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(Utility) ⇒ Consumer Behaviour

① Cardinal Approach

(an individual can attach a specific value or numbers or units from consumption of each quantity of good or combination of goods.

② Ordinal Approach : Indifference curve analysis

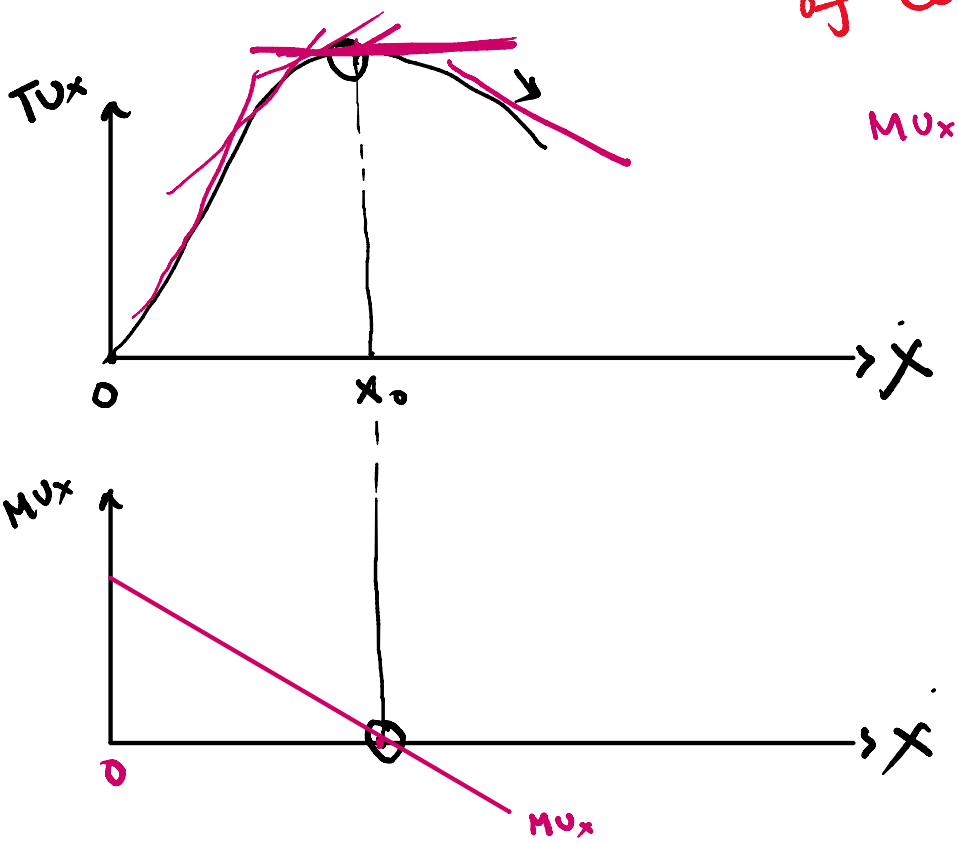
where utility received from consumption of various amounts of goods or basket of goods can be ranked.

Relation Between Total utility (TU) and Marginal Utility (MU)

TU_x = total satisfaction achieved by a consumer after consuming commodity X.

$MU_x = \frac{\partial TU}{\partial X}$ → change in TU (satisfaction) due to change in consumption of commodity X by

$MU_x = \frac{\partial TU}{\partial X}$ due to change of commodity X by one unit.



$MU_x = \frac{dTU}{dx}$ = slope of TU curve

at max TU_x

$MU_x = \frac{\partial TU_x}{\partial x} = 0$

1. when TU rises and TU curve is +vely sloped, MU is +ve
2. when TU is max and const → MU is 0.
3. when TU is falling and negatively sloped then MU is −ve.

Law of Diminishing Marginal Utility (LDMU)

The law of DMU states that the utility derived from the successive units of a good diminishes. This means as the consumer consumes more of units of the commodity, the marginal utility of the commodity

of the commodity, the ... falls.

