Module: 02

Cardinal or Marginal Utility Analysis and **Ordinal Utility or Indifference Curve** Analysis

Session Outline

- Concept of utility
- Relationship between marginal utility and total utility
- Law of diminishing marginal utility
- Utility maximizing rule
- Consumer surplus

Concept of Utility

- What is Utility?
- What do you mean by choice and preference? Is choice and preference same?
- Utility Maximization

Approaches to Measurement of Utility

| | Cardinalist Approach | Ordinalist Approach |
|------|-------------------------|------------------------|
| Good | Utility (in utils) | Rank order |
| А | 14 | 2nd |
| В | 03 | 5th |
| С | 10 | 3rd |
| D | 08 | 4th |
| E | 17 | 1st |

Total Utility and Marginal Utility

| Units of Good X | Total Utility | Marginal Utility |
|--------------------|---------------|---------------------|
| 0 | 0 | 0 |
| 1 | 10 | 10 |
| 2 | 18 | 8 |
| 3 | 24 | 6 |
| 4 | 28 | 4 |
| 5 | 28 | 0 |
| 6 | 26 | -2 |

5

Marginal and Total Utility



Law of Diminishing Marginal Utility

"If an individual consumes more and more of a good, the amount of extra (or marginal) utility he derives from each additional unit tends to decline, given the period of time"

The Law of Diminishing Marginal Utility

| The Law of diminishing marginal utility (chocolates) | | | |
|--|--------------------------------|-----------------------------|--|
| Unit of chocolates | Marginal utility (in utils) | Total utility (in utils) | |
| First | 10 | 10 | |
| Second | 6 | 16 | |
| Third | 2 | 18 | |
| Fourth | 0 | 18 | |
| Fifth | -5 | 13 | |

Utility-Maximizing Rule



The utility-maximizing combination of products A and B obtainable with an income of Rs.10 (hypothetical data)

| Unit of product | Product A: Price = Rs.1 | | Product B: Price = Rs.2 | |
|-----------------|--|---|--|---|
| | (a) Marginal Utility (in utils) | (b) Marginal Utility per rupee (MU/price) | (a) Marginal Utility (in utils) | (b) Marginal Utility per rupee (MU/price) |
| First | 10 | 10 | 24 | 12 |
| Second | 8 | 8 | 20 | 10 |
| Third | 7 | 7 | 18 | 9 |
| Fourth | 6 | 6 | 16 | 8 |
| Fifth | 5 | 5 | 12 | 6 |
| Sixth | 4 | 4 | 6 | 3 |

10

Derivation of Demand Curve Using Marginal Utility Curve



11

An Alternative Approach

- Price Effect
- Substitution Effect
- Income Effect

Price Effect = Substitution Effect + Income Effect

Diamond and Water Paradox



Consumer Surplus

| Apples purchased | Marginal benefit (in Rs.) | Total benefit (in Rs.) | Expenditure on Apples @ Rs.5 each | Consumer Surplus (in Rs.) |
|---------------------|---------------------------------|---------------------------|---|---------------------------------|
| 1 | 10 | 10 | 5 | 5 |
| 2 | 8 | 10 + 8 = 18 | 10 | 5 + 3 = 8 |
| 3 | 5 | 18 + 5 = 23 | 15 | 8 + 0 = 8 |
| 4 | 3 | 23 + 3 = 26 | 20 | 8 – 2 = 6 |

Computation of Consumer Surplus



Consumer Surplus (Graphical Representation)



Session Outline

- Indifference Curve
- Properties of indifference curve
- Budget line
- Properties of budget line
- Equilibrium of tangency
- Derivation of demand curve using indifference curve

Indifference Curve Analysis

• What is indifference curve?



Properties of Indifference Curve

- Indifference curve slopes downward
- Two indifference curve cannot intercept each other
- An indifference curve must be convex to the origin
- Indifference map

Indifference Curve Slopes Downward



Convexity



Two Indifference Curves Cannot Intercept Each Other



Indifference Map



Degree of Substitutability (Ordinary Goods)



24

Degree of Substitutability (Perfect Substitutes)



Reynolds Pen at the Shop A

Degree of Substitutability (Perfect Complements)



Budget Constraint

• What is budget line?

$$Y = P_x \cdot Q_x + P_y \cdot Q_y$$

Where Y = Total income $P_x = Price \text{ of product } X$ $Q_x = Quantity \text{ of product } X$ $P_y = Price \text{ of product } Y$ $Q_y = Quantity \text{ of product } Y$

Budget Constraint

| The budget line: combinations of A and B attainable with an income of Rs.12 | | | |
|---|-------------------------|----------------------|--|
| Units of A (Price = | Units of B (Price of | Total Expenditure | |
| Rs.1.50) | Rs.1.00) | (in Rs.) | |
| 8 | 0 | 12 (=12 + 0) | |
| 6 | 3 | 12 (=9 + 3) | |
| 4 | 6 | 12 (=6 + 6) | |
| 2 | 9 | 12 (=3 + 9) | |
| 0 | 12 | 12 (=0 + 12) | |

Budget Line

Quantity of A



Characteristics of Budget Line (a) Income Change



Characteristics of Budget Line (b) If prices of two goods increase



Characteristics of Budget Line (c) Price of a Good Changes



Equilibrium of Tangency



Quantity of B

Session Outline

- 1) Deriving the price consumption curve
- 2) Deriving the demand curve
- 3) Deriving the income consumption curve





DERIVING THE DEMAND CURVE USING PRICE CONSUMPTION CURVE

Price

Quantity Demanded

36

Derivation of Demand Curve Using Indifference Curve

- The demand curve of the consumer can be derived from the price consumption curve (PCC).
- A price consumption curve represents the successive point of tangency between the different budget lines and the indifference curves as seen in the graph above

INCOME CONSUMPTION CURVE

 The equilibrium of the consumer is obtained on the basis of the assumption that the income level of the consumer and the prices of both the commodities remain constant. If the income of the consumer changes, the budget line shifts as seen in the earlier slides.

INCOME CONSUMPTION CURVE

- The locus of all points of tangency between the budget lines and the indifference curve is called the Income consumption curve.
- The income consumption curve shows the effect of the change in income on the equilibrium quantities purchased of the two commodities.



Derivation of Demand Curve Using Indifference Curve



41