E-Learning Module

Module-II: Indifference Curve Approach

By-
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1.1   Hicksian Analysis:

The technique of indifference curve analysis was invented by the English economist F.Y. Edgeworth in the late nineteenth century. Later it was developed further by the Italian economist Vilfredo Pareto. Finally it was perfected as full-fledged method of analysis for the study of consumer behaviour by R.G.D.Allen and J.R. Hicks. It is now widely accepted as better than the cardinal utility analysis of the neoclassical economists.

1.1.1   Introduction:

The neoclassical economists believed that by using money as a standard of measurement the utility value of a unit of a good could be measured. Their assumption of constant marginal utility of money made it appear that utility could be measured though indirectly. If a monetary unit assigned arbitrarily a utility value, then the marginal utility of a good can be measured by the price the consumer is willing to pay to purchase the marginal unit of that good. But this way of explaining consumer behaviour concealed more than it revealed. It slurred over the distinction between the income effect and the substitution effect of a price change. It implied the absence of the income effect. Further the concept of measurable utility itself came to be regarded as non-essential and so dispensable. Even without such a concept it was found possible to construct a complete theory of consumer behaviour based only on preferences that the consumer could rank or order. With the help of such ordinal ranking alone one can explain demand, substitutability, complementarity and so on. Moreover, this approach lends itself to being extensively used to decide upon many matters of economic policy in the fields of taxation, welfare and so on.

1.1.2 Assumptions:

The indifference curve analysis is based upon the following assumptions:

1. Completeness:

This means that the consumer's preferences are complete in the sense that he or she can compare and rank all possible combinations of goods and services. He/she is able to express a preference or indifference between any pair of goods without any exception.

2. Consistency and Transitivity:

The consumer is assumed to act rationally and be consistent in his choice. If he prefers A to B at one time he will not prefer B to A at any other time assuming the availability of both A and B on both occasions.

That a consumer's preferences are transitive means that for any three bundles A, B and C, if he prefers A to B and prefers B to C, then he always prefers A to C. Otherwise his preferences will be inconsistent.

This assumption implies no bundle can belong to more than one indifference set.

3. Non-Satiation:

It means that a consumer always prefers more of any good to less. This assumption implies that all goods are 'desirable'. This assumption leads to the requirement that when the consumer constructs his indifference set consisting of the different bundles that yield him the same amount of satisfaction he can do so only by substituting or trading off one good for another.

4. Continuity:

The indifference curve which graphs the indifference set of the consumer is continuous, i.e., it has no gaps or breaks at any point. Goods are perfectly divisible in the sense that a consumer can give a small amount of the good he has and get some more of the other good and stay on the same level of satisfaction.

2.1 Indifference curves:

This approach makes use of an analytical tool called 'indifference curves'. They represent the tastes and preferences of the consumer. Neither the income of the consumer nor the prices of goods need to be known for constructing these curves because they are just a diagrammatic representation of the consumer's pattern of preferences.

2.1.1 Construction of Indifference curves:

To begin with, let us construct an indifference schedule which list the various combinations of goods X and Y that yield the same amount of satisfaction to the consumer. First, let us specify a particular combination of X and Y which the consumer desires; say, x_1 unit of X, y_1 units of Y. It is possible that he may derive the same amount of utility from different combinations of X and Y with more of X and less of Y, or more of Y and less of X. The only criterion to be kept in mind is that in whatever manner the quantities of goods are varied they must end up yielding the same specific amount of utility to the consumer. All such combinations of the goods X and Y are listed in the schedule. The consumer is said to be indifferent with regard to them because he is equally happy or well-off whether he gets A, or B or any other bundle given in the schedule. Now the combinations given in the schedule can be marked on a two dimensional diagram, with the good X shown on the horizontal axis and the good Y on the vertical axis. If all the points representing the different bundles are plotted and joined we get an Indifference Curve.

Definition: An Indifference curve may be defined as the locus of points representing different combinations of the goods X and Y which yield the consumer the same level of utility.