That is the additional benefit which a person derives from a given increase of his stock of a thing ~~diminish~~ diminishes with every increase in the stock that he already has.

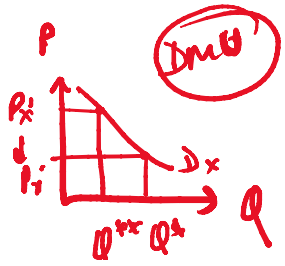
Consumer's Equilibrium in Cardinal Utility Approach (Marshallian Approach)

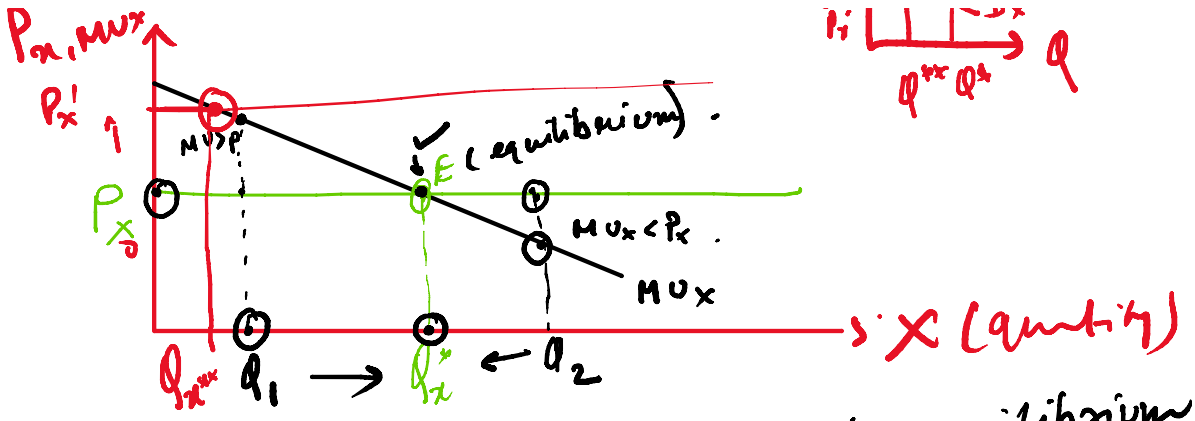
→ [single commodity case]

In this analysis, the total utility the consumer enjoys is measured by the maximum price the consumer is willing to pay.

Similarly, MU is measured by additional price paid to get one additional unit of the commodity.

Let the consumer spend his entire income on consumption of the commodity X. Quantity X Consumed is measured along X-axis and P_x and MU_x along Y-axis.





At pt E when $MU_x = P_x$ is the consumer's equilibrium point and Q_x^* is the equilibrium amount of quantity purchased (in case of single commodity)

What is Law of equimarginal Utility?

The Law states that a consumer will allocate his income in such a way so that the ratio of MU to the price for all commodities will be the same. Thus, if there are two commodities X and Y, then according to the law the equilibrium be established when

$$\frac{\text{Marginal utility of X}}{\text{Price of X}} = \frac{\text{Marg Utility of Y}}{\text{Price of Y}}$$

i.e. $$\frac{MU_x}{P_x} = \frac{MU_y}{P_y}$$

If there are more than two commodities like X ... the equality will be

If there are more than two ... X, Y, ..., N, then the equality will be expressed by $\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = \cdots = \frac{MU_N}{P_N}$

Indifference Curve Analysis:

Axioms:

