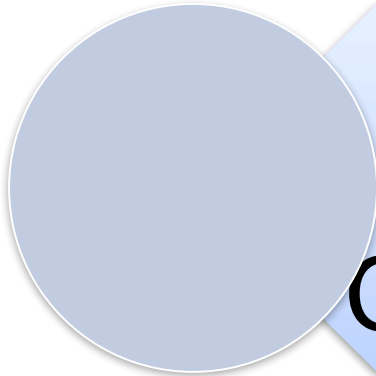




UNIT 3

Theory of Consumer Behaviour



THE CONCEPT OF UTILITY

Utility:

- The satisfaction which a consumer gets by having or consuming goods or services.
- The same commodity gives different utilities to different consumers.
- Even for the same consumer, utility varies from unit to unit, from time to time and from place to place.

Measurement of Utility

I Total Utility

- the sum total of satisfaction which a consumer receives by consuming the various units of the commodity.

II Marginal Utility

- the change in total utility resulting from one unit change in the consumption of the

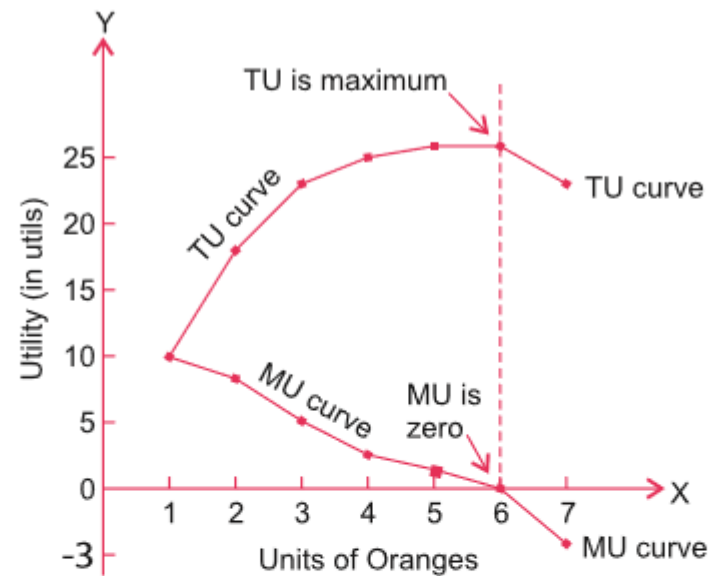
$$MU_x = \frac{\Delta TU_x}{\Delta Q_x}$$

Relationship between Total Utility and Marginal Utility

Table 3.1: Marginal Utility and Total Utility

Units of Oranges Consumed	Marginal Utility (utils)	Total Utility (utils)
0	–	0
1	10	10
2	8	18
3	5	23
4	2	25
5	1	26
6	0	26
7	–3	23

Total
Utility
= Sum
of all
Margin
al
Utilities



Where, TU = Total utility and MU = Marginal utility.

Figure 3.1: Relationship between total utility and marginal utility

A study of [Table 3.1](#) and [Figure 3.1](#) indicates the following relationship between Total Utility (TU) and Marginal Utility (MU).

- *TU increases as long as marginal utility is positive .*
- *TU is maximum when MU is zero.*
- *TU starts declining when MU becomes negative.*



THE CARDINAL UTILITY THEORY

Assumptions

- **Rationality** - The consumer is rational. She/he aims at the maximisation of her/his utility, subject to the constraints imposed by her/his given income. □
- **Cardinal utility**: The utility of each commodity is measurable. □
- **Constant Marginal Utility of Money**: This assumption is necessary if the monetary unit is used as the measure of utility. □
- **Diminishing Marginal Utility**: The utility gained from the successive units of a commodity diminishes. This is the axiom of diminishing marginal utility

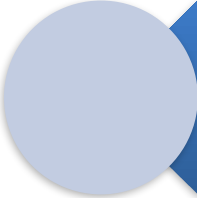
The Law of Diminishing Marginal Utility

As the amount of a commodity increases, the utility derived by the consumer from the additional units, that is, marginal utility, goes on decreasing.

