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THEORY OF CONSUMER BEHAVIOUR

INTRODUCTION

A consumer is said to be in equilibrium when he is sepending his given income on various goods in a way that maximises his net utility. The point at which net utility of the consumer is miximised is called **the Equilibrium Point** and the corresponding consumption is called **the Equilibrium Consumption.** Once the consumer reaches equilibrium position, he has then no tendency to deviate from this point. In this chapter, different concepts of utility like total utility and marginal utility will be discussed. Law of diminishing, marginal utility, consumer's equilibrium with single commodity and two commodities will also be discussed. Thereafter, using indifference curve and budget line we will analyse the equilibrium of the consumer.

LAW OF DIMINISHING MU

Hermann Heinrich Gossen was the first to formulate this law in 1854. The law of diminishing *MU* was elaborately formulated by *Prof. Alfred Marshall*.

Statement of the Law

The law states that as the consumption of a particular commodity increases utility obtained from the additional units (*i.e.,* Marginal utility) declines.

Assumptions of the Law

The law is based on certain assumptions :

1. Utility can be measured by some cardinal numbers.
2. Utility is measurable in terms of money.
3. Marginal utility of money is constant.
4. Tastes, preferences and income of the consumer remain unchanged during the process of consumption.
5. All the units consumed by the consumer must be uniform in size, colour, design, quality etc.
6. The consumption of goods must be continuous.
7. Independent utility function.
8. The objective of the consumer is to maximise utility or satisfaction.

Numerical illustration of the law is shown in Table 1 in the previous section. From the table, it is clear that as the consumption of the commodity increases, total utility rises but at a diminishing rate. This implies that the MU decreases as consumption increases. The Law of Diminishing Marginal Utility can be represented diagramatically (in Figure 1).

Fig. 1. Law of Diminishing Marginal Utility (DMU)

In the upper panel of Figure 1, it is seen that up to $Q = Q^*$, TU increases. At $Q = Q^*$, TU reaches maximum. Beyond $Q =$ TU declines. In the lower panel of Figure 1, MU curve is drawn. MU falls from beginning. When TU reaches maximum, MU becomes zero. When TU declines, becomes negative.

Limitations of the Law

We can also mention some exceptions to the law of diminishing marginal uti
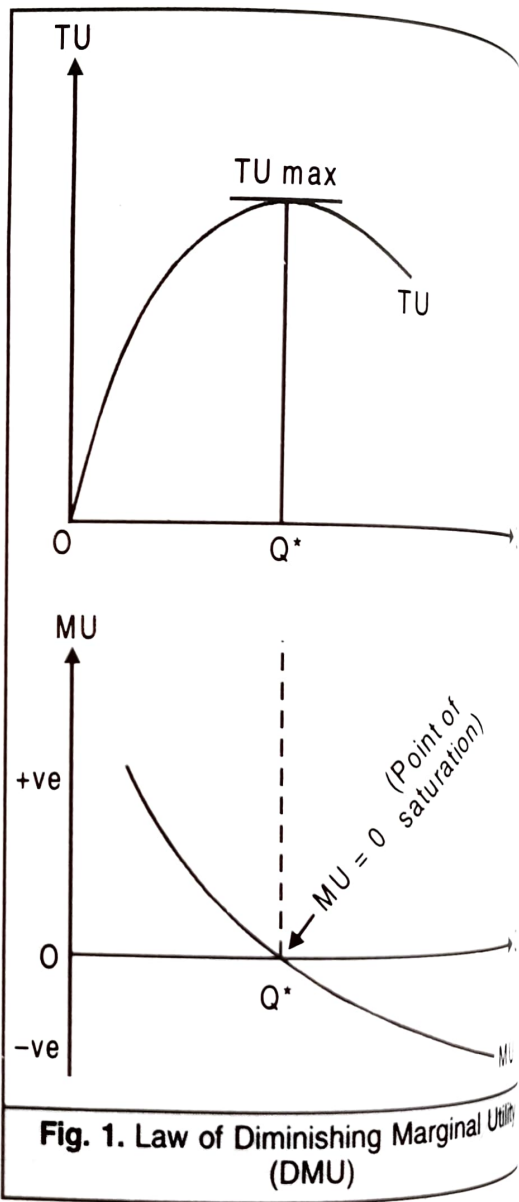
Firstly, marginal utility may not diminish from the very beginning. As the consumption of a commodity increases, marginal utility may increase initially and only after a certain stage it will decrease.

