# CONSUMER'S EQUILIBRIUM

A consumer is one who buys goods and services for satisfaction of wants.

**Why are we studying this chapter?**

As the resources are limited in relation to unlimited wants , a consumer has to follow some principles or laws in order to attain the highest level of satisfaction. To study about this highest level of satisfaction we are going to study this chapter.

**Two main approaches to study consumer behaviour and consumer equilibrium are:-**

1. Cardinal Utility approach ( Marshall's Utility Analysis or Marginal Utility analysis)
2. Ordinal Utility approach ( Indifference Curve Analysis or Hicksian Analysis)

## CARDINAL UTILITY APPROACH

Numerical

Satisfaction

Under the cardinal utility approach, the concept of '**UTILITY**' is used to attain the consumer's equilibrium.

**Utility**:- It refers to want satisfying power of a commodity. Utility differs from person to person, place to place and time to time.

## How to Calculate Utility?

By using Cardinal Utility approach, it is possible to numerically estimate Utility, which a person derives from consumption of goods and services. But, there is no standard unit to measure utility.
Therefore, economists derived an imaginary measure known as '**UTILS**'.

**UTILS** are imaginary units which are used to measure satisfaction obtained from consumption of a certain quantity of a commodity.

**Total Utility:-** it refers to the total satisfaction obtained from the consumption of all possible units of a commodity.

$$TU_n = U_1 + U_2 + U_3 + \text{-----} + U_n$$

**Marginal Utility:-** It is the additional utility derived from the consumption of one more unit of the given commodity.

When change in unit is 'one'

$$MU_n = TU_n - TU_{n-1}$$

$$MU_2 = TU_2 - TU_1 =$$

When change in unit is 'more than one'

$$MU = \frac{\text{change in TU}}{\text{change in no. of units}}$$

(1) + (2)

(1) + (2) + (3)

| Ice creams consumed | TU | MU |
|---|---|---|
| 1 | 20 | 20 |
| 2 | 36 | 36 − 20 = 16 |
| 3 | 46 | 10 |
| 4 | 50 | 4 |
| 5 | 50 | 0 |
| 6 | 44 | 44 − 50 = −6 |

(1) + (2) + (3) + (4) + 5

TU increases at ↑sing rate → When MU is ↑sing

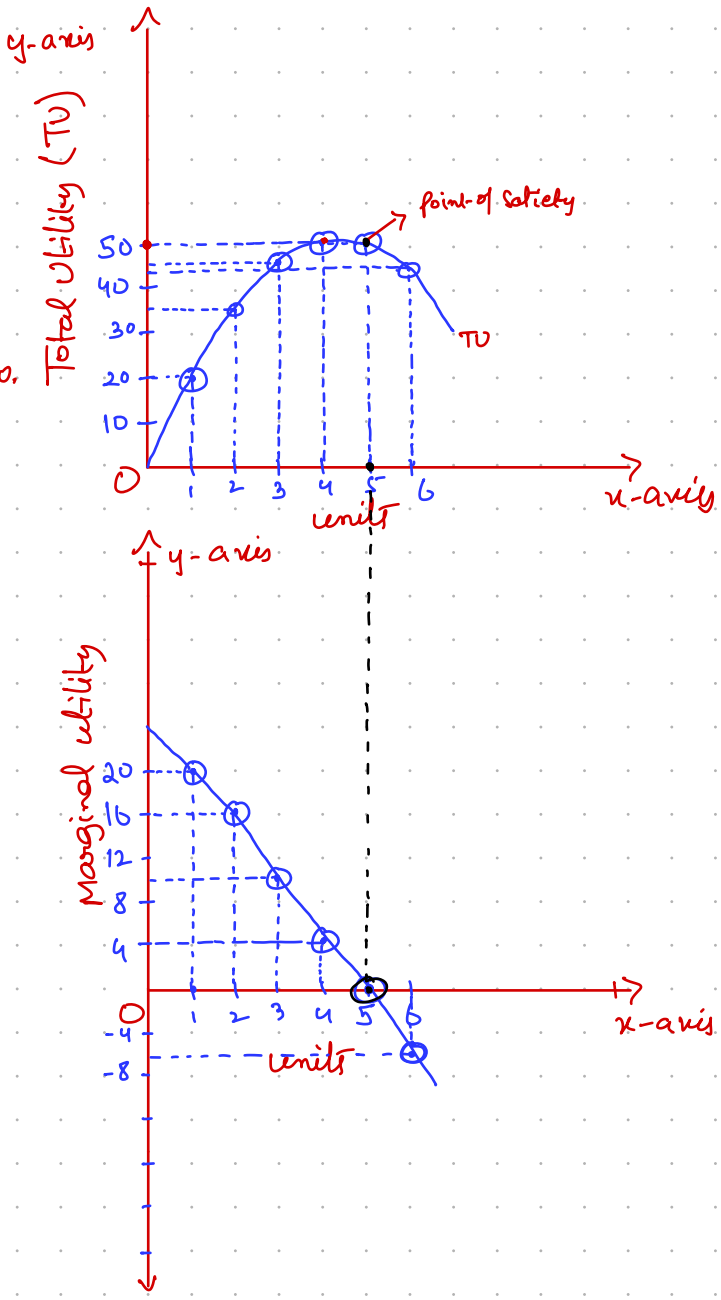
TU increases at ↓sing rate → When MU is ↓sing

