known as the elasticity of substitution. Elasticity of substitution measures the percentage change in factor proportions due to a change in MRTS.

Optimal factor combination :Producer's Equilibrium

An important problem facing an entrepreneur is to decide about a particular combination of factors which should be employed for producing a product. There are various technical possibilities open to a firm from which it has to choose, that is, there are various combinations of factors which can yield a given level of output and from among which a producer has to select one for production.

Producer's equilibrium or optimization occurs when he earns maximum profit with optimal combination of factors. A profit maximization firm faces two choices of optimal combination of factors (inputs).

1. To minimize its cost for a given output; and

2. To maximize its output for a given cost.

Thus the least cost combination of factors refers to a firm producing the largest volume of output from a given cost and producing a given level of output with the minimum cost when the factors are combined in an optimum manner. We study these cases separately.

Cost-Minimization for a Given Output:

In the theory of production, the profit maximization firm is in equilibrium when, given the cost-price function, it maximizes its profits on the basis of the least cost combination of factors. For this, it will choose that combination which minimizes its cost of production for a given output. This will be the optimal combination for it.

Assumptions:

This analysis is based on the following assumptions:

1. There are two factors, labour and capital.

2. All units of labour and capital are homogeneous.

3. The prices of units of labour (w) and that of capital (r) are given and constant.

4. The cost outlay is given.

5. The firm produces a single product.

6. The price of the product is given and constant.

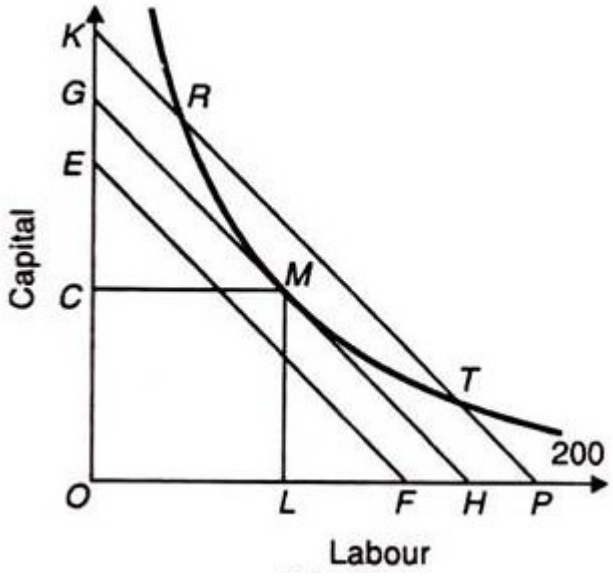
7. The firm aims at profit maximisation.

8. There is perfect competition in the factor market.

Explanation:

Given these assumptions, the point of least-cost combination of factors for a given level of output is where the isoquant curve is tangent to an iso-cost line. In Figure 17, the iso-cost line GH is tangent to the isoquant 200 at point M.

The firm employs the combination of OC of capital and OL of labour to produce 200 units of output at point M with the given cost-outlay GH. At this point, the firm is minimising its cost for producing 200 units.



Any other combination on the isoquant 200, such as R or T, is on the higher iso-cost line KP which shows higher cost of production. The iso-cost line EF shows lower cost but output 200 cannot be attained with it. Therefore, the firm will choose the minimum cost point M which is the least-cost factor combination for producing 200 units of output.

M is thus the optimal combination for the firm. The point of tangency between the iso-cost line and the isoquant is an important first order condition but not a necessary condition for the producer's equilibrium.

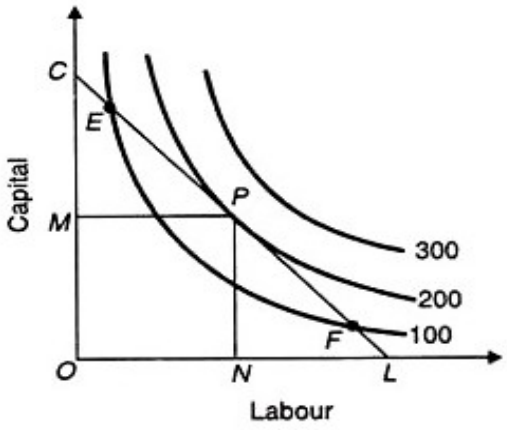
Output-Maximisation for a given Cost:

The firm also maximises its profits by maximising its output, given its cost outlay and the prices of the two factors. This analysis is based on the same assumptions, as given above.

The conditions for the equilibrium of the firm are the same, as discussed above.

1. The firm is in equilibrium at point P where the isoquant curve 200 is tangent to the iso-cost line CL in Figure 19.

At this point, the firm is maximising its output level of 200 units by employing the optimal combination of OM of capital and ON of labour, given its cost outlay CL. But it cannot be at points E or F on the iso-cost line CL, since both points give a smaller quantity of output, being on the isoquant 100, than on the isoquant 200.



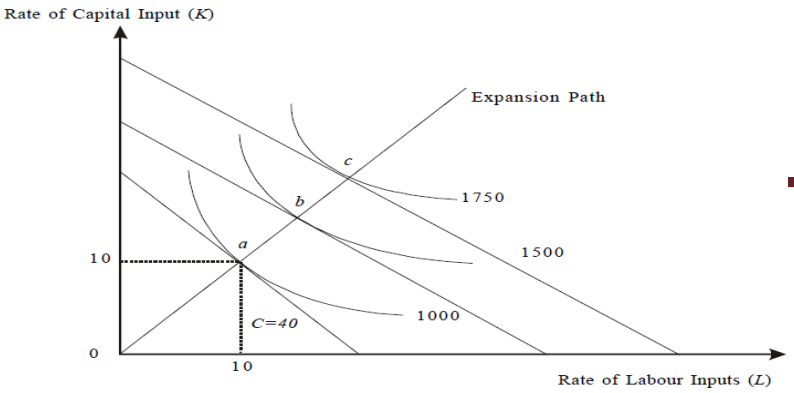
The firm can reach the optimal factor combination level of maximum output by moving along the iso-cost line CL from either point E or F to point P. This movement involves no extra cost because the firm remains on the same iso-cost line.

The firm cannot attain a higher level of output such as isoquant 300 because of the cost constraint. Thus the equilibrium point has to be P with optimal factor combination OM + ON. At point P, the slope of the isoquant curve 200 is equal to the slope of the iso-cost line CL. It implies that $w/r = MP_L/MPC = MRTS_{LC}$

2. The second condition is that the isoquant curve must be convex to the origin at the point of tangency with the iso-cost line.

Expansion Path

Expansion path is the line formed by joining the tangency points between



various isocost lines and the corresponding highest attainable isoquants. It can alternatively be defined to be the locus of equilibrium points of the isoquant with the lowest possible isocost line. An expansion path is a long run concept and each point on the expansion path represents a combination of inputs that minimizes cost.

The arrow from the origin shows all the cost minimizing input combinations for various levels of output this firm could produce in the long run. It is referred to as the firm's long run expansion path which shows the cheapest cost of raising output in the long run.

Law of Returns to Scale:

Just as the law of diminishing returns to a factor or the law of variable proportion is a short run phenomenon, return to scale is a long run phenomenon, in which the scale of production is determined on the basis of change in both the inputs in the production process. Returns to scale refer to the degree by which the level of output changes in response to a given change in all the inputs in a production system.

When the firm expands it scale, it increases both the inputs proportionately, then there are three technical possibilities. The output may increase by a greater proportion, by in the same proportion or in a smaller proportion to its inputs. This behavior of output with the increase in scale of operation is termed as

- Increasing returns to scale,
- Constant returns to scale and
- Diminishing returns to scale.

These three laws of returns to scale are now explained, in brief, under separate heads.

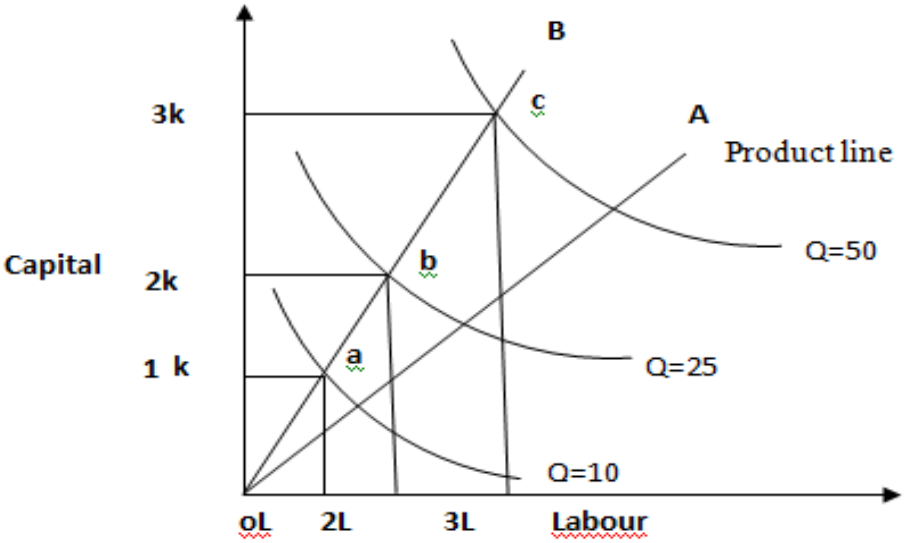
Assumption of the law:

1. Technique of production is unchanged
2. All units of factors are homogeneous
3. Returns are measured in physical terms

(1) Increasing Returns to Scale:

If the output of a firm increases more than in proportion to an equal percentage increase in all inputs, the production is said to exhibit increasing returns to scale. So increasing return to scale means that output increases in a greater proportion than the increase in input.

For example, If the amount of inputs are doubled and the output increases by more than double, it is said to be an increasing returns to scale. When there is an increase in the scale of production, it leads to lower average cost per unit produced as the firm enjoys economies of scale.



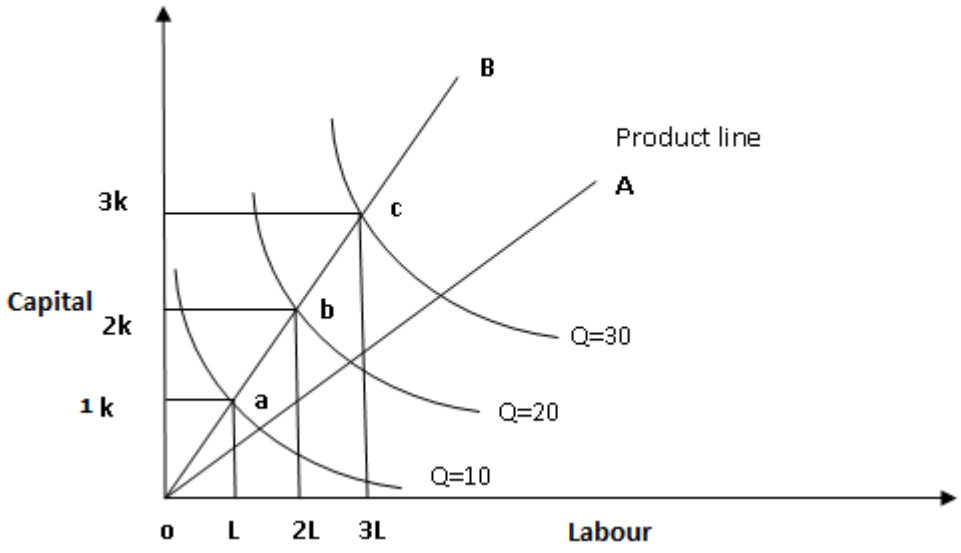
The increasing return to scale is shown in this diagram. The movement from point **a** to **b** on the line OB means doubling the inputs. It can be seen In The Figure That Input Combination Increases From 1k+1l To 2k+2l.As a result of doubling the inputs, ouput is more than doubled, it increases from 10 to 25.From point **b** to **c** output increases from 25 to 50.This kind of relationship between the inputs and output shows increasing return to scale.

Causes of increasing return to scale:

1. **Better utilization of factors of production i.e. divisibility of factors**
2. **Economies of scale**

(2) Constant Returns to Scale:

When all inputs are increased by a certain percentage, the output increases by the same percentage, the production function is said as constant returns to scale.



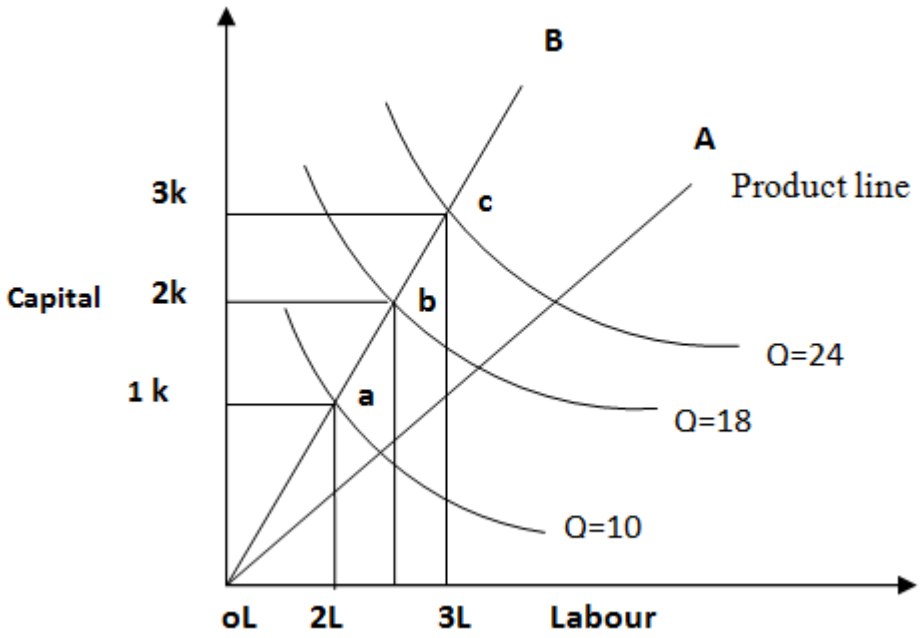
For example, if a firm doubling the inputs, doubles the output. In case, it triples output. The constant scale of production has no effect on average cost per unit produced.
In The Figure That Input Combination Increases From 1k+1l To 2k+2l.As a result of doubling the inputs, output is doubled, it increases from 10 to 20.From point **a** to **c** output increases from 10 to 30(by tripling the input. This kind of relationship between the inputs and output shows constant return to scale

Causes of constant return to scale:

1. **Capacity of the firm and**
2. **Supply of input is constant**

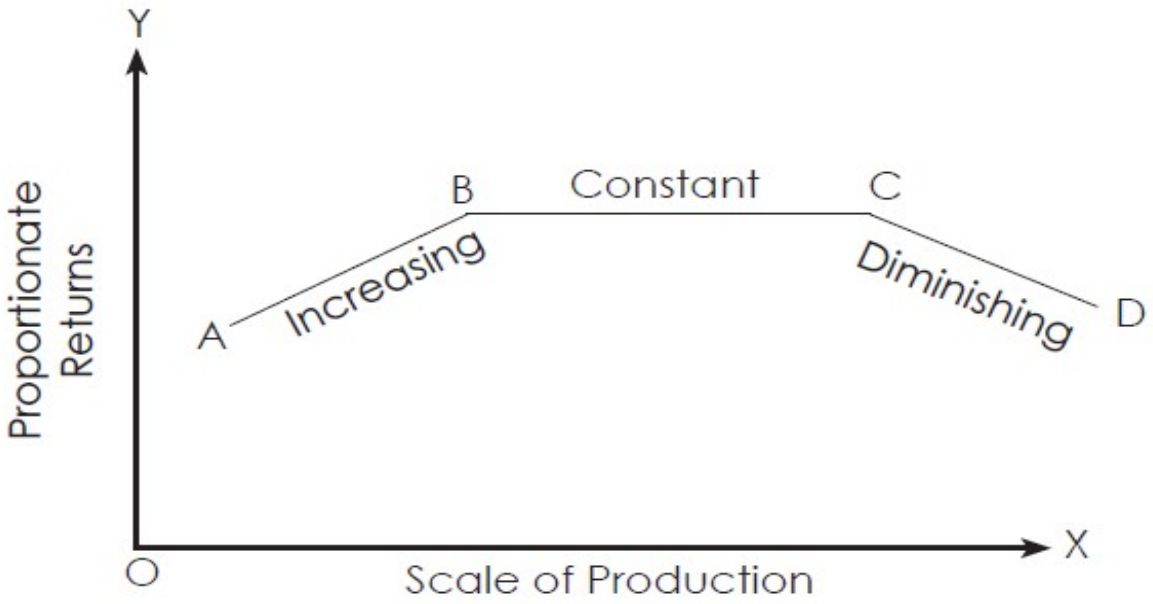
(3) Diminishing Returns to Scale:

The term 'diminishing' returns to scale refers to scale where output increases in a smaller proportion than the increase in all inputs.