(1) Completeness: A P B

or B P A

that means A I B

(2) Transitivity: A P B

B P C

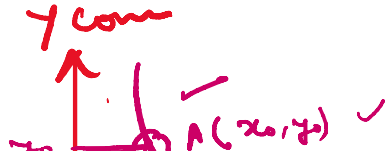
then A P C

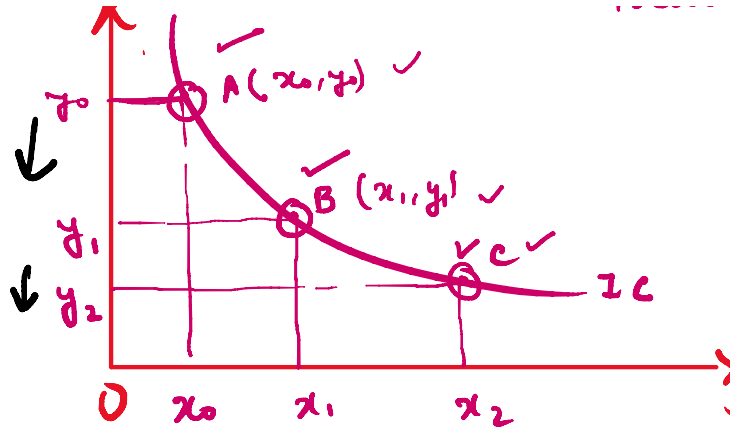
(3) Reflexiveness: two identical bundle A and B, A I B.

(4) Continuity: This axiom states that if there is a very small change in the quantity of a good, there will be a change in the ranking of a bundle.

What is an Indifference Curve? $U = U(X, Y)$

→ locus of different combination of points ~~forming~~ of alternative





points ~~joining~~ of alternative combination of consumption of two commodities X and Y such that the satisfaction level or the total utility remains constant.

Properties:

Shape of Indifference curve

a) Ic curve is downward sloping.

Let $U = U(x,y)$

Total Differentiation on both sides,

$$dU = \frac{\partial U}{\partial x} \cdot dx + \frac{\partial U}{\partial y} \cdot dy$$

$U = \bar{U}$ = const along Ic.

$$\therefore 0 = \frac{\partial U}{\partial x} \cdot dx + \frac{\partial U}{\partial y} \cdot dy$$

$$\Rightarrow \frac{dy}{dx} = -\frac{\partial U/\partial x}{\partial U/\partial y} = -\frac{MU_x}{MU_y} < 0$$

$\therefore$ Ic is downward sloping and slope $= -MU_x/MU_y < 0$

(b) Ic is convex to the origin

Marginal Rate of Substitution

$$\frac{d^2y}{dx^2} = \frac{d}{dx}\left(-\frac{MU_x}{MU_y}\right)$$

Marginal rate between x and y.

$MRS_{x,y}$

$$\frac{d^2y}{dx^2} = \frac{d}{dx}\left(\frac{MU_x}{MU_y}\right)$$

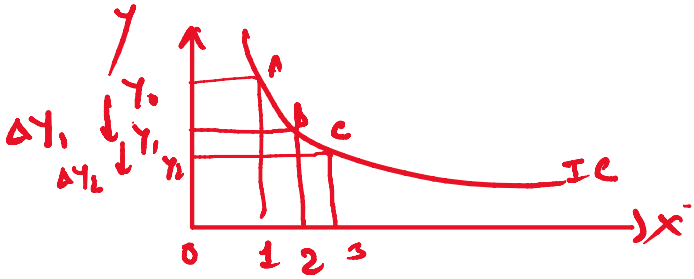
$$= -\left[\frac{MU_y \cdot \frac{\partial MU_x}{\partial y} - MU_x \cdot \frac{\partial MU_y}{\partial x}}{MU_y^2}\right]$$

we will get $\frac{d^2y}{dx^2} > 0$

Hence convex !

MRS is defined as the amount of Y consumption sacrificed or given up for an additional unit of X consumption to remain on the same IC (or utility const).

$$MRS_{x,y} = \frac{MU_x}{MU_y} = \frac{\Delta y}{\Delta x}$$



$\Delta Y_1 > \Delta Y_2$

$$\frac{\Delta Y_1}{\Delta X_1} > \frac{\Delta Y_2}{\Delta X_2} > \cdots$$

since $\Delta X_1 = \Delta X_2 = 1$

$$MRS^A_{xy} > MRS^B_{x,y} > \cdots$$

∴ MRS is is diminishing with increase in X comm

∴ Ic is convex to origin.