

# Economics

## Class-12

### Chapter -2

#### Utility Analysis

## Introduction:

- Human wants are unlimited and means are limited. Therefore all human wants cannot be satisfied at a time.
- However, particular want can be satisfied fully at a specific time and a person can maximize his satisfaction from it.
- Utility is the capacity of a commodity to satisfy human wants. In other words, utility is the want satisfying power of a commodity.
- Utility analysis explains a consumer's behaviour in relation to maximization of satisfaction.



## Features of Utility:

### 1. Relative Concept:

Utility changes from time to time and place to place. For eg, i) Aqua Guard ( water purifier) has more utility in the rainy season as compared to other seasons as the risk of water-borne diseases is high. ii) A room freshner has more utility in the bathroom as compared to the drawing room.

### 2. Subjective Concept:

Utility is a psychological concept. Utility gets influenced by person's likes, dislikes, habits, preferences etc. A product may give high utility to one person but the same product may not give as much utility to another. Therefore it is a subjective concept. For eg, A measuring tape will have more utility to a tailor as compared to a cobbler.

### 3. **Ethically neutral concept:**

The concept of utility is morally and ethically colourless. It does not consider whether the commodity satisfies morally good want or bad want. A commodity can have utility even if it satisfies bad or unethical want. In short, it is ethically neutral. For eg, A gun has utility for a soldier as well as a terrorist. Their wants are of different nature but are satisfied by the same commodity.

### 4. **Utility differs from usefulness:**

Usefulness is the benefit derived which is derived by consuming a commodity whereas utility is the want satisfying power of a commodity. For eg, Alcohol has utility to a drunkard but it is not useful as it harms health. On the other hand, milk has not only utility but also usefulness to the consumer.

5. **Utility differs from pleasure:**

A commodity may have utility but it is not necessary that its consumption will give pleasure to the consumer. For eg, injection for a patient has utility because it cures the ailment but it hardly gives any enjoyment or pleasure to him.

6. **Utility differs from satisfaction:**

Utility and satisfaction are inter-related but there is a difference between the two concepts. Utility is a cause of consumption whereas satisfaction is the end result of consumption. Utility is assumed satisfaction but satisfaction is something that is actually realised by a person through consumption.

## 7. Measurement of utility is hypothetical:

The term utility is psychological and abstract concept. It can not be measured in numbers. It is also intangible and invisible. It is inherent feeling. For eg, i) thirsty person after drinking water may derive higher or lower level of utility. ii) It cannot be said that “Marie” biscuit has 3 utility and “Good Day” biscuit has 5 utility. Thus, the utility can only be experienced and found to be either positive or negative or zero. Negative utility is called as disutility.

## 8. Utility is multi-purpose:

A commodity can not only satisfy the want of more than one person but also can be put to several uses. For eg, one individual can make use of electricity for operating washing machine, another individual can make use of electricity to operate air conditioning unit.

9. **Utility depends on the intensity of want:**

Utility has direct relation to intensity of want. More intense the want, greater will be the utility. As and when the urgency declines, utility also diminishes. For eg, i) a hungry person finds more utility in food than a person who is not hungry. ii) The utility of fan is high when the weather is warm outside as the intensity of want for the fan's breeze is high.

10. **Utility is the basis of demand:**

A person demands a commodity if it gives utility to him. So, the utility forms basis for demand. For eg, i) a sick person has utility in medicines hence, he demands medicines. ii) A football player will not demand for a cricket bat as it has no utility for him instead, he will demand for football of best quality.

## Types of Utility:

### 1. Form Utility:

Utility is created by changing the shape, size and colour of the commodity. It is called as form utility. In this, the structure of an existing material changes to another structure which is more useful. So, there is increase in the utility. For eg, i) When a log of wood is transformed into a table or chair its utility increases. ii) When tea leaves are processed to a tea powder, its utility increases.

### 2. Place Utility:

If there is increase in utility of a commodity due to change in its place, it is called as place utility. Transport creates place utility. Place utility is created when goods are transferred from the place of production to the place of consumption. For eg, i) grapes of Nashik are brought to Mumbai. ii) The utility of mobile phones increases when they are distributed from manufacturing plants to mobile stores.