For example, If a firm increases its inputs l and k to 2l and 2k but the output increases from 10 to 18.this means that when capital and labour are increased by 100%,output increased by 80%, the firm is said to exhibit decreasing returns to scale. In case of decreasing returns to scale, the firm faces diseconomies of scale. The firm's scale of production leads to higher average cost per unit produced.
Causes of decreasing return to scale:

1. Over utilization factors
2. Diseconomies of scale



Return to scale describes how output increases due to increase in input, but in different proportions. From the above description it shows that output may increase same proportion to input, it may increase more than proportionate to input, and it may increase less than proportionate to input due to different reasons.

COST ANALYSIS

Cost plays a very important role in managerial decisions involving a selection between alternative courses of action. In managerial economics, cost is normally considered from the producer's or firm's point of view. A cost is the value of money that has been used up to produce something.

In economics a cost is an alternative that is given up as a result of a decision.

In accounting cost is the value of money that has been used upto produce something.

So cost is a resource sacrificed or foregone to achieve a specific objective or something given up in exchange.

In other words, cost is a sacrifice or foregoing that has occurred or has potential to occur in future, measured in monetary terms.

Generally, cost function expresses a functional relationship between costs and output.

Mathematically, we can express the cost function as: C= f(Q,T, Pr)

Where C= Cost, Q=Output, T=Technology, Pr=price of inputs

Kinds of Cost

- **Accounting cost-** It refer to the actual expenditure of the firm to hire or purchase inputs for production. These are the cost which go to book of accounts. Also termed as explicit cost.

- **Real cost-** It is more or less social and psychological in nature and non-quantifiable in money term.
- **Opportunity cost-** It is the benefit foregone from the next best alternative that is not selected.
- **Implicit Cost-** refers to the value of the inputs that are owned and used by the firm in its own production activity.
- **Explicit cost-** Also known as out of pocket cost or accounting cost, these cost go to the trading and profit & loss account.
- **Social cost-** it consist of private costs of the firm and social costs paid by the society.
- **Replacement cost-** These are current price or cost of buying or replacing any input at present.
- **Historic and future cost-** Historic costs are sunk costs, as they cannot be retrieved from the business without loss. Future costs are the costs which are likely to occur in future. These are also called as budgeted or planned costs.
- **Economic cost-** refers the sum of explicit and implicit costs. These costs must be distinguished from accounting costs, which refer only to the firm's actual expenditures, or explicit cost, incurred for purchased or hired inputs.
- **Direct and Indirect cost-** Direct costs are those that can be attributed to any particular activity. In other hands, indirect costs may not be attributed to output. They are distributed over all activities.
- **Controllable or uncontrollable costs-** Controllable costs are those which are subject to regulations by the management of a firm, e.g., fringe benefits to employees, cost of quality control, etc. On the other hand, uncontrollable costs are beyond regulations of the management, e.g., minimum wages to be paid which is determined by govt., price of raw material by supplier.
- **Production and selling cost-** Production costs are estimated as a function of the level of output, whereas selling costs are incurred on making the output available to the consumer.

Similarly, there are some other categories of cost like:

Fixed Cost: Fixed costs are that part of the total cost of the firm which doesn't vary with output upto a certain volume of production. Fixed cost includes payment of rent for building, interest paid on capital, depreciation and maintenance allowances, and administrative expenses.

Variable Cost: Variable cost are those which vary with the variation in the total output, variable cost include cost of raw material, running cost of fixed capital, such as fuel,repairs,routine maintenance expenditure and the cost of all other inputs that vary with output.

Total Cost (TC):

Total cost is the sum of fixed cost and variable cost incurred at each level of output. Total cost of production of a firm equals its fixed cost plus its:

Formula:

TC = TFC + TVC

Where:

TC = Total cost.

TFC = Total fixed cost.
TVC = Total variable cost.

Total Fixed Cost (TFC):

Total fixed cost occurs only in the short run. Total Fixed cost as the name implies is the cost of the firm's fixed resources, Fixed cost remains the same in the short run regardless of how many units of output are produced. We can say that fixed cost of a firm is that part of total cost which does not vary with changes in output per period of time. Fixed cost is to be incurred even if the output of the firm is zero.

For example, the firm's resources which remain fixed in the short run are building, machinery and even staff employed on contract for work over a particular period.

Total Variable Cost (TVC):

Total variable cost as the name signifies is the cost of variable resources of a firm that are used along with the firm's existing fixed resources. Total variable cost is linked with the level of output. When output is zero, variable cost is zero. When output increases, variable cost also increases and it decreases with the decrease in output. So any resource which can be varied to increase or decrease with the rate of output is variable cost of the firm.

For example, wages paid to the labor engaged in production, prices of raw material which a firm. incurs on the production of output are variable costs. A firm can reduce its variable cost by lowering output but it cannot decrease its fixed cost. These expenses remain fixed in the short run. In the long run there are no fixed resources. All resources are variable. Therefore, a firm has no fixed cost in the long run. All long run costs are variable costs.

Average Total Cost (ATC):

Average total cost refers to cost (both fixed and variable) per unit of output. Average total cost is obtained by dividing the total cost by the total number of commodities produced by the firm or when thetotal sum of average variable cost and average fixed cost is added together, it becomes equal to average total cost.

Formula:

ATC = Total Cost (TC)
Output (Q)

Average Fixed Cost (AFC):

Average fixed cost refers to fixed cost per unit of output. Average fixed Cost is found out by dividing the total fixed cost by the corresponding output.

Formula:

AFC = TFC
Output (Q)

For instance, if the total fixed cost of a shoes factory is $5,000 and it produces 500 pairs of shoes, then the average fixed cost is equal to $10 per unit. If it produces 1,000 pairs of shoes, the average fixed cost is $5 and if the total output is 5,000 pairs of shoes, then the average fixed cost is $1 pair of shoe.

From the above example, it is clear, that the fixed cost, i.e., $5,000 remains the same whether the output

Average Variable Cost (AVC):

Average variable cost refers to the variable expenses per unit of output Average variable cost is obtained by dividing the total variable cost by the total output.

For instance, the total variable cost for producing 100 meters of cloth is Rs800, the average variable cost will be Rs8 per meter.

Formula:

$$AVC = \frac{TVC}{Q}$$

Marginal cost:
Marginal Cost is an increase in total cost that results from a one unit increase in output. It is defined as:
"The cost that added to total cost because of a unit of goods produced".
Example:

For example, the total cost of producing one pen is Rs5 and the total cost of producing two pens is Rs9, then the marginal cost of expanding output by one unit is Rs4 only (9 - 5 = 4).

The marginal cost of the second unit is the difference between the total cost of the second unit and total cost of the first unit. The marginal cost of the 5th unit is Rs5. It is the difference between the total cost of the 6th unit and the total cost of the, 5th unit and so forth.

Marginal Cost is governed only by variable cost which changes with changes in output. Marginal cost which is really an incremental cost can be expressed in symbols.

Formula:

$$\text{Marginal Cost} = \frac{\text{Change in Total Cost}}{\text{Change in Output}} = \frac{\Delta TC}{\Delta Q}$$

Or $MC_n = TC_n - TC_{n-1}$

Short Run Cost: Short run costs are those that have a short run implication in the process of production. Such costs are made once, i.e, payment wages, cost of raw materials, etc. Short run costs are those that vary with the variation in output, the size of the firm remaining the same. Therefore short run costs are treated as variable cost.

Long run cost: Long run costs are those that have long run implications in the process of production, i.e. they are used over a long range of output. The costs that are incurred on the fixed factors like plant, building, machinery etc are known as long run cost.

Table of fixed cost, variable cost and marginal cost

Unit of output(Q)	Total fixed cost (TFC)Rs	Total variable cost(TVC) Rs	Total cost (TC=TFC +TVC) Rs	Average fixed cost(AFC=TFC/Q)	Average variable cost(AVC =TVC/Q) Rs	Average total cost (ATC=AVC+AF	Marginal cost(MC= ∆TC/∆Q) Rs

				Rs		C) Rs	
0	1,000	0	1,000	-	-	-	-
10	1,000	400	1,400	100.0	40.0	140.0	400/10=40
20	1,000	700	1,700	50.0	35.0	85.0	300/10=30
30	1,000	930	1,930	33.3	31.0	64.3	230/10=23
40	1,000	1,100	2,100	25.0	27.5	52.5	170/10=17
50	1,000	1,400	2,400	20.0	28.0	48.0	300/10=30
60	1,000	1,900	2,900	16.7	31.7	48.4	500/10=50
70	1,000	2,500	3,500	14.3	35.7	50.0	600/10=60

Determinants of Cost:

(i) **Size of plant:** plant size is an important variable influencing cost. The relationship between scale of operation or size of plant to the unit cost is negative in the sense that, as the former increases per unit cost decreases and vice versa.

(ii) **Output level:** Level of output and total cost are related –total cost increasing with increase in output. But average and marginal cost first decline and then increases with increase in output.

(iii) **Price of inputs:** change in input price influence costs, depending on the selective usage of the input and relative change s in their prices. When a factor, which is major component in production becomes relatively costly it raises the cost significantly.

(iv) **Technology:** Modern and efficient technology is certainly cost saving and is there for generally found higher capital output ratio.

(v) **Managerial efficiency:** Though cost is influenced a great deal by managerial efficiency, it is difficult to quantify it. If managers are efficient enough then they can produce more at a low cost.

Short run cost function:

Short run is defined as period of time in which output of a firm can be increased or decreased by changing the amount of variable factor s such as labour ,raw materials ,chemicals ,fuels etc. In the short run, quantities of the fixed factor such as capital equipment, factory building etc. cannot be varied for making changes in output.

Costs in the short run:

- Total cost and output
- Average cost and output
- Marginal cost and output.

Short run average costs and output:

Average fixed cost (AFC): average fixed cost is the total fixed cost divided by the number of units of output produced, therefore,

AFC=TFC/Q

Q represents the number of units of output produced. As total fixed cost is constant quantity in short run, average fixed will steadily fall as output increases. Therefore, average fixed cost curve slopes downward throughout its length.

Average variable cost (AVC): Average variable cost is the total variable cost divided by the number of units of output produced. Therefore,

AVC=TVC/Q

Thus average variable cost is the variable cost per unit of output.

Average total cost: Average total cost or the average cost is the total cost divided by the number of units of output produced. Therefore**,**

ATC or AC=TC/Q

The average total cost is the sum of average variable cost and average fixed cost.

This can be proved as follows:

ATC=TC/Q

We Know That **TC=TVC+TFC**

There Fore **ATC=TVC+TFC**

Q

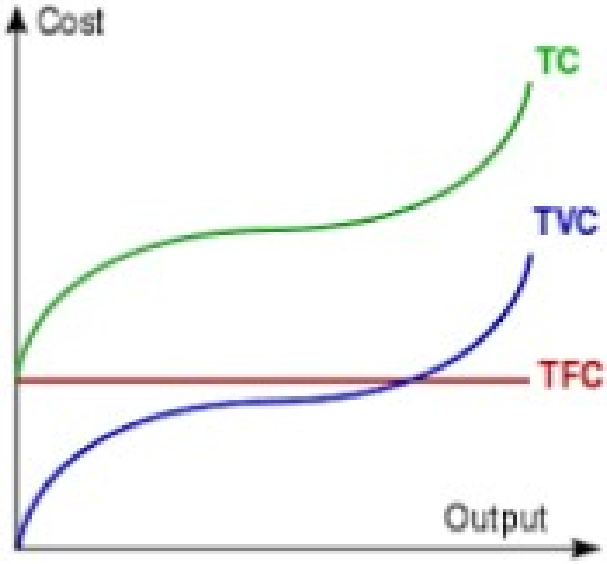
=TVC/Q+TFC/Q=AVC+AFC

So **AC=AVC+AFC**

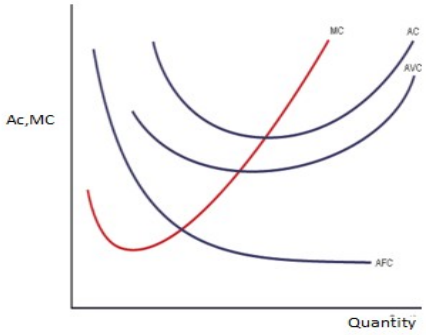
Average total cost is also known as unit cost, since it is cost per unit of output produced.

Average Costs and Marginal Cost

The marginal cost curve, average variable cost curve and average total cost curves are generally U-shaped. The U-shape in the short run is attributed to increasing and diminishing returns from a fixed-size plant (law of variable proportion), because the size of the plant is not variable in the short run.



Short-run Average and Marginal costs



The average fixed cost curve slopes down continuously. The average total cost curve is the vertical summation of the average fixed cost curve and the average variable cost curve. The ATC curve is always higher than AFC and AVC curves. While output gets big and AFC decline to zero, the AVC curve approaches the ATC curve.

Relationship between Average Costs and Marginal Cost

AC being the sum of AFC and AVC at each level of output lies above both AFC and AVC curves. The AC curve is U-shaped; initially AC falls with increase in output, reaches a minimum and then increases.

If MC > AC, then AC is rising

If MC = AC, then AC is at its minimum

If MC < AC, then AC is falling

If MC > AVC, then AVC is rising

If MC = AVC, then AVC is at its minimum

If MC < AVC, then AVC is falling

Summarization of Cost concepts in mathematical terms

TC= TFC+TVC

AFC=TFC/Q

AVC=TVC/Q

AC=TC/Q= TFC+TVC/Q= AFC+AVC

In the short run production function if Q is the quantity of output, w (wage) is the price of the variable input L (labour), then it must be true that: AVC=TVC/Q=w.L/Q

Since, Q/L is the Average Product (AP), we can say that:

AVC=w.1/AP

Now, since AP generally rises and then falls with increase in output and w is constant, AVC must decreases and then increase with increase in output.

MCQ= TCQ-TCQ-1 / ΔTC/ΔQ

Where Q is the number of units of output.

Applying calculus we get:

MC= ΔTC/ΔQ= dTC/dQ

Again, if the price of variable input L (labour) is given by the firm then:

ΔTVC= wΔL

MC= wΔL/ΔQ=w.1/MP

Where MP is the marginal product of the variable input

Relationship between Marginal Product & Marginal Cost

Marginal productivity (MP) of the variable input generally increases in the beginning, attains a maximum and eventually declines with increase in output. Marginal cost (MC) being the product of w (wage) and the inverse of MP, would generally (though not always) decrease, attain a minimum and eventually increase with increase in output.

Cost in Long Run

All costs are variable in the long run since factors of production, size of plant, machinery and technology are all variable. The long run cost function is often referred to as the 'planning cost function' and the long run average cost (LAC) curve is known as the "planning curve". The long run cost curve is the composite of many short run cost curves.

