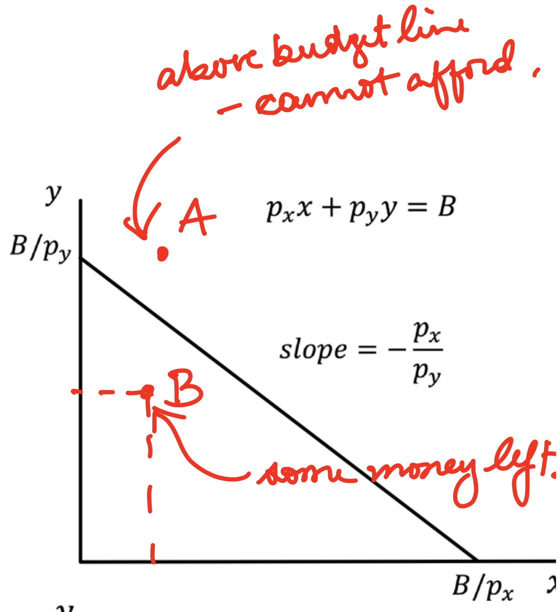
Chapter 12 Consumption: Equilibrium

Consumer's Problem The consumer wants to maximize satisfaction (utility) by deciding what and how much to consume under a limitation of income



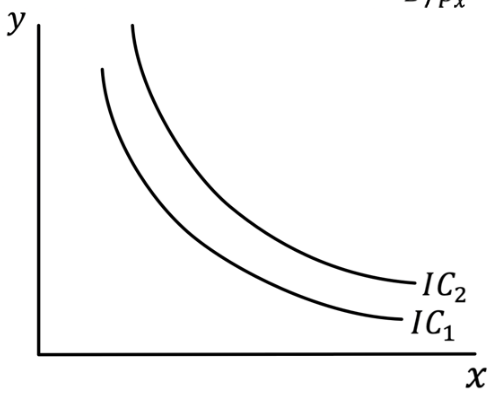
Budget Line

- Every point on the budget line is a bundle the consumer can afford.
- Slope of budget line

$$relative\ price\ x\ interms\ of\ y = -\frac{p_x}{p_y}$$

$$= exchange\ rate\ of\ x\ in\ terms\ of\ y\ in\ the\ market$$

Indifference Curve (IC)

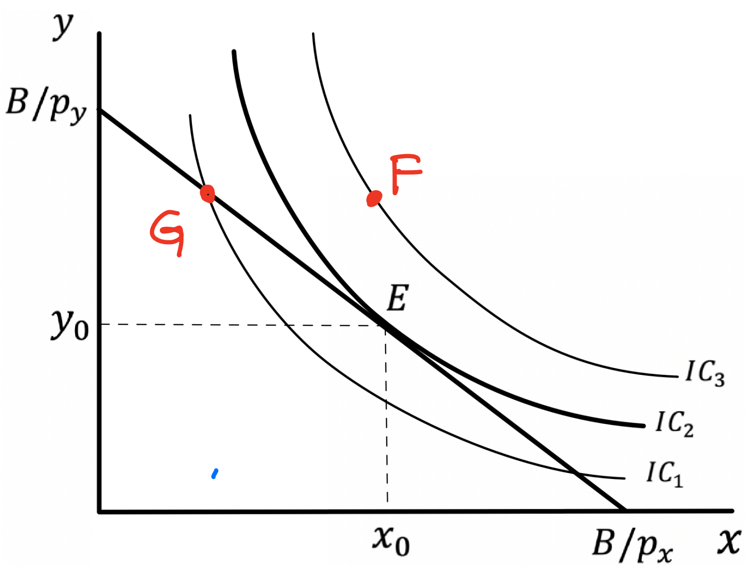


- Each IC shows all the bundles that give the same satisfaction.
- Higher IC means higher satisfaction.
- Slope of IC at (x_0, y_0) is

$$MRS = -\frac{MU_x(x_0, y_0)}{MU_y(x_0, y_0)}$$

$$= exchange\ rate\ of\ x\ in\ terms\ of\ y$$
$$in\ the\ \textbf{mind of consumer}$$

Equilibrium of Consumption Problem The consumer wants to maximize satisfaction (utility) by deciding what and how much to consume under a limitation of income



The equilibrium is at point $E = (x_0, y_0)$ because

1) E is on the budget line—E is affordable

2) E is on the highest IC (IC_2) the consumer can reach.

