

Economic Theory

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Background

Economic Thinking

- i) Ancient economic thoughts (2500 BC to 475 AD)
 - Hebrews, Greek, Roman, Hindu, Buddhist
- ii) Medieval Economic Thoughts (476 AD to 1453 AD)
- iii) Mercantilism
- iv) Physiocrats
- v) Adam Smith, 1776 AD
- vi) Alfred Marshall, 1890 AD
- vii) Lionel Robbins, 1923 AD

Adam Smith, 1776 AD

Book published by Adam Smith on 1776 AD titled as
"An enquiry into the nature and causes of wealth of nation"

Economics is **the science of wealth**" It deals with production, distribution, and consumption.

- a) Political Economics
- b) Laissez Faire (Free market economy)

Malthus (Theory of Population)

Ricardo (Theory of Rent)

Alfred Marshall, 1890 AD

Book Published by Alfred Marshall titled as

“Principles of Economics”

Definition of Economics as per *Alfred Marshall*- “Economics is a study of mankind in the ordinary business of life. It examines that part of individual's and social actions which is most closely connected with the attainment and with the use of material requisites of well being.

Economics studies that portion of the personal and social activities, which are closely related to the attainment of material resources, related to welfare and its utilization .

Economics studies all the actions that people take in order to achieve economic welfare because man earns money to get material welfare.” Economics is the study of humans, in relation to the ordinary business of life.”

Lionel Robbins, 1932 AD

Book Published by Lionel Robbins titled as

“Principles of Economics” and “Essay on Nature and significance of economic science” 1932 AD

Definition of Economics as per *Lionel Robbins*- “Economics is the science which studies human behavior as a relationship between end and scarce means, which have alternative use.”

a) Unlimited Wants

b) Scarce Means

c) Alternative Use of Scarce

d) Means Variation in the Intensity of wants

General Definition of Economics

Economics is a social science concerned with production, distribution and consumption of goods and services.

It studies how individuals, businesses, governments and nations make choice about how to allocate resources. Economics is a science which study that how people allocate scarce resources for production, distribution and consumption both individually and collectively. In simple language the economics is a science which is use to determine effective use of resources to meet private and social goals. It is concerned with Production and employment, investment and savings, health, money and the banking system, government policies on taxation and spending, international trade, industrial organization and regulation, urbanization, environmental issues. These are just a sampling of the concerns at the heart of the science of economics.

Definitions of Micro economics

The modern approach divides the subject matter of economics in to two broad inter dependent branches. These terms are first use by professor Ragner Frisch. That is Micro Economics And Macro Economics

Microeconomics deals with a small part or Small component of the national economy of a country. It is the study of economic actions of individuals and small group of individuals. Microeconomics may be defined as that branch of economic analysis which studies the economic behavior of individual units, may be a person ,a particular household, or a particular Firm. It is a study of one particular unit rather than all the units combined together.

According to G Ackley “ Micro economics deals with the division of total output among industries products , firms and allocation of resources among competing groups”

According to Boulding “ Microeconomics includes the study of particular household, individual price, wage, income, industry particular commodities etc”

Scope or Subject matters of Microeconomics

- 1) Theory of Demand
- 2) Theory of production
- 3) Theory of Product pricing
- 4) Theory of factor pricing
- 5) Theory of welfare Economy

Types of Microeconomics

- A) Micro statics
- B) Comparative Micro Statics
- C) Micro Dynamics

Economic System

The economic activity such as production takes place at several economic institutions such as schools, hospitals, factories, mines, shops, banks cinema houses, workshops, government and private offices, farms, etc. All these economic activities (such as production, distribution, consumption, investment) by the economic institutions that produce income for the people involved are collectively known as an economy.

Just like a machine or a human body (as a system) is made up different parts that perform specific functions, an economy is also made up of different part, which has different functions, due to which an economy is called an ‘economic system’. An economy as a ‘system’ is made up of different organs like producers (production), distributors (distribution), consumers, investors (investment), entrepreneurs, etc. perform different functions and work together, just like a system is made up of different organs and when any one of the organ dysfunctions, then the whole system collapse or does not exist.

In short ,”An economic system is a particular setoff social institutions which deals with the production, distribution, consumption, of goods and services.”

- A) **Capitalist Economy Or Market Economic System**
- B) **Socialist Economy Or Planned Economic System**
- C) **Mixed Economy Or Mixed Economic System**

Capitalist Economy Or Market Economy

Capitalism is an economic system in which private individuals or businesses own capital goods. The production of goods and services is based on supply and demand in the general market-known as a market economy-rather than through central planning-known as a planned economy or command economy.

The purest form of capitalism is free market or laissez-faire capitalism. Here, private individuals are unrestrained. They may determine where to invest, what to produce or sell, and at which prices to exchange goods and services. The laissez-faire marketplace operates without checks or controls.

Capitalist Economic System

- i) Production is carried out to maximize private profit.
- ii) Decisions regarding investment and the use of the means of production are determined by competing business owners in the marketplace.
- iii) Production takes place within the process of capital accumulation.
- iv) The means of production are owned primarily by private enterprises decisions regarding production and investment determined by private owners in capital markets.

Characteristics of a Capitalist Or Market Economy

- a) Private property b) Free competition c) Right of Inheritance d) Freedom of occupation And enterprise
- e) Price mechanism f) Profit Motive g) Self interest h) Freedom of choice for consumer
- i) Minimum government intervention j) Individual property and economic growth k) Decentralizations on economic decision

Socialism or Command economic system

In a command system, there is a dominant, centralized authority –usually the government – that controls a significant portion of the economic structure. The government comes in and exercises control over the resources. Centralized control covers valuable resources . The people regulate other less important sectors of the economy, such as agriculture.

Command economies are rigid compared to other systems. They react slowly to change because power is centralized. That makes them vulnerable to economic crises or emergencies, as they cannot quickly adjust to changed conditions

A centrally planned economy, also known as a command economy, is an economic system in which a central authority, such as a government, makes economic decisions regarding the manufacturing and the distribution of products. Centrally planned economies are different from market economies, in which such decisions are traditionally made by businesses and consumers.

The production of goods and services in command economies is often done by state-owned enterprises, which are government owned companies. In centrally planned economies, which are sometimes referred to as "command economies", prices are controlled by bureaucrats. In a command system, there is a dominant, centralized authority –usually the government – that controls a significant portion of the economic structure. The government comes in and exercises control over the resources. Centralized control covers valuable resources. The people regulate other less important sectors of the economy, such as agriculture. Command economies are rigid compared to other systems. They react slowly to change because power is centralized. That makes them vulnerable to economic crises or emergencies, as they cannot quickly adjust to changed conditions.

Characteristics of a Socialist Economy planned economy

- i) Ownership by government
- ii) Decisions on what to produce, how to produce and how to distribute goods taken at national bureaucratic level
- iii) Prices usually set by price controls rather than market forces.
- iv) Distribution according to ration books.
- v) Production could be planned for five or ten years in advance
- vi) Requires more levels of bureaucracy to manage and plan economic decisions
- vii) Scope for inefficiency is less due to lack of incentive
- viii) Often required degree of political control and censorship

	Free Market economy	Command economy
Ownership	Firms owned by private sector	Industry owned and managed by the government
Incentives	Profit motive acts as incentive for owners and managers	Government give little incentive to be efficient and profitable.
Prices	Prices determined by supply and demand.	Price controls
Efficiency	Incentives for firms to be efficient and cut costs	Government owned firms have less incentives to be efficient
Equality	Free market likely to lead to income and wealth inequality	Government may provide more equitable distribution of resources.
Examples	Hong Kong, Singapore – have limited government intervention.	Soviet Union, China (until 1970s), Cuba
Problems	Inequality, market failure, monopoly	Inefficiency, bureaucratic, shortages, surpluses, less choice, less freedom.

Mixed Economic system

A **mixed economic** system is a system that combines aspects of both capitalism and socialism. A **mixed economic** system protects private property and allows a level of **economic** freedom in the use of capital, but also allows for governments to interfere in **economic** activities in order to achieve social aims.

Mixed systems combine the characteristics of the market and command economic systems. It is also known as dual systems. Sometimes the term is used to describe a market system under strict regulatory control.

Most industries are private, while the rest, comprised primarily of public services, are under the control of the government.

A mixed system combines the best features of market and command systems. However, practically speaking, mixed economies face the challenge of finding the right balance between free markets and government control. Governments tend to exert much more control than is necessary

Main characteristics of Mixed Economy

- > Coexistence of private and public sector
- > Cooperative sector (government can provide financial assistance to co operatives societies involved in warehousing , agriculture, dray industry)
- > Freedom and Control
(In mixed economy all individuals have freedom of produce goods, hold private property, choose occupation and choose products and occupation as they want. But to keep a check on monopoly practices and discrimination of the backward sector of society the state maintain some control.)

Production Possibilities Curve

Production Possibility Curve (PPC) is a graphical representation of all the possible combinations of two goods that can be produced by the optimum (fuller) utilization of available resources and the given technology. It gives us the maximum limit of goods and services that could be produced. It gives us the maximum limit of goods and services that could be produced. So, it is also known as the **production possibility boundary** or **production possibility frontier (PPF)**.

Production Possibility Curve (PPC) is the locus (the path of a moving point) of various combinations of two commodities which can be produced with given level of resources and technology. It is also known as transformation curve. Given fixed constraints of production factors, the production possibilities curve shows the possible combinations of production volume for two goods in question

A **production possibilities curve** in economics measures the maximum output of two goods using a fixed amount of input. The input is any combination of the four factors of production: natural resources (including land), labor, capital goods, and entrepreneurship. By describing this trade-off, the curve demonstrates the concept of opportunity cost. Making more of one good will cost society the opportunity of making more of the other good

The PPF simply shows the trade-offs in production volume between two choices. All choices along the curve shows production efficiency of both goods. Production points inside the curve show an economy is not producing at its comparative advantage. Conversely, production outside the curve is not possible as more of both goods cannot be produced given the fixed resources.

In short, production–possibility frontier (PPF), production possibility curve (PPC), or production possibility boundary (PPB), or Transformation curve/boundary/frontier is a curve which shows various combinations of the amounts of two goods which can be produced within the given resources and technology/a graphical representation showing all the possible options of output for two products that can be produced using all factors of production, where the given resources are fully and efficiently utilized per unit time. A PPF illustrates several economic concepts, such as allocative efficiency, economies of scale, opportunity cost (or marginal rate of transformation), productive efficiency, and scarcity of resources

PRODUCTION POSSIBILITIES SCHEDULE

A table of numbers that illustrates the production possibilities of an economy--the alternative combinations of two goods that an economy can produce with given resources and technology. A production possibilities schedule illustrates that the economy must give up the production of one good to produce another good--the basic economic notion of opportunity cost. A production possibilities schedule is also used to derive the highly useful production possibilities curve (or frontier).

Production Possibility Schedule(PPS) and Curve (PPC)

Table 1: Production Possibility Schedule

Possibilities of Production	Wheat (in lakh tonnes)	Machines (in thousands)
A	0	15
B	1	14
C	2	12
D	3	9
E	4	5
F	5	0

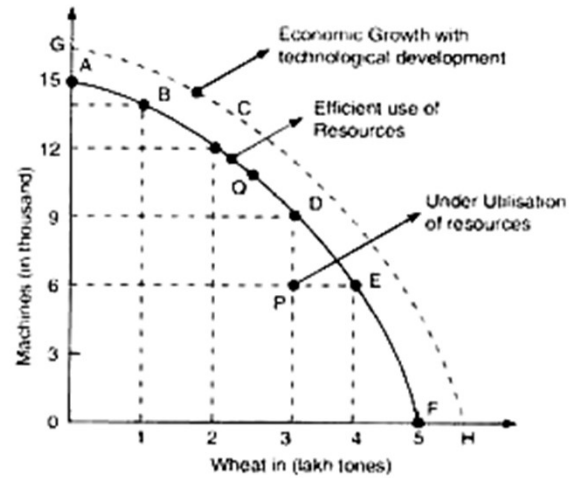


Figure 1

Utility

Utility is the total satisfaction or benefit derived from consuming a good or service. it is a term used to determine the worth or value of a good or service. Utility of a commodity is its want-satisfying capacity. The more the need of a commodity or the stronger the desire to have it, the greater is the utility derived from the commodity. Utility is subjective. Different individuals can get different levels of utility from the same commodity. On the other hand Utility is that one individual gets from the commodity can change with change in place and time.