Long-Run Cost Curves

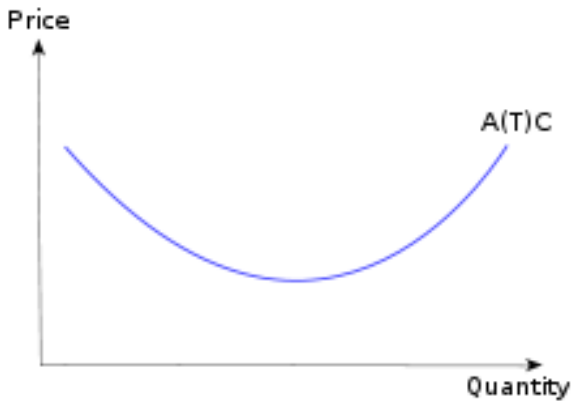
- **Long-Run Total Cost** = The minimum total costs of producing various levels of output when the firm can build any desired scale of plant: LTC = f(Q)
- **Long-Run Average Cost** = The minimum per-unit cost of producing any level of output when the firm can build any desire scale of plant: LAC = LTC/Q
- **Long-Run Marginal Cost** = The change in long-run total costs per unit change in output: LMC = ΔLTC/ΔQ

Long run average cost curves:

Long run average cost curve is a curve which shows the minimum per unit cost of each quantity of output. Where

$$LAC=\frac{LTC}{Q}$$

LAC=Long run average cost
LTC=Long run total cost
Q=Quantity



Long run marginal cost:

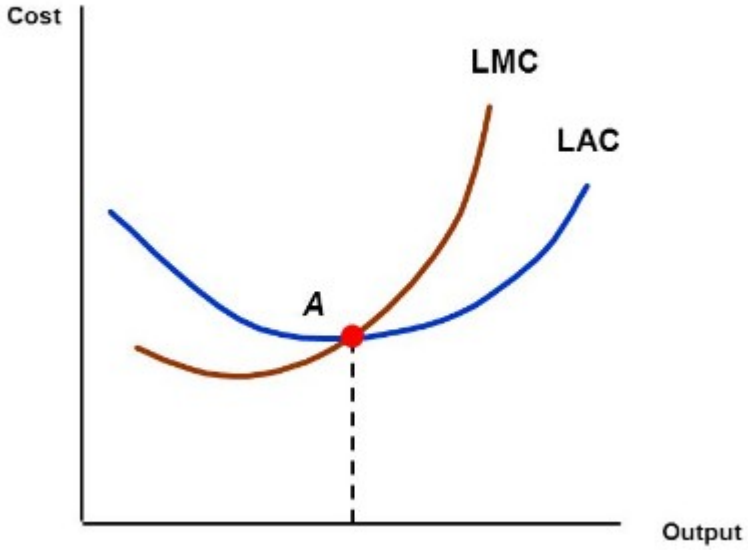
Marginal cost measure s the change in total cost resulting from any expansion or contraction activity .in other words it is a change in total cost that accompanies a unit change in output.

$$MC=\frac{\Delta TC}{\Delta Q}$$

Where MC =Marginal Cost

ΔTC=Change in total cost

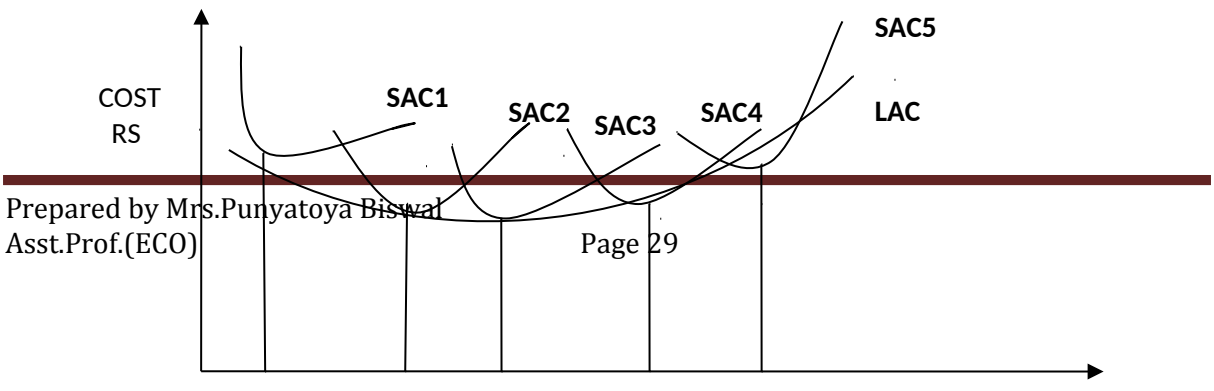
ΔQ=Change in output



Long run marginal cost depends upon the marginal products of inputs. Long run marginal cost curve lies below the average cost curve to the left of the minimum point of LAC. To the right of the minimum point, LMC is above LAC and at the minimum point LMC is equal to LAC.

Long run average cost curve is derived from short run cost curves:

The long run affords flexibility to the firm to choose the most suitable plant size for the desired level of output. When the firm shifts to another plant size, some of production factor will become fixed. The firm will again be operating in the short run, till it again decides to shift to a higher plant size. Thus the long run average cost curve is derived from short run average cost curves. Lets us take a simple example; affirm faces a choice of three methods of production, each with a different plant size, a small, a medium, a large plant size. These plants operate with the average costs of SAC_1, SAC_2, and SAC_3 respectively. Each plant operates most efficiently at output level corresponding to lowest point on its short run average cost. If it is found that the average cost of larger output is less on a bigger plant, the firm would adopt that bigger size (compare SAC_1 TO SAC_2 for output level Q_1 and Q_2).so the firm will move from SAC_1 to SAC_2 and then to SAC_3.



If we assume that there are many plant sizes, each suitable for a certain level of output we will get many sac curves intersecting each other. As the number of plant size increases, the point of intersection of SAC curve will come closer. And if we assume that there is larger number of plant sizes, the intersection point will be so nearer to each other that we get almost a continuous curve. This continuous curve is known as the long run average cost curve (LAC) or the envelop curve (as it envelopes the family of short run average cost curves).

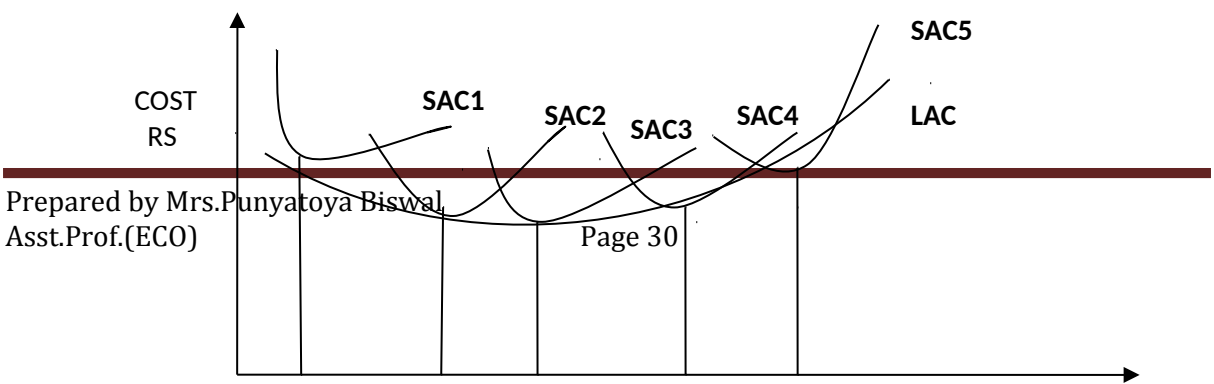
Long run average cost curve is u-shaped:

It is generally believed by economist that that the LRAC curve is normally u-shaped, that is the long run average cost curve first declines as output is increased and then beyond a certain point it rises. But why the long run average cost curve behave like this.

U-shape of the SRAC curve is explained with the law of variable proportions .But the LRAC curve depends upon the returns to scale. In the long run all inputs including the capital equipment can be altered. Therefore the relevant concept governing the shape of the LRAC curve is that of return to scale. Return to scale increase with initial increase in output and after remaining constant for a while, they decrease. It is because of the increasing return to scale in the beginning that the long run average cost of production falls as output is increased and likewise, it is because of decreasing return to scale that the long run average cost of production rises beyond a certain point.

But the question is why we first get increasing return to scale i.e. fall in cost and after a But the question is why we first get increasing return to scale i.e. fall in cost and after a certain point we get decreasing return to scale that result in rise in cost. The reason behind it is economies of scale and diseconomies of scale. Economies of scale results in cost saving and diseconomies leads to rise in cost. Increasing return to scale operate till economies of scale are greater than the diseconomies of scale and return to scale decrease when diseconomies are greater than the economies of scale .when economies and diseconomies are in balance ,return to scale are constant.

In the diagram below economies of scale operates up to point Q_3.Q_3 is called the optimum point.. These are explained below:



Economies of scale:

Large scale production is economical in the sense that the cost of production is low. The low cost is a result of "economies of scale". **''In broad sense, anything which serves to minimize average cost of production in the long run as the scale of output increases is referred to as economies of scale ''**. In other words, economies of scale are the cost advantages that an enterprise obtains due to expansion. It leads to reduction in unit costs as the scale of operations increases.

It is measured in money terms. The economies of scale may be classified as:

a) Internal or real economies
b) External or pecuniary economies

Internal or real economies: internal economies also called real economies are those that arise from the expansion of the plant size of the firm and are internalized. Internal economies may be classified under the following categories:
(i) Economies in production
(ii) Economies in marketing
(iii) Managerial economies and
(iv) Economies in transport and storage

Economies in production: Economies in production arises from two sources :(a) technological advantages and (b)advantages of division of labour based on specialization and skill of labour.

Technological advantages: Large scale production provides an opportunity to the expanding firms to avail themselves of the advantages of technological advances. Technical economies refer to the reduction in the cost of manufacturing process itself. These relate to the methods and techniques of production, specially to the nature and form of capital employed.

There are various types of technical economies as follows:

Economies of superior technique: A small firm can't install high quality machine which a big firm can. Small firm generally make increasing use of ordinary machines where as a large firm generally use big automatic machines worked by electricity. Such automatic machines are quicker and more efficient, and there output is large as compared to the ordinary machines. For example an automatic loom is more economical than handloom. But a village weaver can't afford to have an automatic loom, which a textile mill can. The average cost becomes low under superiortechnology in a large scale production.

Economies of linked process: A large plant usually enjoys the advantage of the linking processes, by arranging production activities in a continuous sequence without any loss of

time. According to Prof.Cairncross,''There is generally saving in time and saving in transport cost, since two departments of eth same factory are closer together than two separate factories''. For the same reason, process of editing and printing of newspapers are generally carried out in the same premises.

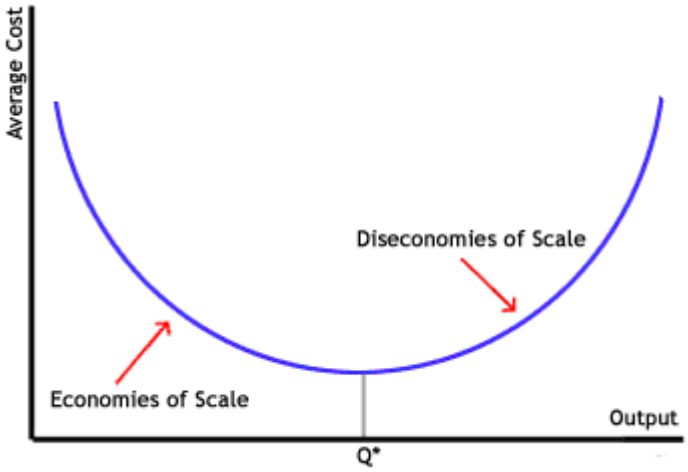
Advantages of division of labour based on specialization: When a firm's scale of production expands, more and more workers of varying skills and qualifications are employed. With the employment of larger number of workers, it becomes increasingly possible to divide the labour according to their qualifications and skills and assign them the functions to which they are best suited. This is known as division of labour. Division of labour leads to a greater specialization of manpower. It increases productivity of labour, and there by reduces cost of production. Besides, specialized workers develop more efficient tools and techniques and gain speed of work. These advantages of division of labour improve productivity of labour per unit of cost and time.

Economies in marketing: Economies in marketing arise from the large scale purchase of raw materials and other material inputs and large –scale selling of the firm's own product. As to economies in the purchase of inputs, the large –size firms normally make bulk purchase of their inputs. The large scale purchase entitles the firm for certain discounts in input prices and other concessions that are not available on small purchases.

Managerial economies: Managerial economies arise from specialization in managerial activities, i.e, and the use of specialized managerial personnel. For a large size firm, it becomes possible to divide its management into specialized departments under specialized personnel, such as production manager, sales manager, personnel manager etc. This increases the efficiency of management at all the levels of management because of the decentralization of decision making. It increases production given the cost. Large scale firm have the opportunity to use advanced technique of production. This leads to quick decision making, help in saving valuable time of the management and thereby, improve the managerial efficiency.

Economies in transport and storage: Economies in transportation costs arise from fuller utilization of transport and storage facilities. Transportation costs are incurred both on production and sales sides. Similarly storage costs are incurred on both raw materials and finished products .The large size firm may acquire their own means of transport and thereby reduce the cost of transportation .Besides own transport facility prevents delays in transporting goods .Some large scale firms have their own railway tracks from the nearest railway point to the factory, and thus they reduce the cost of transporting goods in and out. For example, NALCO has its own railway tracks .Similarly large scale firms can create their own depot in the various center of product distribution and can save on cost of storage.

External or pecuniary economies of scale: External economies are enjoyable by all the firms in the industry, irrespective of their size. External economies are those that arise outside the firm and accrue to the expanding firms. External economies appear in the form of money saving on inputs. That is why external economies are also called pecuniary economies. pecuniary economies accrue to the large size firms in the form of discounts and concessions on (i)large scale purchase of raw materials(ii)large scale acquisition of external finance, particularly from the commercial banks(iii)massive advertisement campaigns(iv)large scale hiring of means of transport and warehouses etc. These benefits are available to all the firms of an industry but large scale firms benefit more than small firms.



Diseconomies of scale: Diseconomies of scale are disadvantages that arise due to the expansion of production scale and lead to rise in the cost of production. These diseconomies, by raising the average cost of production, act as a limiting factor on the further expansion of the firm. Like economies, diseconomies may be internal and external. Let us describe the nature of internal and external diseconomies in detail:

Internal diseconomies: Internal diseconomies are those that are exclusive and internal to a firm-they arise within a firm. Like everything else, economies of scale have a limit too. This limit is reached when the advantages of division of labour and managerial staff have been fully exploited; excess capacity of plant, warehouses, transport and communication system etc is fully used, and economy in advertisement cost tapers off.

(a)**Difficulties of management:** As the firm expand the complexities and problems of management increase. Thus after a point, the manager finds it difficult to control the whole production organization. The entrepreneur and management will not be able to maintain contact with each other and check on all the departments of a very large concerned problem of supervision becomes complex and intractable, thus leading to increasing possibilities of mistakes and mismanagement. All these prove to be uneconomical, for the defects in organization will lead to waist and result in rising average cost.

(b) **Difficulties of co-ordination:** The task of organization and coordination become progressively more and more difficult with the increasing size of the firm. The management of the firm will gradually face numerous problems of decision making and organization. It may therefore, not find enough time to give careful thought to individual problems.

(c)Difficulties in decision making: A large firm cannot take quick decision and make quick changes as and when they are needed, for it has to consult various departments for making any decision and so urgent matters requiring timely decisions are inevitably delayed. This may sometimes cause loss to the firm.

(d)**Increased risks:** As the scale of production, investment also increases, so too the risks of business.The larger the output, obviously the greater will be the loss. To bear greater risks is an important limitation to the expansion of the size of affirms from an error of judgment or

misfortune in business. Therefore unwillingness to bear greater risks is an important limitation to the expansion of the size of a firm.

(e) **Labour diseconomies:** Extreme division of labour with a growing scale of output results in lack of initiative and drive in the executive personnel. Thus a large firm becomes more impersonal and contact between management and a worker becomes less. As such, there are more chances of occurrence of grievances, and industrial disputes which prove to be costly to the large firm.

External diseconomies: External diseconomies are the disadvantages that originate outside the firm, especially in the input markets and due to natural constraints, specially in agriculture industries. With the expansion of the firm, particularly when all the firms of the industry are expanding, the discounts and concessions that are available on bulk purchases of inputs and concessional finance come to an end. More than that, increasing demand for inputs puts pressure on the input market and input prices begin to rise causing a rising in the cost of production .these are pecuniary diseconomies.

(a) **Scarcity of factor supplies:** Due to increase in the concentration of firms in a particular locality, each firm will find scarcity of available factors. Hence, competition among firms in purchasing labour, raw materials, etc, will result in increased factor prices. Thus extreme concentration of external economies becomes assort of diseconomy in the form of high factor prices.
(b) **Financial difficulties:** A big concern needs huge capital which cannot always be easily obtainable. Hence the difficulty in obtaining sufficient capital frequently prevents the further expansion of such firms.
(c) **Marketing diseconomies:** When the industry expands and the firm grows, competition in the market tends to become stiff. Thus, firms under monopolistic competition will have to undertake extensive advertising and sales promotion efforts and expenditure which ultimately lead to higher costs.

