1.8 Techniques or Methods of Managerial Economics

Managerial economics is essentially applied economics in the field of business management. It is economics of business or managerial decisions. It pertains to all economic aspects of managerial decision making. It is an evolutionary science; it is a journey with continuing understanding and application of economic concepts, principles, theories, models, and categories in dealing with emerging business situations and problems in a dynamic economy.

Techniques or Methods of Marginal Economics:

Following are the most important methods which are used by managerial economics to explain and solve business problems of a firm:

1. Scientific Method: Scientific method is a branch of study which is concerned with observed facts systematically classified and which includes trustworthy method for the discovery of truths. It refers to a procedure or mode of investigation by which scientific and systematic knowledge is acquired. The method of enquiry is a very important aspect of science, perhaps this is the most significant feature. Scientific method alone can bring about confidence in the validity of conclusions. It concentrates on controlled experi-ments and investigates the behaviour of preconceived elements in a highly simplified environment. This method is of limited use because it is difficult to carry out experiments to test the validity of managerial behaviour, as it deals with human aspects and behaviour which is complex.

2. **Experimental method**: The experimental method may be usefully applied to those aspects of managerial behaviour which call for accurate and logical thinking. The experimental methods are of limited use to managerial economics. A managerial economist cannot apply experimental methods to the same extent and in the same way as a physicist can in physical sciences.

3. **Inductive and Deductive Method:** Managers usually adopt an inductive as well as deductive approach in any analysis of managerial behaviour. The deductive

method begins with postulates and hypotheses which are arbitrary. For the rational-ists, there stands at the head of the system, a set of self-evident propositions and it is from these that other propositions are derived by the process of reasoning. At the other end are empiricists who believe that science must construct its axioms from the same data and particularly by ascending continually and gradually till it finally arrives at the most general axioms. Both the methods are interdependent and hold an equally important place in any scientific analysis.

4. The Statistical Method: Statistical methods are a mechanical process especially designed to facilitate the condensation and analysis of the large body of quantitative data. The aim of statistical method is to facilitate comparison, study relationships between the two phenomena and to interpret the complicated data for the purpose of analysis. Many a time comparison has to be made between the changes and results which are due to changes in time, frequency of occurrence, and many other factors.

Statistical methods are used for such comparison among past, present and future estimates. For example, such methods as extrapolation can be applied for the purpose of making future forecast about the trends of say, demand and supply of a particular commodity. The statistical method of drawing inference is mathematical in nature. It not only establishes causal relationship between two or more variables but also tries to establish a mathematical relation-ship between them. Statistical approach is a quantitative micro-approach. Certain important correlation and association of attributes can be found with the help of statistics. It is useful for the study of manage-ment, economics, etc. and it is very helpful to bankers, state, planners, speculators, researchers, etc.

Though statistical methods are the handmaid of managerial economics, they should be used with care. The most significant peculiarity of the statistical method is that it helps us to seek regularities or patterns in economic data and permits us to arrive at generalizations that cannot be reached by any other method.

5. Method of Intellectual Experiment: The fundamental problem in managerial economics is to find out the nature of any relationship between different variables such as cost, price and output. The real world is also invariably complex. It is influenced by many factors such as physical, social, temperamental and psychological. It is difficult to locate any order, sequence or law in such a confused

and complex structure. In this context, it is essential for the managerial economist to engage in model building. Managerial economics may be viewed as economics applied to problem solving at the level of the firm. The problems relate to choices and allocation of resources is faced by managers all the time. Managerial economics is more concrete and situational and mainly concerned with purposefully managed process of allocation. For this purpose the managerial economist can and does use an abstract model of the enterprise. Firms have only limited resources at their disposal which they must utilise to make profit. The managers of these firms must make judgements about the disposition of their resources and decide which priori-ties among the various competing claims they have upon them. Models can guide business executives to predict the future consequences.

6. The Method of Simulation: It is an extension of the intellectual experiment. This method has gained popularity with the devel-opment of electronic computers, calculators and other similar equipment and internet services. We can programme a complex system of relationship with the help of this method. Computer is not only used for scientific or mathematical applications, it may also be used for some business applications, docu-ment generations and graphical solutions. Computer is a fast electronic calculating machine capable of absorbing, processing, integrating, relating and producing the resultant output information within a short span of time. A manager has to take numerous decisions in the management of business which may be minor or major, simple or complex. They have to ensure that once the decision is taken, it is to be implemented within the minimum time and cost. The electronic gadgets will enable the manager to understand busi-ness problems in a better perspective and increase his ability to solve the business problems facing him in the management of business.

7. The Historical Method: Past knowledge is considered to be a pre-requisite for present knowledge. This is the main argu-ment for the adoption of historical method in the present day managerial economics. In order to discover some basis for business activity, the method becomes generic in character. The main objective of this method is to apply mind in the matter of various business problems by discovering the past trend regard-ing facts, events and attitudes and by demarcating the lines of development of thought and action. If we have an idea of the past events, we can understand the current economic problems much better. The wisdom of a particular economic policy is an inevitable product of its past. The historical method

requires experience not only in collecting data but also in finding out their relations and significance in the particular context. The managerial economist must take up the analyti-cal view in order to get perfect control over facts and the synthetic view of facts. He should be able to find out the relations between events and events and between events and environment. It is necessary to make an objective approach both in discovering facts and interpreting them. But in order to be objec-tive, the approach must be based on relevant, adequate and reliable data. For applying historical method, the managerial economist should be familiar with the general field of his topic and be clear with regard to his own objective. A good deal of imagination is required to apply the historical method.

8. The Descriptive Method: The descriptive method is simple and easily applicable to various business problems, particularly in developing countries. It is a fact finding approach related mainly to the present and abstract generalisations through the cross sectional study of the present situation. This method is mainly concerned with the collection of data. To some extent, the descriptive method is also concerned with the interpretation of data. In order to apply the descriptive method, the data should be accurate and objective and if possible quantifiable. Since the descriptive method wants to relate causality of the collected facts, it is necessary for it to make comparisons between one situation with the other and among different aspects of the same situation. Thus, situational comparability is an essential element of this method. This method is used to describe the organisation and functioning of institutions and the policies which have economic significance. To analyse the impact of the organisational structure in the working of business enterprises, it is widely used by the managerial economist. The best descriptive studies are observational in nature. This method provides the empirical and logical basis for drawing conclusions and gaining knowledge. Thus it enables the managerial economists to describe or present the picture of a phenomenon or phenomena under investigation.

⑥⑥⑥

Unit-2

Demand Analysis and Consumer Behaviour

2.13 Indifference curve : Meaning, Properties, Consumer's equilibrium through Indifference Curve and Revealed Preference Theory

Introduction:

In this topic we are dealing with the meaning and properties of Indifference curve. Further we shall see the consumer's equilibrium with the help of Indifference curve.

The Indifference curve approach was first of all invented by a classical economics **Edgworth**. He used this technique to show the possibilities of exchange between two persons and neglected to explain the consumer's demand. J. R. Hicks and R.G.D. Allen in their well-known paper "A reconsideration of the Theory of Value" ruthlessly criticized Marshall's cardinal approach and put forth the concept of indifference curve which was based on ordinal utility. This same article he had reproduced in 1939 in his book "Value and Capital".

Meaning of Indifference Curve

Indifference curve has retained some of the assumption of Marshall's cardinal utility analysis such as rationality, continuity of ranking the combinations of goods till the consumer yields the satisfaction.

The supported of Indifference curves theory thinks that utility is a psychic entity and it cannot be measured in quantitative/cardinal terms. Thus, indifference curve depends on the ordinal utility approach. The ordinal utility implies that the consumer is cabable of simply comparing the different levels of satisfaction. The basis of indifference curve analysis of demand is the preference indifference hypothesis.

Assumptions of Indifference curve Analysis

1) More of a commodity is better than less (Non-satisfy)
2) Preference or indifference of a consumer are transitive.
3) Diminishing Marginal rate of substitution

What is indifference curve?

"The indifference curve means the Locus points on the indifference curve are the combinations of goods, which gives equal amount of satisfaction to the consumer." In other words, all the combinations of two goods lying on a consumer's indifference curve are equally desirable or equally preferred by him and also he is indifference about them.