There are two types of Utility Analysis

- Cardinal Utility Analysis
- Ordinal Utility or Indifference Curve Analysis

The **Cardinal Utility** approach is propounded by neo-classical economists, who believe that utility is measurable, and the customer can express his satisfaction in cardinal or quantitative numbers, such as 1,2,3, and so on.

The neo-classical economist developed the theory of consumption based on the assumption that utility is measurable and can be expressed cardinally called as “Utils” meaning the units of utility.

The cardinal utility approach used in analyzing the consumer behavior depends on the following assumptions

- Rationality**
- Resources (Money) are Limited**
- Maximize Satisfaction**
- Utility is cardinally Measurable**
- Diminishing Marginal Utility**
- Marginal Utility of Money is Constant**
- Utility is Additive**

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1. Rationality: It is assumed that the consumers are rational, and they satisfy their wants in the order of their preference. This means they will purchase those commodities first which yields the highest utility and then the second highest and so on.

2. Limited Resources (Money): The consumer has limited money to spend on the purchase of goods and services and thus this makes the consumer buy those commodities first which is a necessity.

3. Maximize Satisfaction: Every consumer aims at maximizing his/her satisfaction for the amount of money he/she spends on the goods and services.

4. Utility is cardinally Measurable: It is assumed that the utility is measurable, and the utility derived from one unit of the commodity is equal to the amount of money, which a consumer is ready to pay for it, i.e. **1 Util = 1 unit of money.**

5. Diminishing Marginal Utility: This means, with the increased consumption of a commodity, the utility derived from each successive unit goes on diminishing. This law holds true for the theory of consumer behavior.

6. Marginal Utility of Money is Constant: It is assumed that the marginal utility of money remains constant irrespective of the level of a consumer's income.

7. Utility is Additive: The cardinalists believe that not only the utility is measurable but also the utility derived from the consumption of different commodities are added up to realize the total utility.

Measures of Utility

Total Utility: Total utility of a fixed quantity of a commodity (TU) is the total satisfaction derived from consuming the given amount of some commodity x. More of commodity x provides more satisfaction to the consumer. TU depends on the quantity of the commodity consumed. Therefore, TU_n refers to total utility derived from consuming n units of a commodity x.

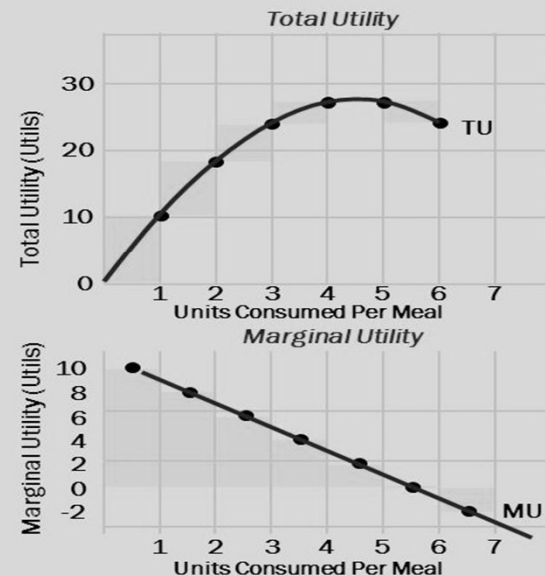
Marginal Utility: Marginal utility (MU) is the change in total utility due to consumption of one additional unit of a commodity. For example, suppose 4 bananas give us 28 units of total utility and 5 bananas give us 30 units of total utility. Clearly, consumption of the 5th banana has caused total utility to increase by 2 units (30 units minus 28 units). Therefore, marginal utility of the 5th banana is 2 units. $MU_5 = TU_5 - TU_4 = 30 - 28 = 2$ In general, $MU_n = TU_n - TU_{n-1}$, Table and Figure show an imaginary example of the values of marginal and total utility derived from consumption of various amounts of a commodity. Usually, it is seen that the marginal utility diminishes with increase in consumption of the commodity. This happens because having obtained some amount of the commodity, the desire of the consumer to have still more of it becomes weaker.

Law of Diminishing Marginal Utility

Law of Diminishing Marginal Utility states that marginal utility from consuming each additional unit of a commodity declines as its consumption increases, while keeping consumption of other commodities constant. In given Figure and table MU becomes zero at a level when TU remains constant. In the example, TU does not change at 6th unit of consumption and therefore $MU_6 = 0$. Thereafter, TU starts falling and MU becomes negative.

Law of Diminishing Marginal Utility

(1) Tacos Consumed Per Meal	(2) Total Utility, Utils	(3) Marginal Utility, Utils
0	0	10
1	10	8
2	18	6
3	24	4
4	28	2
5	30	0
6	30	-2
7	28	



Law of equi-marginal utility

The equi-marginal principle is based on the law of diminishing marginal utility. The equi-marginal principle states that a consumer will be maximizing his total utility when he allocates his fixed money income in such a way that the utility derived from the last unit of money spent on each good is equal. In other words, consumer is in equilibrium position when marginal utility of money expenditure on each goods is the same.

Now, the question is how he would allocate his money income among various goods that is to say, what would be his equilibrium position in respect of the purchases of the various goods. It may be mentioned here that consumer is assumed to be 'rational,' that is, he coldly and carefully and substitutes goods for one another so as to maximize his utility or satisfaction.

In short, the law of equi-marginal utility tells us the way how a consumer maximizes his total utility.

Consumer's Equilibrium

The **Cardinal approach to Consumer Equilibrium** posits that the consumer reaches his equilibrium when he derives the maximum satisfaction for given resources (money) and other conditions. A consumer is said to be highly satisfied when he allocates his expenditure in such a way that the last unit of money spent on each commodity yields the same level of utility. Suppose a consumer with a given amount of resources (money) consumes a single commodity, say X. For a consumer, both his income and commodity X will have respective utilities and he can either retain his income in the form of asset or can exchange it for the commodity X. If the marginal utility of commodity X (MU_x) is greater than the marginal utility of money (Mu_m), then a utility-maximizing consumer will exchange his money income for a commodity

Assumptions of the Law

- | | |
|--|---|
| i) A consumer has many wants. | v) The consumer has a fixed income. |
| ii) The utility is measurable in cardinal terms. | vi) The marginal utility of money is constant |
| iii) There are substitutes for goods | vii) Consumer tries to have maximum satisfaction |
| iv) Price of the goods or services are Constant. | viii) A consumer has perfect knowledge of utility and price of the goods. |

. Based on the assumption, the marginal utility of a commodity is said to be declining with each successive unit and whereas the marginal utility of money remains constant, therefore the consumer will spend his money income on commodity X as long as $MU_x > P_x(Mu_m)$. The P_x is the price of the commodity and Mu_m is equal to one.

Thus, the consumer reaches his equilibrium when,

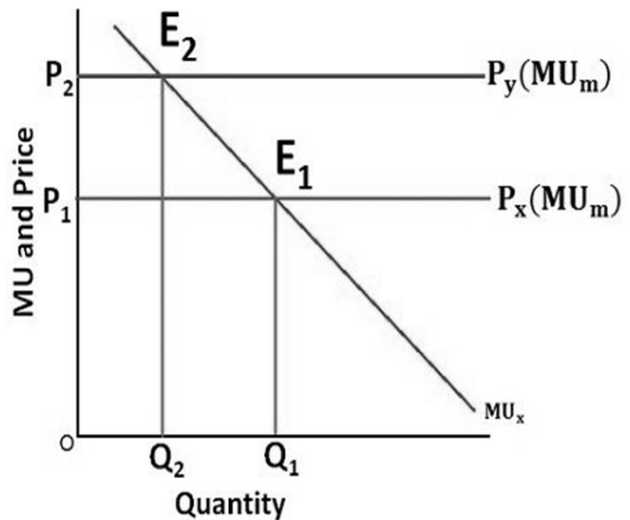
$$Mux = Px (Mum) \text{ or } Mux / Px = Mum$$

As per the given graph, $P_x (Mu_m)$ is the horizontal line which shows the constant utility of money, whereas the MU_x is a downward sloping curve which shows the diminishing marginal utility of commodity X. The $P_x(Mu_m)$ line and Mu_x curve intersect at point E, which indicates that at quantity OQ_x , $MU_x = P_x(Mu_m)$. Therefore, the consumer is said to be in equilibrium.

Any point above E, let's say at M, the $MU_x > P_x(Mu_m)$ the consumer will exchange money for commodity X since the marginal utility of the commodity is greater than the marginal utility of money, his satisfaction level will increase. Whereas any point below the equilibrium point "E," the consumer loses utility and hence can compensate by reducing his consumption of commodity X.

Units	MU X	Total U
1	30	30
2	25	55
3	20	75
4	10	85
5	0	85
6	-5	80

Suppose Mum One unit of money = 20 utils ,
 Price of X= 1unit of money, consumer has 5 units of money
 Consumer will spent 3units of money and get maximum satisfaction
 where Mum=20 and Mu of 3rd X=20 or MUX= Mum
 Total utility became 115 utils,
 Equilibrium of Consumer=Mux = Mum,
 Or Consumer equilibrium = $Mux/P_x = M_{uy}/P_y = Mum$



Numerical Example Of Equi-marginal Utility

No of Good	MuX	MuY	MuZ
1 st	15	18	30
2 nd	12	14	21
3 rd	9	12	18
4 th	6	9	12
5 th	4	8	9
6 th	2	6	6
7 th	0	4	3
8 th	-2	2	0

If Price of X Y Z are same 1Rs per each
 and MU of goods XYZ are as the schedule.

If **MUm** of money is **12** for **Ram** ,he will
 buy 2 units of X, 3 units of Y and 4 units of
 Z, and get total utility=152
 [(15+**12**=27from X),(18+14+**12**=44 from Y)
 and (30+21+18+**12**= 81 From Z)]

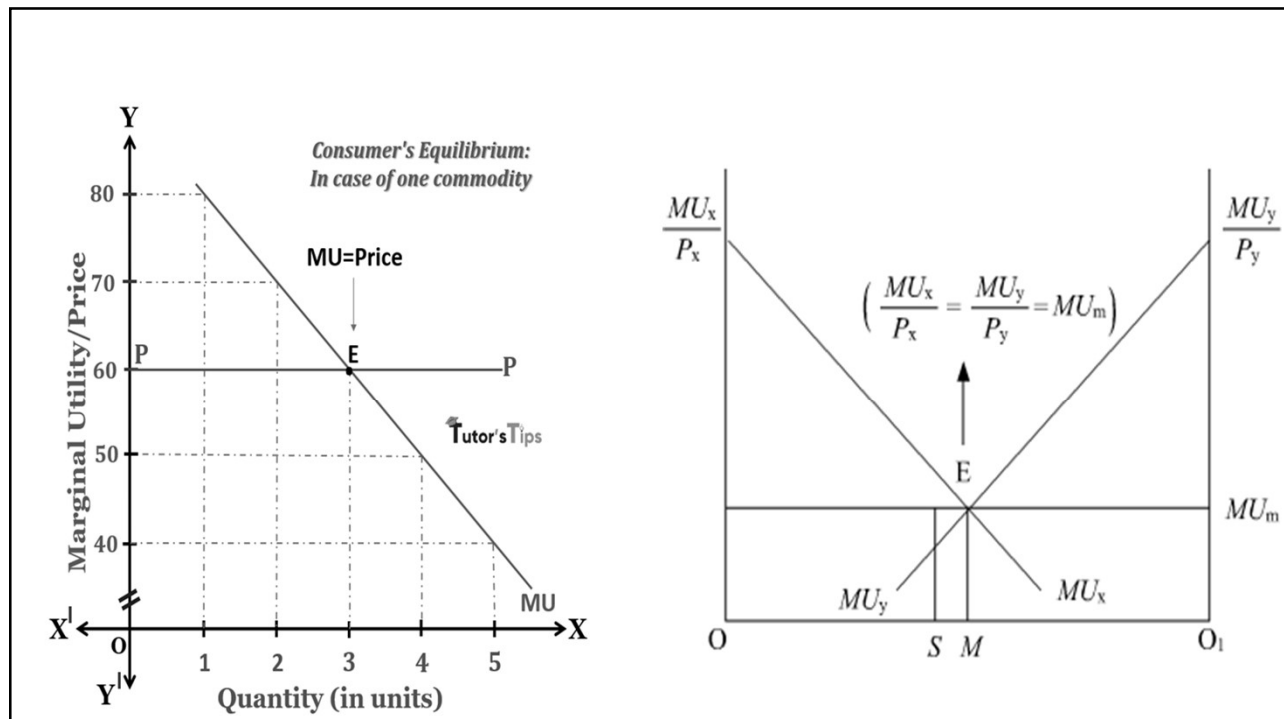
where **Mux = MUY = Muz = Mum =12,**

If **MUm** of money is **6** for Shyam , he will
 buy 4 units of X, 6 units of Y and 6 units of
 Z and get total utility=199 (Tux=42,Tuy=61.
 Tuz=96) where **Mux=Muy = Muz= Mum =6**