On the production side, the law of diminishing returns to scale come into force due to excessive use of fixed factors. For example, excessive use of cultivable land turn sit into barren land, pumping out water on a large scale for irrigation causes the water level to go down resulting in rise in cost of irrigation, extraction of minerals on a large scale soon exhausts the mineral deposits on upper levels and mining further deep causes rise in cost of production, extensive fishing reduces the availability of fish and the catch, even when fishing boats and nets are increased. These kinds of diseconomies make the LAC move upward.

LINKAGE BETWEEN COST, REVENUE AND OUTPUT THROUGH OPTIMIZATION

Definition of Revenue:

By ***'revenue'*** of a firm is meant the total sale proceeds or the total receipts of a firm from the sale of the output.

The various ***kinds of revenue*** will be discussed here under three heads:

(i) Total Revenue,
(ii) (ii) Marginal Revenue, (iii)

(iii) Average Revenue.

Total Revenue (TR): The total amount of money received by a firm from goods sold (or services provided) during a certain time period.

TR=Q.P

Where Q= Quantity sold, P= Price per unit

- **Average Revenue (AR):** The revenue earned per unit of output sold.

AR=TR/Q= Q.P/Q=P

- **Marginal Revenue (MR):** The revenue a firm gains in producing one additional unit of a commodity.

MRQ= TRQ-TRQ-1

Where Q is the number of units sold.

MR= ΔTR/ΔQ= dTR/dQ

MARKET STRUCTURE

Key Concept

Market is defined as the institutional relationship between buyers and sellers; it refers to the interaction between buyers and sellers of a good (or service) at a mutually agreed upon price.

A market structure is an economic model that helps economists to examine the nature and degree of competition among businesses in the same industry.

In short, market structure refers to the number of firms and the intensity of competition between the firms.

Why the Concept Matters

The level of competition in a market has a major impact on the prices of products. The more sellers compete for your rupees, the more competitive prices will be.

Elements of Market:

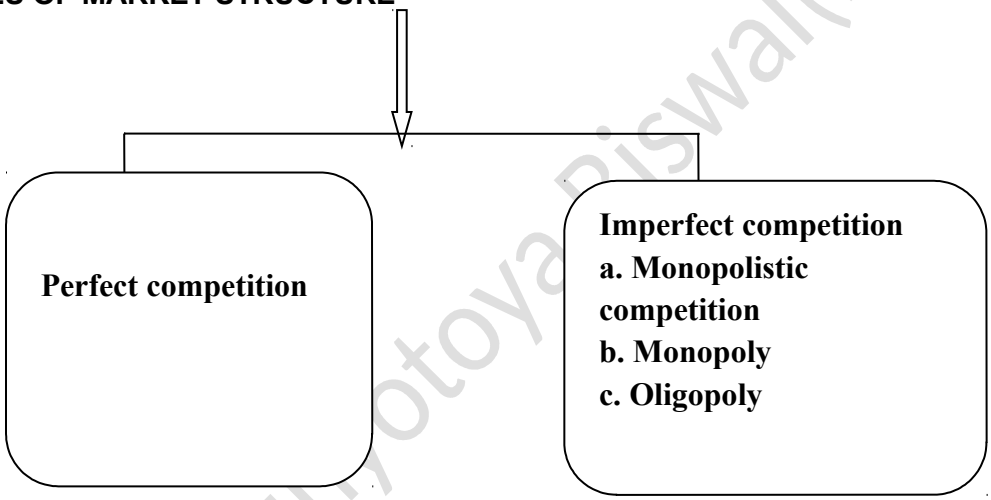
The essentials of a market are:
(i) Presence of goods and services to be exchanged.
(ii) Existence of one or more buyers and sellers.
(iii) A place or a region where buyers and sellers of a good get in close touch with each other.

Market Morphology

- For the purpose of analysis and understanding economic dimensions of decision making like production and pricing, market may be characterized on the basis of the following parameters:
- Nature of competition
- Nature of product
- Number and size of buyers
- Freedom to enter into or exit from the market

Type of market	Number of firms	Nature of product	Number of buyers	Freedom of entry and exit	Examples
Perfect competition	Very Large	Homogeneous (undifferentiated)	Very Large	Unrestricted	Agricultural commodities, shares, unskilled labour
Monopolistic competition	Many	Differentiated	Many	Unrestricted	Retail stores, detergents
Oligopoly	Few	Undifferentiated or differentiated	Few	Restricted	Cars, computers, universities
Monopoly	Single	Unique	Many	Restricted	Indian Railways, Microsoft
Monopsony	Many	Undifferentiated or differentiated	Single	Not applicable	Indian defence industry

TYPES OF MARKET STRUCTURE



- **Perfect competition**: There are a large number of buyers and sellers of the good. The price of a good is determined in the market by the demand and the supply. The firm does not have any choice in fixing the price of the good. Eg: vegetable market, Indian Fish Market
- **Monopoly**: There is a single seller of the good in the market with no close substitutes for the good. There is very little competition with the firm exercising a great deal of control over the price of the good. Eg: Indian railway, State Electricity Board
- **Monopolistic competition**: There are a large number of firms which are involved in the production of similar goods. Each firm has some discretion in fixing the price of its product. Eg: Indian Banking Sector,
- **Oligopoly**: There are a few large firms selling the similar or differentiated goods. There is intense competition between the firms and often they form cartels with the aim of controlling the markets. Each firm has a control over the price of the good it produces, especially if the good is differentiated. Eg: Indian telecom sector, automobile sector

PERFECT COMPETITION:

Definition of Perfect Competition:

The concept of **perfect competition** was first introduced by Adam Smith in his book "Wealth of Nations". Later on, it was improved by Edgeworth. However, it received its complete formation in Frank Kight's book "Risk, Uncertainty and Profit" (1921). Left witch has defined market competition in the following words:

"*Prefect competition* is a market in which there are many firms selling identical products with no firm large enough, relative to the entire market, to be able to influence market price".

According to Bllas:

"The *perfect competition* is characterized by the presence of many firms. They sell identically the same product. The seller is a price taker".

The main ***conditions or features*** of perfect competition are as under:

Features or Conditions for Perfect Competition:

(1) Large number of firms. The basic condition of perfect competition is that there are large number of firms in an industry.
(2) Large number of buyers. In a perfect competitive market, there is very large number of buyers of the product.

(3) The product is homogeneous. Another provision of perfect competition is that the good produced by all the firms in the industry is identical. In the eyes, of the consumer, the product of one firm (seller) is identical to that of another seller.
(4) No barriers to entry. The firms in a competitive market have complete freedom of entering into the market or leaving the industry as and when they desire. There are no legal, social or technological barriers for the new firms (or new capital) to enter or leave the industry.

(5) Complete information. Another condition for perfect competition is that the consumers and producers possess perfect information about the prevailing price of the product in the market.
(6) Profit maximization. For perfect competition to exist, the sole objective of the firm must be to get maximum profit.

Importance of Perfect Competition:

Perfect competition model is hotly debated in economic literature. It is argued that the model is based on unrealistic assumptions. It is rare in practice. It also makes us understand as to how a firm adjusts its output in a competitive world.

Price and output determination under perfect competition/Equilibrium of the Firm:

The mode of price determination- price level and variation-depends on the time taken by the supply position to adjust itself to the changing demand conditions. Therefore price determination under perfect competition is analyzed under different time periods.

(i) Short run

(ii) Long run

Calculus Corner

In all market forms the principal objective of the firm is to maximise profits. In other words, its objective is:

$$\text{Max } \Pi = R(Q) - C(Q)$$

The first order condition of profit maximisation is given as:

$$\frac{d\pi}{dQ} = \frac{dR(Q)}{dQ} - \frac{dC(Q)}{dQ}$$

$$= 0$$

$$\Rightarrow \quad MR - MC = 0$$

$$\Rightarrow \quad \mathbf{MR = MC} \qquad (3)$$

The second order condition of profit maximisation is given as:

$$\frac{dMR}{dQ} - \frac{dMC}{dQ} < 0$$

$\Rightarrow$ Slope of MR curve < Slope of MC curve (4)

To summarise, the profit maximising conditions are given as:

Necessary Condition: Marginal Revenue is equal to Marginal Cost

Sufficient Condition: MC curve cuts MR curve from below.

Let us explain the concept of profit maximisation with a numerical example.

Given the following equations: $TR = 48Q - Q^2$ and $TC = 12 + 16Q + 3Q^2$, calculate the output that maximises profit and the amount of maximum profit.

Solution:

The profit maximising output can be determined from the conditions of profit maximisation.

$$MR = \frac{dTR}{dQ} = 48 - 2Q$$

$$MC = \frac{dTC}{dQ} = 16 + 6Q$$

Profit is maximised when $MR = MC$:

$$48 - 2Q = 16 + 6Q$$

$$\Rightarrow \quad Q = 4$$

Second Order Condition: $\frac{d^2\Pi}{dQ^2} = -8 < 0$

The equation for profit is: $\Pi = R(Q) - C(Q) = 48Q - Q^2 - (12 + 16Q + 3Q^2)$

$$= -12 + 32Q - 4Q^2$$

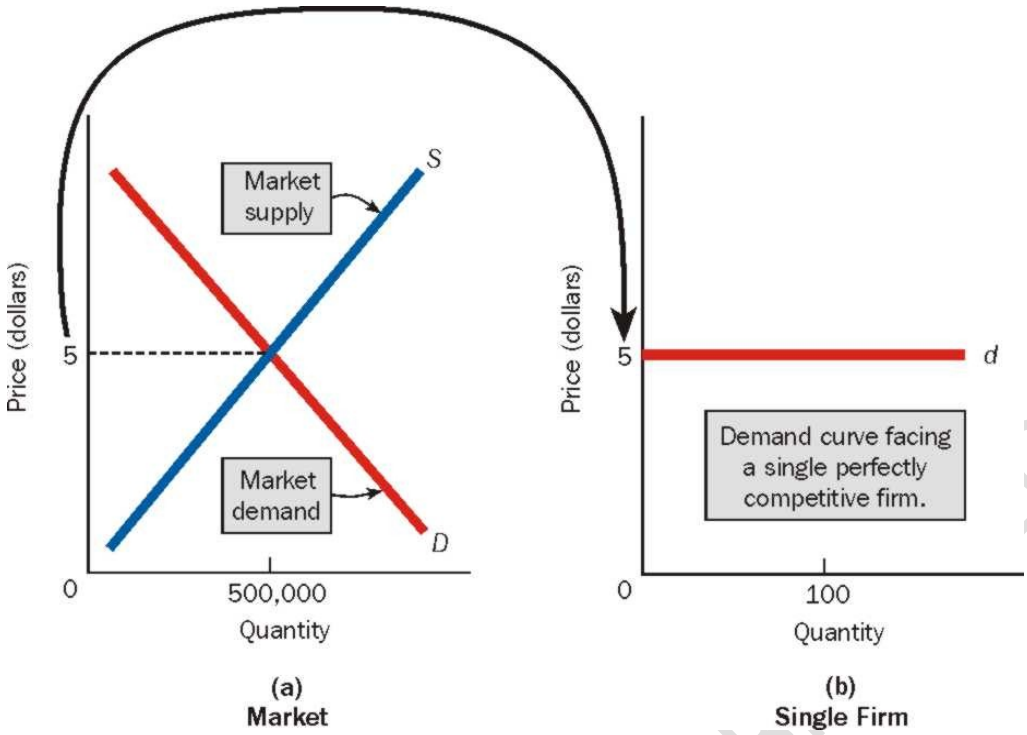
Substituting $Q = 4$ in this equation we get: $\Pi = -12 + 128 - 64 = 52$

Market demand curve and Firm's demand curve

The market demand curve for the whole industry is a standard downward sloping curve, which shows alternative combinations of price and output available to the buyers, such that an individual buyer is able to get the maximum amount of output at each Existing price at the given time. Definitely, the buyer would demand more of the product at lower price and less at higher prices, other things remaining equal. The market demand curve is the horizontal summation of individual demand curves. The demand curve for an individual firm is a horizontal straight line showing that the firm can sell infinite volume of output at the same price.

The market supply curve is upward sloping, giving various combinations of price and output: it shows the maximum output any firm is willing to produce and supply at each specified price, at a given time. Firms definitely are willing to sell larger quantities of output at higher prices and lower quantities at lower prices. other things remaining constant. The market supply curve is the horizontal summation of all the individual supply curves of the firms.

In the below figure, the intersection point of market demand and market supply curve determines the market equilibrium point. Each perfectly competitive firm being a price taker, take the equilibrium price from the market. When the equilibrium price has been established, a single perfectly competitive faces a horizontal demand curve at the equilibrium price.



Demand curve and Marginal Revenue Curve under Perfect Competition market

- The Marginal Revenue Curve of a Perfectly Competitive Curve is the Same as its Demand Curve which is equal to price.
- Price equals MR in perfect competition because your demand curve is horizontal. No matter how much you produce, it always sells at the same price.
- Since the firms in a competitive market are price takers, they can only adjust quantity at a fixed price. Hence TP depends on quantity only. Following the concept of MR we have:

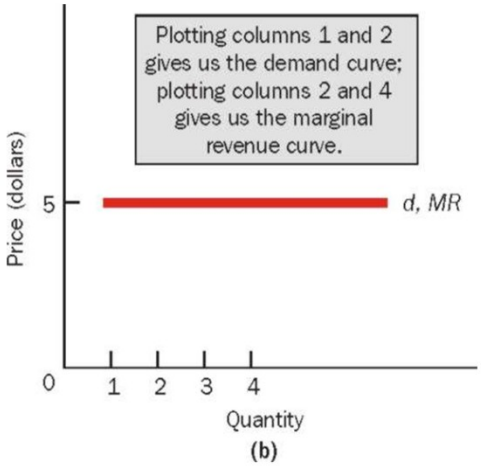
$$\text{Marginal Revenue (MR)} = \frac{dTR}{dQ} = \frac{d}{dQ}PQ$$

$$= Q.\frac{dP}{dQ} + P.\frac{dQ}{dQ}$$

- $= P$
- In short**, under perfect competition: AR=MR=Price**

(1) Price	(2) Quantity	(3) Total Revenue = (1) × (2)	(4) Marginal Revenue = $\Delta TR/\Delta Q$ = Δ(3)/Δ(2)
$5	1	$ 5	$5
5	2	10	5
5	3	15	5
5	4	20	5

(a)



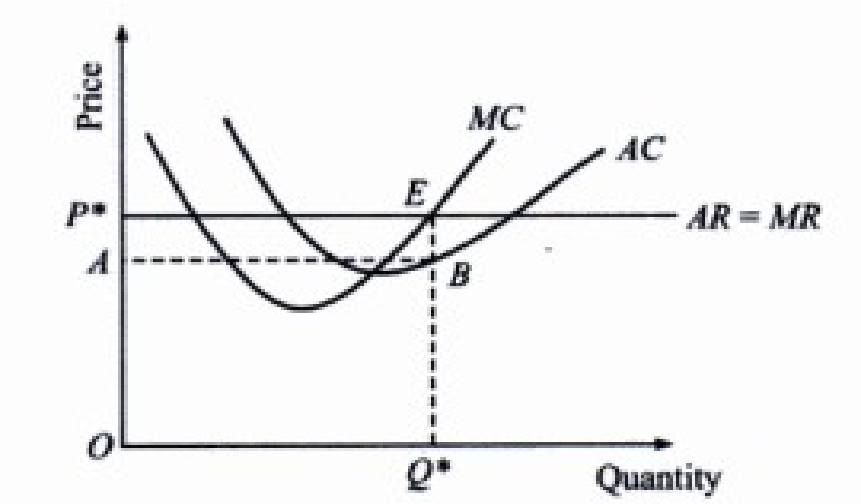
(b)

Short Run Equilibrium

In the short run, an individual firm under perfect competition may either earn supernormal profit, or normal profit, or can incur losses. This depends on the position of the cost curves. Let us begin this section with an assumption that in each case, the point of market equilibrium is attained by the interaction of market demand curve and market supply curve, at point E. an individual firm takes the equilibrium price P* as given, and faces an infinitely elastic demand curve given by P=AR=MR .