Secondly, it is assumed that there should be no change in the tastes, habits, customs, fashions and income of the consumer. A change in anyone of them will increase utility rather than diminish.

Thirdly, the law of diminishing marginal utility is not applicable in the case of consumption of goods of habitual necessities such as cigarette, wine etc.

Fourthly, there should be continuity in the consumption of the commodity. The law may not be valid for consumption at different points of time.

Fifthly, sometimes, each additional unit does not lead to a fall in marginal utility. For example, some persons have the habit of collecting old coins and stamps. For them, marginal utility increases with the increase in their collection.

Sixthly, the law is not applicable for the commodities which are not finely divisible.

Seventhly, the law of diminishing marginal utility treats goods as if these were independent of the other. In other words, the fact of dependence or complementary is ignored. But in reality, the utility obtained from any commodity depends also on the consumption of other commodity. For example, the utility of tea also depends on the utility of sugar or milk.

Importance of the Law

The law of marginal utility has a good number of uses in economic theory. Some of its important uses are mentioned below :

1. The law of diminishing marginal utility forms the basis for many economic laws like Law of Demand, Elasticity of Demand, Consumer's Surplus and Equi-marginal Utility.

2. The downward sloping demand curve can also be explained with the help of this law.

3. The law helps to explain the phenomenon in value theory that the price of a commodity falls when its supply increases.

4. The famous 'diamond-water paradox' of *Smith* can be explained with the help of this law.

5. It is on the basis of this law that progressive taxes are being imposed by the government.

CONCEPT OF CONSUMER'S EQUILIBRIUM

Consumer's equilibrium refers to a situation where a consumer gets maximum satisfaction from the purchase of the commodity and the consumer has no tendency to make any change in his existing purchase as long as circumstances remain unchanged.

The concept of consumer's equilibrium will help us to answer the question of how should a consumer allocate his given money income among different commodity ?

There are two approaches to explain the consumer's equilibrium :

(a) Cardinal approach or Utility approach,

(b) Ordinal approach or Indifference curve approach.

In the following sections we will discuss both the approaches one by one.

CONSUMER'S EQUILIBRIUM : A SINGLE COMMODITY CASE

Law of diminishing marginal utility helps us to explain consumer's equilibrium. For the sake of simplicity, we assume that the consumer consumes only one commodity (say, commodity-X). P_X is the price of commodity-X. The following assumptions are made to discuss the consumer's equilibrium :

1. Utility can be cardinally measurable.

2. Price of the commodity is fixed.

3. Income of the consumer is fixed.

4. Consumer spends the whole amount of money income on purchase of the commodity.

5. Marginal utility of money is constant.

6. Tastes and preferences of the consumer are unchanged.

7. Commodity is perfectly divisible.

8. The consumer is rational.

9. The law of diminishing marginal utility operates.

Based on the above assumptions, the consumer attains equilibrium when the net utility is maximised. The amount of utility, obtained from different units of commodity X is given in Table 3. We assume that P_X = ₹ 10.

Table 3 : Total Utility and Net Utility

Quantity (Q_X)	TU_X	MU_X	Total Expenditure (TE_X)	Net Utility $(TU_X - TE_X)$
1	50	50	10	40
2	70	20	20	50
3	80	10	30	50
4	80	0	40	40
5	70	-10	50	20

From Table 3, it is clear that net utility is maximum for that amount of X for which MU_X = P_X. This is the equilibrium condition. Thus the equilibrium level of consumption is Q_X = 3 units.