	Rs1	Rs2	Rs3			
No of Good	MuX	MuY	MuZ	Mux/px	Muy/py	Muz/pz
1 st	15	18	30	15	9	10
2 nd	12	14	21	12	7	7
3 rd	9	12	18	9	6	6
4 th	6	9	12	6	4.5	4
5 th	4	8	9	4	4	3
6 th	2	6	6	2	3	2
7 th	0	4	3	0	2	1
8 th	-2	2	0	-1	1	0

If Price of X Y Z are different as above If **Mum** of money 1Rs= 6 utility for Ram and he has 30Rs.
To get equilibrium having maximum utility Ram will buy 4 units of X, 3 units of Y and
3 units of Z , Total expenditure 19 Rs, remain Rs 11

Total utility from X= 42 (15+12+9+6) Mux/px = 6 (6/1)
Total utility from Y= 44 (18+14+12) Muy/py =6 (12/2)
Total utility from Z= 69 (30+21+18) Muz/ pz = 6 (18/3)
Total utility from m = 66 (11x6) Mum= 6
TOTAL = 221



Criticism of Cardinal Utility Analysis

- 1) Consumer is not rational
- 2) Cardinal measurement of utility is not possible
- 3) Marginal utility of money does not remain constant
- 4) Marginal utility cannot be estimated in all conditions
- 5) Money is not a satisfactory measure of utility
- 6) Every product is not an independent product or utility analysis ignored cross effect.
- 7) Utility analysis has too many assumptions
- 8) Man is not a calculating machine or computer.
- 9) No distinction between income effect and substitution effect.
- 10) Utility analysis does not explain Giffen paradox.

Derivation of Demand Curve under Cardinal Approach

Dr. Alfred Marshall derived the demand curve with the help of law of diminishing marginal utility. The law of diminishing marginal utility states that as the consumer purchases more and more units of a commodity, he gets less and less utility from the successive units of the expenditure. At the same time, marginal utility of money is constant and the consumer gets equilibrium when, $MU_x = MU_m$.

A rational consumer, before, while purchasing a commodity compares the price of the commodity which he has to pay with the utility of a commodity he receives from it. So long as the marginal utility of a commodity is higher than its price ($MU_x > P_x$), the consumer would demand more and more units of it till its marginal utility is equal to its price $MU_x = P_x$ or the equilibrium condition is established. To put it differently, as the consumer consumes more and more units of a commodity, its marginal utility goes on diminishing. So it is only at a diminishing price at which the consumer would like to demand more and more units of a commodity as the consumer purchases more and more units of one commodity, then lesser and lesser amount of money is left with him to buy other goods and services. If it is expressed in graph we can get a demand curve as below.

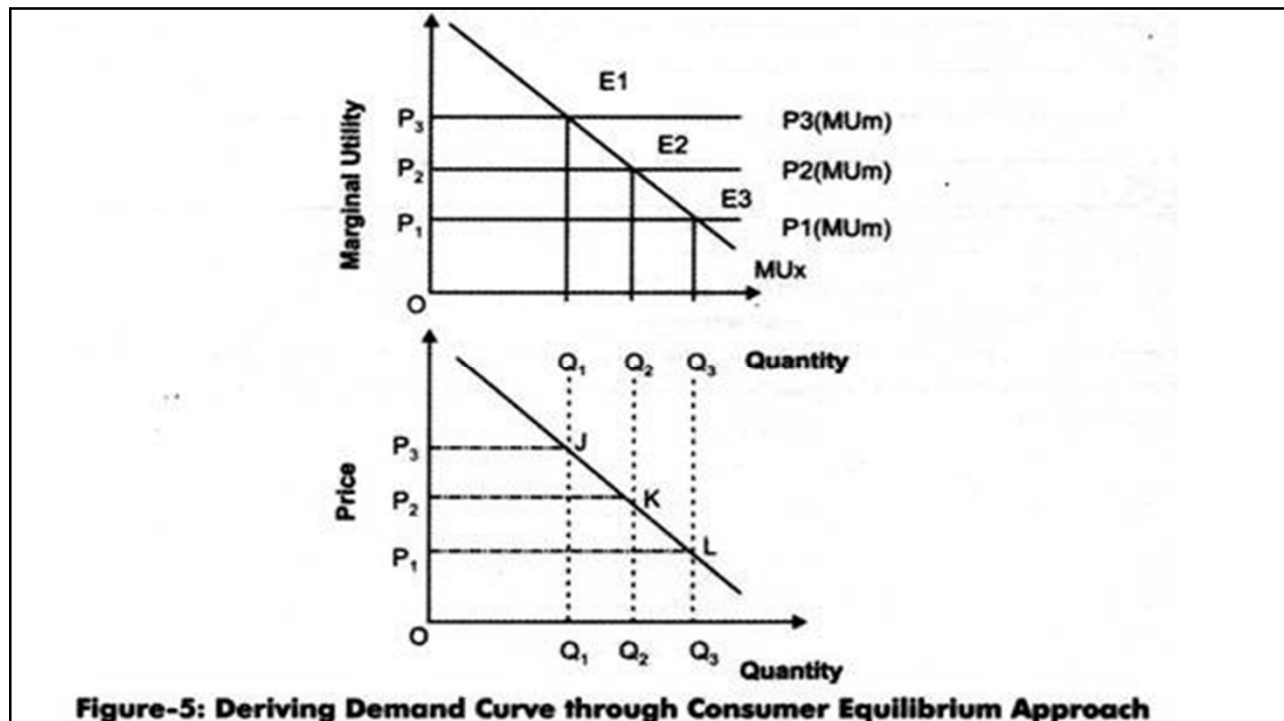
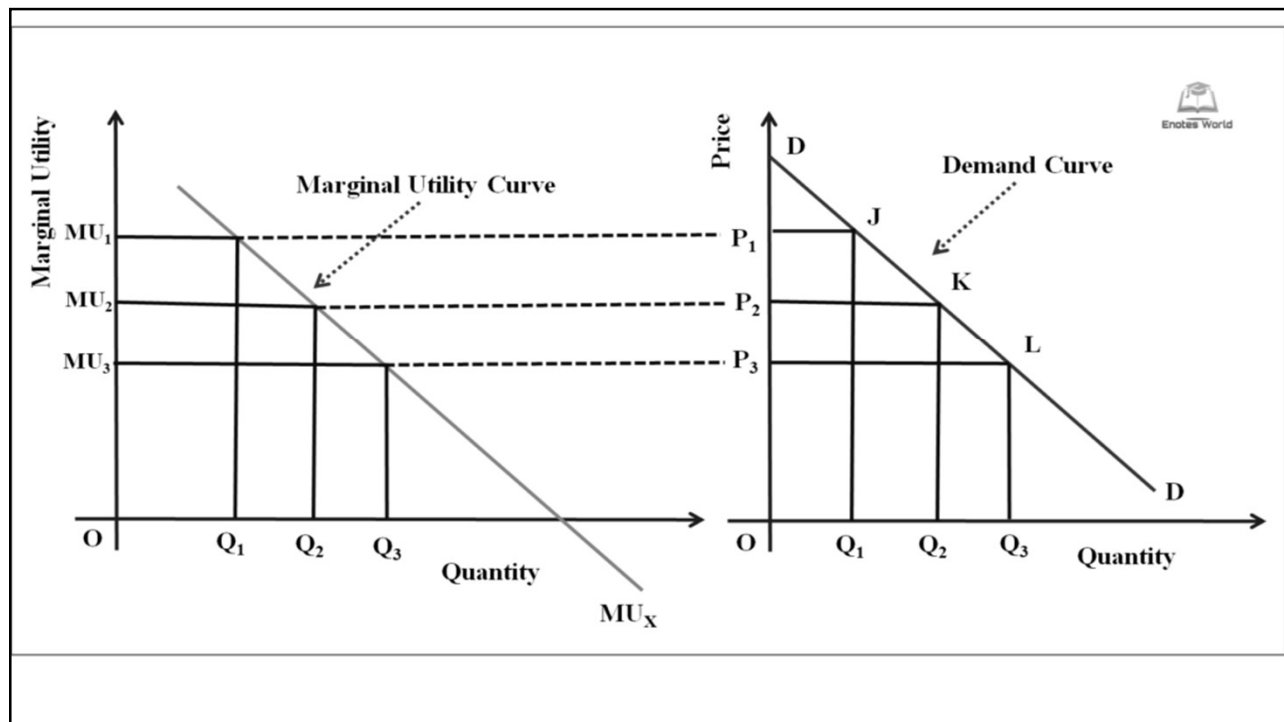


Figure-5: Deriving Demand Curve through Consumer Equilibrium Approach

Ordinal Utility Analysis or Indifference curve Analysis

The modern economist, Hicks have applied the ordinal utility concept to study the consumer behavior. The **Ordinal Utility** approach is based on the fact that the utility of a commodity cannot be measured in absolute quantity, but however, it will be possible for a consumer to tell subjectively whether the commodity derives more or less or equal satisfaction when compared to another. The modern economist mention that the utility being the psychological phenomena it cannot be measured theoretically, quantitatively and even cardinally. According to ordinal approach consumer behavior can explain in terms of his preference or ranking for different combinations

The modern economist introduced a tool of analysis called “**Indifference Curve**” to analyze the consumer behavior. An indifference curve refers to the locus of points each showing different combinations of two substitutes which yield the same level of satisfaction and utility to the consumer.

Assumptions of Ordinal Utility or Indifference curve Approach

Rationality: It is assumed that the consumer is rational who aims at maximizing his level of satisfaction for given income and prices of goods and services, which he wish to consume. He is expected to take decisions consistent with this objective.

Ordinal Utility: The indifference curve assumes that the utility can only be expressed ordinally . This means the consumer can only tell his order of preference for the given goods and services.

Transitivity and Consistency of Choice: The consumer’s choice is expected to be either transitive or consistent. The transitivity of choice means, if the consumer prefers commodity X to Y and Y to Z, then he must prefer commodity X to Z. In other words, if $X \succ Y$, $Y \succ Z$, then he must treat $X \succ Z$. The consistency of choice means that if a consumer prefers commodity X to Y at one point of time, he will not prefer commodity Y to X in another period or even will not consider them as equal.

Diminishing Marginal Rate of Substitution (MRS): The marginal rate of substitution refers to the rate at which the consumer is ready to substitute one commodity (A) for another commodity (B) in such a way that his total satisfaction remains unchanged. The MRS is denoted as DB/DA . The ordinal approach assumes that DB/DA goes on diminishing if the consumer continues to substitute A for B.

Explanation of Indifference Curve Analysis

Indifference Schedule And Indifference Curve Derivation

An **Indifference Curve** is drawn from the

Indifference Schedule of consumer. An

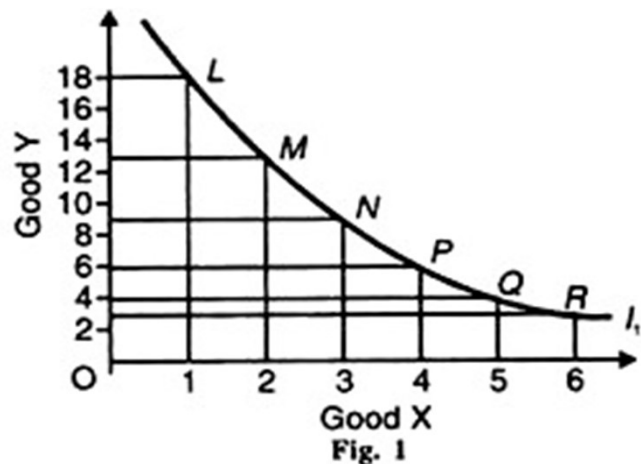
indifference schedule is a list of combination of two commodities, the list being so arranged that a consumer is indifferent to the combinations, preferring none of them to any of other. Thus, an indifference schedule may be defined as a schedule of various combinations of two goods that will be equally acceptable to the consumer.

Now , we will construct an imaginary indifference schedule of a consumer for the purpose of drawing an indifference curve.