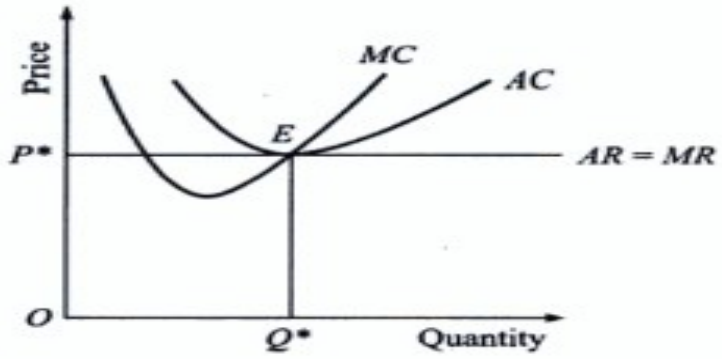
Case of Supernormal Profit

In the short run a perfectly competitive firm can earn supernormal profits (when revenue exceeds cost). The Average Cost (AC) and Marginal Cost (MC) curves are the usual short run cost curves. As the firm maximizes profits at the point where MR is equal to MC and also where MC cuts MR from below, the point of equilibrium of the firm in the given Figure is at point E; output at this price is OQ'. So, by selling 0Q equilibrium output at equilibrium price P', the total revenue earned by the firm is given by the rectangular area OPEQ (area below the AR curve, since TR= AR.Q). To produce this output. the total cost incurred by the firm is given by the rectangular area OABQ (area below the AC curve, since TC = AC.Q). Therefore, profit earned by the firm is given by the rectangular region APEB. This is the supernormal profit made by the firm in the short run, because the ruling market price P' is greater than average cost.

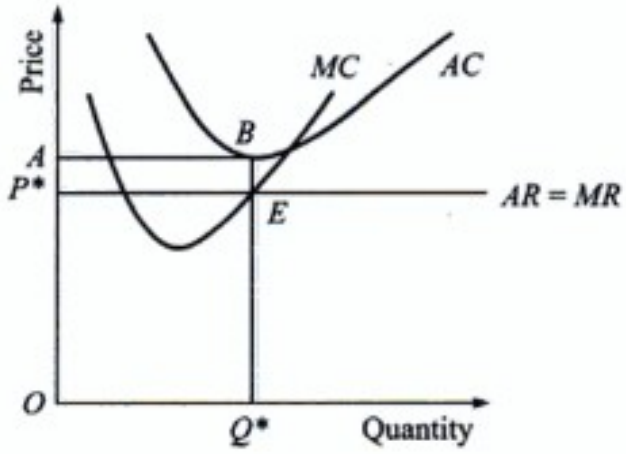


Case of Normal Profit

Not all firms earn supernormal profits in the short run: some of them may also earn normal profits (when revenue is equal to cost). As in the previous case, equilibrium of the firm is shown at E in Figure below the output that maximizes profit is 0Q. Total revenue earned by the firm by selling 0Q is the rectangular area OPEQ. Similarly, the total cost of producing 0Q is also given by the area OPEQ. Profit is thereby nil, in other words, the firm makes normal profit, and actually ends up producing at the breakeven level of output. This situation occurs because the average cost curve is tangent to the average revenue line.



Case of Loss (or Subnormal Profit)



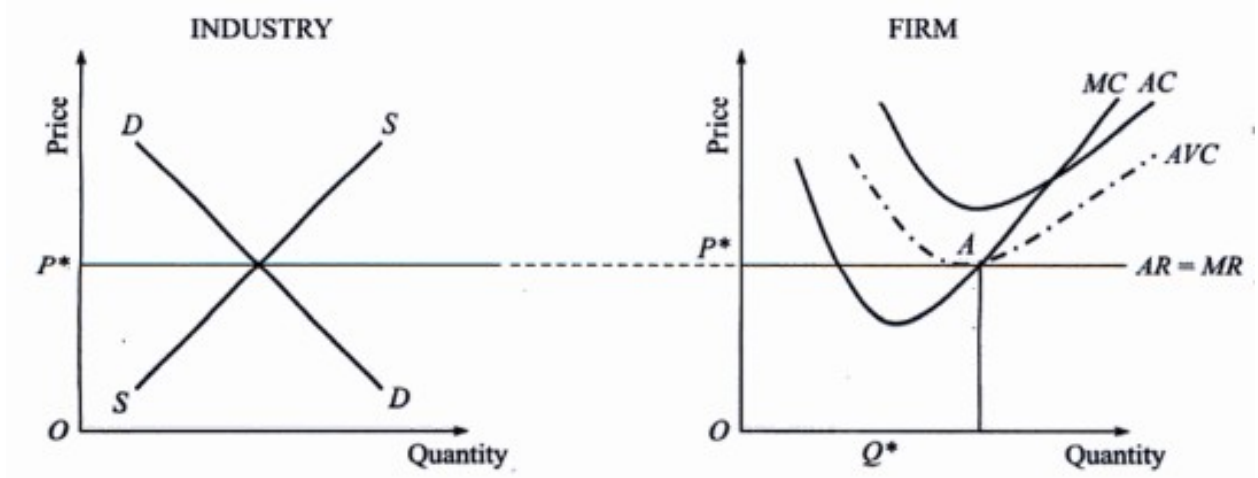
In the given figure point E determines the equilibrium level of output 0Q to be produced by the firm. Total revenue is given by the rectangular area OPEQ (as in the earlier cases) and the cost of producing 0Q level of output is given by the rectangular area OABQ. Thus the total cost of producing 0Q is more than the revenue earned by selling OQ. The amount of loss incurred by the firm is given by the area P'ABE. The firm incurs loss or subnormal profit in the short run because the average cost of producing this output is more than the ruling market price.

Exit or Shut Down Point

As long as the market price is above the AVC of the firm, in spite of making losses, the firm will cover all its variable costs and will wait and hope to cover the fixed costs in the long run. Point A in the Figure below actually denotes the shutdown point, where price P is equal to AVC. Any fall in market price blow P will cause this firm shut down.

In short, if Price< minimum AVC= Shut down

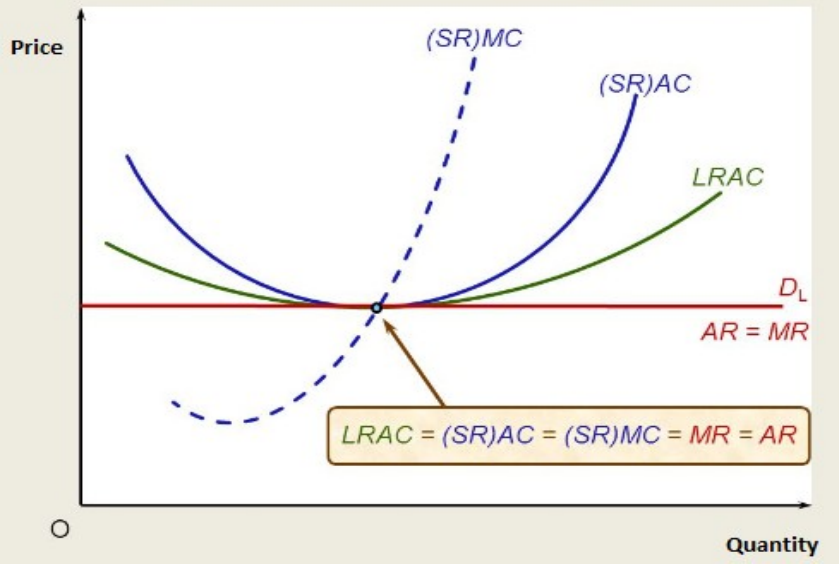
In this figure, point A is the shutdown point, where P*= AVC



Long Run Equilibrium

In the long run the firm only earns normal profit due to unrestricted entry and exit. If some of the existing firms earn supernormal profits, this will attract new firms to the industry to gain profits. As a result of which the supply of commodities will increase. Assuming no change in the demand, it lowers the price level. Alternatively, suppose firms are making losses in the short run. This would force some of them to leave the industry in the long run, as they may not be able to sustain losses for long. Their exit from the industry causes a reduction in the supply of the product and as a result the equilibrium price in the industry rises. This process of adjustments continues till the price becomes equal to the long run average cost (AR=AC=MR=MC)

Let us sum up the above discussion and explain the profit maximizing condition of perfectly competitive firms in the long run in the given Figure. The long run supply curve of the industry shows the phenomena of entry and exit of firms we have explained previously. The point of equilibrium in the long run is where each firm would be operating at the minimum points of both its short run and long run average cost curves, thus attaining full economies of scale. Point EL in the figure represents the long run equilibrium point at which P =LAC= SAC= SMC=MR = AR.



MONOPOLY

Market structure influences firm's price decisions. Monopoly comes under imperfect market structure where the degree of competition is close to nil. It implies firm's degree of freedom is considerably high. Because higher the degree of competition, the lower the firms degree of freedom in pricing decision and control over the price of its own product. Thus a monopoly firm has considerable control over the price of the product. A monopoly firm is free to fix any price for its product.

In reality competition can never be perfect. So actually there prevails imperfect competition. This happens when there are smaller numbers of firms or products may be differentiated by different sellers in actual practice. Similarly there is no pure monopoly in reality too.

What is Monopoly?

Monopoly market is one in which there is only one seller of a product having no close substitutes. This sole seller in the market is called monopolist. A monopolized industry is a single firm industry.

Features of monopoly: It is a firm that produces and sells a commodity which has no close substitutes.

Single firm: There is a single firm which controls the market. Thus firm and industry are identical.

No close substitutes: A monopolist produces that product which has no close substitutes.

Price maker: A monopolist fixes the price of the product .he can vary the price from buyer to buyer.

A down word sloping demand curve: A monopoly firm itself being the industry, it faces a downward sloping demand curve for its product. That means in can't sell more output unless the price is lowered.

Barriers to entry: Other rivals can't enter into the industry due to certain legal, technological or economic obstacles.

Demand and Marginal Revenue Curve for a Monopoly Firm

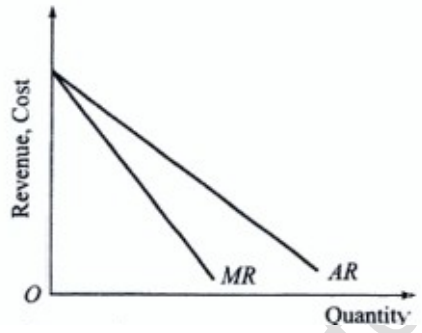
A monopoly firm is able to independently determine an optimal combination of price and output, and has a normal demand curve with a negative slope. The main reason behind the negative slope is that although a monopoly firm is in total control of the market price, yet it

can sell more only when it reduces the price of its product. In short, **monopolist cannot set both price and quantity at its own will**.

The **demand curve of the monopolist is highly price inelastic** because there is no close substitution and consumers have no or very little choice. As the monopoly firm faces a normal demand curve which is highly inelastic, therefore AR curve would be downward sloping, and MR curve would lie below the AR curve

AR AND MR IN IMPERFECT COMPETITION

No. units sold	TR	AR	MR
1	16	16	16
2	30	15	14
3	42	14	12
4	52	13	10
5	60	12	8



Consider the demand equation for a monopoly firm to be P = a – bQ. Prove that in absolute terms the slope of MR is twice that of AR.

Solution:

$$P = a - bQ \Rightarrow R = aQ - bQ^2$$

$$AR = a - bQ$$

Slope of AR (absolute) = b.

$$MR = \frac{dR}{dQ} = a - 2bQ$$

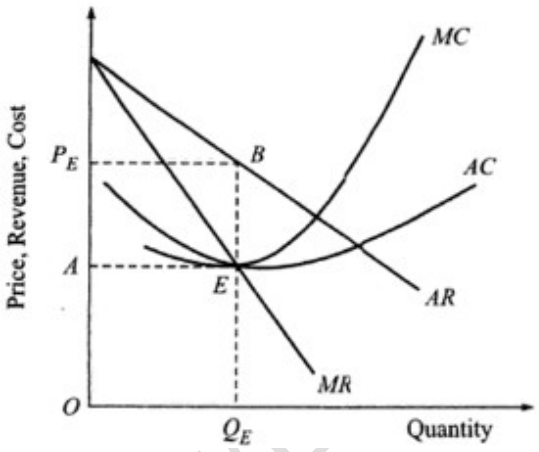
Slope of MR (absolute) = 2b.

Hence in absolute terms the slope of MR is twice that of AR.

Price and Output Decisions in Short Run

We assume here that in order to maximize profit a monopoly firm follows the rule of MR=MC when MC is rising. Similar to the case of perfect competition, a monopoly firm may earn supernormal profit or normal profit or even subnormal profit in the short run. However, it is the negative slope of the demand curve that is instrumental for chances of monopoly profits in the short run.

Case of Supernormal Profit



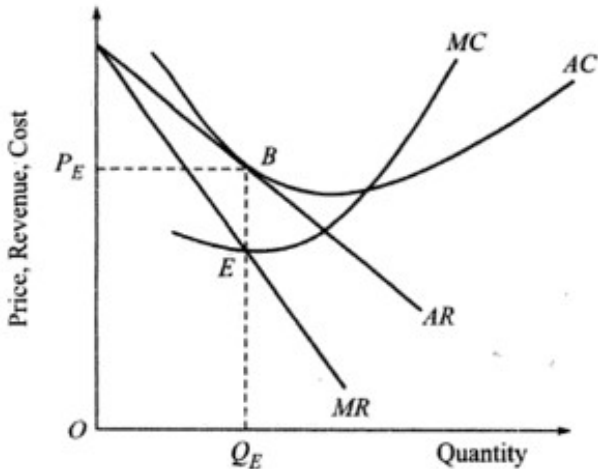
First of all we shall explain the occurrence of supernormal profit. Because that appears to be the most acceptable position for a monopolist. Following the conditions of profit maximization, the point of equilibrium is E and the equilibrium output is shown as OQF in Figure below. Now what will be the price at which the monopoly firm would reach equilibrium? This price would be determined by the forces of demand, because the monopolist would like to sell its entire product and hence it would charge a price 'E' which is the equilibrium price. Since this equilibrium price (or AR) is more than AC. the firm earns supernormal profit. The total revenue earned by the firm by selling OQ at OP1 is given by the rectangular area OPEBQE (the area below the AR curve), whereas the total Cost incurred is given by the rectangular area OAEQE (the area below the AC curve, since TCAC.Q). Therefore, the total profit (supernormal) earned by the firm is given by the rectangular region APEBE.

Case of Normal Profit

A firm earn normal profit under monopoly. This is technically possible, in the early years of operations the firm may be producing at high costs and may be just able to manage normal profit.

Normal profit: AC=AR

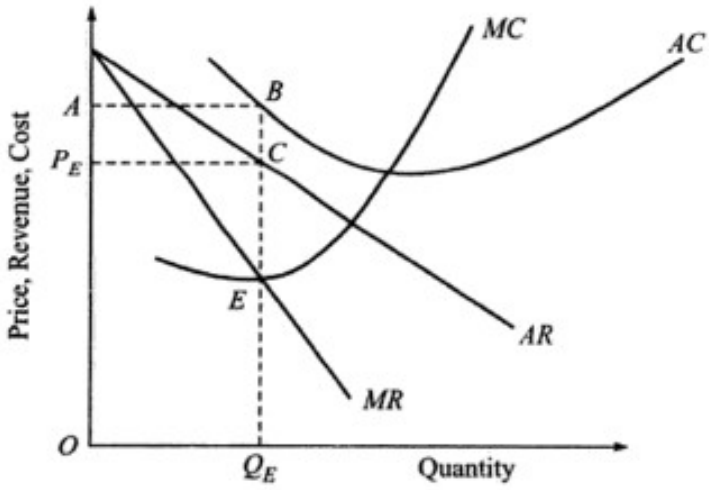
It can be shown graphically, when the AC curve is tangent to the AR (or demand) curve. Point E is the equilibrium point where two cinditions of profit maximization is fulfilled.