To understand indifference curve, it is better to begin with indifference schedule. In the table 2.4.1 Indifference schedule is given.

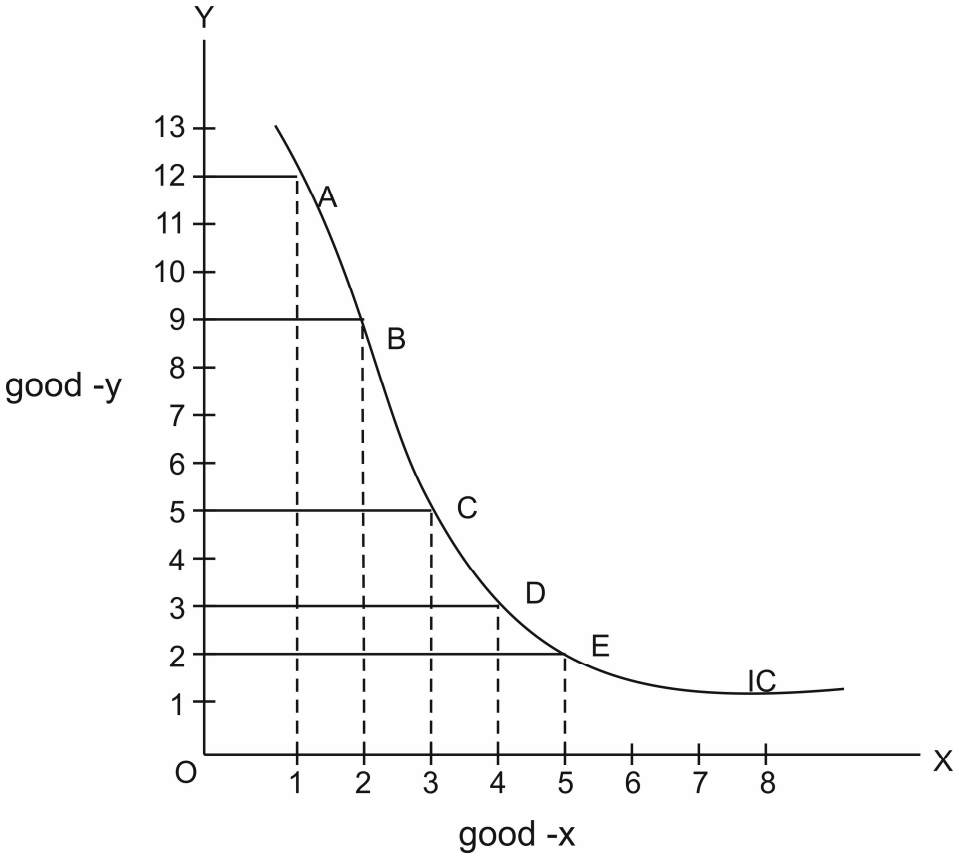
Table 2.4.1 – Indifference Schedule

Combination	Good – X	Good – Y
A	1	12
B	2	8
C	3	5
D	4	3
E	5	2

In the above table, indifference schedule, indicates that consumer has to start with 1 unit of X and 12 units Y. When a consumer prefers combination 'B' he is willing to give up 4 units good-Y for the gain of one additional unit of good-X i.e. (2x+8y.) Further, the successive increments in his stock of X he is giving up Good-Y. As such we get combinations 3x+5y, 4x+3Yand 5X+2Y. Thus, combinations A=B=C=D=E are giving equal amount of satisfaction to the consumer. But the question before him is, which combination should be selected? because he is indifferent about them.

Now, we have to convert the indifference schedules into indifference curve by plotting the various combinations in the following Fig – 2.9

Fig. 2.9



In Fig. 2.9 indifference curve.

IC is drawn by plotting the various combinations of the indifference schedule depicted in the table – 2.4.1

OX axis Good X is measured

OY axis Good Y is measured

A=B=C=D=E combinations are giving equal level of satisfaction. The smoothness and continually of an indifference curve mean that good in question are assumed to be perfectly divisible.

Marginal Rate of Substitution

The concept of Marginal Rate of substitution is an important tool of indifference curve analysis of demand. The Marginal Rate of substitution means "it is the rate at which the consumer is prepared to exchange good X and Y, so that his level of satisfaction remain the same." Let us we should see the indifference schedule with MRSxy.

Table : 2.4.2 Indifference schedule with MRSxy.

Combination	Good – X	Good – Y	MRSxy
A	1	12	-
B	2	8	1:4
C	3	5	1:3
D	4	3	1:2
E	5	2	1:1

Table – 2.4.2 indicates that when a consumer moves from 'A' to 'B' combination he substitutes one unit & good-x too four units & good-Y i.e. (1:4) this continues up to 'E' combination. This MRSxy is diminishing in nature ie. Combination 'B' (MRSxy-1:4) Combination 'C' (MRSxy-1:3) combination 'D' (MRSxy-1:2) and so on. The following two factors are responsible for diminishing Marginal Rate of substitution.

First the want for a particular good is satiable so that as the consumer has more and more of a good the intensity of his want for that good goes on declining.

The second reason for the decline in marginal rate of substitution is that the goods are imperfect substitutes of each other.

Relationship Between MRS & Marginal Utilities

Mathematically can be expressed in the following.

MRSxy between goods is equal to the ratio of marginal utilities of good X&Y.

An Indifference curve can be represented by

$U(x,y) = a$ (i)

$\therefore$ a = constant utility along an Indifference curve.

Taking total differential of (i) above

$\frac{dU}{dX}$ dX + $\frac{dU}{dY}$ = 0

$\frac{dY}{dX} = \frac{\frac{dU}{dX}}{\frac{dU}{dY}}$

$\frac{dU}{dX}$ and $\frac{dU}{dY}$ are marginal utilities of goods X and Y respectively.

$$\frac{dy}{dx} = \frac{MUx}{MUy}$$

$\frac{dy}{dx}$ is the slope of indifference curve and represents MRS_{xy}. Thus,

MRSxy = $\frac{MUx}{MUy}$.

Properties of Indifference Curve

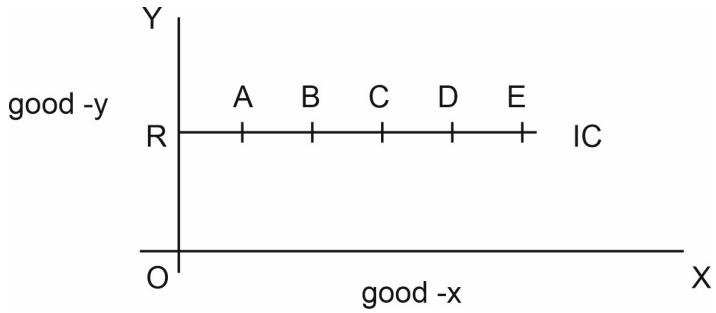
We have observed the meaning of indifference curve and its assumptions. On the basis of it we should understand the various properties of Indifference curve, as it has been given below.

1) Indifference curves slope downward to the right :

An Indifference curve has negative slope. Indifference curve slopes downward from left to right due to diminishing Marginal Rate of substitution. In other words the indifference curve slopes downward means the amount of one good is increasing and other get reduced in the given combination. It is clear that an indifference curve on which those combination of two goods lie that yield same level of satisfaction to the consumer. To support this fact we must find following three impossible shape of indifference curves.

a) Indifference curve cannot be a horizontal straight line shown in Fig. 2.10 A

Fig. 2.10 A



As indicated by Fig. 2.10 (A) The Indifference curve cannot be horizontal straight line. At each combination i.e. A, B, C, D, and E amount of good-x is increasing but amount of good-y is constant i.e. 'OR' of good-y. Therefore, IC cannot be horizonatal straight line.

b) Indifference curve cannot be a vertical straight line.

The vertical straight line IC means the amount of good-y in the combination increases and the amount of good-x remains the same. This can be explained with the help of Fig. 2.10 (B).