Combinations	Good X	Good Y	MRS (Dy/Dx)Ratio	
A	1	20	--	
B	2	15	5	1:5
C	3	11	4	1: 4
D	4	8	3	1: 3
E	5	6	2	1:2
F	6	5	1	1: 1
G	8	4	-2	1: 0.5
H	12	3	-4	1:0.25

Indifference Curve Definition

The **Indifference Curve** shows the different combinations of two goods that give equal satisfaction and utility to the consumers. In other words, the indifference curve is the graphical representation of different combinations of goods (generally two), for which the consumers are indifferent, in terms of the overall satisfaction and the utility. An indifference curve is a curve that represents all the combinations of goods that give the same satisfaction to the consumer. Since all the combinations give the same amount of satisfaction, the consumer prefers them equally. Hence the name indifference curve.



Indifference Map

An Indifference Map is a set of Indifference Curves. It depicts the complete picture of a consumer's preferences. The following diagram showing an indifference map consisting of three curves: We know that a consumer is indifferent among the combinations lying on the same indifference curve. However, it is important to note that he prefers the combinations on the higher indifference curves to those on the lower ones. This is because a higher indifference curve implies a higher level of satisfaction. Therefore, all combinations on IC₁ offer the same satisfaction, but all combinations on IC₂ give greater satisfaction than those on IC₁.

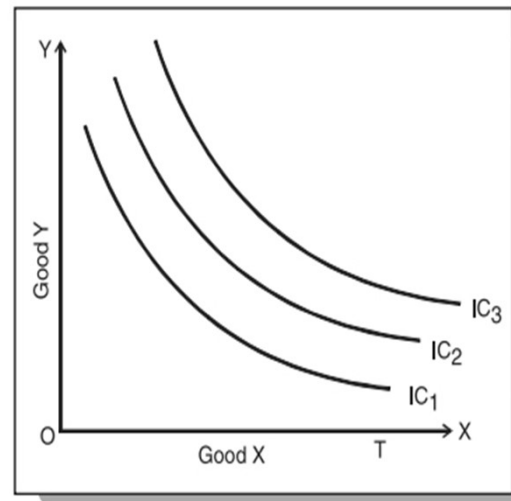
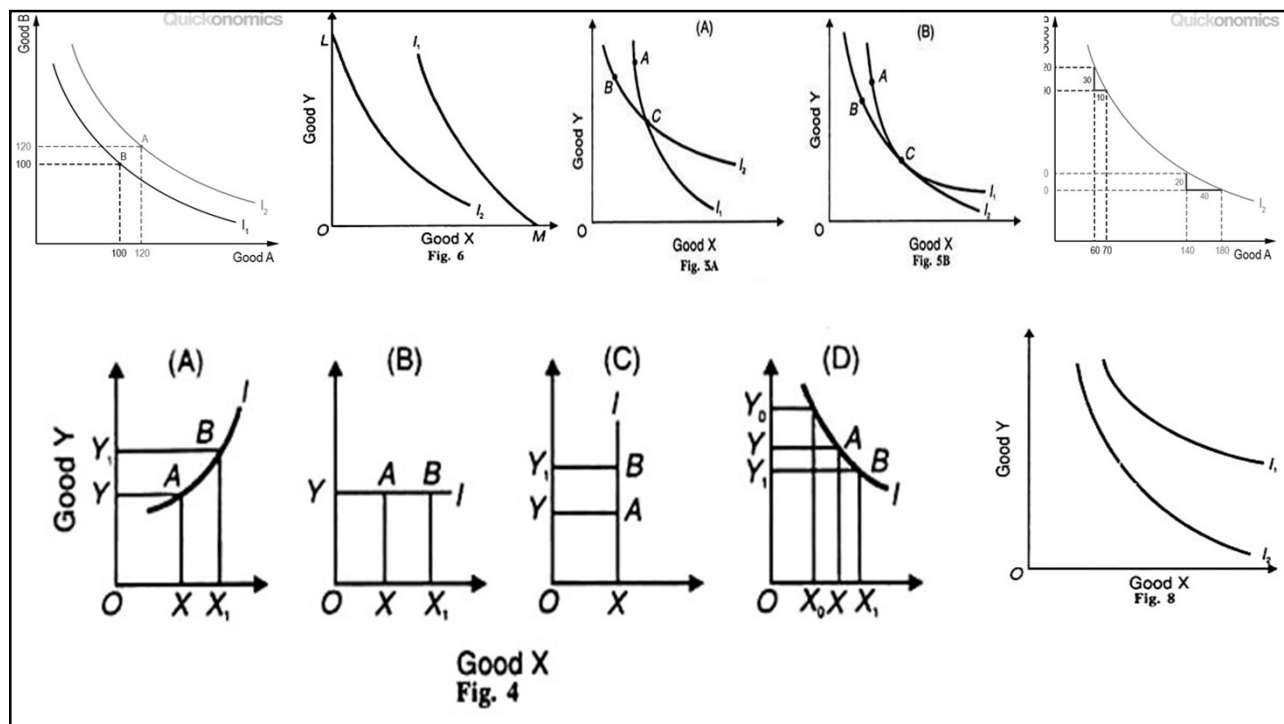


Fig. 2 : Indifference Map

Properties of an Indifference Curve

- 1) A higher Indifference Curve to the right of another represents a higher level of satisfaction and preferable combination of two goods..
- 2) The slope of Indifference Curve is negative downward sloping from left to right
- 3) The Indifference Curves are convex to the origin . The convexity rule implies that as the consumer substitute X for Y the marginal rate of Substitution diminishes. But if these two goods are perfectly Substitutable then indifference curve seems to straight line downward from left to right, on the other hand if these two goods are closely complimentary then Indifference Curve seems to L shape.
- 4) Indifference Curves cannot touch X axis or Y axis and they neither touch nor intersect each other.

5) Indifference Curves cannot be parallel to each other



Marginal Rate of Substitution (MRS)

In economics, the marginal rate of substitution (MRS) is the amount of one good that a consumer is willing to give up in exchange for a new good, while maintaining the same level of utility or satisfaction. MRS is used in indifference Curve to analyze consumer behavior. When someone is indifferent to substituting one item for another, their marginal utility for substitution is zero since they neither gain nor lose any satisfaction from the trade. The marginal rate of substitution (MRS) measures the willingness of a consumer to replace one good for another good, as long as the same satisfaction—or utility—is maintained. The slope of this curve represents quantities of good X and good Y that a consumer would be happy substituting for one another.

In other words, the MRS is the slope of the indifference curve at any given point along the curve and displays a frontier of utility for each combination of "good X" and "good Y." When the law of diminishing MRS is in effect, the MRS forms a downward, negative sloping, convex curve showing more consumption of one good in place of another.

$$MRS_{xy} = dy/dx = MU_y / MU_x$$

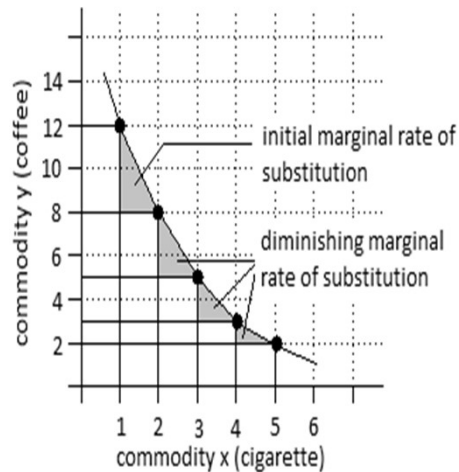
where:

x, y = two different goods

dx/dy = derivative of y with respect to x

MU = marginal utility of good x, y

MRS is the slope of the indifference curve at any single point along the curve. The slope will often be different as one moves along an indifference curve. Most indifference curves are usually convex because, as you consume more of one good, you will consume less of the other. The value of the MRS is equal to the slope of the indifference curve drawn for the two products.



Combinations	Good X	Good Y	MRS (Dy/Dx)	Ratio	Utility level
A	1	20	--		100
B	2	15	5	1:5	100
C	3	11	4	1: 4	100
D	4	8	3	1: 3	100
E	5	6	2	1:2	100
F	6	5	1	1: 1	100
G	8	4	-2	1: 0.5	100
H	12	3	-4	1:0.25	100

"L" shaped indifference curve

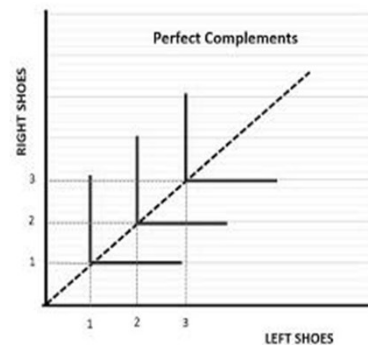
An indifference curve is the curve at every point of which the utility would remain same. The indifference curve of perfect complementary goods is 'L' shaped.

Let us consider this example-

'Left shoe' and 'Right shoe' can be considered as perfect complimentary goods. This is because the utility of Left shoe would be zero without a Right shoe and vice versa.

So, we have the following combinations of Left shoe and Right shoe and every combination would give us the same utility.

Combinations	Left shoe	Right shoe	Combinations	Left shoe	Right shoe
A	1	1	F	1	1
B	1	2	G	2	1
C	1	3	H	3	1
D	1	4	I	4	1
E	1	5	J	5	1

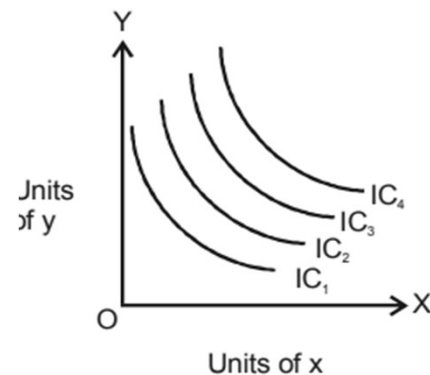


Two commodities are perfect substitutes for each other —where MRS is constant, In this case, the indifference curve is a straight line,

Consumer's Equilibrium and Indifference Curve Analysis

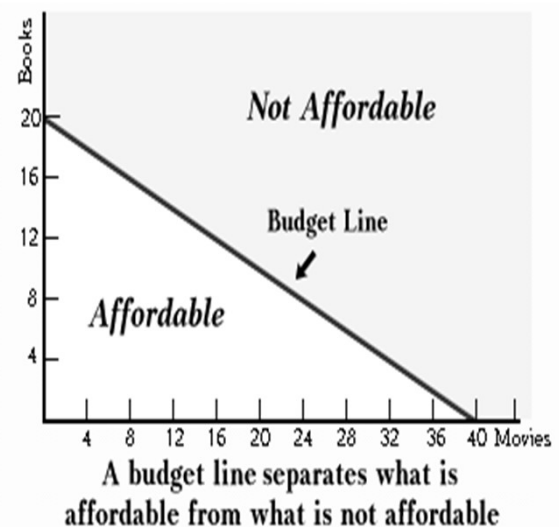
A consumer is said to be in equilibrium when he has derived maximum satisfaction and does not want to change his consumption level. Hence, **Consumer's Equilibrium** is a situation in which a consumer has maximum satisfaction with limited income and does not tend to change his existing way of expenditure. The point of equilibrium or maximum satisfaction is achieved by the study of the **Indifference Map and Budget Line** together.

An **Indifference Map** represents every possible indifference curve that the consumer has, which helps in ranking their preferences. The combination of goods on the higher indifference curve gives a higher satisfaction level to the consumer. Therefore, the highest of the indifference curves of an indifference map is preferred by a consumer.



Budget Line

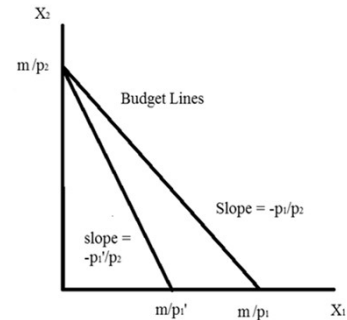
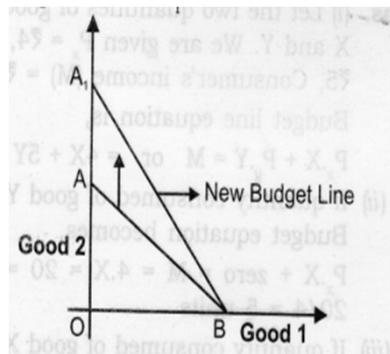
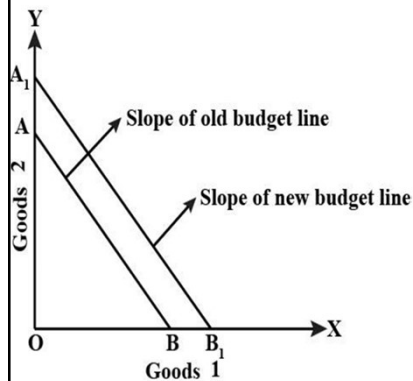
The term **Budget Line** refers to a graphical representation of all the potential combinations of two commodities that can be bought within a certain income and price, and all of these combinations provide the same satisfaction level. It comes with the condition that the cost of each combination must be less than or equal to the consumer's money income. Simply put, a budget line is the locus of various combinations of two goods a consumer consumes and whose cost is equal to his income. Other names of Budget Line are **Price Line, Price Opportunity Line, Budget Constraint Line, or Price Income Line.**



Shift in the Budget Line

There is a shift in the budget line when there is a change in the income of the consumer or when there is a change in the prices of either one or both commodities.