TR=OPEBQE

TC=OPEBQE

Case of Loss (Subnormal Profit)



In the short run, the monopolist may have to incur losses. This situation occurs if in the short run price falls below the average cost (AR<AC). In other words, if price falls due to depression and fall in demand, the monopolist will continue to produce as long as price covers the average cost. Once the price falls below the average cost, monopolist will stop production.

TR=OPECQE

TC=OABQE

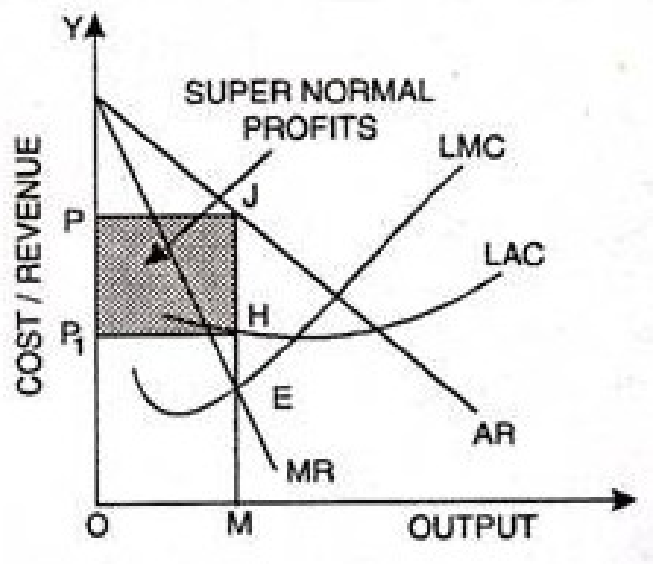
Loss=PEABC

Price and output decision in the long run

In the long run , the monopolist can change the scale of his output in response to a long run change in demand. This is the case with a perfect competitive market also, but what distinguish monopoly from the later is that the entry of new firm being ruled out, excess profits (supernormal profit) is possible in the long run. In the given Fig. monopolist is in equilibrium at OM level of output. At OM level of output MR is equal to LMC and the monopolist fixes OP price. HM is LAC and Price OP being more than LAC i.e., HM which fetch the monopolist super normal profits.

TR=OPJM, TC=OP1HM

Supernormal profit=P!PJH



Price Discrimination/ Discriminating Monopoly

- Price discrimination is the practice of discriminating among buyers on the basis of the price charged for the same good (or service).
- **Bases of price discrimination:**

Personal: The most basic form of price discrimination is personal discrimination. When the seller has direct contact with its customers, it is convenient for the seller to charge different prices from different customers. In this case of discrimination both the above mentioned conditions are fulfilled. The seller knows about the paying capacity of the customers and the intensity of their needs, and hence can easily estimate the price elasticity for each customer. Moreover, since this discrimination is being done on a personal basis, the good (or service) is nontransferable. Personal price discrimination may' be on ground of demography, paying capacity or need. For example, as explained before, senior citizens. Physically challenged persons and children below a certain age get certain concessions on rail fare, which is not available to other people. This is demographic separation of market. Lawyers may charge higher fee from a person who has a case of life and death as against a client who has some small issue of discontent. This segmentation is on basis of need. Doctors may treat poor patients free or may charge a concessional fee; this is on the basis of paying capacity.
Geographical: Another very popular method of market segmentation is on geographical basis, in which people living in different areas are required to pay different prices for the same product. E.g. edible oils and many packaged food items are sold at different prices in different States of India. There is no differentiation as regards the product, yet people living in one area pay more as compared to other areas.
Time: Markets may also be divided on the basis of time, i.e., which time of the day or month or year is the product being purchased. Interestingly here the same person may be required to pay different prices for the same product because of this type of discrimination. Off season discounts on a wide range of goods serve as a very good example of such type of discrimination. Earlier the Department of Telecommunications (DoT) in India used to charge different rates for a call to the same distance on basis of time of the day the call was being made. At one point of time as many as three time zones existed for telephone tariff. This, however, is no longer into existence. Higher rates for tickets of movie shows in the first few days of release of a movie can be given as another example of time bound price discrimination. The INOX chain of multiplexes in the metro cities of India charge higher price

for movie shows in the weekends. Sunday editions of leading newspaper dailies are charged higher than the daily rates and serve as another example.

Purpose of use: Another distinction is on the basis of the purpose for which the product is being purchased. Customers are segregated on basis of their purpose of use. e.g. electricity rates are lower for domestic purpose and higher for industrial purpose. Banks charge different interest rates for different types of loans. So the same person pays different rates for different loans, say loans for car and education.

MONOPOLISTIC COMPETITION

The term "imperfect competition" has been derived from the realistic features of markets, a large number of sellers sell heterogeneous or differentiated products and buyers have preferences for specific sellers. The market can also be termed as "monopolistic" because each of these sellers makes the product unique by some differentiation and has control over the small section of market, just like a monopolist. This market form was seen to have characteristics of both perfect competition (e.g. many sellers) and of monopoly (e.g. control over market). The features of imperfect competition and monopolistic competition were so similar that later economists used the two terms alternatively for long.

Monopolistic competition is a type of imperfect **competition** such that many producers sell products that are differentiated from one another (e.g. by branding or quality) and hence are not perfect substitutes.

Features:

- **Larger number of buyers and sellers:** Under monopolistic competition there are very large number of firms, but not as large as in perfect competition. Each firm produces a small portion of industry output; each buyer also purchases a very small part of the industry output. The product must be produced by 50 to 100 or more firms, with each firm's product a fairly close substitute for the products of the other firms in the same product group.
- **Heterogeneous Products**
  Monopolistic competition makes a sharp departure from product homogeneity under perfect competition as firms in this type of market sell heterogeneous (somewhat differentiated) products.
- **Selling Costs**
  Every producer (or seller) tries to promote its own product through different types of expenditures, such as attractive packaging, higher commission to distributors, sales promotion, advertisements and other incentives. These are selling costs that must be considered along with production costs.
- **Independent Decision Making**

Similar to monopoly individual firms in a monopolistic market can take decisions about the price and output of their own products, independent of decisions of rival firms. Due to the presence of a large number of firms selling heterogeneous products, each firm decides on its own price and output. Based on individual demand and cost; in this it does not take into account the possible reactions of rival firms. Thus firms are independent, as opposed to interdependent firms in oligopoly. There is no collusion, such as price fixing, or market sharing among firms in the product group.

- **Imperfect Knowledge**

Information about cost, quality, price. etc is not uniformly available to all buyers and sellers in the market. As per the basic definition given by Robinson, the imperfect market (monopolistic market) is characterized by distortion of market conditions by the sellers.

Demand and Marginal Revenue Curve of a Firm

Demand curve for a firm under monopolistic competition has a negative slope as all firms sell products which are close substitutes of each other. In short, the substitution effect results in the negative slope. AR curve denotes the demand curve of a firm and also determines the slope of MR curve. The demand curve of the firm is highly price elastic. Hence, the slope of the demand curve for monopolistic competition is flatter, as compared to that in case of a monopolist.

Price and Output Decisions in Short Run

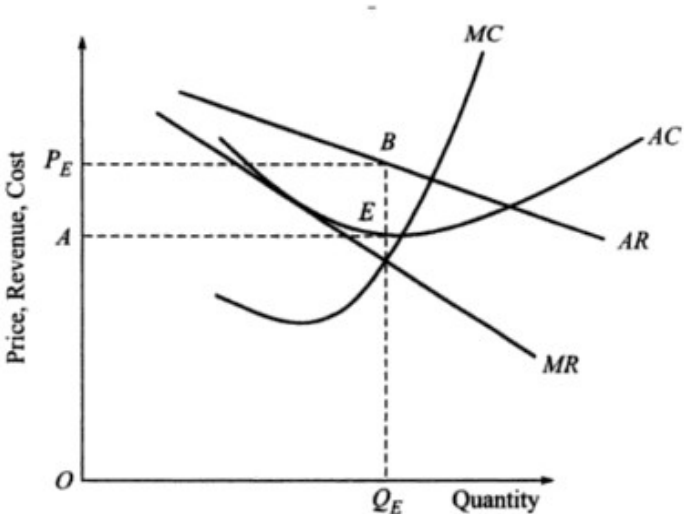
The negative slope of the demand curve under monopolistic competition is instrumental for chances of monopoly profit in the short run.

When MC=MR (when MC is rising) is the rule for profit maximization.

Like monopoly, there are three possible cases of profits of a firm under monopolistic competition in the short run.

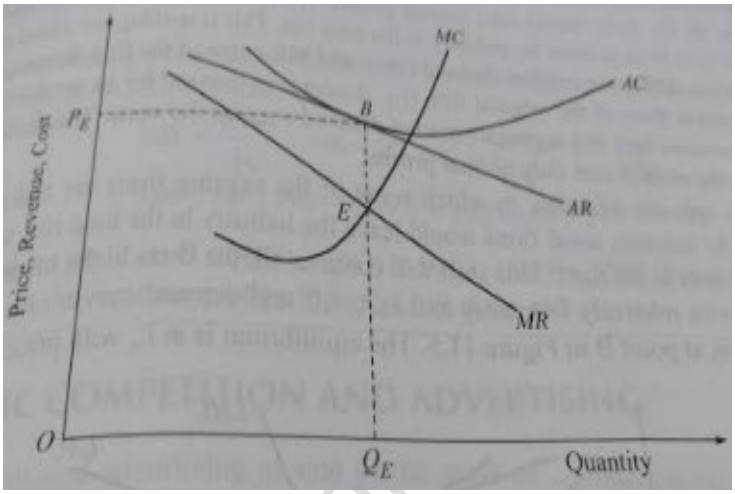
Case of Supernormal Profit

In the short run the monopolistically competitive firm can earn supernormal profit. As the firm maximizes profit at a point where (I) MR MC and (ii) MC cuts MR from below, the point of equilibrium in Figure below is at point E. with the equilibrium price at °E and output at OQE. So the total revenue earned by the firm by selling OQE at OPE is given by the rectangular area °E8QE (the area below the AR curve). To produce this equilibrium output OQE. The total cost incurred by the firm is given by the rectangular area OAEQE (the area below the AC curve). Therefore, the total profit (supernormal) earned by the firm is given by the rectangular region AEBPF, because price PE is greater than average cost.



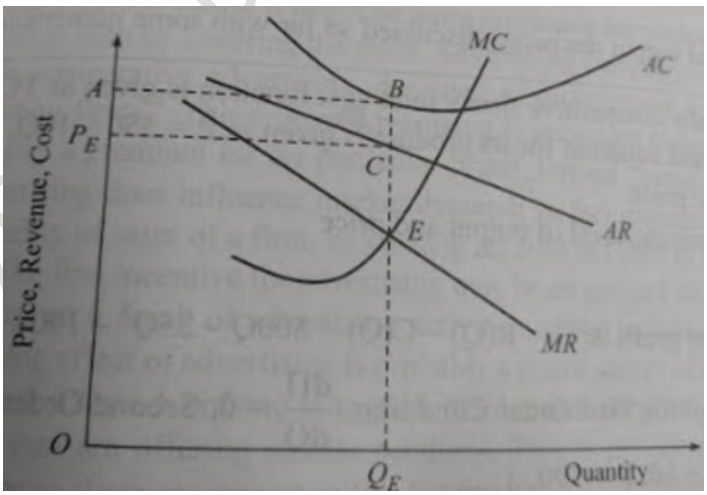
Case of Normal Profit

Not all firms ¡n the market can earn supernormal profits in the short run; some firms may also earn normal profits. This situation occurs when the average cost is just equal to average revenue and the AC curve is tangent to the AR (demand) curve, given in Figure 11.3. Equilibrium here occurs at point E where the conditions of profit maximization are satisfied. At E, the output that maximizes profit QF and price is 'E'. The total revenue earned by the firm by selling OQE is the rectangular area OQFBPF.



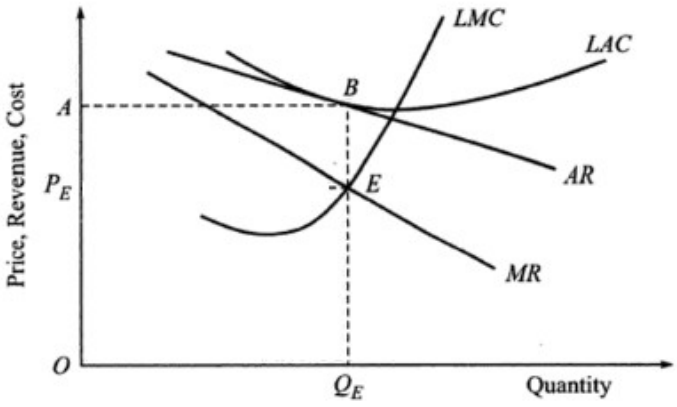
Case of Loss (Subnormal Profit)

In the short run a monopolistically competitive firm can also incur loss, i.e., when average revenue is less than average cost, or when the AC curve is over and above the price line. As shown in the figure below the equilibrium point in this case is at point E, with equilibrium level of output at OQE and price OPE. Now the firm earns total revenue given by the rectangular area . But the cost of producing OQE level of output is given by the rectangular area . Thus the total cost of producing OQE is more than the revenue earned by selling OQE. The amount of loss incurred by the firm is given by the area ABCPE.



Price and output decision in the long run

In the long run, unlike the perfect competition market all the firm earn normal profits. If any firm is earning supernormal profit, this would attract new firms to enter the industry in the long run. This add to the competition as a result of which the original demand curve (AR and MR would to shift downwards to the left, signifying a decrease in market share of the original firm.



Other hand, if some of the existing firms are making losses, due to freedom of exit few firms would leave the market, causing the demand curve to shift upwards to the right. This will continue till the firm in the market earns only normal profit.

Normal Profit: AC=AR

LAC is tangent to AR at point B.

TR=OABQE

TC=OABQE

OLIGOPOLY

Oligopoly is the most realistic types of markets and yet it is the most complicated to be defined as a theory. The word oligopoly is derived from the Greek word “oligo” means few and “polo” means sell; it means a market with few sellers. Oligopoly is a market where a few dominant sellers sell differentiated or homogeneous products under continuous consciousness of rivals actions.

Types of Oligopoly

- **Pure/Perfect Oligopoly**:
- Pure Oligopoly refers to a market where all the firms are producing homogenous product. For instance cement and steel industry, where there is no any more chances for differentiated products.
- **Differentiated/Imperfect Oligopoly:** An Oligopoly market said to be a differentiated oligopoly when the products are produced by firms having some kind of differences. But at the same time the products are substitutable one. Since there is no any perfect uniformity in products, it can also call as imperfect oligopoly. For example, we are using laptops made by different companies. Actually these are substitutable. But a small kind of variations can be seen in size, color and quality etc.
- **Collusive Oligopoly:**
- If the firms cooperate with each other in determining price or output or both, it is called collusive oligopoly or cooperative oligopoly. Oil and Petroleum Exporting Countries (OPEC) is the best example, where few countries are producing the commodity and they collude under the label of OPEC and it influence the price fixing, market sharing and other related policies.
- **Non-collusive Oligopoly:**
- If firms in an oligopoly market compete with each other, it is called a non-collusive or non-cooperative oligopoly. Non - collusive Oligopoly market is one, where there is no any kind of agreements and conducts between the firms. Each firms running on the basis of the policies of themselves. No one will ever depend on the decision of

others. Automobile industry is the best example. Where, each firm fixes their price and other matters independently.