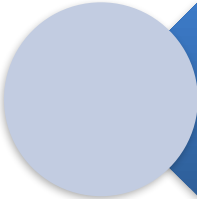
In other words, as the consumer consumes more, her/his total utility will increase but at a decreasing rate.

It is a natural fact that when a consumer consumes additional units of a particular good at a point of time, her/his desire for every successive unit become less intense, consequently utility derived from each successive unit diminishes.

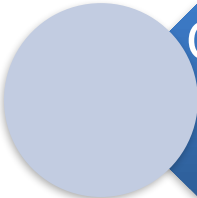
Assumptions of the Law of Diminishing Marginal Utility



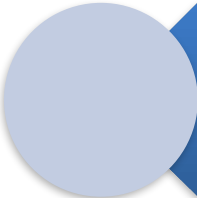
Various units of the good are homogeneous,



There is no time gap between consumption of the different units,
□



Consumer is rational (that is, she/he has complete knowledge and maximises utility),



Tastes, preferences and fashions remain unchanged.

A consumer will be in equilibrium when she/he spends her/ his given income on the purchase of different commodities in such a way so as to maximise her/his total utility.

The law of equi-marginal utility states that a consumer gets maximum satisfaction when the ratio of marginal utilities of all commodities and their prices is equal. In other words, the consumer should incur expenditure on different commodities in such a manner that the marginal utility of the last Birr spent on each one of them is equal.

Mathematically, the conditions of equilibrium are as follows.

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \dots\dots\dots = \frac{MU_n}{P_n}$$

Where, MU_x = Marginal utility of commodity x;

MU_y = Marginal utility of commodity y;

MU_n = Marginal utility of commodity n

P_x = Price of x

P_y = Price of y

P_n = Price of n

Expenditure on x + Expenditure on y + ... + Expenditure on n = Consumer's Income

or

$$P_x \times Q_x + P_y \times Q_y + \dots + P_n \times Q_n = I$$

Where, Q_x , Q_y and Q_n are quantities of commodities x, y and n, respectively
and I = consumer's income.

An Illustration

Suppose there are two commodities x and y.
 $P_x = \text{Birr } 4 \text{ per unit}$; $P_y = \text{Birr } 2 \text{ per unit}$;
consumer's money income = Birr 30.
Marginal utilities of x and y are given in Table 3.2 below.

Table 3.2:

Unit	MU_x	MU_y
1	80	40
2	72	38
3	64	36
4	56	34
5	48	32
6	40	30
7	32	28
8	24	26
9	16	24
10	8	22

Table 3.3: Per Birr MU of x and y

Unit	MU_x/P_x	MU_y/P_y
1	20	20
2	18	19
3	16	18
4	14	17
5	12	16
6	10	15
7	8	14
8	6	13
9	4	12
10	2	11

At 4 units of $x = \frac{MU_x}{P_x} = 14$ and at 7 units of $y = \frac{MU_y}{P_y} = 14$.

$$\therefore \frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

Also, $P_x \times Q_x = 4 \times 4 = \text{Birr } 16$

$$P_y \times Q_y = 2 \times 7 = \text{Birr } 14 \text{ and } I = \text{Birr } 30$$

$$\therefore P_x \times Q_x + P_y \times Q_y = I: (16 + 14 = 30)$$

Class Work

Table 1: Total Utility of Good X and Y

Units	<u>TU_x</u> (Units)	<u>TU_y</u> (Units)	MU _x /P _x	MU _y /P _y
1	20	24		
2	38	45		
3	54	63		
4	68	78		
5	80	90		
6	90	99		

Income Rs 24

Price of x Rs.2

Price of y Rs.3

Class Work

Table 1: Marginal Utility of Good X and Y

Units	MU _x (Units)	MU _y (Units)	MU _x /P _x	MU _y /P _y
1	20	24	10	8
2	18	21	9	7
3	16	18	8	6
4	14	15	7	5
5	12	12	6	4
6	10	9	5	3

Income Rs 24

Price of x Rs.2

Price of y Rs.3

6 units of X

4 units of Y

$$MU_x/P_x = MU_y/P_y = 10/2 = 15/3 = 5$$

THE ORDINAL UTILITY
THEORY:
INDIFFERENCE CURVE
APPROACH

Indifference Set, Curve, and Map

Indifference Set

- a table that shows various combinations of two goods which give equal level of satisfaction (utility) to the consumer.