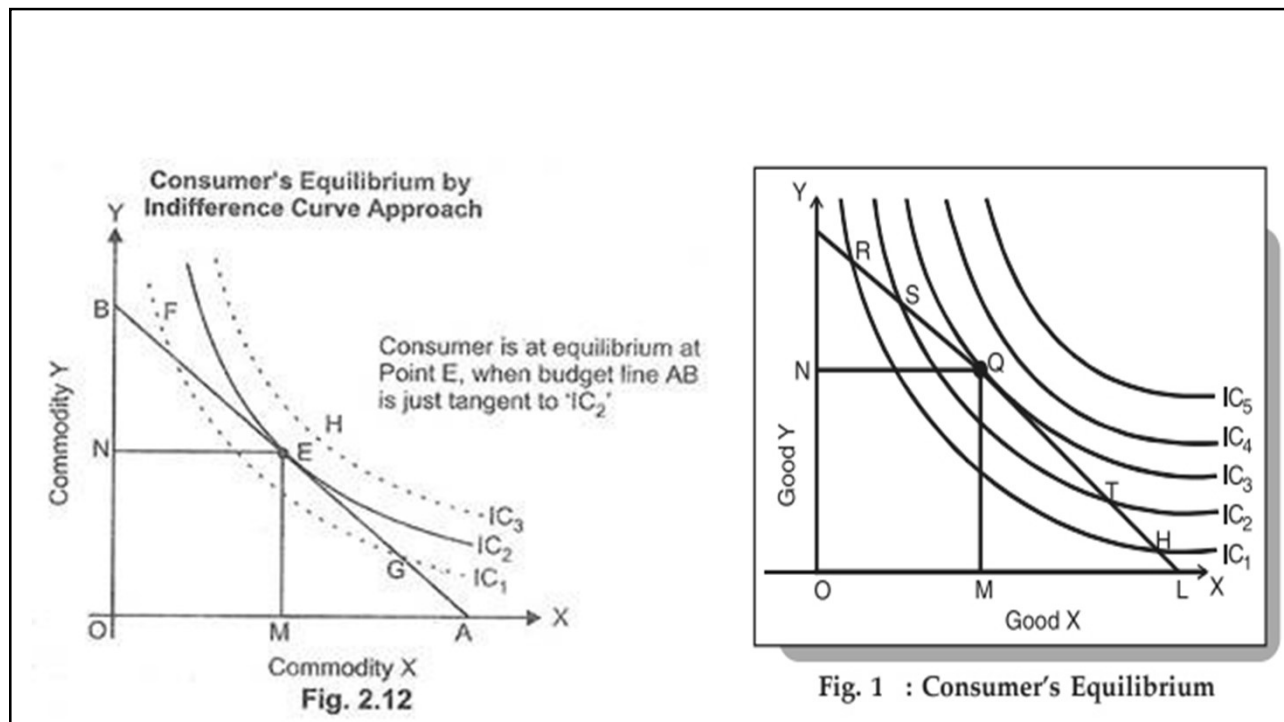
1. Effect of a Change in the Income of Consumer
2. Change in Prices of both Commodities
3. Change in the Price of Commodity on the Y-axis (Good Y)
4. Change in the Price of Commodity on the X-axis (Good X)



Consumer's Equilibrium and Indifference Curve Analysis

A consumer is said to be in equilibrium when he has derived maximum satisfaction and does not want to change his consumption level. Hence, **Consumer's Equilibrium** is a situation in which a consumer has maximum satisfaction with limited income and does not tend to change his existing way of expenditure. The point of equilibrium or maximum satisfaction is achieved by the study of the **Indifference Map and Budget Line** together.

In other words the term consumer's equilibrium refers to the amount of goods and services which the consumer may buy in the market given his income and given prices of goods in the market". The aim of the consumer is to get maximum satisfaction from his money income. Given the price line or budget line and the indifference map "A consumer is said to be in equilibrium at a point where the price line is touching the highest attainable indifference curve from below" Consumer equilibrium refers to a situation, in which a consumer derives maximum satisfaction, with no intention to change it and subject to given prices and his given income. The point of maximum satisfaction is achieved by studying indifference map and budget line together.



Consumer's Equilibrium, Income Effect and ICC curve

Income effect express how a change in the consumer's income influences his total satisfy action. We can define income effect as the effect caused by changes in consumer's income on his purchases and satisfaction while prices of commodities remaining the same. When a consumer's income increases, his budget line shifts parallel and upward and when his income decreases the budget line shifts downward. As the income changes, a new equilibrium is established and the consumer moves from one equilibrium point to another. Such movements show the rise and fall in the consumption basket. This is termed "income effect".

In given figure, with given prices and a given money income as indicated by the budget line P_1L_1 , the consumer is initially in equilibrium at Q_1 on the indifference curve IC_1 and is having OM_1 of X and ON , of Y. Now suppose that income of the consumer increases. With his increased income, he would be able to purchase larger quantities of both the goods. As budget line shift upward and parallel to the original budget line P_1L_1 . Let us assume that the consumer's money income increases by such an amount that the new budget line is P_2L_2 (consumer's income has increased by L_1L_2 in terms of X or P_1P_2 in terms of Y). With budget line , P_2L_2 the consumer is in equilibrium at Q_2 on indifference curves IC_2 and is buying OM_2 of X and ON_2 of Y. and so on,

Thus, as a result of the increase in his income the consumer buys more quantity of both the goods. Since he is on the higher indifference curve IC_2 he will be better off than before i.e., his satisfaction will increase. As the consumer's income increases, he switches to higher indifference curves and as a consequence enjoys higher levels of satisfaction. If now various points Q_1, Q_2, Q_3 and Q_4 showing consumer's equilibrium at various levels of income are connected together, we will get what is called Income Consumption Curve (ICC). Income consumption curve is thus the locus of equilibrium points at various levels of consumer's income. Income consumption curve traces out the income effect on the quantity consumed of the goods. Income effect can either be positive or negative. Nature of ICC curve depends on the nature of goods consumed by the consumer.

If both goods are normal or superior goods then the nature of ICC curve seems to upward slopping left to right, if one of good is stable good, change in income of consumer will not change that good all the effect goes to other good at that time the nature of ICC curve will be parallel to OX axis or OY axis. But the nature of one good is Superior good and other is inferior then the nature of ICC curve became slope towards X axis or Y axis indicating that as income increase the consumption of superior good goes up and the consumption of inferior good goes down as shown in given figures.

Income Effect and Nature of ICC Curves

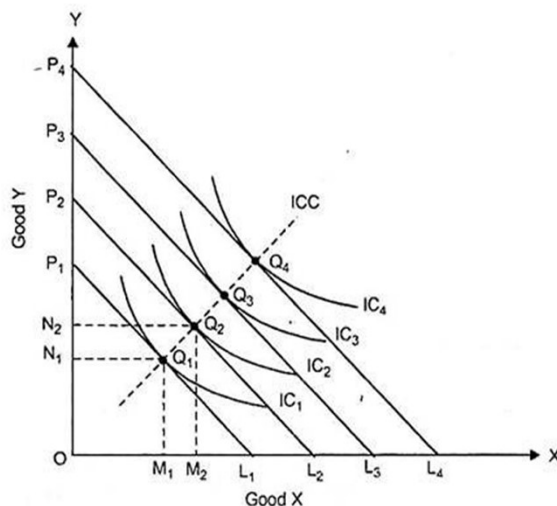


Fig. 8.21. Income Consumption Curve : Income Effect

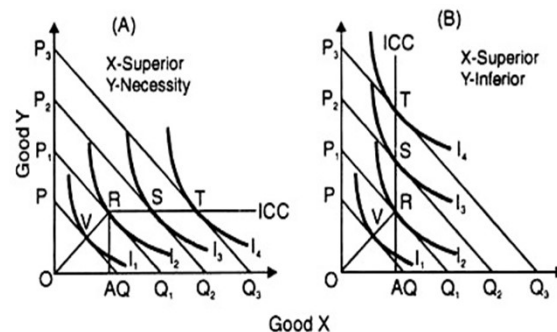
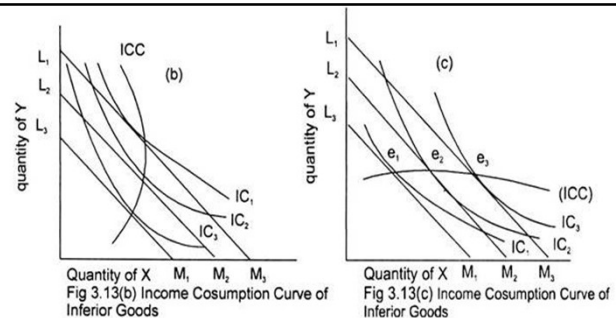
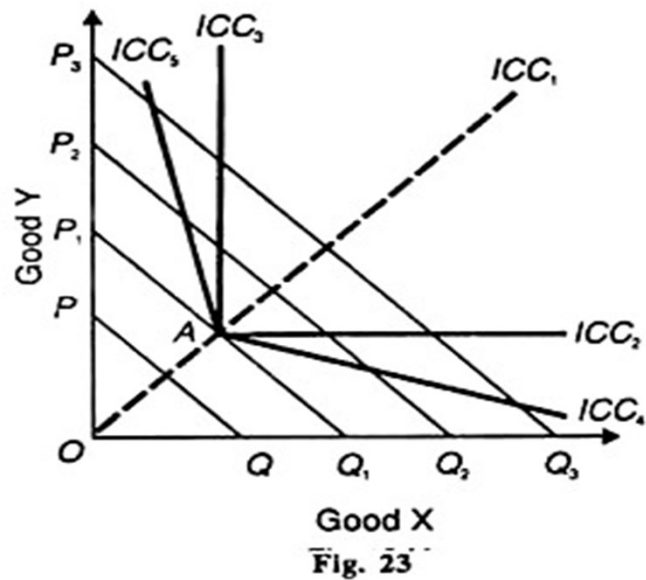


Fig. 22 (A) (B)

ICC curves



Income Effect and Example Numerical

Income of consumer Rs 10000 per month .

Product	Price	Demand	Total Expenditure
X	200	20	4000
Y	100	60	6000

Change in income to Rs 15000 per month

Nature of Goods

1) X stable Y superior

Product	Price	Demand	Total Expenditure
X	200	20	4000
Y	100	110	11000

2) X and Y both Superior or Normal

Product	Price	Demand	Total Expenditure
X	200	30	6000
Y	100	90	9000

3) X Superior Y inferior

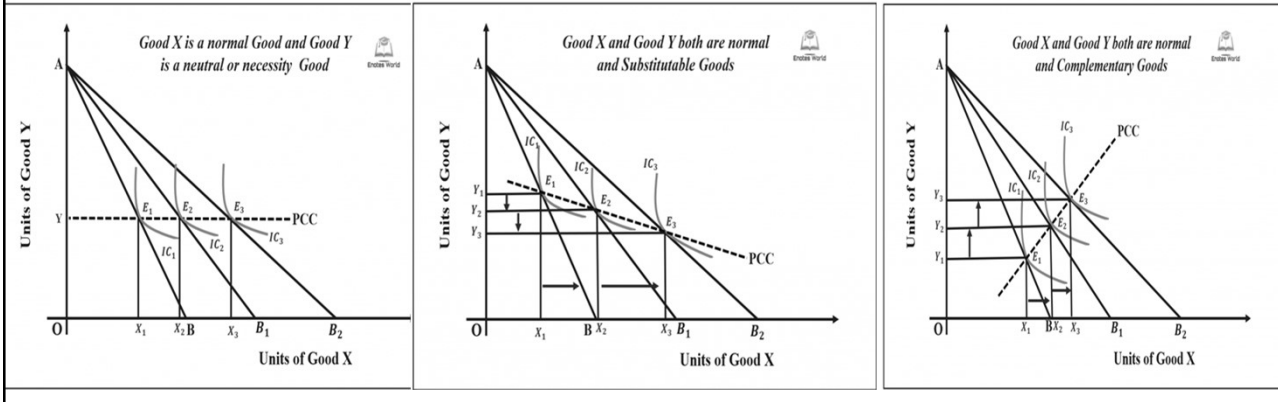
Product	Price	Demand	Total Expenditure
X	200	50	10000
Y	100	50	5000

4) Y Superior X Inferior

Product	Price	Demand	Total Expenditure
X	200	100	10000
Y	100	140	14000

Price Effect and PCC Curve

A **price effect** represents change in consumer's optimal consumption combination on account of change in the price of a good and thereby changes in its quantity purchased, price of another good and consumer's income remaining unchanged. The consumer is better-off when optimal consumption combination is located on a higher indifference curve and vice versa. In other words, The price effect describes the condition on the consumer's purchases for a commodity (say X good) when its price changes, given consumer's tastes & preferences, his income and the price of good Y remains constant. It shows the total effect on consumer's demand for a commodity due to the change in the price of the same commodity, other things being equal.