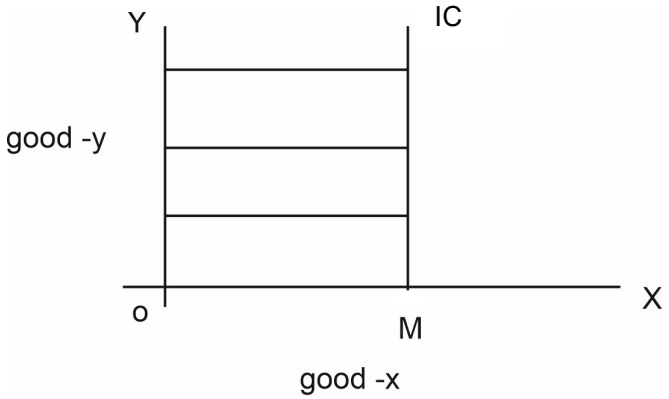


Fig. 2.10 (B)

As shown in the Fig. 2.10 (B) the indifference curve cannot be a vertical straight line.

Good – X – OR Combination 'A'

Good – Y – OP

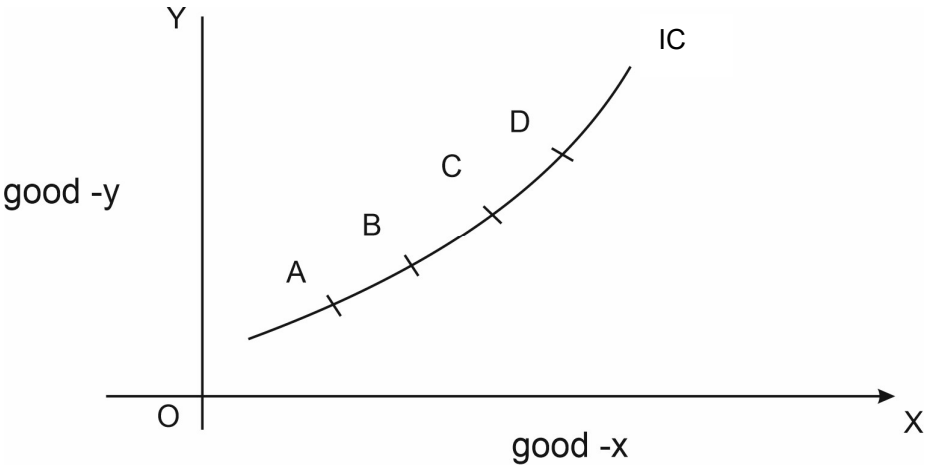
Good X – OR Combination ‘B’

Good Y- OQ

c) Indifference curve cannot slopes upward to the right.

Upward – sloping Indifference curve means that the amount of both the goods increase as one moves to the right along the curve. This can be explained in Fig. 2.10 C.

Fig. 2.10 (C)



Hence, As shown in the fig. 2.10 (C) the indifference curve cannot be upword sloping curve to the right.

2) Indifference curves are convex to the origin.

Generally, indifference curve is convex to the origin. It means the indifference curve is relatively flatter in its right hand portion and relatively steeper in its left hand portion. This property of IC curve is based on the Diminishing marginal rate of substitution (MRSxy). If an indifference curve is concave to the origin means, it imply that the increasing marginal rate of substitution. (MRSxy)

Likewise, an indifference curve cannot be a straight line slopes downward from left to right, except when goods are perfect substitutes. In other words, a straight line Indifference curve means marginal rate of substitution remains constant. Therefore, following are the impossible diagrams of indifference curves.

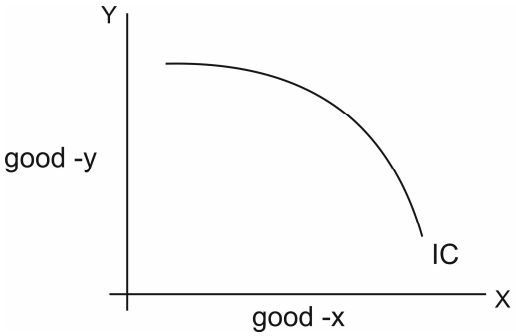


Fig. 2.11 (A)

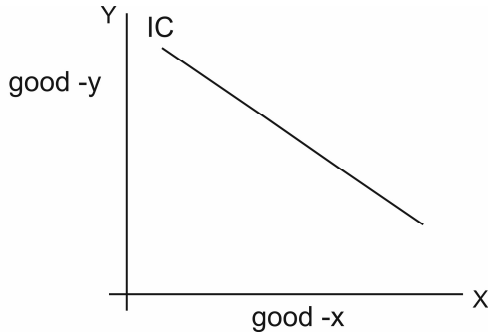


Fig. 2.11 (B)

Indifference cannot be concave

Indifference curve cannot be straight line expect in case of perfect substitutes

3) Indifference curves cannot intersect each other.

Two indifference curves cannot intersect each other. This can be explained through Fig. 2.12

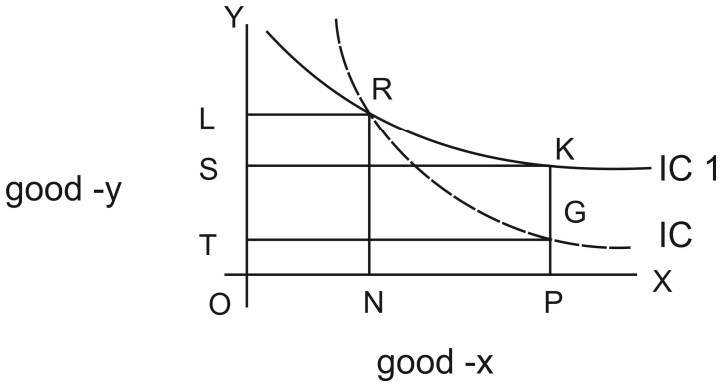


Fig. 2.12

As in the Fig. 2.12 The IC and IC_1 are intersecting each other at point 'R'.

Which is absurd or self-contradictory

All the combinations lie on indifference curve are giving equal level of satisfaction But R and K are not giving equal amount of satisfaction. This can be expressed with following explaination.

The IC_1			Good X		Good Y
At Combination	R	-	ON	+	OL
,,	K	-	OP	+	OS
The IC	R	-	ON	+	OL
	G	-	OP	+	OT

Here combination K>G even it is equal to R. On the IC_1 at K combination the amount of good y is OS which is greater than at G combination lies on IC i.e. the amount of good y - OT

Therefore if R= K=G.

But Infact K≠G.

∴ K>G. ?

4) Higher Indifference curve gives higher level of satisfaction and vice-versa.

Indifference map shows the bunch of IC curves. It indicates that higher IC curves gives higher level of satisfaction and lower level IC curves gives lower level of satisfaction.

As the consumer's income rises, he purchase more units of both commodities and selects such combinations of two goods, which would be giving him higher level of satisfaction. On the contrary, if consumers income falls, he buys less units of both goods such combinations of two goods gives him lower satisfaction.

Hence as the income of the consumer rises, he moves to higher IC curves and vice-versa.

The above explaination can be depicted in the following diagram. 2.13

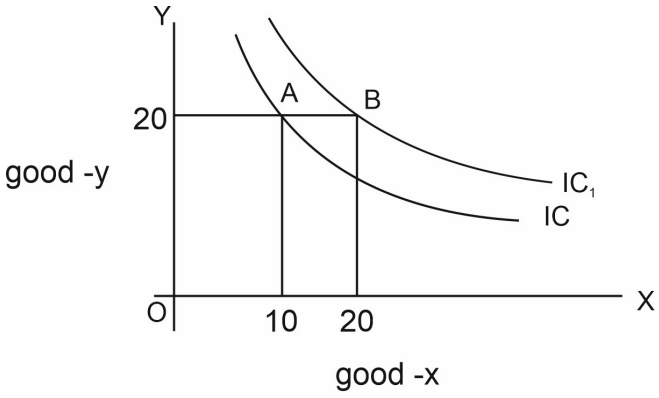


Fig. 2.13

In the Fig. 2.13 we find that IC_1 falls below the IC curve. The combination 'A' lies on IC curve and combination 'B' lies on IC_1 curve. The combination 'A' is of 20 units of good-Y + 10 units of good – X and combination B is of 20 units of good-Y + 20 units of good-X. It means that combination 'B' lies on IC_1 which contains more of good - X i.e. 10 extra good-x and surely it gives greater satisfaction than combination 'A'. Hence, the combination lies on IC_1 curve gives more satisfaction than IC.