Table 3.4: Indifference Set

Combination	Good X (units)	Good Y (units)
A	1	10
B	2	7
C	3	5
D	4	4

An indifference curve shows various combinations of two goods which give equal satisfaction to the consumer.

Different points A, B, C and D on indifference curve IC show the combinations of good X and good Y which give equal satisfaction to the consumer.

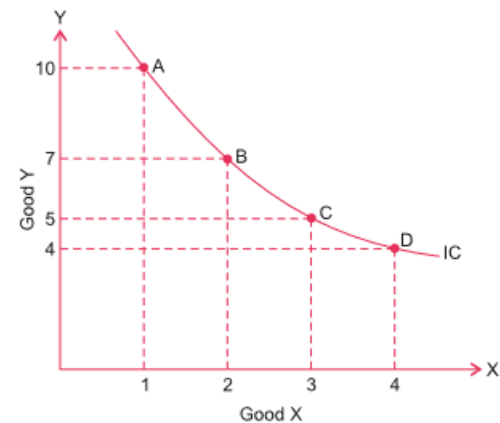


Figure 3.2: Indifference Curve

An indifference map is a group or set of indifference curves, each one of which represents a given level of satisfaction.

The farther the curve is from the origin, the higher is the level of satisfaction it represents.

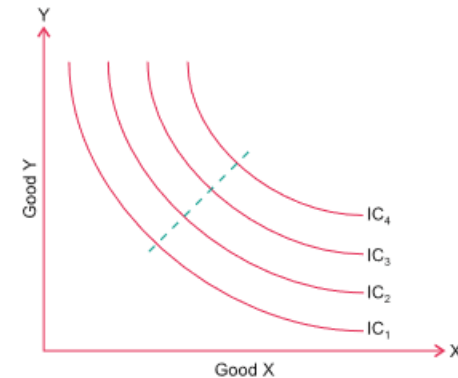


Figure 3.3: Indifference Map

Properties of Indifference Curve

I. Indifference curve is downward sloping:

II. Indifference curve is convex to the origin:

III. Two indifference curves never intersect each other

MRS_{X,Y} is the number of units of good Y that must be given up in extra unit of good X so that maintains the same level

$$MRS_{xy} = \frac{\text{Amount of } Y \text{ lost}}{\text{Amount of } X \text{ gained}} = \frac{\Delta Y}{\Delta X}$$

it shows the rate at which one good is substituted for another good, while remaining on the same indifference curve.

Table 3.5: Marginal Rate of Substitution

Combination	Good X	Good Y	MRS_{xy}
A	1	12	
B	2	8	4
C	3	5	3
D	4	3	2
E	5	2	1

A good is demanded by the consumer if he/she has:

- a preference for that good
- □ purchasing power to buy the good

$$E = Q_X \cdot P_X + Q_Y \cdot P_Y$$

The budget equation (Equation 3.6) gives us a budget line. Let a consumer have $E = \text{Birr } 2,000$, $P_X = \text{Birr } 50$ and $P_Y = \text{Birr } 40$. The maximum amount of X which he can buy can be found from his budget equation:

$$2000 = 50(Q_X) + 40(0) \text{ or } Q_X = 40$$

Similarly, we find that the maximum amount of $Q_Y = 50$.