Price Effect and Example Numerical

Income of consumer Rs 10000 per month .

Product	Price	Demand	Total Expenditure
X	200	20	4000
Y	100	60	6000

Income remain constant 10000. but price of product change

Relation of goods

1) X and Y are nonrelated Goods

Product	Price	Demand	Total Expenditure
X	200	20	4000
Y	200	30	6000

2) X and Y both are complimentary Goods

Product	Price	Demand	Total Expenditure
X	200	22	4400
Y	200	28	5600

3) X and Y both are Substitute Goods

Product	Price	Demand	Total Expenditure
X	200	30	6000
Y	200	20	4000

Price consumption curve can also have a backward-sloping shape, which is depicted in Fig. 8.33. Backward-sloping price consumption curve for good X indicates that when price of X falls, after a point smaller quantity of it is demanded or purchased. This is true in case of exceptional type of goods called Giffen Goods.

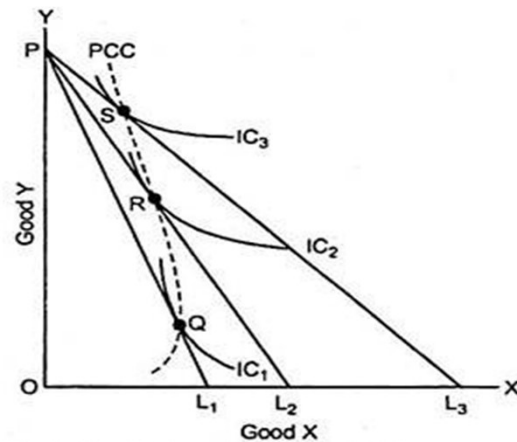


Fig. 8.33. Backward-Sloping Price Consumption Curve

Demand Supply and Price

Meaning of demand and Law of demand

Demand in economics means a desire to possess a good supported by willingness and ability to pay for it. If you have a desire to buy a certain commodity. Demand is an effective desire, i.e., a desire which is backed by willingness and ability to pay for a commodity in order to obtain it. According to Prof. Bober, **“By demand we mean the various quantities of a given commodity or service which consumers would buy in one market in a given period of time at various prices or at various incomes or at various prices of related goods.”**

Demand is an economic principle referring to a consumer's desire to purchase goods and services and willingness to pay a price for a specific good or service. Market demand is the total quantity demanded across all consumers in a market for a given good. Thus there are three main characteristics of demand in economics. ☐

- (i) Willingness and ability to pay. Demand is the amount of a commodity for which a consumer has the willingness and also the ability to buy.
- (ii) Demand is always at a price. If we talk of demand without reference to price, it will be meaningless. The consumer must know both the price and the commodity. He will then be able to tell the quantity demanded by him.
- (iii) Demand is always per unit of time. The time may be a day, a week, a month, or a year.

Summing up, we can say that by demand is meant the amount of the commodity that buyers are able and willing to purchase at any given price over some given period of time. Demand is also described as a schedule of how much a good people will purchase at any price during a specified period of time.

Individual Demand, market demand and Demand Schedules

Individual Demand implies the quantity demanded of a commodity by a single potential consumer, firm, or household, at different price levels, and during a given period at given market. In other words, the quantity of a commodity a consumer is willing and able to purchase at every possible price during a specific time period in a specific market is known as Individual Demand.

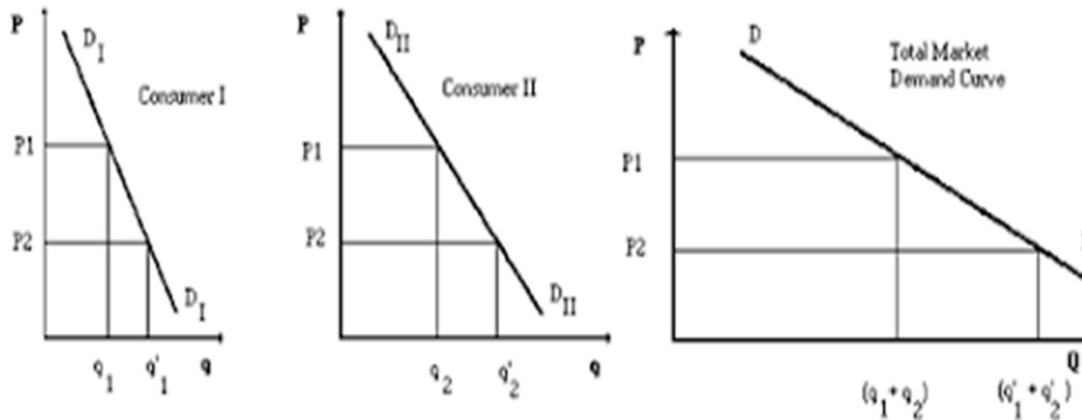
Market Demand implies the sum total of all individual demand for the commodity at each possible price, over a period of time at given Market. In other words, the quantity of a commodity that all consumers are willing and able to purchase at every possible price during a specific time period in a specific market is known as Market Demand . Market demand for a commodity refers to the aggregate quantity of the commodity demanded by all the potential consumers in the market at different price levels, over a certain period

An individual demand schedule is a **tabular representation** of the list of quantities of a commodity demanded by an individual at different price levels, during a certain period of time

A market demand schedule is a **tabular representation** indicating how much quantity of a commodity the consumers are willing and able to buy in a market at different prices, during a specified period of time. Basically, it is a sum of the individual demand schedules, indicating the preference scale of different consumers taken together, at different price levels.

Table 2.2: Individual and Market Demand Schedules			
Price (Rs. per kg)	Quantities Demanded		
	Mr. A (kg per week)	Mr. B (kg per week)	Market Demand (kg per week) (= Mr. A + Mr. B)
(i)	(ii)	(iii)	(iv) = (ii) + (iii)
7	4	0	4
6	5	3	9
5	8	7	15
4	10	10	20
3	13	15	28
2	18	17	35

Demand Curve

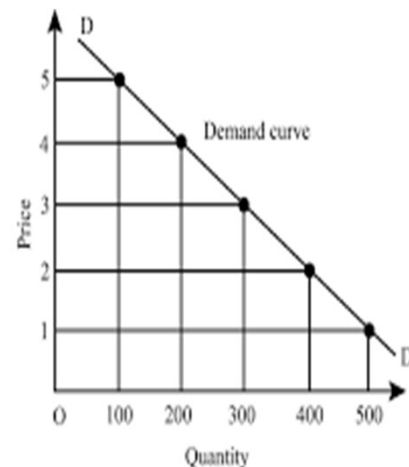


Law of Demand

The law of demand is one of the most fundamental concepts in economics. The law of demand states that the quantity purchased varies inversely with price. In other words, the higher the price, the lower the quantity demanded. This occurs because of diminishing marginal utility. That is, consumers use the first units of an economic good they purchase to serve their most urgent needs first, then they use each additional unit of the good to serve successively lower-valued ends.

Demand curve is a relation between the price and the quantity demanded of a good. The main point of this relation is that, "other things" remaining the same, if the price of a good increases or decreases, then its quantity demanded decreases or increases, respectively. This relation is known as the law of demand.

Demand Schedule	
Px	Dx
5	100
4	200
3	300
2	400
1	500



Demand Function

The demand function is an equation that express the relationship between the demand for a product or service as a function of its price, and other variables including income, preferences, and prices of substitutes and complements. The main thing about the demand function, is that demand for a good, apart from depending on its own price, depends on "other things" as well, e.g., income of the buyers, prices of substitute and complementary goods, the tastes and habits of the buyers, number of buyers, etc. The influence of these "other things" on the demand for a good is also very important.

The Demand Function is a mathematical function that describes the relationship between price and quantity demanded. It is used to determine how much of a good or service consumers are willing to purchase at a given price. So in general $D = f(P)$

But the demand function lists out the variables that are believed to have an influence on the demand for the product .

it can be written as

$$D_x = f (P_x , P_r , Y , T , A , E, G_p, W, N_p , F, M)$$

where

D_x is demand for commodity x ;

P_x is price of given commodity x ;

P_r is price of related goods ;

Y is Income of the consumer ;

T denotes tastes and preferences ;

A denotes advertising ;

E denotes expectation about future prices ;

G_p denotes Government Policies

W denotes weather

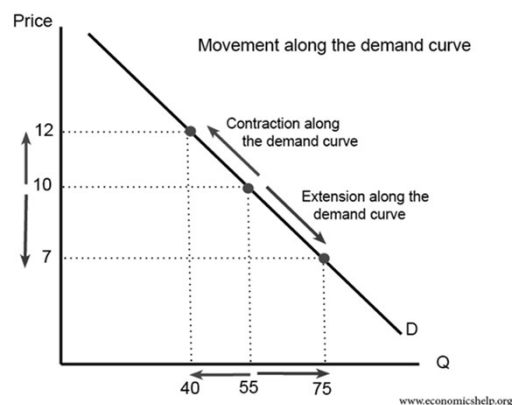
N_p denotes Number of Population

F denotes Fashion

M denotes all other miscellaneous factors.

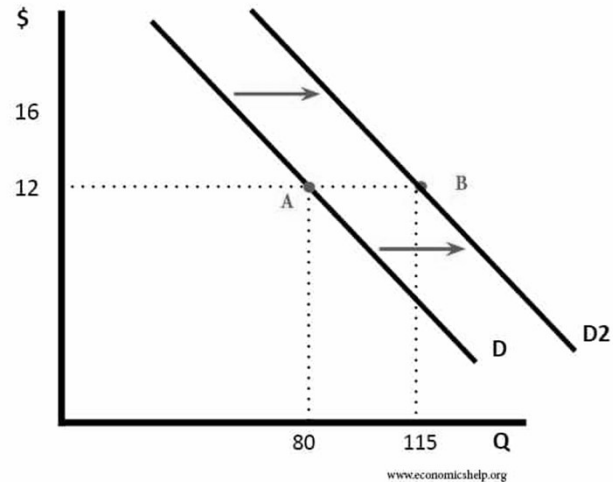
Movement on demand curve

- The movement along a demand curve occurs due to a change in the price level of the goods. When the price level decreases, the demand curve moves upward or contracts towards the left side while keeping other variables constant. And as the price level decreases, the demand for the good extends to the right while other factors are constant.
- Contraction in demand. An increase in price from Rs 10 to Rs12 causes a movement along the demand curve, and quantity demand falls from 55 to 40. We say this is a contraction in demand
- Expansion in demand. A fall in price from Rs 10 to Rs 7 leads to an expansion (increase) in demand. As price falls, demand increase from 55 to 75 there is a movement along the demand curve and more is bought



Shift of demand curve

- Demand curve is a relation between the price and the quantity demanded of a good. The main point of this relation is that, “other things” remaining the same, if the price of a good increases or decreases, then its quantity demanded decreases or increases, respectively. This relation is known as the law of demand.
- The main thing about the demand function, on the other hand, is that demand for a good, apart from depending on its own price, depends on “other things” as well, e.g., income of the buyers, prices of substitute and complementary goods, the tastes and habits of the buyers, number of buyers, etc. The influence of these “other things” on the demand for a good is also very important.



If one (or more) of these things changes, then, at any particular price, the quantity demanded of the good would also change, i.e., the demand curve for the good would shift to the right or to the left. For example, in Fig. 1.6, initially, the demand curve for a good is D_1D_1 . This curve tells us that at prices p_1 and p_2 , quantities demanded of the good are p_1F_1 and p_2F_2 , respectively. Suppose, now there is an increase in the income of the buyers of the good.

