

Laxmi Narain Dubey College, Motihari

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Department of Economics

Topic: Utility Analysis

Paper-I: MICROECONOMICS

Part-I

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Instructor

Durgesh Mani Tewari

Assistant Professor

dmtewari@gmail.com

Utility

The utility of a good is the power of the good to satisfy a want. Thus, it is the satisfaction gained from the consumption of a good.

Note:

- i) Utility is a subjective concept.
 - ii) It varies from person to person. Even for a same person, it may vary from time to time. For example, a glass of water may give an individual more utility on a hot summer afternoon than in the winters.
 - iii) Utility is ethically neutral in that it does not differentiate between bad and good.
- ✓ According to the law of demand, there exists a negative relationship between the quantity demanded of a good and the price of the good. The law does not explain as to why this relationship holds. It does not explain as to why the consumer demands more of a good when the price falls.
 - ✓ This aspect of the behaviour of the consumer is explained by three approaches of utility:
 - **Cardinal utility approach**
 - **Ordinal utility approach**
 - **The revealed preference theory**

Cardinal Utility and Ordinal Utility

- ✓ One, two, three, four, and other such numbers are all cardinal numbers.
- ✓ Ordinal numbers are those that can be ranked or ordered.
- ✓ Ordinal utility, analysed by R. G. D. Allen and J. R. Hicks, does not assign any numbers to utility.
- ✓ In simpler terms, cardinal utility implies that the utility can be measured in quantitative terms. One can say that a cup of tea gives two times more satisfaction as compared with a glass of milk.
- ✓ However, in terms of ordinal utility, one can just say that one prefers a cup of tea over a glass of milk. One cannot assign any numbers while expressing likes and dislikes.

Cardinal Utility Approach

- ✓ According to the concept of cardinal utility, one can measure the utility in terms of utils (a unit of measuring utility).
- ✓ Professor Marshall was of the view that one can measure the utility in terms of price. The price that a consumer is willing to pay for a good is an indication of the utility of that good to the consumer. It was assumed that the utility of money remains constant.

Total utility

- ✓ It is the sum of the utility that a consumer derives from the consumption of the different units of a good.
- ✓ Suppose a consumer consumes five units of good x. He derives $u_1, u_2, u_3, u_4,$ and u_5 from the successive units of the good. The total utility that the consumer derives from the consumption of the five units of good x is

$$U_x = u_1 + u_2 + u_3 + u_4 + u_5$$

- ✓ If the consumer consumes n units of good x, then the total utility that the consumer derives from the consumption of n units of good x is

$$U_n = u_1 + u_2 + u_3 + u_4 + u_5 + \dots + u_n$$

- ✓ If the consumer consumes goods x, y, and z, then the total utility that the consumer derives from the consumption of the goods is

$$U = U_x + U_y + U_z,$$

Where, U is the total utility that the consumer derives from the consumption of goods x, y, and z;

U_x is the total utility that the consumer derives from the consumption of good x;

U_y is the total utility that the consumer derives from the consumption of good y; and

U_z is the total utility that the consumer derives from the consumption of good z.

Marginal Utility Approach and the Law of Diminishing Marginal Utility

Marginal Utility

- ✓ Marginal utility of a good is the change in the total utility from consuming an additional unit of the good. Hence,

$$MU = \Delta TU / \Delta Q$$

Where MU is marginal utility, ΔTU is change in total utility, and ΔQ is change in quantity.

- ✓ Marginal utility can also be expressed in terms of total utility as

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

Where, MU_n is marginal utility from the nth unit of the good,

TU_n is total utility from n units of the good, and

TU_{n-1} is total utility from (n-1) units of the good.

Law of Diminishing Marginal Utility

According to the *law of diminishing marginal utility*, as the quantity consumed of any one good increase, while the consumption of all other goods consumed remains constant, the marginal utility from the good must eventually decrease. In other words, as additional units of the good are consumed, the total utility from the good increases at a decreasing rate. The law is also known as the *law of satiable wants*.

Assumptions of the law

The law of diminishing marginal utility is based on the following assumptions:

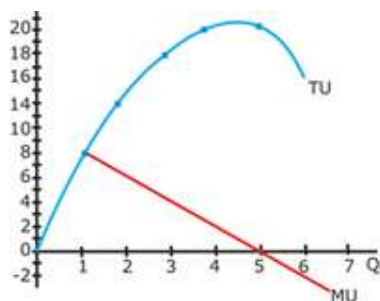
- ✓ The units of the good, which are consumed, are homogenous.
- ✓ The good is consumed within a short period without any gaps or any break in between.
- ✓ The consumer's income does not change in the period under consideration.
- ✓ The consumer's tastes, preferences, and habits do not change in the period under consideration.
- ✓ The law does not hold good for a collection of say, antiques and rare stamps, since here the utility increases with the increase in the quantity of the good.

Explanation of the law

Total Utility and Marginal Utility Schedule

Units Consumed	Total Utility	Marginal Utility
1	8	8
2	14	6
3	18	4
4	20	2
5	20	0
6	18	-2

- ✓ The table shows that from the first unit of the good the consumer gets a total utility of eight units. When he consumes the second unit of the good, his total utility increases to 14 units and with the third unit it increases to 18. Thus, the *total utility is increasing at a diminishing rate*. With the consumption of the fourth unit of the good, his saturation point is reached at 20 units, which remain unchanged even when he consumes the fifth unit. As the sixth unit is consumed, his total utility starts decreasing.



Law of Diminishing Marginal Utility

- ✓ Thus, in the figure, the total utility curve increases at a decreasing rate, then reaches a maximum when five units of the good are consumed and then starts decreasing.

- ✓ As far as the marginal utility is concerned, it goes on decreasing with the consumption of every additional unit of the good and when the fifth unit is consumed it becomes zero at the point of saturation and thereafter if additional units are consumed it becomes negative causing disutility to the consumer. Negative marginal utility implies that you have too much of a good and would prefer lesser.
- ✓ So, in the figure, the marginal utility curve slopes downwards showing that marginal utility decreases as additional units of the good are consumed. It reaches zero and intersects the x-axis when five units of the good are consumed and the consumer is at the point of saturation. Thereafter, if additional units of the good are consumed, the marginal utility becomes negative.

Note:

From the above analysis we can identify the following *relationship between TU and MU*.

- i) MU is the rate of change of TU
- ii) When TU increases at decreasing rate, the MU decreases.
- iii) When total utility is a maximum, marginal utility is zero.
- iv) When total utility is decreasing, marginal utility is negative.

Limitations of the cardinal approach

The cardinal utility approach suffers from many shortcomings:

- ✓ It was assumed that utility is cardinal. In reality, it is subjective and it is difficult to put a specific value on the utility that one gets from the consumption of a good. One can certainly compare the utilities from two goods but one cannot give a definite value to the utility derived from the two goods.
- ✓ Utility is assumed to be additive and thus to arrive at total utility, the utility from different goods was added together. This is not true because utility is not cardinal and also because one derives different types of utility or satisfaction from different types of goods. One cannot add different types of utility or satisfaction from different goods.
- ✓ The marginal utility of money was assumed to be constant. This is not true and it is often a subject of much debate as to whether the law of diminishing marginal utility applies to money.
- ✓ The cardinal utility analysis is unable to explain the existence of **Giffen goods** (a Giffen good is a product that people consume more of as the price rises and vice versa—violating the law of demand).
- ✓ The cardinal utility theory does not analyse the effect of a change in the price in terms of the income effect and the substitution effect.