## Relationship between TU & MU.

1. TU increases with increase in consumption as long as MU is positive. i.e till 4th icecream. Here, TU is increasing but at a diminishing rate, because MU is decreasing.

2. When TU reaches at maximum, MU is zero. ie 5th cream. This point is known as point of Satiety. At this point, TU stops increasing.

3. After the point of satiety, TU starts falling as MU becomes negative.




## ★★ Law of Diminishing Marginal Utility :-

Law of diminishing marginal utility(DMU) states that as we consume more and more units of a commodity, the utility derived from each successive unit goes on decreasing.

- Law of DMU is a UNIVERSAL law and it applies to all the goods and services.
- Law of DMU was given by Proff. H.H GOSSEN.
- Its another name is Gossen's First law of consumption.

## Assumptions of Law of DMU:-

**1. Consumption of reasonable quantity:-** It is assumed that a reasonable quantity of the commodity is consumed.

**2. Continuous Consumption:-** It is assumed that consumption is a continuous process.

**3. No change in quality:-** Quality of the commodity consumed is assumed to be constant.

**4. Fixed income and prices:-** It is assumed that income of the consumer and prices of the goods which the consumer wishes to purchase remain constant.

**5. Perfect Knowledge:-** It is assumed that the consumer knows the different goods on which income can be spent and the utility that he is likely to get out of such consumption.

## Consumer Equillibrium (Cardinal Approach)

It refers to the situation when a consumer is having maximum satisfaction with limited income and has no tendency to change his way of existing expenditure.

As per the Law of DMU, utility derived from each successive unit goes on decreasing. At the same time, his income also decreases with purchase of more and more units. So, a rational consumer aims to balance his expenditure in such a manner, so that he gets maximum satisfaction with minimum expenditure.

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Consumer equilibrium, can be discussed under two different situations:-

1. Consumer spends his entire income on a Single Commodity
2. Consumer spends his entire income on Two Commodities

## Consumer spends his entire income on Single Commodity:-

A consumer purchasing a single commodity will be at equilibrium, when he is buying such a quantity of that commodity, which gives him maximum satisfaction.

$$\text{MU in terms of Money} = \frac{\text{MU in utils}}{\text{MU of one Rupee } (MU_m)}$$

Equilibrium Condition :-

x -> name of commodity

$$MU_x = P_x$$

when Marginal utility is equal to price paid for the commodity.

for Simplicity, it is assumed that

₹ 1 = 1 utils therefore $MU_m$ = ₹ 1

$$\text{MU in terms of Money} = \frac{\text{MU in utils}}{\text{MU of one Rupee } (MU_m)}$$

what if $MU_x > P_x$

If MUx is greater than Px, then consumer is not at equilibrium and he goes on buying because benefit is greater than the cost. As he buys more, MU falls because of Law of DMU. When MU becomes equal to price, consumer gets maximum benefit and he is in equilibrium.

what if $MU_x < P_x$

In this case also consumer is not at equilibrium, as he will have to reduce consumption of commodity to raise his total satisfaction till MU becomes equal to price.