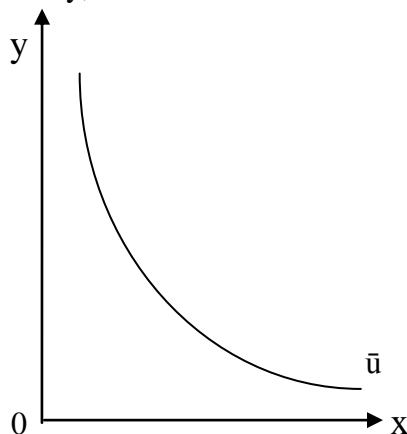Diagrammatically, indifference curve can be depicted as follows-

Figure 1: Indifference curve

Figure 1 depicts the Indifference curve every point on which represents given level of utility.

2.1.2 Characteristics of Indifference curve:

1. Indifference curves slope downward from left to right.

2. Indifference curves do not intersect.

3. Indifference curves are convex to the origin.

4. Higher the Indifference curves, higher will be the level of utility.

2.1.3 Marginal Rate of Substitution (MRS):

The concept of MRS is an important tool of indifference curve analysis. MRS may be defined as the rate at which an individual consumer is prepared to exchange successive units of one commodity for another, say X for Y (MRS_{xy}). This may be defined as the amount Y the consumer is willing to give up in order to get an additional unit of X. Similarly, say Y for X (MRS_{yx}) may be defined as the amount of X the consumer is willing to give up in order to get an additional unit of Y. The MRS can be understood more precisely with the help of the following indifference schedule. When the consumer moves combination (A) to (B) the consumer gives up 4 units of Y for getting 1 unit of X, but consumer's level of satisfaction remains the same. At this stage, $MRS_{xy}= 4$; successively, when the consumer sacrifices 3 units of Y for 1 additional unit of X, $MRS_{xy}=3$ and when consumer sacrifices further 2 units of Y for 1 extra unit of X, $MRS_{xy}= 2$ and so on. This could be illustrated with the help of the following table:

Combinations	X	Y	$MRS_{xy}=\Delta y/\Delta x$
A	1	20	---
B	2	16	20-16=4
C	3	13	16-13=3
D	4	11	13-11=2

MRS is defined, mathematically, as-

$$MRS_{xy}= \frac{MUx}{MUy};$$

MRS is, basically, measured by means of slope of the concerned Indifference curve. Hence, if MRS_{xy} is decreasing then it means that the slope of Indifference curve is subsequently diminishing. The geometric explication of this illustration is that it implies Indifference curve is convex to the origin which is, however, one of the important properties of Indifference curve.

3.1 Consumer Equilibrium:

The theory of consumer behaviour takes into account three basic factors. They are-

1. Objects of choice- i.e. goods consumed.
2. Constraints on choice, such as the income of the consumer, the given prices of goods.
3. Choice involves selection among alternatives.

This is guided by the tastes and preferences of the consumer.

The consumer is assumed to behave in conformity with the assumptions of the model already cited (see section 1.1.2). The problem the consumer is facing relates to the maximization of the utility he derives by spending all his give income on goods with given prices.

In order to identify the point of maximum attainable utility subject to the constraints of income and prices he must take into account his scale of preferences represented by his indifference map, and the budget line. The position and shape of budget line is determined by the income of the consumer and the relative price of two goods. The indifference map consists of a series of indifference curves, each representing specific level of utility. As we move from the origin, up and towards the right, we reach higher and yet higher levels of utility. So, the consumer always aims at reaching the highest possible indifference curve. The budget line represents the upper boundary of the feasible set of bundles of goods he can get with his/her given income on the given prices. Any point above the boundary represents a combination he/she cannot afford.

Suppose, the total income of the consumer= Rs. I/- (Fixed)

Price of X=P_x and Price of Y=P_y; then the slope of the budget line will be= - (P_x/P_y).
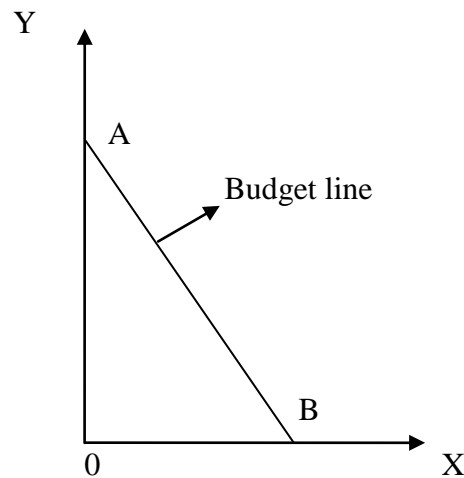
The budget line may be drawn as follow-

Figure 2: Budget line

Here, AB is the budget line every point on which denotes a constant amount of income.