If price is greater than the marginal utility (P_X > MU_X), the rational consumer can increase his total utility by consuming less units of the commodity. Similarly, if price is less than the marginal utility (P_X < MU_X) the consumer can increase his total utility by purchasing more units of the commodity. Thus, equilibrium of the consumer

attains where marginal utility = Price of the commodity. Consumer's equilibrium in a single commodity case is shown in Figure 2.

In Figure 2, consumer attains equilibrium at point A, where $MU_X = P_X$. Corresponding to the equilibrium point, consumer purchases X2 units of the commodity. At X_1 units of the commodity, $MU_X > P_X$. Therefore, the consumer can increase his total utility by purchasing more than X_1 units of the commodity. At X_3 units of the commodity, $MU_X < P_X$ and hence the consumer can increase his total utility by consuming less than X_3 units of the commodity. Thus, point A is a **stable equilibrium point.**
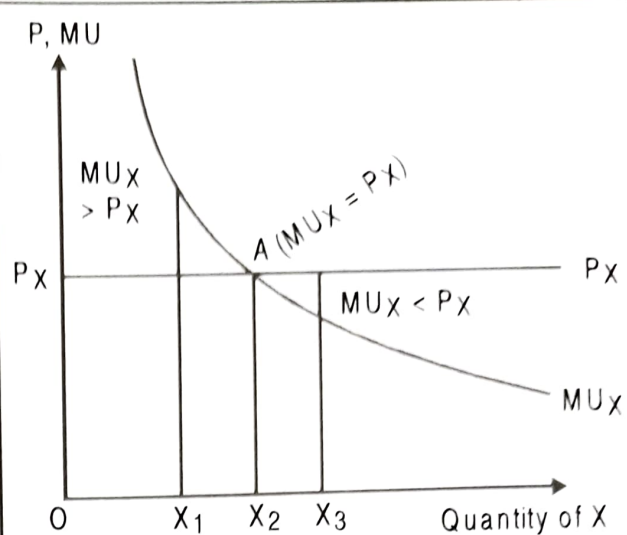
Fig. 2. Consumer's Equilirbium in a Single Commodity Case

Quick Question 1 : What is the relation between individual demand curve and marginal utility curve ?

Hint: MU curve is identical with demand curve, or the law of diminishing marginal utility is identical with the law of demand. We know, the consumer buys a commodity up to a point when P = MU. Law of diminishing marginal utility tells us that MU tends to decline as more and more of the commodity is consumed. Since, P = MU, P must also be declined as more and more units of commodity is consumed. So, we get a negative relation between P and Q.

Quick Question 2 : What will be the equilibrium purchase when a commodity is freely available?

Hint: If a commodity is freely available (i.e., the price of the commodity is zero), a rational consumer will attain equilibrium when MU = O. So, the consumer will purchase that quantity at which TU is maximum.
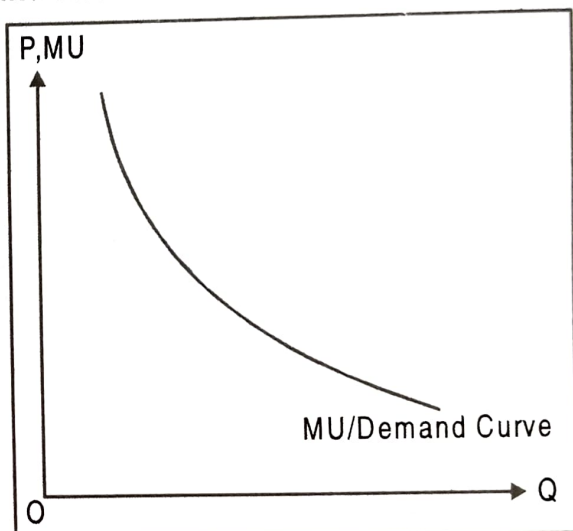
CONSUMER'S EQUILIBRIUM IN CASE OF TWO COMMODITIES OR LAW OF EQUIMARGINAL UTILITY