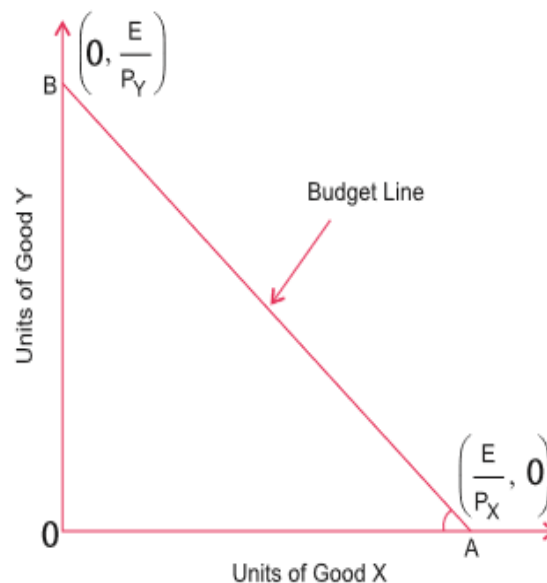


Figure 3.6: The Budget Line

So, the combinations (40, 0) and (0, 50) are possible consumption bundles within the budgeted amount of money. By joining these two points in a graph we get the budget line AB (Figure 3.6). All combinations of goods X and Y on the budget line can be purchased by the consumer if she/he spends whole of his allocated money on X and Y, given prices of goods X and Y.

budget line as a graph that shows various combinations of two commodities which can be purchased with a given budget at given prices of the two

Note that the slope of the budget line AB ([Figure 3.6](#)) would be equal to

$$\frac{\Delta Y}{\Delta X} = \frac{E/P_y}{E/P_x} = \frac{P_x}{P_y} \text{ relative prices of X and Y.}$$

Effect of Change in Income/Price of Goods

In case income of the consumer changes, with prices of the two goods remaining the same, there will be a parallel shift in the budget line (Figure 3.7). Whereas with a change in price of good, say X, (income and price of Y remaining constant), the budget line shifts only at its end touching the relevant-axis (X-axis here) (Figure 3.8). The budget line $A_1 B_1$ shifts outward to $A_1 B_2$ when price of X declines. It would have shifted inward if price of X increased.

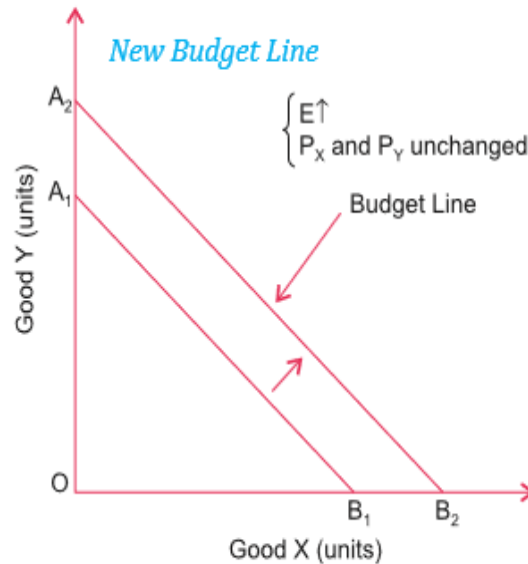


Figure 3.7: Change in Consumer's Income

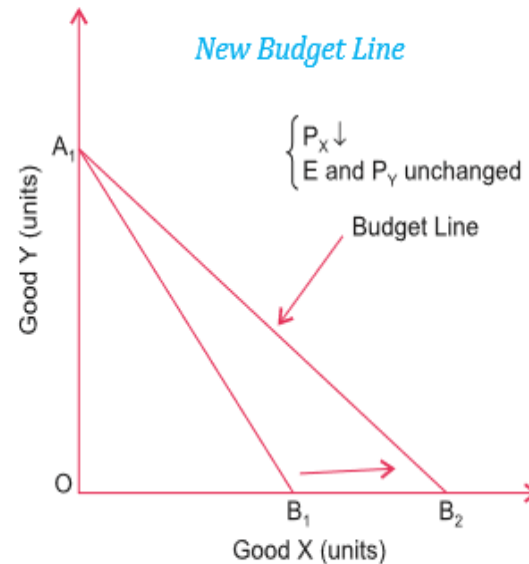


Figure 3.8: Decrease in Price of Good X

A consumer will be in equilibrium when
**the budget line is tangent to the
highest attainable indifference curve.**



This is shown in Figure 3.9, where E is the equilibrium point, having combination X^* and Y^* of goods X and Y respectively. Any other point, like (C, D, F, G, etc.), cannot be considered as optimum point because it lies on a lower indifference curve than I_3 (where point E lies). On the other hand, any point like H is unattainable, because it is outside the budget line.