So, it can be concluded that a consumer who is consuming a single commodity, will be at equilibrium when MU from commodity is equal to Price paid for the commodity.

$$\frac{MU_x}{MU_M} = P_x$$

$$\frac{MU_x}{P_x} = MU_M$$

**Table 2.3: Consumer's Equilibrium in case of Single Commodity**

| Units of x (icecream) | Price ($P_x$) (₹) | Marginal utility (utils) | Marginal utility in ₹ ($MU_x$) 1 util = ₹1 | Difference $MU_x$ and $P_x$ | Remarks |
|---|---|---|---|---|---|
| 1 | 10 | 20 | 20 ÷ 1 = 20 | 20 – 10 = 10 | $MU_x > P_x$, so consumer will increase the consumption |
| 2 | 10 | 16 | 16 ÷ 1 = 16 | 16 – 10 = 6 | |
| **3** | **10** | **10** | **10 ÷ 1 = 10** | **10 – 10 = 0** | **Consumer's Equilibrium ($MU_x = P_x$)** |
| 4 | 10 | 4 | 4 ÷ 1 = 4 | 4 – 10 = –6 | $MU_x < P_x$, so consumer will decrease the consumption |
| 5 | 10 | 0 | 0 ÷ 1 = 0 | 0 – 10 = –10 | |
| 6 | 10 | –6 | –6 ÷ 1 = –6 | –6 – 10 = –16 | |

# Consumer Equilibrium in case of TWO COMMODITIES :-

In real life, a consumer normally consumes more than one commodity. In such a situation, **'Law of Equi-Marginal Utility'** helps in optimum utilisation of his income.

- Law of equi-marginal utility states that a consumer gets maximum satisfaction, when **ratios of MU of two commodities and their respective prices are equal** and **MU falls as consumption increases**.

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

$MU_m$ = MU of Money

**NOTE:-** A consumer in consumption of two commodities will be at equillibrium when he spends his limited income in such a way that the ratios of MU of two commodities and their respective prices are equal and MU falls as consumption increases.

# ORDINAL UTILITY APPROACH( INDIFFERENCE CURVE ANALYSIS)

**Indifference curve** refers to the graphical representation of various alternative combination of bundles of two goods among which the consumer is indifferent.

## Indifference Schedule

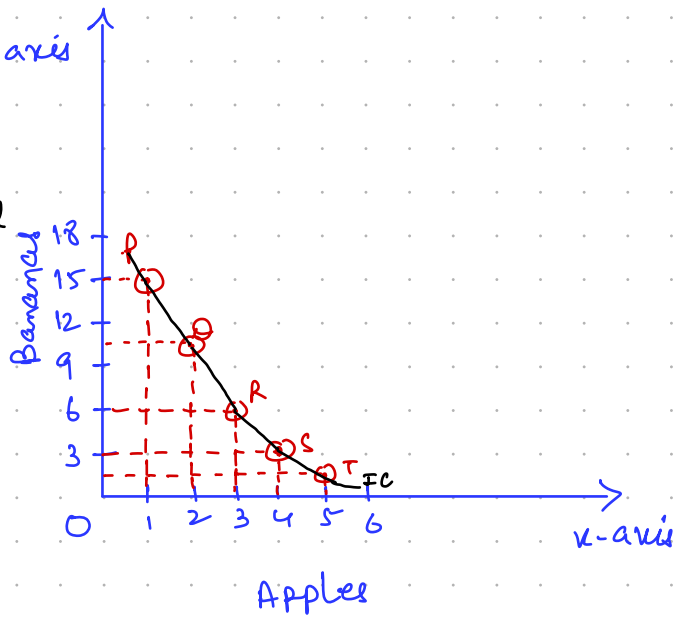
| Combination of Apples & Bananas | Apples (A) | Bananas (B) |
|---|---|---|
| P | 1 | 15 |
| Q | 2 | 10 |
| R | 3 | 6 |
| S | 4 | 3 |
| T | 5 | 1 |

+1 +1 −4 −5

As seen in schedule, consumer is indifferent between five combination of two goods(Apples and Bananas).

Combination P (1A+15B) gives the same utility as combination Q(2A+10B) and R, S &T as well.

When we represent these combinations graphically and join them together, we get an Indifference Curve (IC)




Every point on curve IC, represent same level of satisfaction to the consumer. So, consumer is said to be indifferent between combinations located on P, Q, R, S & T.

And these indifferent combinations (P, Q, R, S & T) together are known as 'Indifference set'.