At the consumer equilibrium, the goal of the the consumer is to identify the particular combination of goods X and Y that makes MRS_{xy} equal to the price ratio P_x/P_y. In the following figure, both indifference curves and budget line are given. We find that at the point E, where the

IC_2 is tangential to the budget line, the MRS_{xy} (Slope of IC_2) and P_x/P_y (Slope of budget line) are equal.

Any point above the budget line unattainable. Any point below it takes the consumer to an indifference curve say IC_1 that is lower than is attainable with his income and given prices. Thus, here, the maximum level of utility attainable is IC_2 which is tangential to the budget line.
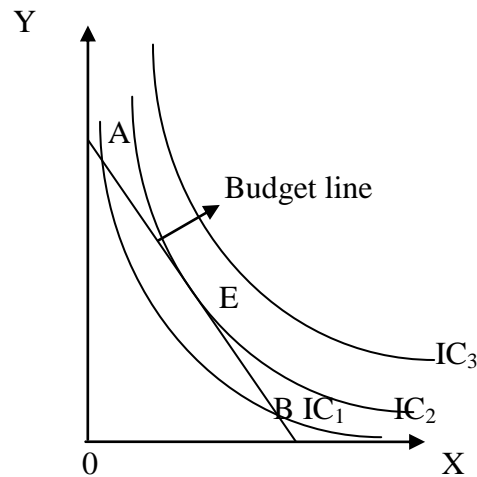

Figure 3: Consumer equilibrium

AB: Budget line; IC_1, IC_2, IC_3- Indifference curves; E- Point of consumer equilibrium.

Thus, at the point of tangency of indifference curve and budget line at point E, consumer attains the highest possible utility subject to his income constraint. And at point E,

$$MRS_{xy} = P_x/P_y.$$

4.1   Limitations of the Indifference curve approach:

The indifference curve approach is not free from limitations. The following criticisms could be put forward against the indifference curve approach-

❖ In the indifference curve theory, it it assumed that the consumer can order any two commodity combinations according to scale of preferences. Now assuming that there are two commodities and that both of them are finely divisible we can get infinite number of combinations of the two commodities. The consumer is supposed to rank all the infinite number of combinations open to him. Only then the consumer can possess an indifference map. However, this assumption is not realistic. No consumer will be able to rank all the available alternatives open to him.

❖ The indifference curve approach assumes that both the commodities are perfectly divisible. For only then the indifference curve will be continuous. But in practice the two commodities are available only in finite quantities. They are not always finely divisible. If they are not finely divisible, the indifference curves will be discontinuous.

❖ The indifference curve approach is applicable only when there are two commodities. When there are more than two commodities indifference curves cannot be drawn.

❖ The indifference curve approach adopts introspective method. In this method the laws are deduced from introspection i.e. from what the ideal consumer thinks to do. This method is unscientific as it fails to analyze the behaviour of an ordinary consumer.

Possible Questions:

A. Short Answer Type Questions: (Marks: 2)

1. What is utility?

2. Define Indifference curve?

3. Define Budget line?

4. 'Indifference curve is negatively sloped'; Why?

5. 'Indifference curve is convex to the origin'; Why?

B. Medium Answer type Question: (Marks: 5)

1. What do you reckon by Hicks-Allen approach of utility?

2. Draw an Indifference map. Give its implication.

3. What do you understand by ordinal measurement of utility?

4. What are the assumptions of Indifference curve approach?

5. What are the properties of indifference curve?

6. How could we construct Indifference curve?

7. What are the implications of off the curve points on the budget line?

8. What is Marginal Rate of Substitutions of X for Y?

C. Essay Types Question: (Marks: 10)

1. How could you explain consumer equilibrium? Derive consumer equilibrium in a two commodity framework with the help of Indifference curve and Budget line.

Suggested Readings:

Sl No.	Title	Author	Publisher
1	Microeconomics, 8th Edition	Robert Pindyck & Daniel Rubinfeld Chapters 3, 4	Pearson Education
2	Microeconomics, 5th Edition	David Besanko, Ronald Braeutigam	Willy Publication
3	Microeconomics: Theory and Applications	G.S. Maddala and Ellen M. Miller	McGraw-Hill Inc.US
4.	An Outline of Microeconomics	Harasankar Bhattacharyya and Jaydeb Sarkhel	Calcutta Book House

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