### 3. Service Utility:

Utility obtained from the services of professional is called as service utility. For eg, i) Professor taking lectures in the class ii) A doctor checks up and gives medicines to the patient

### 4. Knowledge Utility:

Utility obtained from acquiring knowledge is called knowledge utility. Advertisements, demonstrations, user manuals etc. help the user to acquire such knowledge. For eg, i) The utility of washing machine will increase when the user knows about its operation. ii) After completion of training, a person finds more utility in computers.

## 5. **Possession Utility:**

In this type, the ownership of goods is transferred from one person to another. For eg, i) The utility of house will increase once the ownership is transferred from the seller to the buyer. ii) The consumers find more utility in the food grains when they actually buy those food grains from a seller.

## 6. **Time Utility:**

When the utility of a commodity increases with a change in its time of utilization, it is called as time utility. It refers mainly to storage of a product and to use it during the time of need or scarcity. Warehousing helps to create time utility. For eg, i) The utility of sweaters will increase when they are made available at the time of winter season.

**Concepts of Utility:** There are two main concepts of utility. They are as follows:

1. **Total Utility (TU):**

It means the aggregate utility by the consumer from all units of a commodity consumed. In other words, it is the sum of marginal utilities derived from successive units of a commodity consumed.

For eg, If a person consumes 4 ice creams, the total utility is the sum of the total of the utilities derived from consuming all three units at a point of time.

In symbolic terms :

$$\mathbf{TU_n = MU_1 + MU_2 + \dots\dots\dots+ MU_n}$$

$$\mathbf{TU_n = \Sigma MU_n}$$

Where,

**TU<sub>n</sub> = Total Utility derived from consumption of n units**

**MU = Marginal Utility**

## 2. Marginal Utility (MU):

Marginal Utility is the additional utility derived by a consumer from an additional unit of a commodity consumed. So, it is the addition made by the last unit of a commodity consumed.

For eg,

If a person has consumed 4 plum cakes, the additional utility that he derives when he consumes 5<sup>th</sup> plum cake is the Marginal Utility of 5<sup>th</sup> unit of plum cake.

In symbolic terms:

$$\mathbf{MU_n = TU_n - TU_{(n-1)}}$$

Where,

**MU<sub>n</sub> = Marginal Utility of n<sup>th</sup> unit**

**TU<sub>n</sub> = Total Utility derived from consumption of n units**

**TU<sub>(n-1)</sub> = Total Utility derived from consumption of (n-1) units**

Formulae to explain the relationship between Total Utility and Marginal Utility:

$$\text{TU} = \Sigma \text{MU or}$$

$$\text{TU} = \text{MU}_1 + \text{MU}_2 + \text{MU}_3 + \dots + \text{MU}_n$$

$$\text{MU}_n = \text{TU}_n - \text{TU}_{(n-1)}$$

Where,

**TU**= Total Utility

**MU**= Marginal Utility

**MU<sub>1</sub>, MU<sub>2</sub>, MU<sub>3</sub>** = Marginal Utility of each unit

**MU<sub>n</sub>** = Marginal Utility of n<sup>th</sup> unit

**TU<sub>n</sub>** = Total Utility at n<sup>th</sup> level

**TU<sub>(n-1)</sub>** = Total Utility at previous level

## Relationship between Total Utility and Marginal Utility:

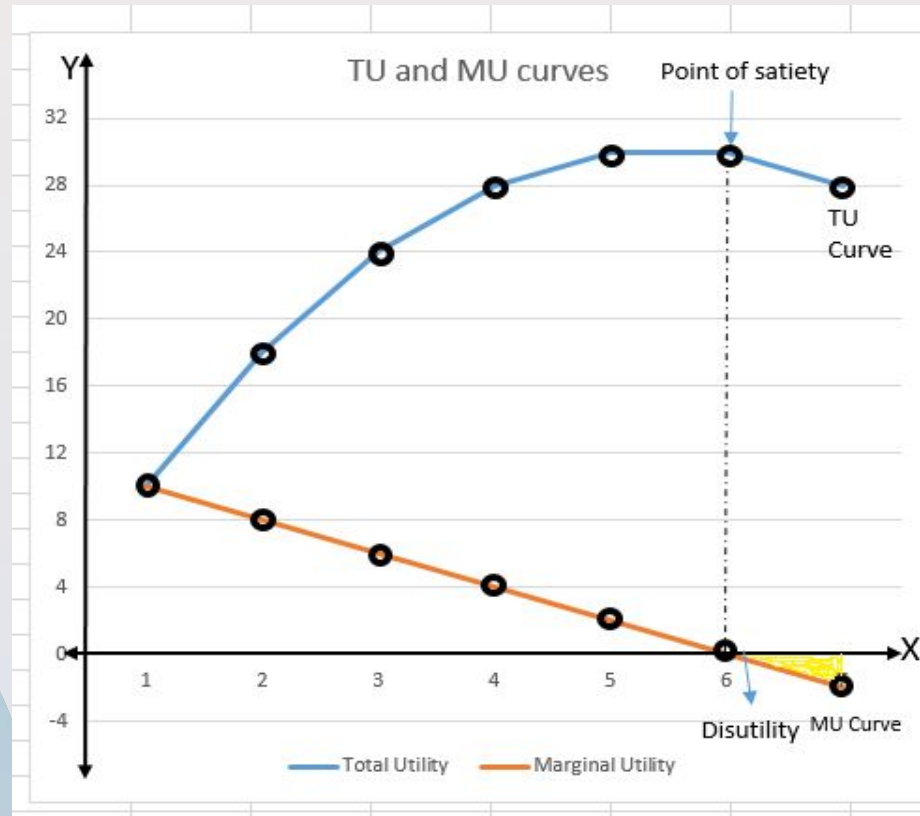
Below is the Utility Schedule and the graphical explanation of the same to explain the relationship between Total Utility and Marginal Utility.

### Utility Schedule

Units of x	Total Utility	Marginal Utility
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2
6	30	0
7	28	-2



# Graphical Presentation of the relationship between Total and Marginal Utility:



## Explanation of the graph:

TU Curve = Total Utility Curve

MU Curve = Marginal Utility Curve

In the above graph, x axis indicates the units of commodity consumed and y axis indicates the figures of total and marginal utility.

The above graph shows that total utility curve slopes upwards and marginal utility curve slopes downwards. The marginal utility curve indicates zero and negative levels of marginal utility while total utility curve shows maximum and constant total utility level.

## Observations of the graph:

1. It is observed that, when very first unit of a commodity x is consumed, the total utility and the marginal utility are the same.
2. When there is more consumption of units , the Total Utility (TU) starts increasing but at the diminishing rate. Whereas, Marginal Utility (MU) goes on diminishing. (TU $\uparrow$ MU $\downarrow$ )
3. At a certain point, total utility becomes maximum and remains constant on the other hand, marginal utility becomes zero. This is a 'Point of Satiation'.

4. After this point, if there is any consumption of any additional unit, there is decline in the total utility whereas marginal utility becomes negative. (TU↓MU negative).
5. When it reaches to the Point of Satiety, a rational consumer is supposed to stop his consumption as the maximum limit of satisfaction is reached and there is no increase in the total utility by any further increase in the stock of commodity.
6. Consumption beyond the Point of Satiety will convert satisfaction into dissatisfaction. It means, the consumer will start experiencing ill effects of the consumption.

## Difference between TU and MU:

	<b>Total Utility</b>	<b>Marginal Utility</b>
1	<b>It means the sum of utilities derived from the consumption of all the units of a commodity.</b>	<b>It is the utility derived from the consumption of the last unit of a commodity.</b>
2.	<b>Generally, it is always positive.</b>	<b>Generally, it can be positive, negative or even zero.</b>
3.	<b>It increases at diminishing rate.</b>	<b>It diminishes continuously.</b>
4.	<b>TU is maximum at the point of satiety.</b>	<b>MU is zero at the point of satiety.</b>

	<b>Total Utility</b>	<b>Marginal Utility</b>
<b>5.</b>	<b>If the consumption continues after the point of satiety, the TU declines.</b>	<b>MU becomes negative after the point of satiety.</b>
<b>6.</b>	<b>TU determines value-in-use of a commodity.</b>	<b>MU determines value-in-exchange of a commodity.</b>
<b>7.</b>	$TU_n = MU_1 + MU_2 + \dots + MU_n$ $TU_n = \sum MU_n$	$MU_n = TU_n - TU_{(n-1)}$

## **Law of Diminishing Marginal Utility:**

### **Introduction:**

Prof. Gossen was come up with this law for the first time but it was discussed by Prof. Alfred Marshall in his book 'Principles of Economics' which was published in 1890.