5) Indifference curves need not be parallel to each other:

As we know that higher IC gives higher level of satisfaction but it is not necessary that the sets of IC curves should be parallel. As each IC curve reveals different marginal rate of substitution for different combination lies on it. In fact the marginal rate of substitutions are not similar. This can be shown in Fig. 2.14.

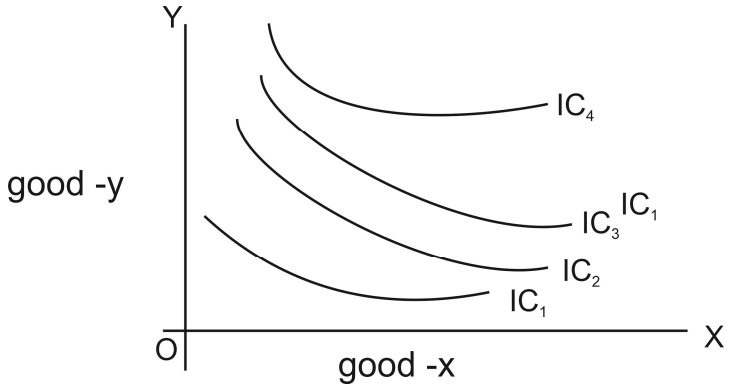


Fig- 2.14

The above figure indicates that IC, IC_2, IC_3 and IC_4 are not parallel to each other.

6) Indifference curve will not touch either axis

The important property & IC is that IC curves will not touch either X axis or Y-axis. This could be explained with help of following Fig. 2.15 (a) Fig. 2.16 (b)

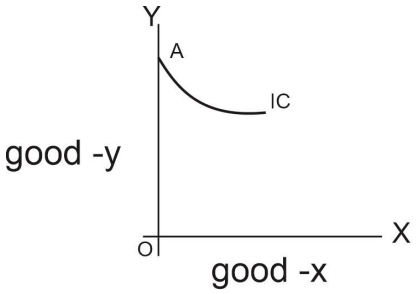


Fig. 2.15 (a)

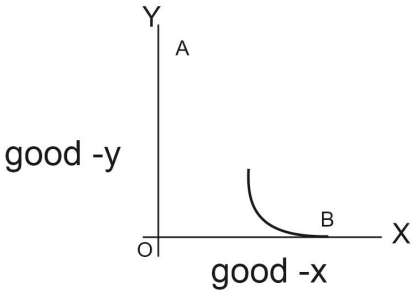


Fig. 2.15 (b)

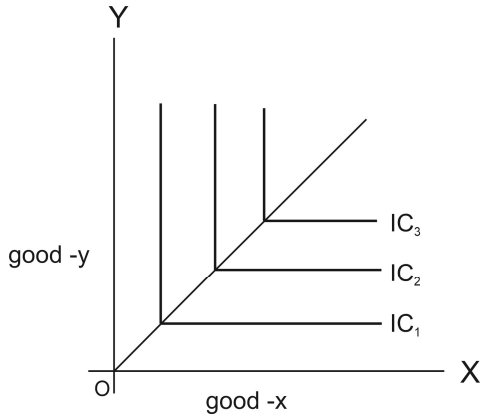
In fig. 2.15(a) IC curve touches to Y-axis at point 'A'. The combination 'A' contains of good Y is of OA plus good – X zero, which indicates that MRSxy is infinite.

In fig. 2.15 (b) IC curve touches to X-axis at 'B'. The combination 'B' contains of good Y is of OB plus good-Y is zero which also indicates that MRSxy is infinite.

7) Indifference curve for perfect complement goods

When the two goods are perfect complementary, the indifference curve will consist of two straight lines with a right angle bent which is convex to the origin shown in the Fig. 2.16

Fig. 2.16



In case, perfect complement goods the shape of the indifference curve is rectangular hyperbola.

2.13.1 Consumer's Equilibrium with IC

Before knowing the consumer's equilibrium with indifference curve it is necessary to know the concept of Budget line. The budget line which represents the prices of the goods and consumer's money income. Thus, budget line is also called as price line.

Concept of Budget line or Price line

Suppose a consumer has got income of Rs. 50 to spend on two goods i.e. X and Y. Let price of the good X in the market be 10 per unit and price of good-Y that of 5 per unit. If the consumer spends his whole income of 50 on good X he would buy 5 units of X; if he spends his whole income of 50 on good Y he would buy 10 units of Y. If a straight line joining 5x and 10Y is drawn, we will get that is called the price line or budget line. Hence, Budget line means all those combinations of two goods which the consumer can buy by spending his given money income on the two goods at their given price. This can be shown in following Figure – 2.17.

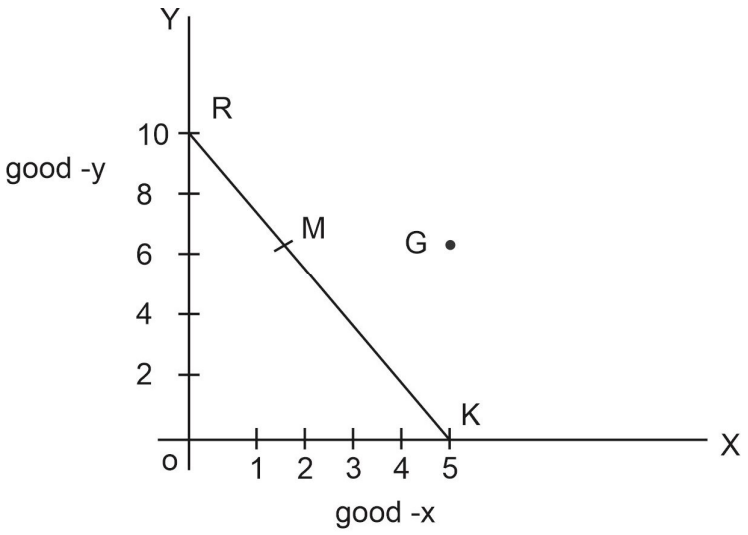


Fig. 2.17

Budget line shown in graphical way i.e. Fig. 2.17

In the fig. 2.17 with Rs. 50, consumer can by 10Y and 0X, or 8Y and 1x; or 6X and 2Y; or 4Y and 3x e.t.c. Thus, he can buy any combination lies on the budget line with his given money income and given price of the goods. Any combination lies

above Budget line i.e. 'G' cannot be purchased. But, he can choose M except R and K combinations.

Thus, Budget line can be written algebraically as follows.

PxX + PyY = M

Px & Py = Price & commodity X & Y.

X and Y = Goods X and Good Y.

M = Money income.

Thus the slope & Budget line is equal to…..

Slope of Budget line = $\frac{OR}{OK} = \frac{Px}{Py}$.

The budget line shifts on the basis of the change in the price of respective goods.

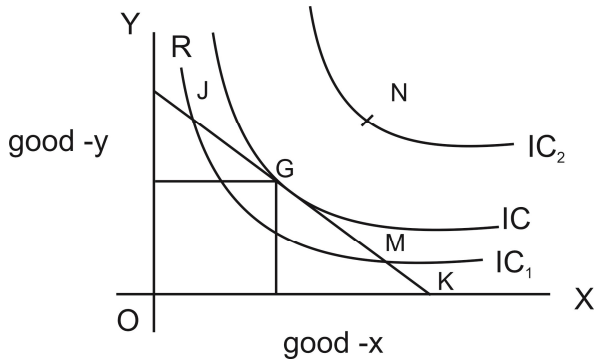
Consumer's Equlibrium with the help of IC.

After realizing the budget line now we are in position to understand that how a consumer reaches at equilibrium position.

Assumptions:

1) Consumer maximizes satisfaction.
2) Consumer is rational.
3) The consumer has a given indifference map exibiting his scale of preference for various combination of two goods i.e. x and y.
4) He has fixed income and has to spent whole income on both goods.
5) Price of goods are given.
6) Goods are homogeneous and divisible.
7) Consistency and transitivity.

With help of above mentioned assumption, we may understand how a consumer can achieves the equilibrium position. Consumer's equilibrium is shown with the help of indifference curve and budget line as given in the following Fig. 2.4.10.