- F is on a higher IC but it is not affordable
- G is affordable because it is on the budget line but it is on a lower IC than IC_2.

At the equilibrium point E, the indifference curve IC_2 is tangent to the budget line $p_x x + p_y y = B$. Thus, at point E the

$$\text{Slope of } IC_2 = \text{Slope the budget line}$$
$$-\frac{MU_x(x_0,y_0)}{MU_y(x_0,y_0)} = -\frac{p_x}{p_y}$$
$$\left.\begin{matrix}\text{Exchange rate between}\\ x \text{ and } y\\ \text{in consumer'mind}\end{matrix}\right\} = \left\{\begin{matrix}\text{Exchange rate between}\\ x \text{ and } y\\ \text{in the market}\end{matrix}\right.$$

- If $\frac{MU_x(x_0,y_0)}{MU_y(x_0,y_0)} \neq \frac{p_x}{p_y}$, the consumer can attain higher satisfaction by buying more (or less) of x and less (or more) of y.

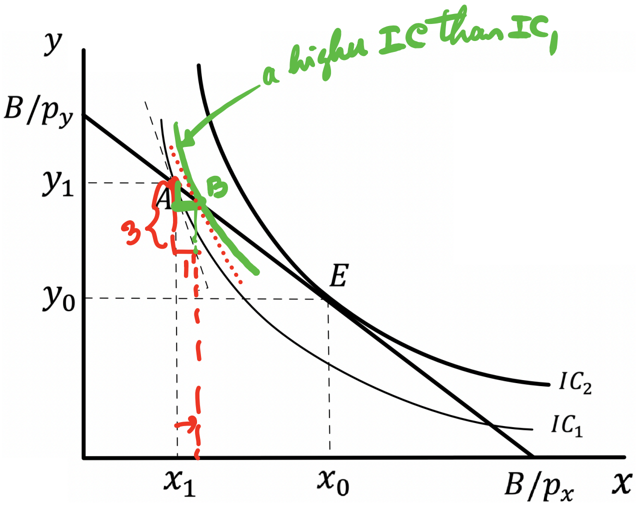
$$\frac{MU_x}{P_x} = \frac{100}{10.} = 10$$

Equilibrium Conditions: Consumer has equilibrium at $E = (x_0, y_0)$ with the following conditions:

1) $p_x x_0 + p_y y_0 = B \Leftrightarrow E$ is affordable,
2) $MRS_{(at\ E)} = \frac{MU_x(x_0,y_0)}{MU_y(x_0,y_0)} = \frac{p_x}{p_y}$, or equivalently $\frac{MU_x(x_0,y_0)}{p_x} = \frac{MU_y(x_0,y_0)}{p_y}$.

- $\frac{MU_x(x_0,y_0)}{p_x} = \frac{MU_y(x_0,y_0)}{p_y}$ means that the utility from the last baht spent on x is equal to that spent on y.

Another Explanation for Equilibrium at E: The equilibrium must be at point $E = (x_0, y_0)$ because if it is anywhere else on the budget line like at point A the consumer can attain a higher utility level.



Equilibrium is at E because otherwise if it is at A.

B is also not the eq. point because slope of IC_1 at B > slope of budget line (in absolute value)

At A, slope of IC_1 is more than the slope of the budget line (in absolute value). That is, we have at $A = (x_1, y_1)$,

$$\overset{3}{\frac{MU_x(x_1,y_1)}{MU_y(x_1,y_1)}} > \overset{1}{\frac{p_x}{p_y}}.$$

- For ease of explanation, let us assume that $\frac{MU_x(x_1,y_1)}{MU_y(x_1,y_1)} = 3$ and $\frac{p_x}{p_y} = 1$. The consumer can consume one more unit of x by sacrificing just 1 unit of y.
- Since $\frac{MU_x(x_1,y_1)}{MU_y(x_1,y_1)} = 3$, in the mind of the consumer, at A he is willing to sacrifice 3 units of y for 1 unit of x to have the same satisfaction.
- By sacrificing only 1 unit of y, instead of 3 units, the consumer thus can be on a higher IC.
- The consumer can repeat this until the point of consumption reaches E, where the exchange rate between x and y in the market is now equal to exchange rate in the mind of the consumer.