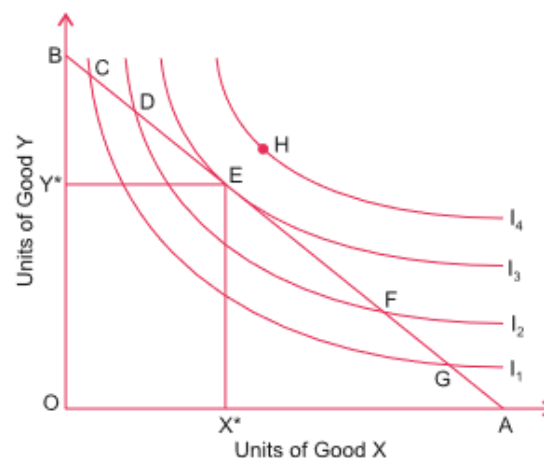


Figure 3.9: Consumer's Equilibrium

Note that at the point of tangency E,

Slope of budget line = Slope of indifference curve I_3

Also, slope of budget line = $\frac{P_x}{P_y}$ (price ratio of X and Y) and,

slope of indifference curve = $\frac{\Delta Y}{\Delta X} = MRS_{xy}$

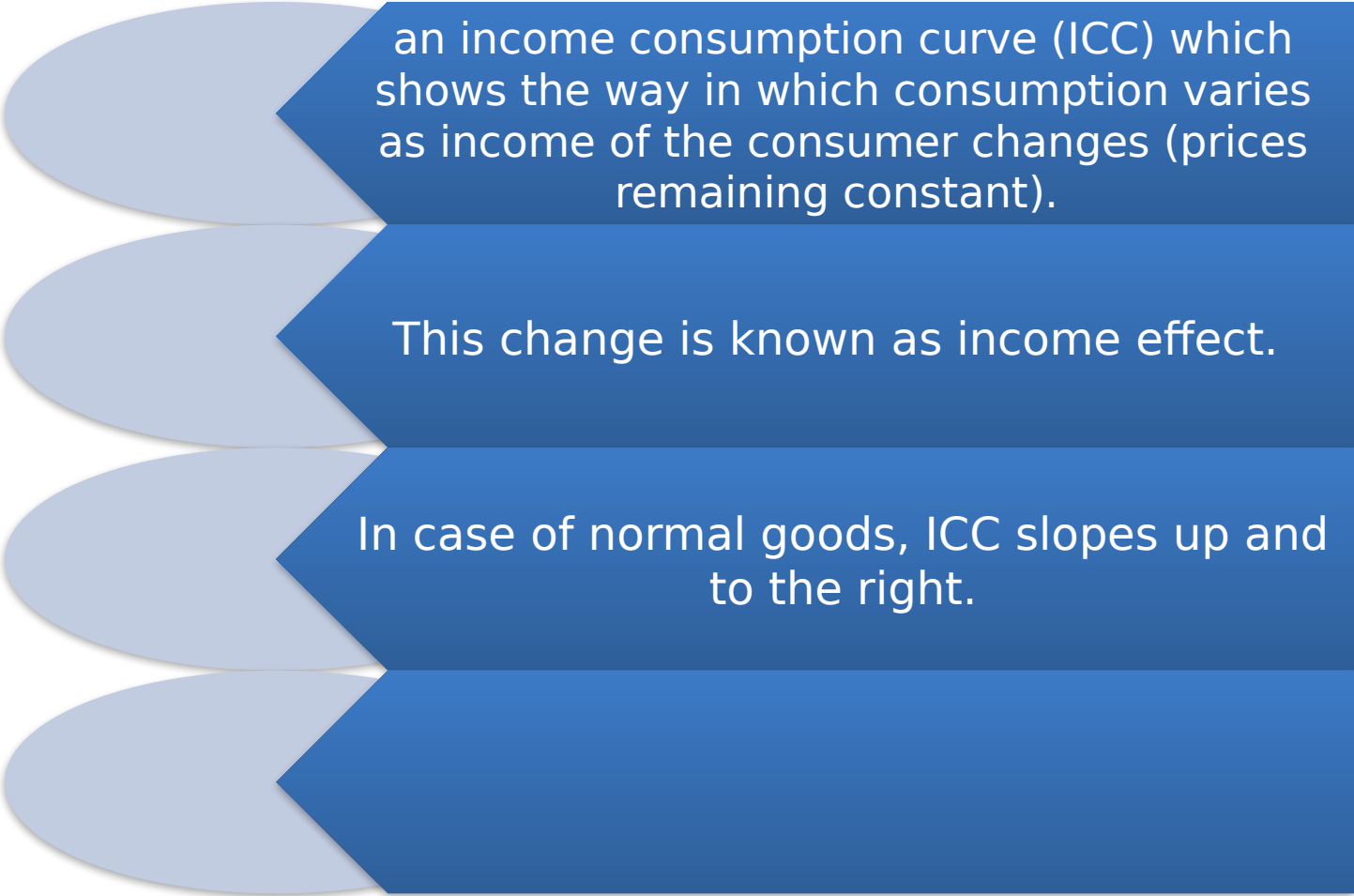
$\therefore$ At equilibrium point E,

$$\frac{P_x}{P_y} = \frac{\Delta Y}{\Delta X} \quad (3.7)$$