The fig. 2.4.10 indicates that consumer has set of indifference curves i.e. IC,IC_1 and IC_2 along with the RK budget line.

The RK budget line reveals that how many units of good-X and good-Y the consumer can purchase with his given money income. In fig. 2.4.10 it is noticed that a higher Indifference curve gives higher level of satisfaction and lower Indifference curve gives lower level of satisfaction.

The Fig. 2.4.10 explains that

RK = Budget line/price line

IC, IC_1 & IC_3 = Three indifference curve.

G = Equilibrium position. It is the tangency point where the slope of budget line RK and indifference curve IC are equal.

The slope of IC means MRSxy

The slope of Budget line means Px/Py.

Therefore, we arrive with equation. viz

MRSxy= $\frac{Price\ of\ good\ x}{Price\ of\ good\ Y} = \frac{Px}{Py.}$

At point R and K MRS is greater or less than price ratio between the two goods. The consumer substitutes good X for good Y till he marginal rate of substitute becomes equal to the price ratio.

The marginal rate of substitution at point J and M are less than the given price ratio in fig. 2.4.10. he continues the process of substitute till he reaches at point G combination

The combination laying on the IC_2 is beyond the reach of consumer on the income terms.

Finally, the tangency between the given priceline/budget line and an indifference curve i.e. MRSxy = Px/Py is a necessary condition but not a sufficient condition of consumer equilibrium with IC.

Therefore, it is concluded that for the consumer to be in equilibrium the following two conditions are required.

1) MRSxy = Px/Py.

2) Indifference curve must be convex to the origin at the point & tangency

2.13.1 Revealed Preference Theory

This theory is given by 'Prof. Samuelson'. It is behaviouristic ordinal utility analysis. Revealed preference theory is called the third root of the logical theory of demand. Samuelson given this theory in order to have a scientific explaination of consumer behaviour. Both Marshallian utility analysis and Hicks-Aliens' Indifference curve analysis have their own limitations. Viz, introspectiveness and subjectiveness as well as unrealistic and restrictrive assumptions. Therefore, Prof. Samuelson' built up the theory of demand from observed behaviour of consumer. This theory analyses consumer's preference for a combination of goods on the basis of observed consumer behviour in market in various price income situations.

Revealed preference theory is based on the presumption that "Choice reveals preference." Keeping this in mind consumer buys a combination of two goods because of he likes this combination as compared to others or it is cheaper than others. Either of one reasons, consumer buys this combination instead of other combinations. Suppose there are many combinations viz. A, B, C, D, E, F, etc. as shown in diagram. Suppose he prefers combination A rather than combination B, C, D, E or F. It means that he reveals his preference to combination A. There are two reasons for showing his preference to combination A. They are as, 1) Combination A may be cheaper than other combinations B, C, D, E and F. or 2) Combination A likes him more than other combinations even though it is dearer. Thus, It is said that A is revealed preferred to other combinations B, C, D, E and F. Or other combinations B, C, D, E, F are revealed inferior to A.

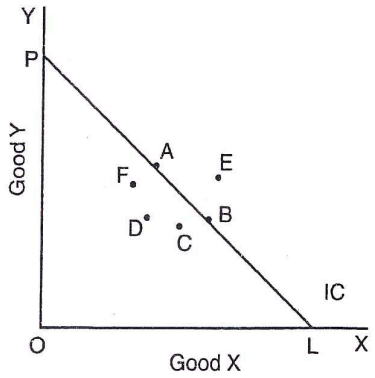


Fig. 2.8.1

PL is price line. Consumer's income and prices of two goods are given. Consumer can buy any combinations of X any Y lied in the area of triangle OPL, with the help of his pL price income line. 'It means that consumer can choose any combinations from A, B, C, D, F which are lied below or on the line pL. But he can't choose combination E, because it is lied above price-income line pL. So it is dearer and beyond the reach of consumer. When he chooses A to B combination. A is revealed preferred to B, because of he likes A more than B. Other combinations C, D, F lies below the price line pL So they are inferior to A. Thus the combinations A is revealed preferred to other combinations. B, C, D and F.

Assumptions :

This theory is based on following assumptions :

1) It assumes strong ordering : This hypothesis is based on strong ordering on the part of the consumer. It assumes that consumer is in a position to tell that which combinations he prefers to the other. So, there is no possibility of indifference between two combinations.
2) The consumer's tastes remain constant.
3) Consumer's choice reveals his preference to the combination.
4) Consumer chooses only one combination.
5) More goods combination is always preferred to less goods combination in any situation.
6) Consistency Assumption: This theory assumes that there is consistency in consumer behaviour. If A is preferred to B in one situation, B can't be preferred to A in any other situation.

7) Transitivity assumption : It refers three term consistency. When A is preferred to B and B to G, then A must be preferred to C.

8) Assumption of positive income-elasticity: This theory assumes positive income elasticity of demand. As consumer's income increases it causes to rise in demand for a commodity and vice versa.

Derivation of Demand Theorem :

The derivation of demand theorem from revealed preference theory is the study of samuelson's "Fundamental Theorem of Consumption Theory. Samuelson stated it as", any good (Simple or composite) that is known always to increase in demand when money income alone rises must definitely shrink in demand when its price alone rises." It means that when income elasticity of demand is positive, price elasticity of demand is negative, i.e. there is positive correlation between income arid demand for commodity and inverse relationship between price and demand for commodity, in regards to change in income demand curve slopes positively, and with regards to price change it slopes negatively.

In order to prove demand theorem, it is divided into two parts as

1) Demand theorem for price rise

2) Demand theorem for price fall

1) Demand theorem for price rise :

Suppose that consumer spends his total income on two commodities oranges and apples PL, is original price line as shown in figure.

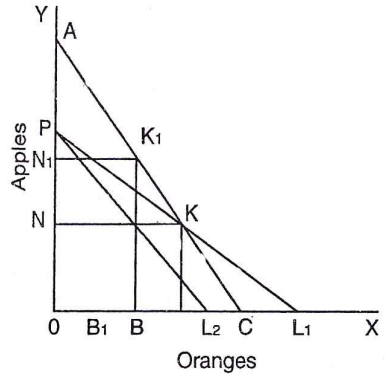


Fig. 2.8.2

Suppose that PL_1 is an Original price line. So, OPL_1, triangle is a consumer's choice triangle. It means that consumer can purchase any combinations lied in this

triangle as well as lied on PL, price line. Suppose consumer has preferred combination lied at point K. It means he revealed his preference to OB quantity of oranges and ON quantity of apples lied at Point K.

Now, the price of apples remains the same and price of oranges is risen. It causes the shift of price line PL_1 to PL_2. It shows the shrink in quantity of Oranges demanded. Therefore now consumer is not able to purchase the combination of two goods lied at point K.

In order to get consumer able to purchase the same combination at point K consumer's money income should be raised to that amount equal to his fall in real income due to rise in price of Oranges. So a parallel line AC is drawn to the PL, price line. Which passes through point K. AC price line shows a slew triangle of Choice OAC. Now consumer is able to choose all combinations lied in or on this triangle OAC.

The point K on original price PL is preferred by him to any other points on that price-line. So all points lying below K would not be preferred by him. (i.e. consistency assumption) Therefore, all the points lying below the point K should not be preferred to the point K lying on KL_1, line i.e. he rejects ail the points below point K.

Now consumer will choose combination either at point K or above the K, which are lied on the part KA of new price line AC. in this situation consumer will choose any combinations lied on KA line, which reveals less quantity of oranges and more of apples. It means that when price of oranges rises, consumer will choose the combination at point K or above the point K. Suppose he has chosen the combination lied at point K_1, it shows. ON, apples and OB, oranges, i.e. he buys BB, less quantity of oranges due to rise in it's price. Hence, It is clear from the above discussion that as price of Oranges due to rise in it's price. Hence, It is clear from the above discussion that as price of Oranges rises, it's demand falls. It shows the inverse relationship between price and demand of a commodity. So, demand curve is negatively slopped.