This law is accepted universally. It is based on the common consumer behaviour that with the reduction in the intensity of a want, the utility derived diminishes.

## Statement of the Law:

Prof. Alfred Marshall states that, “Other things remaining constant, the additional benefit which a person derives from a given increase in his stock of a thing, diminishes with every increase in the stock that he already has.”

Therefore we can conclude that the marginal utility of the consumer diminishes with the increase in the total consumption of every successive units of a particular commodity. In other words, more of a thing you have, the less you want to have more of it.



## Assumptions of the Law:

### 1. Rationality:

The law assumes the consumer to be rational which means his behaviour is normal and he tries to maximize his satisfaction.

### 2. Cardinal Measurement:

It is assumed that the utility can be measured cardinally or in numeric terms. Therefore, the law can be easily operated mathematically to know and compare the utility derived from each unit of a commodity.

### 3. Homogeneity:

It is assumed by the law that all the units of a commodity consumed by the consumer are homogeneous means identical in nature. In other words, all the units of a commodity are same in size, shape, colour, taste etc.

### 4. Continuity:

The law assumes that there will be no lapse of time in consumption. There is quick successive consumption of the units of a commodity. If this not the case, the law will not work i.e. the Marginal Utility (MU) will not diminish.

5. **Reasonability:**

The law assumes that the size of commodity unit is reasonable. In other words, the size of the unit of a commodity is neither too big nor too small i.e. there is reasonability in the size.

6. **Constancy:**

It is assumed that all the other related factors such as tastes, income, habits, choices, likes or dislikes of a consumer are to be remained constant. Also, the Marginal Utility of a money is constant.

7. **Divisibility:**

The law assumes that the commodity consumed by the consumer is divisible in nature so that it can be acquired in small quantities.

8. **Single Want:**

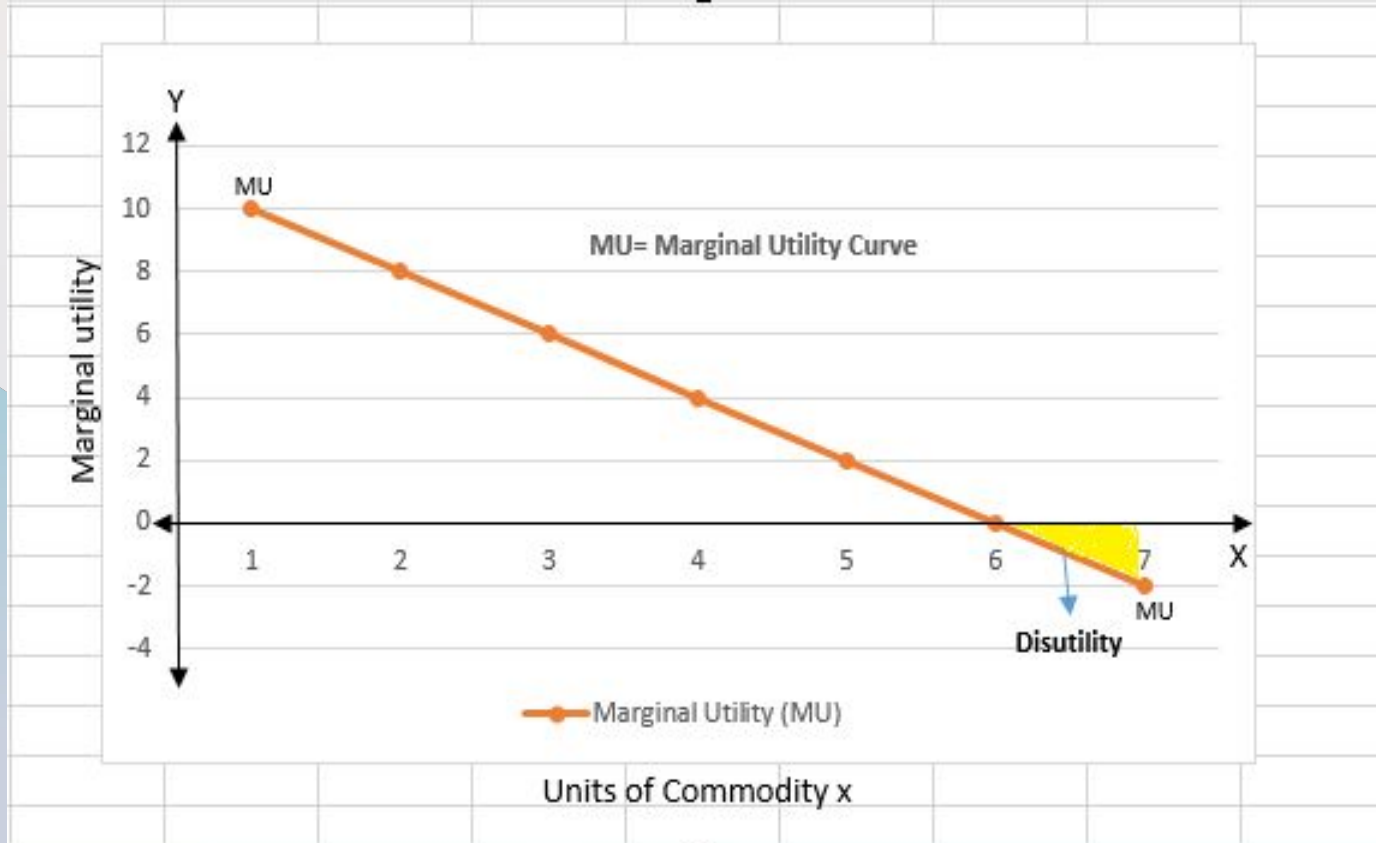
The law assumes the experience of a single want which is totally satiable at a given point of time as the given commodity can satisfy a single want of a person.