Features of Oligopoly

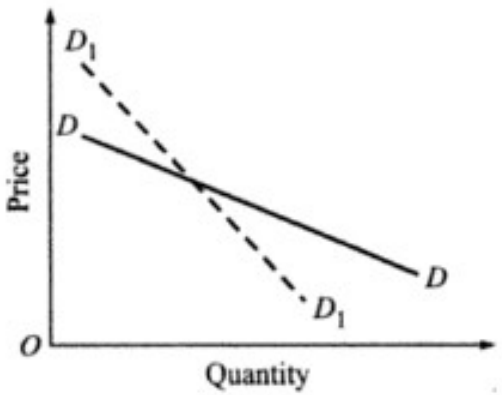
1. **Few sellers:** There are a small number of sellers under oligopoly. Thus the market share of each firm is large and a single firm can influence the market price and business strategy of new firms.
2. **Inter-dependence:** Since the number of firms in the industry is small, the business strategy of each firm in respect of pricing, advertising, product etc is closely watched by the rival firms and has a direct effect on them. And the rival firms may retaliate by changing their own price, output or products.
3. **Importance of advertising and selling costs:** Due to interdependence of firms and in order to retain their market share, they spend much on advertising and other measures of sales promotion. A firm is an oligopolistic industry competes by changing the advertising costs, quality of the product, prices, output etc.
4. **Barriers to entry:** It arises due to the following reasons.
   - **(a)** Huge investment requirement to match the production capacity of the existing ones.
   - **(b)** Preference of consumer to the product of established firms.
   - **(c)** Resistance by the established firms by price cutting.
5. **Indeterminateness of demand curve:** Because of interdependence of firms under oligopoly, a firm can't assume that its rival will keep their prices unchanged when it makes changes in its own price.so, the demand curve facing an oligopolistic firm losses its definiteness. Because the rivals change their prices in reaction to price changes by a firm. And so the price and output are also indeterminate. But once the price is determined, it tends to stabilize.

   Thus in an oligopolistic firm it is very difficult to determine, output and price due to interdependence and indeterminate of the demand curve.

Non price competition

Oligopoly firms avoid the incidence of price war as they know that the price war only benefits the customers. **Price war** is "commercial competition characterized by the repeated cutting of **prices** below those of competitors". If one competitor lowers its **price**, then others will lower their **prices** to match. As in most of cases the prevailing price under oligopoly is fixed after a series of price wars, the oligopolists resort to other strategies like highly aggressive advertisement, product bundling, influencing value perception of the consumers, branding and offering better service packages. The extreme case of non-price competition is the formation of cartels or collusive oligopoly, where all the firms openly or tacitly agree to sell their products at the same price.

Indeterminate demand curve



This is another feature of oligopoly which is very distinct from any other form of competition. As oligopolist's demand is not only affected by its own price or advertisement or quality, but it also affected by the prices of rival products, their quality, packaging, promotion and placement. Due to this fact, in oligopoly, each firm faces two demand curves, this makes price and output determination very complex. When the firm increases the price the demand curve is highly elastic (DD) due to substitution effect and when it reduces the price, the demand curve is highly inelastic (D1D1).

Duopoly

Duopoly is a special case of oligopoly with only two players in the market. This may be possible because of price war. During price war less efficient firms had to exit, or do not find the market attractive, or small firms find it difficult to survive due to high fixed costs. There is another very likely possibility that there are many small players, but two large players are competing neck to neck and thus created a duopoly like situation. Example: Pepsi & CocaCola, Visa & Mastercard, Airbus & Boeing etc.

Price and Output Decisions under Oligopoly

There is no single mode to explain the determination of equilibrium price and output of an oligopoly firm. Difficulty in determining the demand curve and hence the revenue curve of the firm, tendency of the firm to influence market conditions by various activities like advertisement, and fear of price war resulting in price rigidity are some of the reasons which pose a major constraint in developing a model to explain oligopoly. Economist have tried to build various models from time to time to explain the equilibrium of the firm under conditions of oligopoly. **These models only depicts the impact of interdependence among firms and how does this influence their decisions of output and pricing.** No model gives any clear explanation of the question of how much to produce and at what price to sell.

Cournot's Model

- French mathematician Augustin Cournot introduced the model in 1838. The Cournot competition is an economic model that describes an industry structure in which competing firms that make the same homogeneous and undifferentiated product choose a quantity to produce independently and simultaneously. price. **The basic version of the Cournot model dealt with a duopoly, or two main producers in a market.** In the Cournot model, the strategic variable is the output quantity. Each firm decides how much of a good to produce. Both firms know the market demand curve, and each firm knows the cost structures of the other firm. **The essence of the model is this: each firm takes the other firm's choice of output level as fixed and then sets its own production quantities.**

Stackelberg Model

- This model was developed by the German economist H.V Stackelberg and is **an extension of Cournot's model.** This model is **popularly known as leader follower model**. It is assumed, by Stackelberg, that one duopolist is sufficiently sophisticated

to recognise that his competitor acts on the Cournot assumption. This recognition allows the sophisticated duopolist to determine the reaction curve of his rival and incorporate it in his own profit function, which he then proceeds to maximise like a monopolist.

Kinked Demand Curve: Price Rigidity

Paul Sweezy in 1939 introduced the concept of "Kinked Demand Curve" to explain price rigidity. Price rigidity refers to a situation in which price tends to stay fixed irrespective of changes in demand and supply conditions. He tried to explain the behaviour of oligopoly firms on the basis of two assumptions:

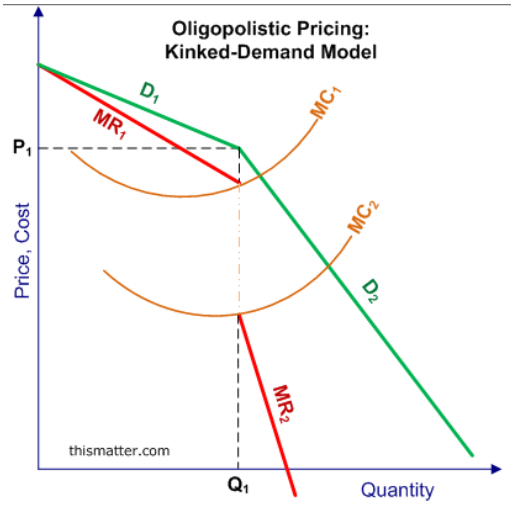
If a firm increases its price, others will not follow.

If a firm decreases its price, others will also do the same.

Thus an oligopolist faces an indeterminate demand curve. Sweezy's model is still considered to be the most suitable explanation of the behaviour of a firm in an oligopoly market.

The model advocates that the behavior of oligopolistic organizations remain stable when the price and output are determined. This implies that an oligopolistic market is characterized by a certain degree of price rigidity or stability, especially when there is a change in prices in downward direction. For example, if an organization under oligopoly reduces price of products, the competitor organizations would also follow it and neutralize the expected gain from the price reduction. On the other hand, if the organization increases the price, the competitor organizations would also cut down their prices. In such a case, the organization that has raised its prices would lose some part of its market share. Hence, a firm under oligopoly has no option but to stick to its current price. Hence, at current price a kink is developed in the demand curve.

Characteristics of Kinked demand curve:



- Price rigidity
- Indeterminate demand curve
- Non price competition
- Interdependent decision making
- $\mathbf{P}_1$ = Product Price of the Oligopoly
- If a firm raises its price ($\mathbf{D}_1$), but the others do not match the increase, then revenue will decline in spite of the price increase.
- If the firm lowers its price (**D2**), then the other firms will match the decrease to avoid losing market share. Because there is a kink in the demand curve, there is a gap in the marginal revenue curve ($\mathbf{MR}_1$ - $\mathbf{MR}_2$).

- **It should be noted that with any cost reduction the new MC curve will always cut the MR curve in the gap because as costs fall the gap continues to widen due to two reasons:**
- (1) As costs fall, the upper portion of the demand curve becomes more elastic because of the greater certainty that a price rise by one seller will not be followed by rivals and his sales would be considerably reduced.
- (2) With the reduction in costs the lower portion of the kinked curve becomes more inelastic, because of the greater certainty that a price reduction by one seller will be followed by the other rivals.

Collusive Oligopoly

An important characteristics of oligopoly is collusion, in which rival firms enter into an agreement in mutual interest on various accounts such as price, market share, etc. Collusion is an agreement between competing firms to coordinate their actions, so that together they can act as a monopoly to raise prices or limit production, in order to control the market.

Prime reasons for Collusion: interdependence of firms, constant consciousness of rivals action, fear of price war.

Types of Collusion

- When a number of producers or sellers enter into a formal agreement, it is called an explicit collusion. The most commonly found form of explicit collusion is known as cartel.
- On the other hand collusion which is not overt, is called as tacit collusion. It occurs when cartels are illegal or explicit collusion is absent. Price leadership is a form of tacit collusion

Cartel

A cartel is a formal (explicit) agreement among firms on price and output. It usually occurs when there are small numbers of sellers and the product is usually homogeneous. Formation of cartel normally involves agreement on price fixation, total industry output, market share, allocation of customers, allocation of territories, establishment of common sales agencies, division of profits, or any combination of these. The immediate impact of cartelisation is a hike in price and reduction in supply.

Types of Cartel

- Centralized Cartel: It is an agreement by all the members, where a centralized body decides on the pricing.
- Market sharing Cartel: It is agreement by all the members to divide the market share among them and fix the price independently.

DESCRIPTIVE PRICING APPROACHES

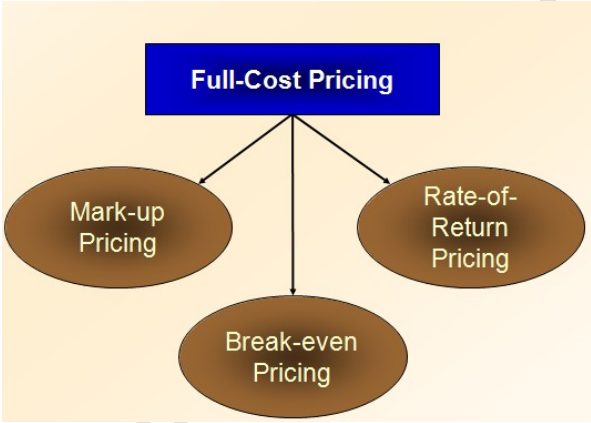
Price denotes two aspects. on one hand it is revenue to the seller and on the other it is the perceived value of the good (or service) to the buyer. So the basic question is what is the right price for a product? A simplistic answer is that the right price is one which keeps all stakeholders happy; consumers feel happy that they got value for their money; sellers are happy because they could sell the desired volume; and shareholders are satisfied that they earned higher profits. Price determines sales revenue, market share and profits.

Full cost pricing

It is a price-setting method under which the firm 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.

Markup percentage: For example, if a product costs INR100, the selling price with a 25%, markup would be INR125. Gross Profit Margin = Sales Price – Unit Cost = 125 – 100 = INR25. Markup Percentage = Gross Profit Margin/Unit Cost = INR25/INR100 = 25%.

Pricing strategies of Full cost pricing



Mark-Up Pricing

- Selling price is determined by adding a fixed amount, usually a percentage, to the (total) cost of the product
- Most commonly used pricing method (e.g., groceries and clothing)

Break Even Pricing

- Equals the per-unit fixed costs plus the per-unit variable costs
- Useful tool for determining the minimum price at which a product must be sold to cover fixed and variable costs
- Often used by non-profit organizations, or by profit-making organizations that may have a short-term breakeven objective

Rate of Return Pricing

- Price is set so as to obtain a pre-specified rate of return on investment (capital) for the organization
- Assumes a linear demand function and insensitivity of buyers to price.
- Most commonly used by large firms and public utilities whose return rates are closely watched or regulated by government agencies or commissions

$$ROI = Pr / I = \frac{\text{revenues - cost}}{\text{investment}} = \frac{P \times Q - C \times Q}{I}$$

Price Skimming

- The practice of initially charging a high price for a new type of product, in an effort to maximize profits before substitutes or imitation products becomes available. The use of market skimming pricing is usually followed by a dramatic drop in prices once imitation products are available, in order to remain competitive with other companies offering the imitation products.
- This pricing strategy uses high upfront prices to maximize short-term profits from the most eager and interested customers. Example: Apple iphone
- A firm may go for skimming pricing when the demand for the product is likely to be inelastic.

Penetration Pricing

- **Penetration pricing** is the practice of offering a low **price** for a new product or service during its initial offering in order to lure customers away from competitors.
- Once it has gained a large market share and customer base, the company begins to increase the price of the product. Companies sometimes use this technique when offering a new product, such as a new technology, to encourage customers to try the product.
- Many times when you enter into supermarkets, you are show signs of “special introductory offers”, the classical sign of penetration pricing strategy.
- Examples: reliance mobile phone, Nirma detergent etc.
- It is ideal to follow penetrating pricing when demand is likely to be price elastic.

Loss Leader Pricing

- Loss leaders are high volume, high profile brands or products that are sold by retailers with the intention to attract customers into their premises, with the hope that those customers will end up buying other goods as well, once inside. Examples could be steeply discounted electronics, or consumer goods, or garments. A zero percent loan for cars is a loss leader example for the dealer.
- Loss leader brands or products are sold at very slim margins or at a loss, with the conscious understanding that other products in the retail outlet will make up for the loss.

Price Bundling

- A marketing ploy in which several products are offered for sale in one combined unit that is often marked at a reduced **price** compared to the sum of their separate purchase **prices**.
- Examples: cable TV channel plans, Value meals at restaurants

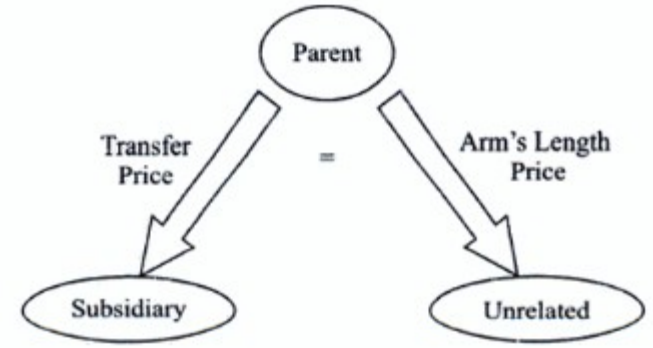
Transfer Pricing

- Transfer pricing is the setting of the price for goods and services sold between controlled (or related) legal entities within an enterprise. In other words, a transfer price is the price at which the subsidiaries of a business sell to each other. For example, if a subsidiary company sells goods to a parent company, the cost of those goods paid by the parent to the subsidiary is the transfer price.
- Transfer prices are the charges made when a company supplies goods,services or financials to its subsidiary or sister concern

International Regulations on **Transfer Pricing**

Country	*Transfer Pricing Regulations*
Germany	Regulations published in 1983; Approved law in 2003
Japan	Law framed in 1986, Documentation rules finalised in June 2002
USA	Regulations finalised in 1994; new regulations proposed in 2003
Australia	Detailed rulings in 1994 based on 1936 Act
South Korea	Law effective from 1996; APA rules updated in 2000
UK	Detailed Rules effective from 1999
India	Detailed law introduced by Finance Act 2001

The above Table clearly shows that all the countries taken cognizance of the need for transfer pricing regulations around the same time as the inception of World Trade Organization (WTO); the reason was that WTO regime saw an upsurge in the growth and expansion of MNCs globally. In general all regulatory authorities agree that the transfer prices should be fixed at harm's length price, that is, the same price should be charged whether the product is transacted between related parties or with a third party an unrelated customer). Companies come under tax scrutiny if they appear to have charged a transfer price different from the price they charge from an independent customer, i.e, if different from arm's length price'.



PEAK LOAD PRICING: Under peak load pricing different prices are charged for the same facility used at different points of time by the same consumers.

Ex: BSNL charges differential pricing on long distance calls for different times of the day. During working hours (9am-6pm) phone tariff was higher than in evening and night hours.

Airlines provide various discounts on tickets purchased at different point of time.

Consumer durable industry uses this strategy by providing off season discounts to encourage purchase of refrigerators, air conditioners etc. during winter.

CONCEPT OF CONSUMPTION, SAVING & INVESTMENT

- **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.

Marginal propensity to consume

- ***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:*
- $C_I = MPC \, . \, Y$

The consumption function

- 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: $C = C_A + C_I$

$$C = C_A + MPC \, . \, Y$$

Determinants of Consumption

- **Current disposable income**: it is the central factor determining a nation's consumption.
- **Permanent income:** It is defined as expected long-term average income.
- **Wealth:** it is the net value of tangible and financial items owned by a nation or person at a point of time.
- **Other (interest rate, inflation, expectations).**

Savings

- ***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

then $\frac{C}{Y} + \frac{S}{Y} = 1$ *and* $\frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} = 1$

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

$$MPS = \frac{\Delta S}{\Delta Y}$$

- MPC + MPS = 1 because the part of each unit of income that is not consumed is necessarily saved.