2) Demand theorem for price fall :

When price of a commodity falls it results into rise in demand. It shows inverse relationship between price and demand of a commodity. It can be explained with the help of diagram. PL_1 is original price line. Consumer reveals his preference to the combination of two goods lied at point K. At point K he prefers ON apples and OB

oranges. Triangle OPL, is his choice triangle. It means that consumer buys any combinations lied in and above the line PL_1 of this triangle. Suppose that price of oranges is fallen, so that price line PL_1 becomes PL_2.

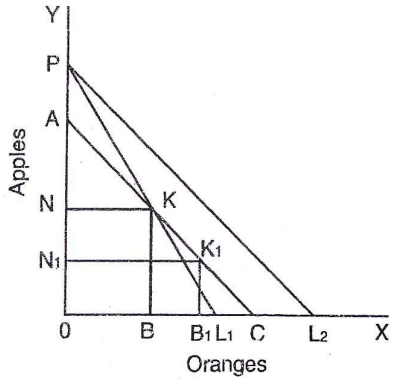


Fig. 2.8.3

It shows the consumer buys more quantity of oranges, how OPL_2, is new triangle of consumer's choice. It reveals that consumer can buy any, combination lied on PL_2 price line.

Suppose, if consumer has to buy previous combination of apples and oranges lied at point, K. Consumer's money income could be reduced to that amount equal to his rise in real income due to the fall in price of oranges. In order to do 5 so a parallel line AC is drawn to the PL_2 price line. Which passes through the point K. Price line AC shows a new triangle of choice OAC.

Now consumer can purchase all combinations lying in or on this triangle OAC. Since consumer has revealed his preference to point K on the original price line PL_1. So all points lying on KP segment will not be preferred by him. (i.e. consistency assumption). So, he rejects ali points on segment KP. Because they reveal less quantity of oranges as price is fallen. Therefore, consumer will either choose point K or any other combination below the point K on segment KC of the price line AC. Suppose consumer has choosen the combination at point K_1, it shows ON_1 apples and OB_1 oranges, i.e. he buys BB, more quantity of oranges due to fall in its price. Thus, it is clear that as price of oranges falls, demand for it rises. It shows the inverse relationship between price and demand of a commodity. Therefore demand e curve slopes downward from left to right. It proves that when income elasticity is positive, price elasticity is negative.

Criticisms :

This theory is criticized on the following grounds.

1) This theory can't consider indifference in the consumer behaviour :

It is based on strong ordering. In actual practice, when consumer chooses a point on price line, there are some points in the vincinity of that point, which consumer can choose. These points are very close to the choosen point of combination. Consumer is indifference in respect of these points. If this criticism is accepted the Samuelson's demand theorem breaks down immediately.

2) This theory is based on positive income elasticities,-doesn't distinguish between income and substitution effect :

This theory assumes positives income elasticity and negative price elasticity of demand. Income effect reveals that rise in demand due to the fali in price of a commodity. But price effect also comprises the income effect. It doesn't say how many demand is risen due to income effect and how many is due to substitution effect. It only says about the rise in total demand.

3) This theory doesn't explain the demand for Giffen goods :

Samuelson assumes the positive income elasticity of demand. It means that as income rises, demand for goods also rises and vice versa. But it doesn't say about the negative income elasticity of Giffen goods. Why demand for Giffen goods falls, as income rises.

This theory doesn't say any thing about the failure of reciprocal relationship between price and demand for Giffen goods.

4) It doesn't explains the market demand :

Samuelson's revealed preference theory gives explanation about the individual demand of a consumer, but say any thing about market demand.

5) This Theory is based on the principle that "Choice reveals preference.

This theory says that consumers choice reveals his preference. But when there are risks and uncertainties in commodity choice, consumer applies strategies like game theory. In this situation his behaviour is not normal and consistent. So, this

theory doesn't give explanation of such types of behaviour. Therefore, the principle choice reveals preference doesn't found to be true. .

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3.2.7 Meaning of Price Discrimination

Price discrimination means it is the practice of seller that different consumers are being charged by different prices for the same product or service. Specifically, those who are willing to pay more will be charged a higher price, whereas price-sensitive individuals will be charged less.

Prof. Stigler defines price discrimination as "the sale of technically similar products at prices which are not proportional to their marginal costs."

Prof. Mrs. Joan Robinson defines it as "charging different price for the same product, or same price for the differentiated product"

A Cricket fan will pay any price to get Tendulkar's signed t-shirt while another person would feel indifferent about it. Seller of t-shirt will get more money selling the signed t-shirt of Tendulkar to a super fan than a person with no interest in Cricket. Basically, the goal of price discrimination is to capture more of the consumer surplus and maximising Producer's surplus.

3.2.7.1 Price discrimination types

Price discrimination may be personal, local, or according to trade or use. According to Prof. A. C. Pigou, there are degrees of Price discrimination, which can be classified into three types: first-degree price discrimination, second-degree price discrimination, and third-degree price discrimination (look at table given below).

Types of price discrimination	**First degree**	**Second degree**	**Third degree**
Price company charge.	Maximum willingness to pay	Based on the quantity used.	Based on customer background

First- Degree Price discrimination

First-degree price discrimination is also known as perfect price discrimination. In this type of discrimination, producers charge their customers the maximum amount they are willing to pay and capture the entire consumer surplus.

Second-degree price discrimination

Second-degree discrimination happens when the company charges prices based on the amounts or quantities consumed. A buyer making bulk purchases will receive a lower price compared to those purchasing a small quantity.

A well-known example is the phone service. Customers are charged different prices for the number of days and mobile data they use

Third-degree price discrimination

Third-degree price discrimination occurs when the company charges different prices for customers from different backgrounds or demographics.

Museums charge adults, children, students, and the elderly differently for their ticket.

Another example of price discrimination is Railway tickets. The tickets usually have different prices depending on the urgency of consumer's travel. When bought in advance, railway tickets are typically much cheaper than those bought 'Tatkal' on the day of travel.

3.2.7.2 Conditions for price discrimination

Here are some of the conditions for price discrimination to occur:

- **A degree of monopoly power:** The seller must have sufficient monopoly power in order to price discriminate. In other words, it needs to be a price maker capacity.
- **The ability to define customer segments:** The seller must be able to separate the market based on customers' needs, characteristics, time, and location.
- **The elasticity of demand:** The consumers must have different elasticity of demand. For example, demand for air travel from low-income consumers is more price elastic. In other words, they will be less willing to travel when the price increases compared to wealthier people.

- **Prevention of re-sale:** the company must be able to prevent its products from being resold to the another group of customers.

Price discrimination is also possible in the following cases.

1. The nature of good.
2. Tariff barriers and long distance.
3. Legal sanction.
4. Buyers' preference or prejudices.
5. Buyers' ignorance or laziness.

3.2.7.3 Dumping

Dumping is an international price discrimination in which an exporter firm sells a portion of its output in a foreign market at a very low price (competitive price) and the remaining output at a high price in the home market (Monopoly Price). **Haberler** defines dumping as: "The sale of goods abroad at a price which is lower than the selling price of the same goods at the same time and in the same circumstances at home, taking account of differences in transport costs" **Jacob Viner's** definition is simple, as per him dumping means"price discrimination between national markets"

3.2.7.4 Types of Dumping

Dumping can be classified in the following three ways:

A. Sporadic or Intermittent Dumping:

It is so happens some time that when the domestic production of the commodity is more than unsold stocks of the commodity even after sales. In such a situation, the producer sells the unsold stocks at a low price in the foreign market without reducing the domestic price. But this is possible only when foreign demand for his commodity is elastic and the producer is a monopolist in the domestic market. The basic aim of seller is to identify his commodity in a new market or to establish himself in a foreign market to drive out a competitor from a foreign market. In such case of dumping, the producer sells his commodity in a foreign country at a price which covers his variable costs and some current fixed costs in order to reduce his loss.

B. Persistent Dumping:

Persistence Dumping means it is the case, where monopolist continuously sells a portion of his commodity at a higher price in the domestic market and the remaining output at a lower price in the foreign market. This situation may happen because the domestic demand for that commodity is less elastic and the foreign demand is highly elastic. Suppose costs is falling continuously along with increasing production, the producer does not wants to lower the price of his product in the domestic market because demand is less elastic in the home market.