## Schedule of Law of Diminishing Marginal Utility (DMU):

Units of x	Marginal Utility (MU)
1	10
2	8
3	6
4	4
5	2
6	0
7	-2

The above table shows that the marginal utility keeps on diminishing with increase in consumption, further it becomes zero and then negative.

## Graph of Diminishing Marginal Utility:



## Explanation of the Graphical Diagram:

In the above diagram, X axis shows the units of commodity and Y axis indicates the marginal utility. As per the give schedule the points are plotted on the graph. We get MU curve when we joined the locus of all the points.

The graph indicates that the MU curve slopes downwards from left to right which shows that the MU diminishes with every successive increase in the consumption of a commodity.

When MU curve intercepts X axis, it becomes zero. The shaded portion of the diagram shows that there is disutility (negative utility) after the further consumption of the commodity.

## Exceptions to the Law of DMU:

### 1. Hobbies:

The law is not applicable in case of the hobbies. For eg, collection of various stamps and coins, rare paintings, music, reading etc. are the hobbies for which the law does not hold true as every additional increase in the stock gives more pleasure. This leads to increase in marginal utility. It also violates the assumption of homogeneity and continuity.

### 2. Miser:

Miser is a person who accumulates more and more wealth and does not spend it. So, his stock of money increases as a result the MU also increases. It contradicts the law. This ignores the assumption of rationality.



### 3. **Addictions:**

In case of drunkard the MU keeps on increasing as he consumes more of it. The alcoholism increases with every additional unit consumed. This situation is similar to almost all addictions. In this case, the assumption of rationality is violated.

### 4. **Power:**

As any person acquires power, his lust for power also increases. So, this is an exception. The MU of power also keeps on increasing as the person continues to get more power. There is no end to the greed of power. Once again, in this case the assumption of rationality is violated.

## 5. Money:

The MU of the money always keeps on increasing with increase in money so, it never becomes zero. Money is a medium of exchange and it is used to satisfy different wants. Some economists say that this law is applicable to money too. For eg, the MU of money is more to a poor person than to a rich person.

## Criticisms of the law of DMU:

### 1. Unrealistic assumptions:

The law of DMU is based on assumptions such as homogeneity, continuity, constancy, rationality etc. but in reality all these conditions can not be fulfilled at a one point.