As a consequence of this, the quantity demanded of the good that was obtained initially at any particular price, would now increase (provided the good is a normal good). After the increase in income, at the prices p_1 and p_2 , the quantity demanded of the good has been $p_1H_1 (> p_1F_1)$ and $p_2H_2 (> p_2F_2)$, respectively. That is, now, the demand curve for the good would shift to the right from D_1D_1 to D_2D_2 . Similarly, if the income of the buyers diminishes, the demand curve would shift to the left from D_1D_1 to, say, D_3D_3 .

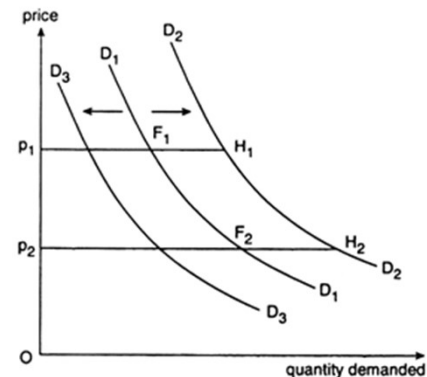


Fig. 1.6 Relationship between demand function and demand curve

Supply, Supply Schedule and Law of Supply

Supply refers to the quantity of a commodity that a firm is willing and able to offer for sale at a given price during a given period of time. Supply refers to how much of a resource firm, producers, laborers, financial asset providers, and other economic agents are willing and able to deliver to the market or to an individual. It is a fundamental economic concept that describes the total amount of a specific good or service that is available to consumers. Each specific good or service will have its own supply patterns based on price, utility and personal preference.

When all other conditions are held constant, supply in the goods market refers to the amount of a product that manufacturers are willing to sell per unit of time at various prices.

A supply schedule refers to a table or spreadsheet that lists the changes in the number of goods or services the producers are willing to offer with the change in their price during a given period. It works on the principles of the law of supply and helps form a supply curve. It indicates a direct relationship between a commodity's price and the quantity supplied.

Law of supply states that other factors remaining constant, price and quantity supplied of a good are directly related to each other. In other words, when the price paid by buyers for a good rises, then suppliers increase the supply of that good in the market. The concept of the law of supply can further be illustrated by **Supply Schedule and Supply Curve**.

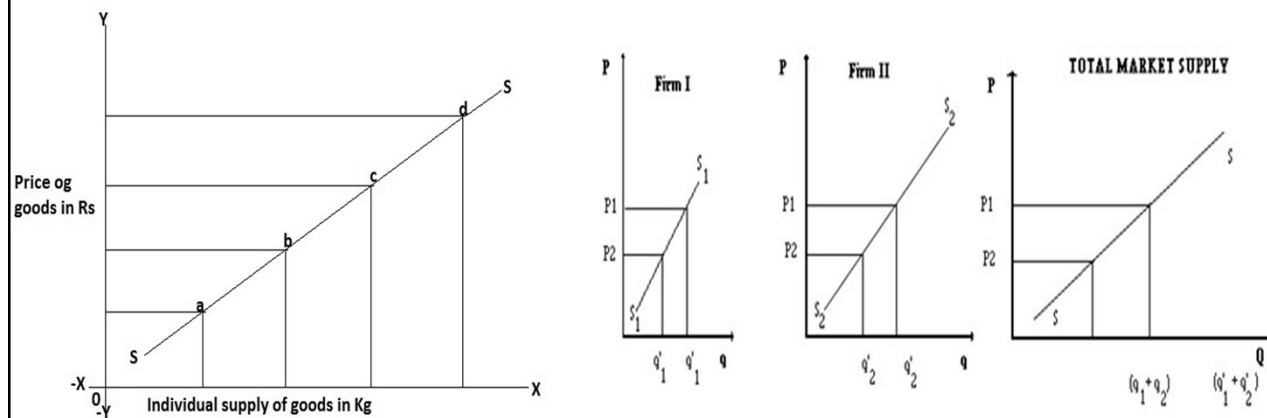
Supply Schedule And Supply Curve

The supply schedule is the tabular representation of the different prices of the commodity and the corresponding quantities that the suppliers are willing to offer for sale.

A **market supply schedule** is a table that lists the various price levels of particular goods and the quantities that two or more producers or suppliers are willing to offer for sale in a given period.

Schedule of Individual Supply		Market Supply (kgs) = Supplier A + Supplier B		
Price (\$)	Quantity (Kgs)	Price (\$)	Individual Supply (kgs) Supplier A	Supplier B
10	150	10	70	80
11	180	11	85	95
12	210	12	100	110
13	240	13	115	125
14	270	14	130	140

Individual and Market Supply curves



Supply Function and Determinants of Supply

The Law of supply expresses that when the price of a product expands or increases, its supply also increases. Likewise, when the price of a product diminishes, its supply additionally diminishes. Hence, there is an immediate connection between the price and the inventory of a product.

Supply function explains the relationship between the supply of a commodity and the factors determining its supply. We can better represent the supply function in the form of the following equation:

$$S_x = f(P_x, P_y, P_i, T, W, G_p, F_g, E, M_s \text{ etc.})$$

Where,

S_x = supply of commodity x

P_x = Price of commodity x

P_y = Price of related good

P_i = Price of inputs

T = Technology

W = Weather conditions

G_p = Government Policy

F_g = Firm's Goal

E = Expectation

M_s = Market structure

The factors on which the supply of a commodity depends are known as the determinants of demand. These are:

- Price of the Commodity
- Prices of related Commodities
- Price of Inputs or Factors
- Technology
- Weather or Natural Factors
- Government Policy
- Firm Goals
- Expectations
- Market structure or Number of Firms

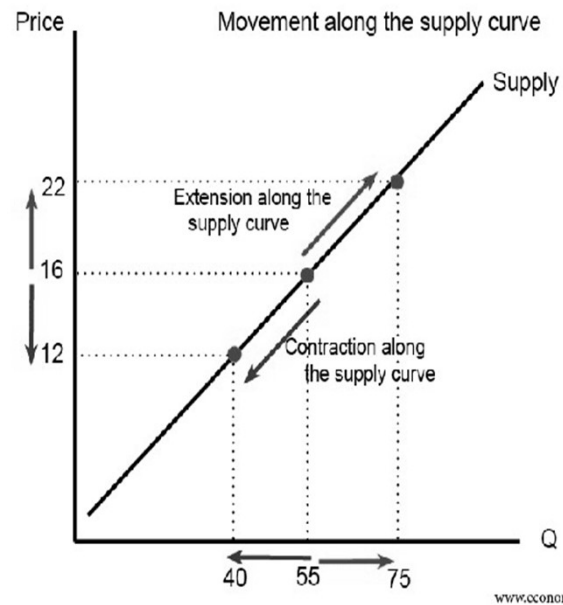
Movement Along the Supply Curve

Supply curve is a relation between the price and the quantity supplied of a good. The main point of this relation is that, "other things" remaining the same, if the price of a good increases or decreases, then its quantity supplied increases or decreases, respectively. This relation is known as the law of Supply.

The price of the product itself is not among the factors that shift the supply curve. A change in price of a good or service typically causes a change in quantity supplied or a movement along the supply curve for that specific good or service, it does not cause the supply curve itself to shift.

Extension of supply It refers to the increase in supply of a commodity with the rise in price, other factors remaining unchanged.

Contraction of supply It refers to the fall in supply of a commodity when its prices fall, other factors remaining unchanged.

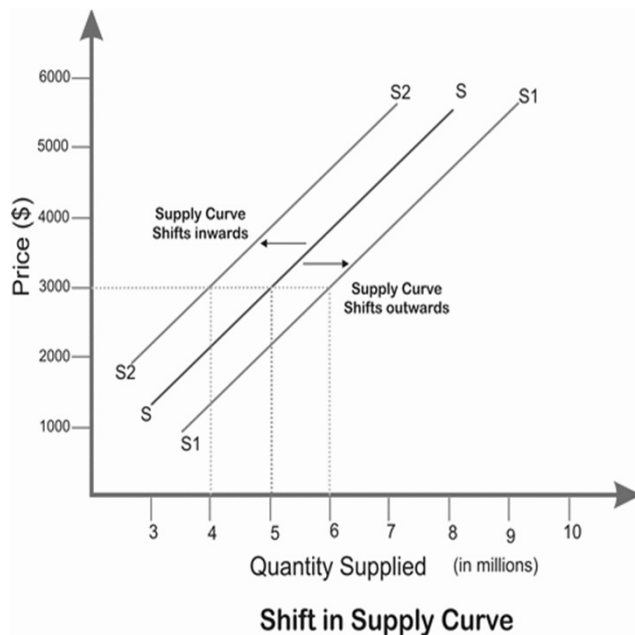


Shift of the Supply Curve

A change in supply is an economic term that describes when the suppliers of a given good or service alter production or output. A change in supply can occur as a result of change in parameters of supply such as Price of inputs, Technology, Weather conditions, Government Policy etc.

Factors effecting the Supply

- Price of the commodity
- Prices related commodities
- Price of inputs for production
- Technological advancement
- Weather of Natural factors
- Government policy
- Firm's Goals
- Future Expectations
- Market Structure



Market equilibrium

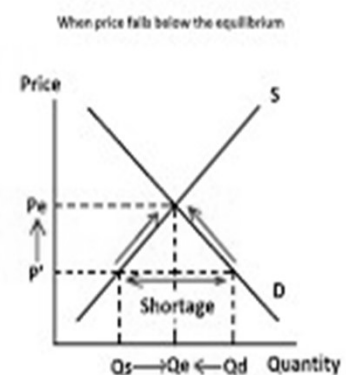
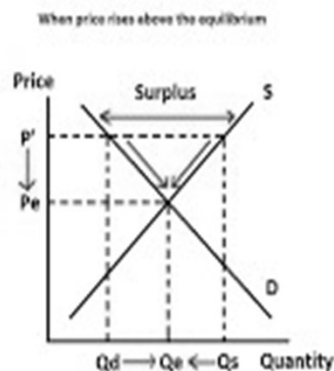
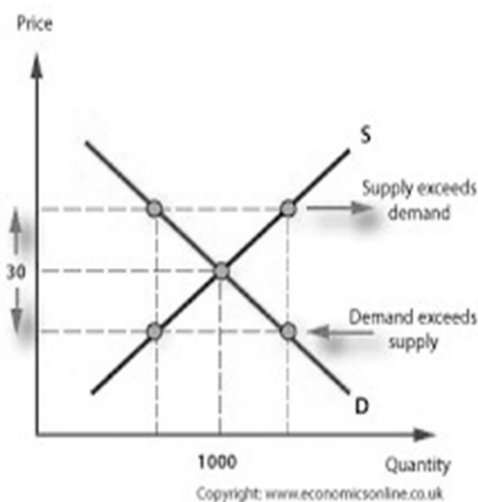
A market is a place where parties can gather to facilitate the exchange of goods and services. The parties involved are usually buyers and sellers. The market may be physical, like a retail outlet, where people meet face-to-face, or virtual, like an online market, where there is no physical presence or contact between buyers and sellers.

In a market some buyers want to buy the goods but cannot find a seller, and sellers want to sell the goods but cannot find a buyer. This means that at the equilibrium price, sellers can sell exactly the quantity they want to sell at this price, and buyers can buy exactly the quantity they want to buy at this price. when the quantity demanded equals the quantity supplied, the market will be in equilibrium.

Buyers and sellers react to price changes. When prices are high, the buyer reduces consumption; when prices are low, the seller reduces production. Theoretically, in a free market condition, the demand for a product equals the supply of a product, and the price remains constant. This state is market equilibrium. A situation where for a particular good supply = demand. When the market is in equilibrium, there is no tendency for prices to change . We say the market-clearing price has been achieved.

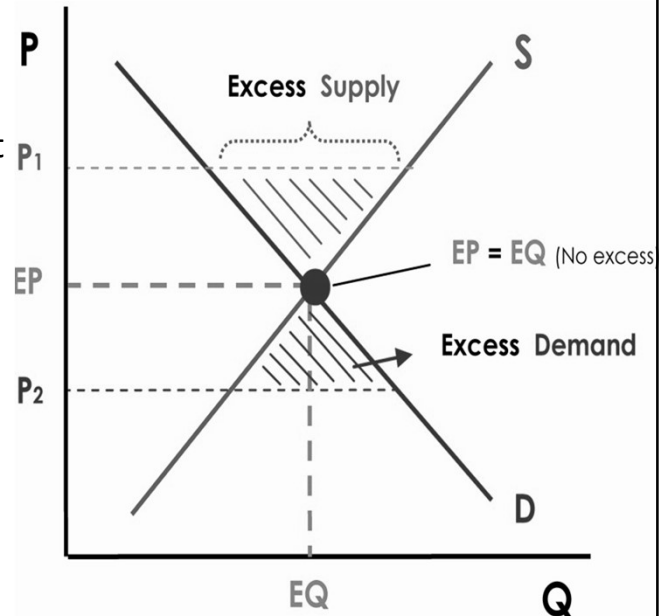
Price of X	Demand	Supply	
100	50	10	$D > S$
200	40	20	$D > S$
300	30	30	$D = S$
400	20	40	$D < S$
500	10	50	$D < S$

Market equilibrium



Equilibrium

The equilibrium is where the supply of goods matches demand. When a major index experiences a period of consolidation or sideways momentum, it can be said that the forces of supply and demand are relatively equal and the market is in a state of equilibrium. Equilibrium is achieved at the price at which quantities demanded and supplied are equal. We can represent a market in equilibrium in a graph by showing the combined price and quantity at which the supply and demand curves intersect.