However, if demand is highly elastic for his product he keeps a lower price in the foreign market. As a result of this, he can earns more profit by selling more quantity of the commodity in the foreign market. Hence, the foreign consumers gets more benefit from it because they are required to pay is less price than in the absence of dumping.

C. Predatory Dumping:

The predatory dumping means when a monopolist firm sells his commodity at a very lower price or at a loss in the foreign market in order to drive out some competitors. But when the competitors disappears from the market, he raises the price of the commodity in the foreign market. Thus, the firm covers loss and if the demand in the foreign market is less elastic, his profit may rise.

3.2.7.5 Objectives of Dumping:

The main objectives of dumping are as follows:

1. To get a space in the Foreign Market:

A monopolist follows dumping in order to find a place or to stay in the foreign market. If there is a perfect competition in the foreign market, he may lower the price of his commodity in order to increase the demand for his commodity. For this, he often sells his commodity at a lower price by incurring loss in the foreign market.

2. To sell Surplus Commodities:

When a monopolist's generates excess production of his commodity and he is not able to sell in the domestic market, he wants to sell the surplus production at a very low price in the foreign market. But it happens occasionally.

3. To Expand Industry:

A monopolist also resorts to dumping for the expansion of his industry. When he expands it, he receives both internal and external economies which lead to the application of the law of increasing returns. Consequently, the cost of production of his commodity is reduced and by selling more quantity of his commodity at a lower price in the foreign market, he earns larger profit.

4. To create a New Trade Relations:

The monopolist practices dumping in order to develop new trade relations with foreign countries. In the view of this, he sells his commodity at a low price in the foreign market, whereby establishing new market relations with those countries. In additions to this, the monopolist increases his production, lowers his costs and earns more profit.

3.2.7.6 Price Determination under Dumping:

The price is determined under Dumping is just like a discriminating monopoly. The basic difference between the two is that under discriminating monopoly both markets are domestic, while under dumping one is a domestic market and the other is a foreign market. In case of dumping, a monopolist sells his commodity at a high price in the domestic market and at a low price in the foreign market.

Price determination under dumping is based on the following conditions or assumptions:

1. The main aim of the monopolist is to maximise his profit. He, therefore, produces that output at which his marginal revenue equals marginal cost. Since he sells his commodity in the domestic market and the foreign market separately, he adjusts the quantity in such way in each market that marginal revenues in both markets are equal.

Given the marginal cost of producing the commodity, the most profitable monopoly output will be determined at a point where the combined marginal revenue of both the markets equals the marginal cost. In other words, dumping profit = $MR_H + MR_F = MC$.

2. The elasticity of demand must be different in the two markets. The demand should be less elastic in the domestic market and perfectly elastic in the foreign market. As a result, the monopolist sells his commodity at a low price in the foreign

market and at a high price in the domestic market. Thus, the price and MR are related to each other which could be explained with the following equation:

$$MR = AR(P)\frac{(e-1)}{e}$$

Where e = refers to the elasticity of demand.

AR= Average Revenue/ P= Price

MR= Marginal Revenue

3. The foreign market should be perfectly competitive and the domestic market should be a monopolistic competition
4. The buyers in the domestic market cannot buy the cheap commodity from the foreign market and bring it in the domestic market.

Explanation

Given the conditions, price and output under dumping will be determined by the equality between the total marginal revenue curve and the marginal cost curve of producing the commodity. Fig-3.2.1 illustrates that price-output determination under dumping.

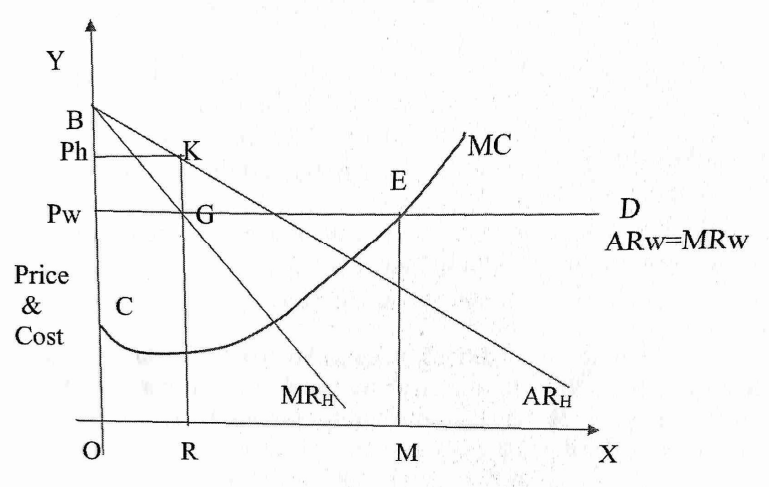

Fig-3.2.1

A special case of Price Determination may take place when a producer is selling his product in two markets, one in which he faces perfect competition, where the demand curve for his product will be perfectly elastic, while in the other he has monopoly market, where the demand curve for his product will be sloping downwards. The Equilibrium in such situation can be shown with the help of Fig-3.2.1.The foreign market demand curve faced by the monopolist is the horizontal line **P_wD** which is also called the *AR=MR* curve because the foreign market is assumed to be perfectly elastic. The demand curve in the home market with a less elastic demand for the product is the downward sloping curve AR_H and its corresponding marginal revenue curve is MR_H. The lateral summation of MR_H and P_wD curves leads to the formation of BGED as the combined marginal revenue curve. In order to determine the quantity of the commodity produced by the monopolist, we take the marginal cost curve MC. E is the equilibrium point where the MC curve equals the combined marginal revenue curve BGED. Since the marginal cost, intersect total marginal curve BGED at point E and equilibrium position is determined. Thus, OM output will be produced for sale in the two markets in such a way that MR in each market is equal to each other and to the marginal cost ME. It is clear from Fig-3.2.1 that when amount *OR* is sold in the market, the marginal is *RG*/OP_w equal to marginal cost *ME*. Hence, total output *OM,* amount OR is sold in home market. The curve **ARh** indicates that Price *OPh* /KR wil be charged in the home market. Remaining the amount RM will be sold in the foreign market at ***RG*/OP_w** or Area **CEGB** represent the total profits earned by both the market. When a producer charges a lower price in the world market then in the home market, is said to be dumping in the world market.

3.2.7.7 Effects of Dumping:

Dumping affects both the importer as well as exporter of the countries in the following ways:

1. Effects on Importing Country:

The effects of dumping on the home as well as foreign country, depends up on whether dumping is for a short period or a long period, the nature of the product and the aim of dumping.

1. If a producer dumps his commodity abroad for a short period, then the industry of the importing country is affected for a short period. But due to the low priced

dumped commodity, the industry of the dumping country has to incur a losses for some time because less quantity of its commodity is being sold.

2. The Dumping is harmful for the importing country, if it continues for a long period. This is because it takes time for changing production in the importing country and its domestic industry is not able to face the competition. But, when cheap imports stop or dumping does not exist, it becomes difficult to change the production again.

3. If the dumped commodity is a consumer good, the demand of the people in the importing country will change for the cheap goods. When dumping stops, this demand will reverse, thereby changing the tastes of the people which will be harmful for the home economy.

4. If the dumped commodities are cheap capital goods, it will leads to the setting up of a new industry in home country. But in case the imports of such commodities stops, the industry depending on imported goods will be shut down. Thus finally, the importing country will come under loss.

5. If the monopolist dumps the commodity for removing his competitors from the foreign market, the importing country gets the benefit of cheap commodity in the beginning. But when competition ends and he sells the same commodity at a higher price, the importing country incurs a losses. Now they have to pay a higher price.

6. If a tariff duty is imposed to force the dumper to equalise prices of the domestic and imported commodity, it will not benefit the importing country.

7. The lower fixed tariff duty benefits the importing country, if the dumper delivers the commodity at a lower price.

2. Effects on Exporting Country:

Dumping affects the exporting country in the following ways:

1. When domestic consumers buys the commodity at a high price when the dumping executes by domestic producer, there will be loss in their consumers' surplus. But if a monopolist produces more commodities in order to dump it in another country, consumers gets benefit. This could be possible if producer undertakes more production of the commodity to mower the marginal cost. As a result, the price of the commodity will be less than the monopoly price without dumping.