**Ques**. Why does increase in consumption of one good requires decrease in consumption of other good for indifference curve analysis?

**Sol.** It happens because if consumption of one good(Apple) is increased, while that of other good(Bananas) is not decreased and vice versa, then in such a combination, consumer will have more quantity of 1 good which means more satisfaction as compared to other combinations, which is against the basic assumption of indifference schedule that each combination should have same satisfaction.

**MONOTONIC PREFERENCE:-** It means that a rational consumer always prefers more of a commodity as it offers him a higher level of satisfaction.

For example:-
A) Two given combination (10A, 10B) & (7A, 7B)
Consumer will prefer combination 1 as it contains more of both apple and bananas.

B) Two given combination (10A, 7B) & (9A, 7B)

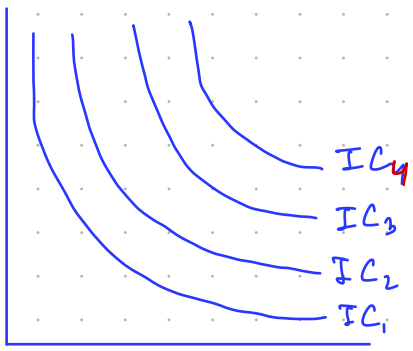
Consumer will prefer combination 1 as it contains more of both apple and equal amount of bananas.

These decisions are made because of monotonic preference.

**Indifference Map:-** It refers to the family of indifference curves that represent consumer preferences over all the bundles of the two goods.

Higher indifference curve represents higher level of satisfaction as higher IC represents larger bundle of goods, which means more utility because of monotonic preference.

Each IC shows different level of satisfaction.




$IC_1 < IC_2 < IC_3 < IC_4$

## Properties of Indifference Curve:-

**1. Indifference curves are always convex to the origin:-** An indifference curve is convex to the origin because of diminishing MRS. MRS declines continuously because of law of DMU.

**2. Indifference curve slope downwards:-** It implies that as a consumer consumes more of one good, he must consume less of the other good. It happens because if the consumer decided to have more un its of one good, he will have to reduce the units of other good, so that Total satisfaction remains same.

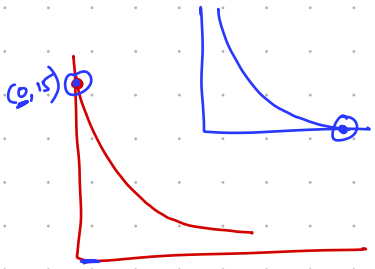
**3. Higher indifference curve represents higher level of satisfaction:-** Higher indifference curve represents large bundle of goods, which means more utility because of monotonic preferences.

**4. Indifference curve can never intersect each other:-** Two indifference curves can never intersect each other because they cannot represent same level of satisfaction.

### What is MARGINAL RATE OF SUBSTITUTION?

It refers to the rate at which the commodities can be substituted with each other, so that total satisfaction of the consumer remains the same.

- MRS measures the slope of Indifference Curve.



### 'An Indifference curve can never touch X-axis or Y-axis'. Why?

**Sol:-** If IC touches Y- axis, it would mean that consumption of commodity on X-axis is zero.

If IC touches X-axis, it would mean that consumption of commodity on Y-axis is zero.

Therefore, an IC can never touch any of the AXES.

# Budget line

curve (Graphical representation

₹ 5,000 × 2 = ₹ 10,000

It is a graphical representation of all possible combinations of two goods which can be purchased with given income and prices, such that the cost of each of these combinations is equal to the money income of the consumer.

Schedule of Budget Line

Assume Income = ₹20

| Combinations of Apple & Banana | Apple (A) (₹ 4 each) | Banana (B) (₹ 2 each) | Money Spent = Income (₹) |
|---|---|---|---|
| A | 5 | 0 | (5×4) + (0×2) = 20 |
| B | 4 | 2 | (4×4) + (2×2) = 20 |
| C | 3 | 4 | (3×4) + (2×4) = 20 |
| D | 2 | 6 | (2×4) + (2×6) = 20 |
| E | 1 | 8 | (1×4) + (2×8) = 20 |
| F | 0 | 10 | (0×4) + (10×2) = 20 |

**Budget Set:-** It is the set of all possible combinations of two goods which a consumer can afford, given his income and prices in the market.