Saving function

- 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**.**

Investment

- Investment pays two roles in macroeconomics:
  - It can have a major impact on output and employment
  - It leads to capital accumulation (it increases the nation's potential output and promotes economic growth in the long run)

Determinants of investment

- **Revenues:** an investment should bring the firm additional revenue.
- **Costs:** interest rate influences the costs of the investment.
- **Consumer demand:** the bigger the increase in consumer demand, the more investment will be needed.
- **Expectation:** business expectation about future state of economy.

BUSINESS CYCLE

- Definition: alternating increases and decreases in the level of business activity of varying amplitude and length.
- How do we measure "increases and decreases in business activity?"
  - Percent change in real GDP!
- Why do we say "varying amplitude and length?"
  - Some downturns are mild and some are severe
  - Some are short (a few months) and some are long (over a year)
  - In short, The Business Cycle allows people to understand the direction the economy (GDP) is going (growing or shrinking) and plan accordingly.

Phases of Business Cycle

- Expansion (Growing)

- Peak (Top)
- Contraction (Shrinking)
- Trough (Bottom)

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. Broadly we may categorize the phases of business cycle in the following head:

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 :-

- High level of output and trade.
- High level of effective demand.
- High level of income and employment
- Rising interest rates.
- Inflation.
- Large expansion of bank credit
- Overall business optimism.
- 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 :-

- Fall in volume of output and trade.
- Fall in income and rise in unemployment.
- Decline in consumption and demand.
- Fall in interest rate.
- Deflation.
- Contraction of bank credit.

- Overall business pessimism.
- 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.

What keeps the Business Cycle Going?

- Four variables cause changes in the Business Cycle:

1. Business Investment

When the economy is expanding, sales and profit keep rising, so companies invest in new plants and equipment, creating new jobs and more expansion. In contraction, the opposite is true

2. Interest Rates and Credit

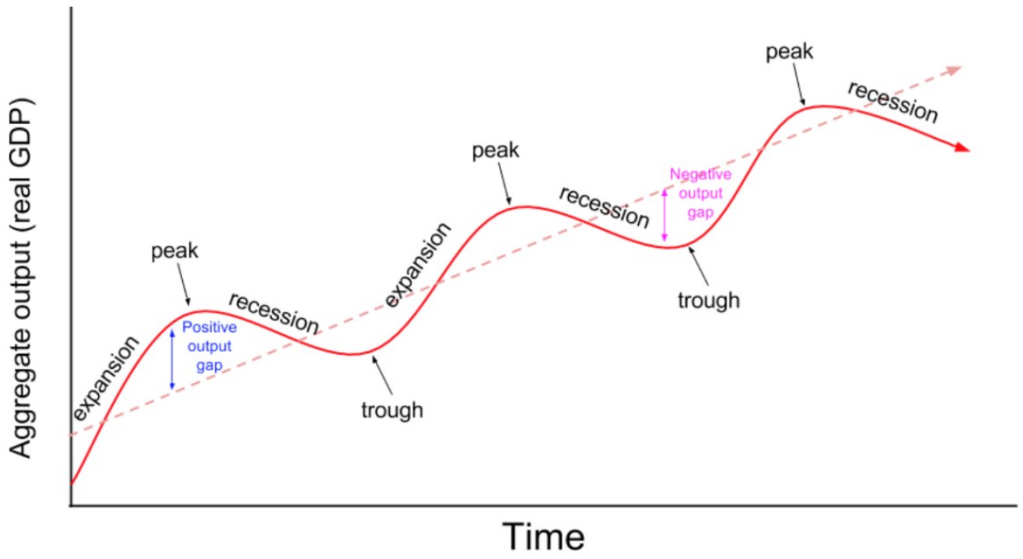
Low interest rates, companies make new investments, adding jobs. When interest rates climb, investment dries up and less job growth

3. Consumer Expectations

Forecasts of an expanding economy fuels more spending, while fear of a recession decreases consumer spending

4. External Shocks

External Shocks, such as disruptions of the oil supply, wars, or natural disasters greatly influence the output of the economy



Effect of Business Cycle

- **Effect during Expansion**
- **Inflation:** Inflation is a necessary evil that comes with expansion. Increase in investment increases demand for capital, which forces more money supply in the system, demand for factor inputs increases, hence their prices increase which increases cost of production. So wages and prices of goods also increase.
- **Severe competition:** Another effect of expansion is intensive competition; firms vie for their share in the growth process and the only bad thing about this situation is that firms resort to large amount of non-productive expenditure on advertisements and publicity.
- **Effect during Recession**
- **Excess Inventory**: As one of the reason for recession is the fall in aggregate demand. Therefore those firms which had produced in abundance during expansion phase face the problem of maintaining unsold items.
- **Retrenchment:** Firms employ more people if they increase production; in the event of reduction in investment, the first axe falls on workers and recession phase is marked by large scale retrenchment.

Controlling Business Cycles

- **At Firm Level**: Firms are the main victims of cycles; at the same time they are one of the main players in the game. During expansion firms gain, and during recession they suffer; therefore expansion is the desired phase for them and recession the unwarranted phase.

- **Precautionary measures**

  Investment: Firms should deter from investing huge amount of funds in fixed assets. Financing pattern should be a balanced mix of debt and equity.

  Inventory: Firms should not create large inventory of raw material or finished goods. Just in time strategy helps in such cases.

  Products: Firms should diversify in different markets and different products, because in this way risk is also diversified.

  Pricing: Flexibility should be the right strategy, so that during recession prices may be adjusted to increase demand without eating away the margins.

- **Curative measures**

  Curative measures are taken during recession phase.

- **At Government Level**:

- Monetary measures (rediscount rate, reserve ratios, open market operations, selective credit control)

- Fiscal measures (public expenditure, public revenue)

INFLATION

- We define **inflation** as a sustained rise in the general price level of goods and services.

- **Note:**

➢ this does not mean that all prices must be rising during a period of inflation –some prices may even be falling; but the general trend must be upward

➢ It is a process of rising prices & not a state of high prices

The value of a rupee does not stay constant when there is inflation. The value of money is usually referred to in terms of its purchasing power. A rupee's **purchasing power** is the amount of real goods and services that it can buy. Consequently, another way of defining inflation is as a decline in the purchasing power of money over time. The faster the rate of inflation, the greater the rate of decline in the purchasing power of money.

Price inflation & Money inflation

Economists categorise inflation into two broad caterogries: price inflation and money inflation. Normally, inflation is referred as price inflation. The two have cause and effect relationship: often price inflation is the effect of money inflation, i.e., when money supply increases persistently, it causes price inflation too.

How money circulation increases?

- Printing of additional currency on demand of the government to meet its needs of expenditure and/or loans.
- Foreign exchange inflow in the form of foreign direct investment (FDI) and foreign institutional investment (FII), tourism and other incomes from abroad. This has increased multifold as an outcome of globalization.

Measuring inflation

- Inflation is the rate of change in the price level
- If the price level in the current year is 'P1' & in the previous year is 'Po', then inflation for the current year is : (P1-P0)/P0X100

Inflationary Gap

- This term was coined by Keynes.
- Inflationary gap represents rise in price due to a gap between effective demand and supply, when the economy does not have the capacity to absorb the increased money supply.
- In India inflation has been mainly due to deficit financing and multifold increase in money supply, as compared to real goods and services.

Causes of Inflation

- Excess money supply: Money supply is directly linked with price level.
- **Demand Pull Inflation**: When aggregate demand level increases due to any reason, and supply of output is unable to match this increased demand, the inflationary pressure thus built is known as demand pull inflation i.e., demand pulls prices up.
- Demand pull inflation may occurs due to any one or a combination of the following:
- Increase in money supply
- Increase in disposable income
- Increase in aggregate spending
- Increase in population of the country
- **Cost Push Inflation:** Cost push inflation occurs when we experience rising prices due to higher costs of production and higher costs of raw materials. Cost push inflation is determined by supply side factors (cost-push inflation is different to

demand-pull inflation which occurs due to aggregate demand growing faster than aggregate supply).

- **Low increase in supply of goods:**
- Obsolete technology
- Deficient machinery
- Scarcity of resources
- Natural calamities
- Industrial disputes and external aggressions

Measuring inflation

- The most common term used to denote inflation is inflation rate (annual rate of increase in prices).
- Price index is a numerical measure designed to help to compare how the prices of some class of goods and/or services, taken as a whole, differ between time periods or geographical locations.
- Price index= Current year's price/Base year's priceX100
- The calculation of price indices is a complex task because various goods and their prices are to be collected and an average has to be taken out.

Some of the important price indices:

- **Producer Price Index (PPI)**: measures average changes in prices received by domestic producers for their output.
- **Wholesale Price Index (WPI):** measuring inflation on the basis of wholesale prices of a wide variety of goods (including consumer and capital goods). In India, WPI is available on a weekly basis, and continues to be the most popular and most comprehensive measure of economy wide inflation available with high frequency.
- **Consumer Price Index (CPI):** measures the price of a selection of goods purchased by a 'typical' consumer. CPIs are compiled in terms of general standards and guidelines set by the International Labour Organizations (ILO) for its member countries.

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Inflation Rate

- If we want to know how much prices have increased over the last 12 months (the commonly published inflation rate number), we would subtract last year's index from the current index and divide by last year's number and multiply the result by 100 and add a % sign.

- **Inflation rate= (Last year index-Current year index)/Current year index*100**

Monetary measures

- Under monetary measures, the central bank of the country uses various methods of credit control to keep a check on inflation. The measures include:
- Increasing the discounting rate
- Increasing the reserve ratio
- Open market operations
- Selective credit control
- **Fiscal measures**
- Under fiscal measures, the government may reduce public expenditure or increase public revenue to keep a check on inflation. It covers:
- Reducing public expenditure
- Increasing public revenue
- **Increasing supply of goods and service**
  As inflation is an outcome of demand and supply gap, hence it is necessary to look at the supply side as well.
- The measures to increase supply may include:
- Increasing import and decreasing export
- Public distribution system
- Administered pricing of essential commodities

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FISCAL AND MONETARY POLICY

Monetary Policy

- Monetary policy is the process by which monetary authority of a country, generally a central bank controls the supply of money in the economy by exercising its control over interest rates in order to maintain price stability and achieve high economic growth. In other words, Monetary policy is the management of money supply and interest rates by central banks to control prices and employment. In India, the central monetary authority is the RBI.
- **Objectives of Monetary policy**
- Financial stability
- Price stability

- Control inflation

Instruments of Monetary Policy

- To achieve the objectives of monetary policy, the central bank has at its disposal quantitative and the qualitative measures of monetary policy.
- While the quantitative measures control the total volume of credit and the cost of credit in the economy, the qualitative measures control the direction and distribution of credit in the economy.

Quantitative Measures of Monetary Policy

- **Open Market Operations**: Open market operation refers to the purchase and sale of Government securities by the Central bank in open market. In order to correct the excess demand or inflation, the central bank sells securities to the commercial banks and general public.
- **Variable cash reserve ratio**: According to the law, each commercial bank has to keep a part of its deposits with the central bank is a ratio known as the cash reserve ratio (CRR). Central bank can increase or decrease this ratio; therefore, it is known as the variable cash this ratio. It is very powerful instrument of credit control. **CRR** is set according to the guidelines of the central bank of a country.
- **The Statutory Liquidity Requirement**: The word statutory here means that it is a legal requirement and liquid asset means assets in the form of cash, gold and approved securities (government securities). The RBI Act instructs that all commercial banks (and some other specified institutions) in the country have to keep a given proportion of their demand and time deposits as liquid assets in their own vault. This is called statutory liquidity ratio.
- **Bank Rate Policy**: Bank rate is the rate charged by the central bank for lending money to commercial banks for meeting shortfall for a long period without selling or buying any security. This rate influence lending rate of commercial banks.
- **Repo (Repurchase) Rate and Reverse Repo (Repurchase) Rate:**
- It is the rate at which the central bank buys securities from commercial banks. It is actually a repurchase agreement. Repo rate is the rate at which the central bank lends money to commercial banks.
- Reverse repo is the exact opposite of repo. In a reverse repo transaction, banks purchase government securities from RBI and lend money to the banking regulator, thus earning interest. Reverse repo rate is the rate at which RBI borrows money from banks.

Qualitative or Selective Measures of Monetary Policy

- The qualitative measures do not regulate the total amount of credit created by the commercial banks. These measures make distinction between good credit and bad credit and regulate only such credit, which creates economic instability. Therefore, qualitative measures are known as the selective measures of credit control.

- **Prescription of margins requirements:** Generally, commercial banks give loan against 'stocks or 'securities'. While giving loans against stocks or securities they keep margin. Margin is the difference between the market value of a security and its maximum loan value. If central bank feels that prices of some goods are rising due to the speculative activities of businessmen and traders of such goods, it wants to discourage the flow of credit to such speculative activities. Therefore, it increases the margin requirement
- **Consumer credit regulations**:
- Now-a-days, most of the consumer durables like T.V., Refrigerator, Motorcar, etc. are available on installment basis financed through bank credit. Such credit made available by commercial banks for the purchase of consumer durables is known as consumer credit.
- If there is excess demand for certain consumer durables leading to their high prices, central bank can reduce consumer credit. On the other hand, if there is deficient demand for certain specific commodities causing deflationary situation, central bank can increase consumer credit
- **Moral Suasion** : Moral suasion means persuasion and request. To arrest inflationary situation central bank persuades and request the commercial banks to refrain from giving loans for speculative and non-essential purposes. On the other hand, to counteract deflation central bank persuades the commercial banks to extend credit for different purposes. This is a combination of persuasion and pressures which a central bank asserts to bring the erring banks in line so that they function in accordance with the central bank's directives.
- **Direct Action**:
    - This method is adopted when a commercial bank does not co-operate the central bank in achieving its desirable objectives. Direct action may take any of the following forms:
    - Central banks may charge a penal rate of interest over and above the bank rate upon the defaulting banks;
    - Central bank may refuse to rediscount the bills of those banks which are not following its directives;
    - Central bank may refuse to grant further accommodation to those banks whose borrowings are in excess of their capital and reserves.

FISCAL POLICY

- Fiscal policy refers to the government's policy regarding government expenditure, taxation and public borrowing with the view to achieving certain well-defined macroeconomic objectives.
- It is the sister strategy to monetary **policy** through which a central bank influences a nation's money supply.

Instruments of Fiscal Policy

- To implement fiscal policy, the government has at its behest several instruments.

- **Taxation**: Taxation is a powerful instrument of fiscal policy in the hands of public authorities which greatly effect the changes in disposable income, consumption and investment. An anti- depression tax policy increases disposable income of the individual, promotes consumption and investment. Obviously, there will be more funds with the people for consumption and investment purposes at the time of tax reduction.

- This will ultimately result in the increase in spending activities i.e. it will tend to increase effective demand and reduce the deflationary gap. In this regard, sometimes, it is suggested to reduce the rates of commodity taxes like excise duties, sales tax and import duty. As a result of these tax concessions, consumption is promoted. An anti-inflationary tax policy, on the contrary, must be directed to plug the inflationary gap.

- **Government Expenditure**: It was realized that government expenditure is imperative for an economy in the form of investments in capital goods industries, building the infrastructure and payments of wages and salaries.

- During the period of inflation, the basic reason of inflationary pressures is the excessive aggregate spending. Both private consumption and investment spending are abnormally high. In these circumstances, public spending policy must aim at reducing the government spending. In other words, some schemes should be abandoned and others be postponed.

- In depression, public spending emerges with greater significance. In this period, deficiency of demand is the result of sluggish private consumption and investment expenditure. Therefore, it can be met through the additional doses of public expenditure. The multiplier and acceleration effect of public spending will neutralize the depressing effect of lower private spending's and stimulate the path of recovery.

- **Public Borrowing**: Public borrowing is a sound fiscal weapon to fight against inflation and deflation. It brings about economic stability and full employment in an economy. When the government borrows from non-bank public through sale of bonds, money may flow either out of consumption or saving or private investment or hoarding. If the bond selling schemes of the government are attractive, the people induce to curtail their consumption, the borrowings are likely to be non-inflationary. If the government bonds are purchased by non-bank individuals and institutions by drawing upon their hoarded money, there will be net addition to the circular flow of spending.