### 2. Cardinal measurement:

It is assumed by the law that the utility can be expressed cardinally therefore it can be added, compared and presented through a schedule. In reality, it is not possible to have cardinal measurement of utility as utility is a psychological concept.

### 3. Indivisible goods:

In case of indivisible and bulky goods such as refrigerator, car, TV sets etc. the law is not applicable as these goods are purchased in single unit at a time. These goods are not purchased on recurring basis.

### 4. Constant marginal utility of money:

This law assumes that the MU of each unit of money remains constant. However, critics say that MU of money differs from person to person as it is influenced by changes in prices, stock of money etc.

### 5. A single want:

This law states that a commodity is used to satisfy only one or single want. But in reality, a person can use one commodity to satisfy more than one want. For eg, water is used to for cooking, cleaning, bathing, drinking etc.

## Significance or Importance of the law:

### 1. Usefulness to the consumers:

The ultimate motive of any consumer is to maximize his/ her satisfaction. In this regard, the law creates awareness among the consumers. So, the consumers can diversify the limited sources among various commodities to obtain maximum utility.

### 2. Useful to the government:

The government can use the law to frame the various policies such as progressive tax policy, pricing policy etc.

### 3. **Basis of paradox of values:**

The law of DMU is the basis of paradox of values. It includes goods having more value in use but zero or less value in exchange such as air, water, sunshine etc. Some goods are having more value in exchange and less value in use such as gold, diamonds etc.

### 4. **Basis of law of demand:**

This law is base for the law of demand. According to the law of demand, when the price of a commodity increases, the demand decreases and vice-versa. Due to initial intensity of want, consumer purchases more and more units of commodity as a result, the MU steadily declines. Therefore, he would buy additional units of a commodity only at a lower price.

## Relationship between Marginal Utility and Price:

No of units	MU/ units of x	MU in terms of money 1 unit = ₹ 10	Market price Unit of x = ₹ 50	Comparison between MU and price
1	10	100 (10 x ₹ 10)	₹ 50	100 MU > ₹ 50
2	8	80 (8 x ₹ 10)	₹ 50	80 MU > ₹ 50
3	7	70 (7 x ₹ 10)	₹ 50	70 MU > ₹ 50
4	5	50 (5 x ₹ 10)	₹ 50	50 MU = ₹ 50
5	3	30 (3 x ₹ 10)	₹ 50	30 MU < ₹ 50
6	1	10 (1 x ₹ 10)	₹ 50	10 MU < ₹ 50

The law of demand is based in the law of DMU. To understand this concept, it is necessary to understand the relationship between marginal utility and price. To understand this, we can convert the marginal utility in terms of price.

The above table shows and helps us to understand the relationship between marginal utility and price. The above table is the schedule of marginal utility in terms of money and price.

From the above table we can conclude that consumer starts buying units of commodity 'x' to consume one after the other. Marginal utility added to his stock goes on diminishing with every further unit of consumption.

The fifth column of the table shows the comparison between price and the marginal utility.



## Observations made from the table:

1. When the consumer consumes first three units of the commodity, the marginal utility in terms of money is greater than the price of the commodity.
2. A rational consumer will buy these units till he is getting more benefit than the price paid for the commodity.
3. At the fourth unit, the price and the marginal utility become equal. Therefore, the consumer can think to buy the fourth unit also.

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1. In case of fifth and sixth units, the marginal utility is less than the market price paid for that commodity.
2. Therefore, once the equality is established between marginal utility and price, a rational consumer will not buy further unit of the commodity.

## Conclusions or inferences made from the table:

1. Units which a consumer buys willingly because MU is greater than price is called as “Intra-marginal units” ( $MU_x > P_x$ )
2. Unit at which MU becomes equal with market price is known as “marginal unit” ( $MU_x = P_x$ ) = Consumer’s equilibrium.
3. Units which a consumer is not willing to buy or purchase and consume where he has to pay more than the MU are called “Extra-marginal units” ( $MU_x < P_x$ ).

Therefore, it can be concluded that a rational consumer attains equilibrium where  $MU_x = P_x$ . This relationship between marginal utility and price paved the way to law of demand.



Thank  
you