But this lower price than the monopoly price depends upon the law of production under which the industry is operating. If the industry is producing under the law of diminishing returns, the price will not fall because costs will increase and so will the rise in the price.

The consumers will be losers and the monopolist will gainer. There will be no change in price under fixed costs. It is only when costs fall under the law of increasing returns that both the consumers and the monopolist will benefit from dumping.

2. The exporting country also benefits from dumping when the monopolist produces more commodity. Consequently, the demand for the required inputs such as raw materials, etc. for the production of that commodity increases, thereby expanding the means of employment in the country.

3. The exporting country earns foreign currency by selling its commodity in large quantity in the foreign market through dumping. As a result, its balance of trade improves.

3.2.7.8 Anti-Dumping Measures:

The following measures are adopted to stop dumping:

a. Tariff Duty:

The importing country imposes tariff on the dumped commodity as a result, the price of the importing commodity increases and the fear of dumping ends. But it is necessary that the rate of duty on imports should be equal to the difference between the domestic price of the commodity and the price of the dumped commodity. Generally, the tariff duty is imposed more than this difference to end dumping, but it will create a harmful effects on other imports.

b. Import Quota:

Import quota is another measure to stop dumping. Under this a commodity of a specific volume or value is allowed to be imported into the country. For this purpose, it includes the imposition of a duty along with fixing quota, and providing a limited amount of foreign exchange to the importers.

c. Import Embargo:

Import embargo is an important retaliatory measure against dumping. According to this, the imports of certain or all types of goods from the dumping country are banned.

d. Voluntary Export Restraint:

To restrict dumping, developed countries enter into bilateral agreements with other countries from which they fear dumping of commodities. These agreements ban the export of specified commodities so that the exporting country may not dump its commodities in other country. Such bilateral VER agreements exist between India and EU countries in exporting Indian textiles.

Conclusion:

Price discrimination is nothing but practice of discriminating monopoly in home market and dumping in world market.

According to Article IV of GATT 1984, which now forms part of the World Trade Organisation (WTO), a country can adopt anti-dumping measures only if the dumped imports "injure" the industry of the country. A commodity is regarded as dumped which is exported to the other country at a value lower than its normal value, or it will also be regarded as dumped if the export price of the commodity is less than its comparable price for final consumption in the exporting county. Under these situations, the importing country can impose anti-dumping duty, provided the margin of dumping is more than 2% of the export price or is more than 7% of the dumped import.

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4.6 The Phillips Curve- The Relation between Unemployment and Inflation

Background: The actual empirical evidence did not fit well in the simple Keynesian macro model. A renowned British Economists, A. William Phillips published an article entitled "Relation between Unemployment and Rate of Change in Money Wages in the United Kingdom, 1861-1957" in *Economica* in 1958. His article was based on good deal of research using historical data from UK for about 100 years in which he arrived at the conclusion that there in fact existed an inverse relationship between rate of unemployment and rate of inflation.

Meaning of Phillips Curve

The Phillips curve states an inverse relationship between inflation and the unemployment rate, i.e., the higher the economy's inflation rate, the lower the unemployment rate will be, and vice-versa. This economic concept was developed by William Phillips and proven in all major world economies.

Explanation of the Theory

The statistical relationship between unemployment and price inflation was coined by Prof. William Phillips. The Phillips curve describes an inverse correlation between inflation and unemployment. It says that as inflation rises, unemployment goes down, and vice versa. The Phillips curve has been an important decision-making tool in the Federal Reserve's interest rate adjustments. For several decades, decision-makers have included the Phillips curve in their efforts to maintain maximum sustainable employment and stable prices. In addition to guiding fiscal policy, the Phillips curve can predict inflation's future direction of change 60 per cent to 70 per cent of the time. This helps the Federal Reserve and central banks understand where the economy is likely going so that they can use their available tools to stimulate or slow the economy as needed. As an economic model, the Phillips curve states that falling unemployment will cause inflation to rise or that

rising inflation will reduce unemployment. While this may intuitively make sense, since more money in workers' pockets means more dollars spent in the economy, the theory has not consistently played out as expected.

Phillips curve represents the economic relationship between the rate of unemployment and the rate of change of money wages. It indicates that wages tend to rise faster when unemployment is low. In "The Relation Between Unemployment and the Rate of Change of Money Wage Rates in the United Kingdom, 1861–1957, Phillips found that, except for the years of unusually large and rapid increases in import prices, the rate of change in wages could be explained by the level of unemployment. Simply put, a climate of low unemployment will cause employers to bid wages up in an effort to lure higher-quality employees away from other companies. Conversely, conditions of high unemployment eliminate the need for such competitive bidding; as a result, the rate of change in paid compensation will be lower.The main implication of the Phillips curve is that, because a particular level of unemployment will influence a particular rate of wage increase, the two goals of low unemployment and a low rate of inflation may be incompatible. Developments in the United States and other countries in the second half of the 20th century, suggested that the relation between unemployment and inflation is more unstable than the Phillips curve would predict. In particular, the situation in the early 1970s, marked by relatively high unemployment and extremely high wage increases, represented a point trade off the Phillips curve.

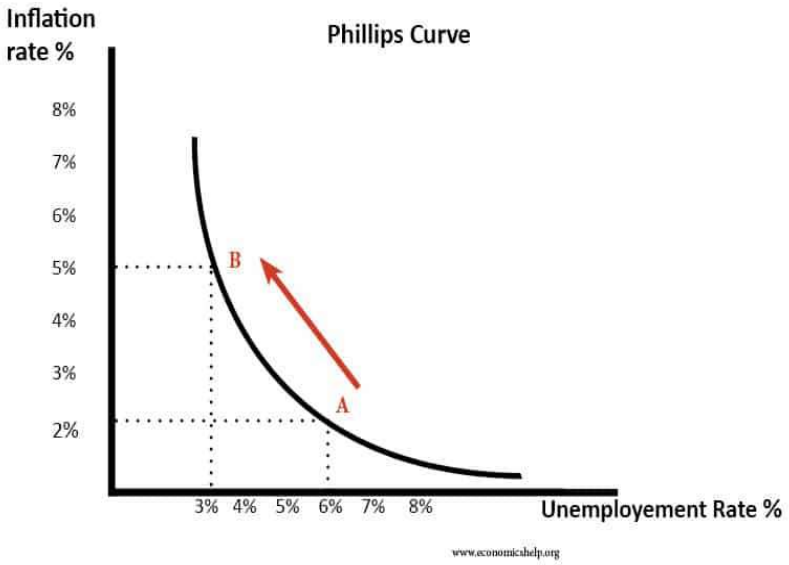

Diagram 4.1

In diagram 4.1 Phillips emphasised on trade-off between unemployment and inflation rate. He found inverse relationship between unemployment and inflation rate. Increase in inflation rate at 5 per cent leads to less unemployment and when inflation rate is slow down at 2 per cent which leads to increase in unemployment at 6 per cent. It clearly shows that employment creates inflation in the economy. Phillips curve shown inverse relation between unemployment and rate of inflation in UK's economy.

Example of the Phillips Curve

Let us take an example of the Phillips curve. In the Phillips curve, the opposite correlation between the inflation in a country's economy and unemployment is portrayed as the downward sloping curve. For example, if the unemployment rate in the economy is 6 per cent, then the inflation rate is 3 per cent. According to the Phillips curve, if the unemployment rate decreases from 6 per cent to 5 per cent, the inflation rate will increase to 3.5 per cent. Therefore, the effect of an increase or decrease in the unemployment rate on inflation is predictable as inverse relation.

Conclusion

The Phillips curve developed by William Phillips states that inflation and unemployment have a stable and inverse relationship, i.e., higher the economy's inflation rate, lower the unemployment rate, and vice-versa. The theory of the Phillips curve claims that economic growth comes from inflation. As a result, it should increase more jobs and less unemployment. Alternatively, focusing on decreasing unemployment also increases inflation.

However, the original concept by William Phillips was proved wrong when the stagflation occurred in the 1970s. At that time of stagflation, both the inflation and unemployment rates were high. So, the implications of the Phillips curve are appropriate only in the short term.