Suppose a consumer has a given income which he has to spend on two goods, X and Y. We also assume that the consumer is 'rational', that is, he tries to maximise his utility or satisfaction. The consumer will maximise his total utility when he allocates his money income among the goods in such a way that the utility derived from the last rupee spent on each goods is equal. Alternatively, consumer is in equilibrium position when marginal utility of the last rupee spent on each goods is the same. This is called the law of equi-marginal utility, since maximum satisfaction is obtained only by equating marginal utilities. The law is variously called as the law of substitution (since the consumer can substitute one commodity for another), law of maximum satisfaction

Statement of the Law

The law of equi-marginal utility states that the consumer will distribute his money
income among the goods in such a way that the utility derived from the last rupee spent
on each goods is equal.

Assumptions : The law of equi-marginal utility is based on the following
assumptions :

(i) Utility can be cardinally measurable.

(ii) Price of the commodity is fixed.

(iii) Income of the consumer is fixed.

(iv) Marginal utility of money is constant.

(v) Consumer spends the whole given money income on purchase of the
commodity.

(vi) The law of diminishing MU holds.

(vii) Commodities are infinitely divisible.

Now, the marginal utility of a rupee spent on a good is equal to the marginal
utility of the good divided by its price. Symbolically,

$$MU_m = \frac{MU_X}{P_X} = \text{Utility obtained by spending one unit of money on X}$$

Where, MU_m = Marginal utility of money

MU_X = Marginal utility of goods X

P_X = Price of goods X

Similarly, $MU_m = \frac{MU_Y}{P_Y}$ = Utility obtained by spending one unit of money on Y

Where, MU_Y = Marginal utility of goods Y

P_Y = Price of goods Y

The consumer will be in equilibrium when he is spending his money income on
two goods in such a way that marginal utility of last rupee spent on the two goods is
the same. That is, consumer is in equilibrium where :

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = MU_m .$$

What happens, when $\frac{MU_X}{P_X} \geq \frac{MU_Y}{P_Y}$?

If $\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$, then utility obtained by spending one rupee on X is greater
than the utility obtained by spending one rupee on Y. In such a situation, the consumer
can obtain higher utility by spending that unit of money on X. Therefore, in such a

situation, the consumer will purchase more of X and less of Y. On the other hand, if $\frac{MU_Y}{P_Y} > \frac{MU_X}{P_X}$, the consumer will obtain higher utility by spending one rupee on Y than on X. In such a situation, the consumer can obtain higher utility by spending one rupee on Y than on X. In this case, the consumer will purchase more of Y and less of X. When $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$, there will be no substitution between the two commodities. This law can be applied in the case of more than two commodities. In the case of three commodities X, Y and Z, $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = \frac{MU_Z}{P_Z} = MU_m$ is needed for equilibrium.

