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Consumer's Equilibrium and Demand

Case II. Two Commodities Case–Law of Equi-Marginal Utility

Let us now analyse a two commodity case. We assume that a consumer consumes only two commodities X and Y and their prices are P_X and P_Y respectively.

In such a case, the law of DMU is extended to two goods which the consumer buys with his income. The condition required by a consumer to maximise his utility for two commodities X and Y is given as:

$$MU_X = P_X \quad \ldots (1)$$

$$MU_Y = P_Y \quad \ldots (2)$$

Divide equation (1) by (2), we get:

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

This is called the law of *equi-marginal utility*. **The law states that a consumer will so allocate his expenditure so that the utility gained from the last rupee spent on each commodity is equal.**

In other words, a consumer buys each commodity up to the point at which MU per rupee spent on it is the same as the MU of a rupee spent on another good. When this condition is met, a consumer cannot shift a rupee of expenditure from one commodity to another and increase his utility.

Consumer's equilibrium conditions in case of two goods X and Y can be written as:

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} \quad \ldots (1)$$

It is subject to budget constraint that $P_X . X + P_Y . Y = M$ $\ldots (2)$

When $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$, utility is maximum.

Example. When a person has a certain quantity of a commodity (say, so many gallons of water per day) which can be put to many different uses, say washing, bathing and cooking), he will, in order to get the maximum benefit from the use of it, so distribute it as between the different uses so that the MU from the commodity is the same in all its uses. In short, equilibrium is reached when MU of the good is the same in all its uses.

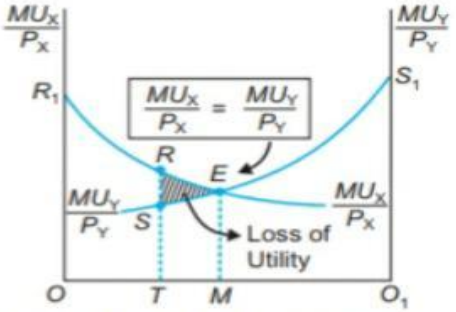

Fig. 2.3 Law of Equi-Marginal Utility

The law of Equi-MU is shown graphically in Fig. 2.3, where,

OO_1 = Total income of the consumer which is to be spent on two goods X and Y.

MU_X = MU curve for good X as the successive rupees are spent on X.

Also, $\frac{MU_X}{P_X}$ values can be obtained as P_X is given and fixed.

MU_Y = MU curve for good Y as the successive rupees are spent on Y.

Also, $\frac{MU_Y}{P_Y}$ values can be obtained as P_Y is given and fixed.

E = Point of consumer's equilibrium where the law of Equi-marginal utility holds *i.e.* $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$. It shows that OM amount of income is spent on good X and O_1M on good Y. The consumer's total utility at point $E = OR_1ES_1O_1$.

What happens when $\frac{MU_X}{P_X}$ is not equal to $\frac{MU_Y}{P_Y}$? Two disequilibrium situations are:

(1) $\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$: In this case, the consumer is getting more marginal utility per rupee in case of good X as compared to Y. Therefore, he will buy more of X and less of Y. This will lead to fall in MU_X and rise in MU_Y. The consumer will continue to buy more units of X till $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}$.

(2) $\frac{MU_X}{P_X} < \frac{MU_Y}{P_Y}$: The consumer is getting more marginal utility per rupee in case of good Y as compared to X. Therefore, he will buy more of Y and less of X. This will lead fall in MU_Y and rise in MU_X. The consumer will continue to buy more of Y till $\frac{MU_X}{P_Y} = \frac{MU_Y}{P_Y}$.