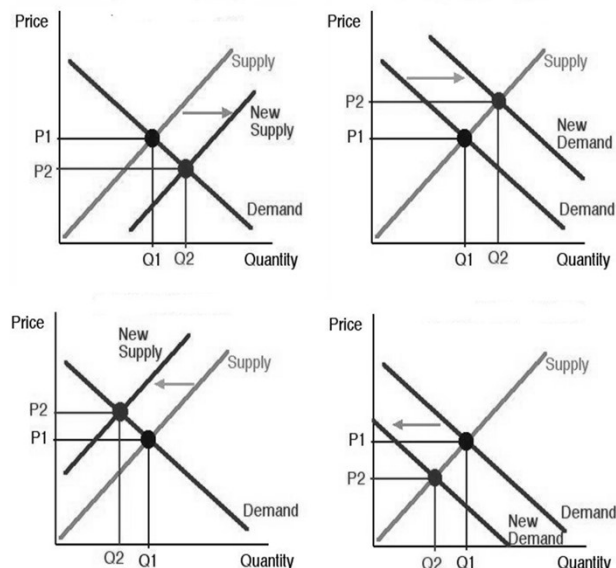
How do shifts in supply and demand curves change Equilibrium

Shifts in supply or demand curves move the equilibrium price and quantity. If demand increases, equilibrium price and quantity both increase. If demand decreases, equilibrium price and quantity both decrease.

If supply increases, equilibrium price decreases, and quantity increases. If supply decreases, equilibrium price increases and equilibrium quantity decreases. When supply and demand both shift, either price or quantity will be indeterminate.

When supply and demand move in the same direction, price is indeterminate. That is because an increase in supply decrease price while an increase in demand will increase price.

Similarly, when supply and demand move in opposite directions, quantity is indeterminate because one shift will increase quantity and the other will decrease quantity.



Elasticity of Demand

Elasticity is the responsiveness of the quantity demanded, as a result of a change in price. When we talk about elasticity of demand we generally refer to price elasticity of demand. This is because, due to their **inverse relationship**, it gives a positive value. In other words, it is the rate of change in the quantity demanded with respect to the rate of change in price. Further, when it comes to the measurement of elasticity of demand, there are three methods through which we can calculate elasticity. These are:

- Outlay method, or Total expenditure method.
- Point Method or Geometric Method
- Arc method

Elasticity of demand is an economic measure of the change in the quantity demanded or purchased of a product in relation to its price of the good or income of consumer or price of related good change. Expressed mathematically, it is:

Price Elasticity of Demand = $\frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Price}}$

Income Elasticity of Demand = $\frac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Income}}$

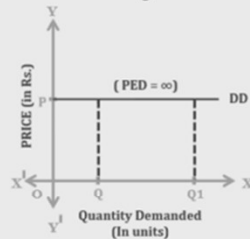
Cross Elasticity of Demand of X on Y = $\frac{\text{Percentage Change in Quantity Demanded of X}}{\text{Percentage Change in Price of Y}}$

Types of Price Elasticity of Demand

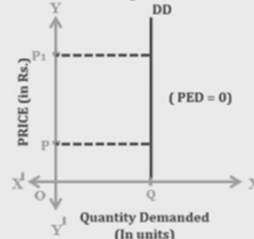
- **Inelastic Demand:** when the percentage change in quantity demanded is less than the percentage change in its price.
- **Elastic Demand:** when the percentage change in quantity demanded is greater than the percentage change in its price.
- **Unit Elastic Demand:** when the percentage change in quantity demanded and percentage change price are equal.
- **Perfectly inelastic demand:** Whatever the % change in price no change in quantity demanded.
- **Perfectly elastic demand:** An infinitely small % change in price leads to infinitely large % change quantity demanded.

Price Elasticity of Demand

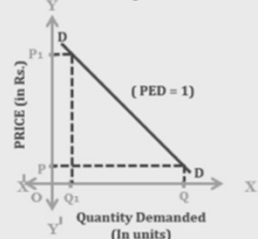
1. Perfectly elastic



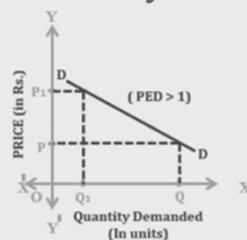
2. Perfectly inelastic



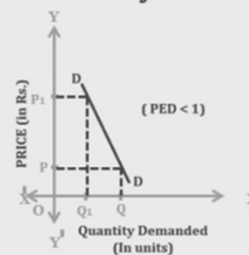
3. Unitary elastic



4. Relatively elastic



5. Relatively inelastic



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MEASUREMENT OF PRICE ELASTICITY OF DEMAND PROPORTIONATE METHOD

$$E_d = - \frac{\text{Percentage Change in } Q_d}{\text{Percentage Change in Price}}$$

$$E_d = - \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

This method is also given by Prof. Marshall. According to this method, price elasticity of demand is the ratio of percentage or proportionate change in demand to percentage change in price. In order to measure price elasticity of demand, the proportionate change in quantity demanded is divided with the proportionate change in the price. This method is also known as Percentage Method.

PD = 1 (Unitary Price Elasticity Of Demand)

PD > 1 (Elastic Price Elasticity Of Demand)

PD < 1 (Inelastic Price Elasticity Of Demand)

PD = 0 (Perfectly Inelastic Price Elasticity Of Demand)

PD > 100 (Perfectly Elastic Price Elasticity Of Demand)

Numerical questions

Q1. Let suppose individual demand schedule of good x is given

Price X Rs	10	20	30	40	50
Dx Tony	160	80	40	20	0
Dx Mac	80	40	20	10	0
Dx Jone	40	20	10	0	0

Find

- Market demand schedule
- Market demand curve
- PED when price falls from Rs 30 to 20
- PED when price rises from Rs 20 to 30

Q2. Let suppose demand schedule of good Y is given

Combination	A	B	C	D	E
Price Y Rs	15	16	17	18	19
Q demand	250	240	230	220	210

Find

- Price elasticity from A to C
- Price elasticity from C to A
- Price elasticity from B to E
- Price elasticity from E to B

GEOMETRIC OR POINT METHOD

This method is also given by Prof. Marshall. This method is used to measure price elasticity of demand at any point on straight line demand curve. According to this method, to measure the price elasticity of demand on any given point of a straight line demand curve, the lower part of the demand curve from that point is divided by the upper part of the demand curve. That is why this method is also known as Point Method.

This Point method is applied when there is small change in price and quantity demanded of the commodity. The method of calculating PED depends upon the nature of the demand curve

Price elasticity on a linear demand curve

If the demand curve is of linear nature, PED is simply calculated by applying the expression given

PED= Lower segment of Demand curve

Upper segment of Demand curve

With the help of the point method, it is easy to point out elasticity at any point along a demand curve. Suppose that the straight line demand curve DC in given Figure is 6 centimeters. Five points L, M, N, P and Q are taken on this demand curve.

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Price elasticity on a linear demand curve

If the demand curve is of linear nature, PED is simply calculated by applying the expression given

$$\text{PED} = \frac{\text{Lower segment of Demand curve}}{\text{Upper segment of Demand curve}}$$

With the help of the point method, it is easy to point out elasticity at any point along a demand curve. Suppose that the straight line demand curve DC in given Figure is 6 centimeters. Five points B, C, D, E and F are taken on this demand curve. The elasticity of demand at each point can be known with the help of the above method. Let point D be in the middle of the demand curve. So elasticity of demand at point D. The conclusion that at the mid-point on the demand curve, the elasticity of demand is unity. Moving up the demand curve from the mid-point, elasticity becomes greater. When the demand curve touches the Y-axis, elasticity is infinity. Ipso facto, any point below the mid-point towards the X-axis will show elastic demand. Elasticity becomes zero when the demand curve touches the X-axis.

POINT/GEOMETRIC METHOD

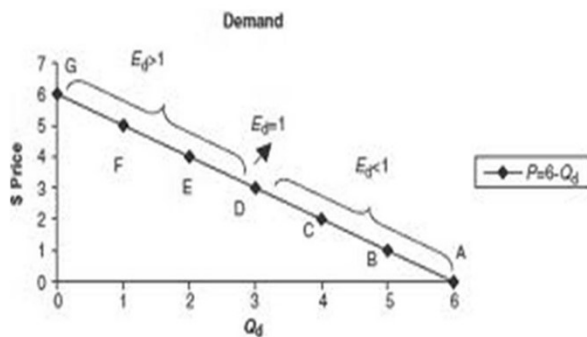


Figure 7.1

This method attempts to measure the price elasticity of demand at a particular point on demand curve

$$\text{Point Elasticity} = \frac{\text{Lower segment of demand curve below the point}}{\text{Upper segment of demand curve below the point}}$$

$$N = \frac{CN \text{ (Lower Segment)}}{ND \text{ (Upper Segment)}} = \frac{3}{3} = 1 \text{ (Unity)}$$

Elasticity of demand at point

$$M = \frac{CM}{MD} = \frac{5}{1} = 5 \text{ or } > 1.$$

(Greater than Unity)

Elasticity of demand at point

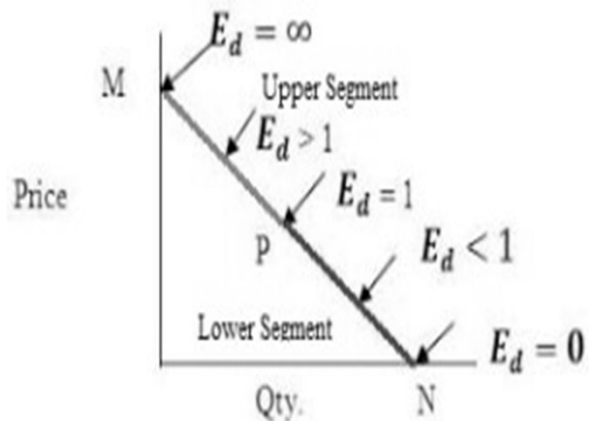
$$L = \frac{CL}{LD} = \frac{6}{0} = \infty \text{ (infinity).}$$

Elasticity of demand at Point

$$P = \frac{CP}{PD} = \frac{1}{5} = \text{(Less than Unity).}$$

Elasticity of demand at point

$$Q = \frac{CQ}{QD} = \frac{0}{6} = 0 \text{ (Zero)}$$



MEASUREMENT OF PRICE ELASTICITY OF DEMAND

ARC METHOD

Price elasticity of demand measures the responsiveness of quantity demanded to a price. It takes the elasticity of demand at a particular point on the demand curve, or between two points on the curve. As point elasticity is a measure of proportionate change in quantity demanded as a result of a very small proportionate change in the price Arc elasticity is the elasticity of a variable in relation to another between two sets of points. This is used in the absence of any general function to define the relationship between two variables. we use arc elasticity to determine price elasticity over some part of the demand curve, instead of a single point. In finer terms, with the help of the arc method, **we can compute elasticity over a range of prices**

Arc elasticity is a beneficial measure for assessing the elasticity of supply and **demand** between two points on a curve providing deep insights into the responsiveness of price or demand over a price range. Its determination involves using a midpoint between the initial and fresh rice plus quantity values, giving way to a more accurate depiction of elasticity on the whole.

MEASUREMENT OF PRICE ELASTICITY OF DEMAND

ARC METHOD

$$\text{Price Elasticity of Demand} = \frac{\frac{Q_2 - Q_1}{(Q_2 + Q_1)/2}}{\frac{P_2 - P_1}{(P_2 + P_1)/2}}$$

$$\text{Price Elasticity of Demand} = \frac{Q_2 - Q_1}{Q_2 + Q_1} \times \frac{P_2 + P_1}{P_2 - P_1}$$