Graphical Analysis

Fig. 3: Consumer's Equilibrium in Case of Two Commodities
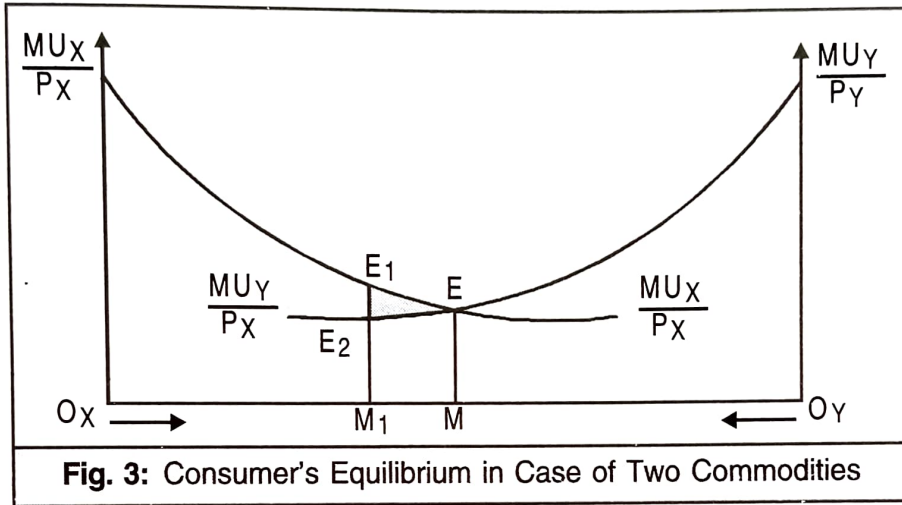
Consumer's equilibrium is graphically illustrated in Figure 3. Since marginal utility curves of the goods slope downward, curves depicting $\frac{MU_X}{P_X}$ and $\frac{MU_Y}{P_Y}$ also slope downward.

In Figure 3, we have measured expenditure on commodity-X from the origin Ox and that on commodity-Y from the origin O_Y. The consumer will be in equilibrium, getting maximum satisfaction at point E, where the marginal utilities of expenditure incurred on X and Y are equal. Corresponding to point E, the consumer spends O_XM rupees on X and O_yM rupees on the purchase of Y. Any other allocation of income on these two goods will be uneconomic in the sense that it cannot yield the consumer maximum total satisfaction. For example, if the consumer spends O_XM_1 amount of money income on X and the rest on Y, then,

$$\frac{MU_X}{P_X} = E_1M_1, \frac{MU_Y}{P_Y} = E_2M_1$$

$$\therefore \quad \frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$$

In this case, it will be advantageous for the consumer if he transfers his purchases from goods-Y to goods-X. By substitution (until he reaches point £) the consumer can increase his total satisfaction by the amount represented in the diagram by the triangle E_1E_2E.

Hence, total utility would be maximum only when,

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$$

Numerical Analysis

Let us illustrate the law of equi-marginal utility with the aid of Table 4. Let prices of goods X and Y be ₹ 2 and ₹ 3 respectively and the consumer has ₹ 19 to spend on the two goods. Marginal utility of the money is 5 utils.

Table 4 : Marginal Utility of a Rupee

Units	MU_X (utils)	MU_Y (utils)	$\dfrac{MU_X}{P_X}$	$\dfrac{MU_Y}{P_Y}$
1	18	21	9	7
2	16	18	8	6
3	14	15	7	5
4	12	12	6	4
5	10	9	5	3
6	8	6	4	2

By looking at Table 4, it becomes clear that $\dfrac{MU_X}{P_X}$ is equal to 5 utils when the consumer purchases 5 units of goods-X and $\dfrac{MU_Y}{P_Y}$ is equal to 5 utils when he buys 3 units of goods-Y and by doing so he is spending all his money income of ₹ 19. Therefore, the consumer will be in equilibrium when he is buying 5 units of goods-X and 3 units of goods-Y and will be spending (₹ 2 × 5 + ₹ 3 × 3) = ₹ 19 on them.

Limitations of the Law

Following are the main criticisms of the law :

1. Consumer is assumed to be rational in his behaviour. But in reality, ordinary consumers are not so rational and calculating. Consumers are generally governed by habits and customs and also influenced by fashion, advertisement etc. Therefore, the consumer cannot be expected to act rationally and the ratio between marginal utility and price will not be equal for all goods.

2. The law is based on the unrealistic assumptions of the cardinal measurement of utility and constant marginal utility of money.

3. The law is assumed that all quantities are divisible. Sometimes the commodities are not infinitely divisible. For example, car, fan, radio, refrigerator cannot be divided into smaller units. In this case, the law of equi-marginal utility will be invalid.