So we may express the condition of consumer equilibrium in another way, as below.

Price ratio of two goods = MRS

Income Effect (Income Consumption Curve)



an income consumption curve (ICC) which shows the way in which consumption varies as income of the consumer changes (prices remaining constant).

This change is known as income effect.

In case of normal goods, ICC slopes up and to the right.

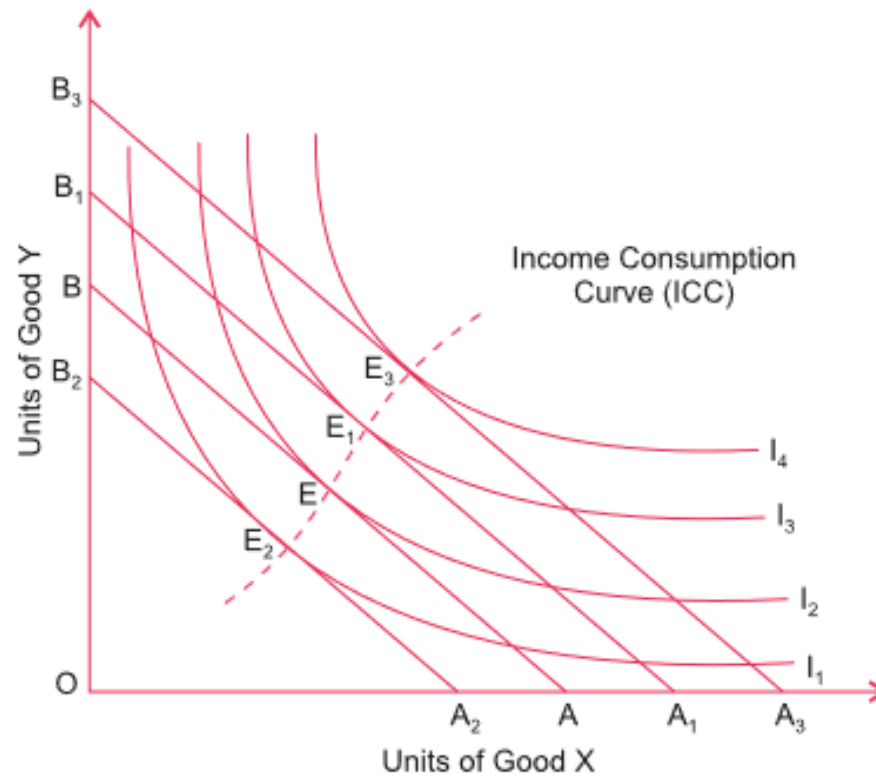


Figure 3.10: Income Effect



Figure 3.11: Price Effect