

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

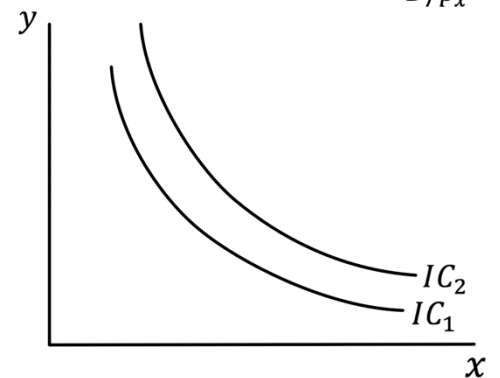
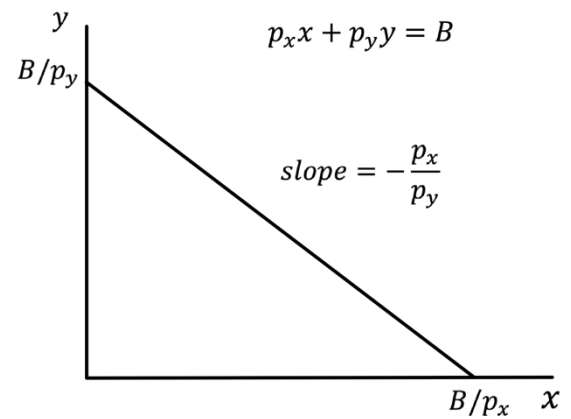
$$\begin{aligned} \text{relative price } x \text{ in terms of } y &= -\frac{p_x}{p_y} \\ &= \text{exchange rate of } x \text{ in terms of } y \text{ in the market} \end{aligned}$$

Indifference Curve (IC)

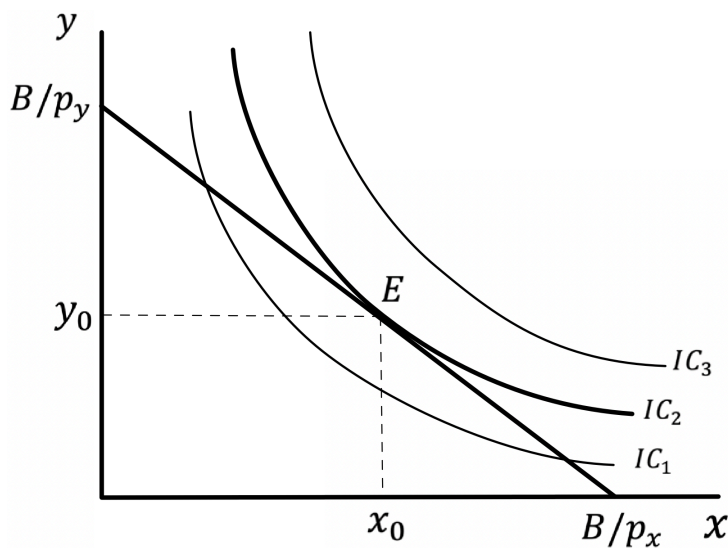
- Each IC shows all the bundles that give the same satisfaction.
- Higher IC means higher satisfaction.
- Slope of IC at (x_0, y_0) is

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

= exchange rate of x in terms of y in the *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. Thus, at point E the

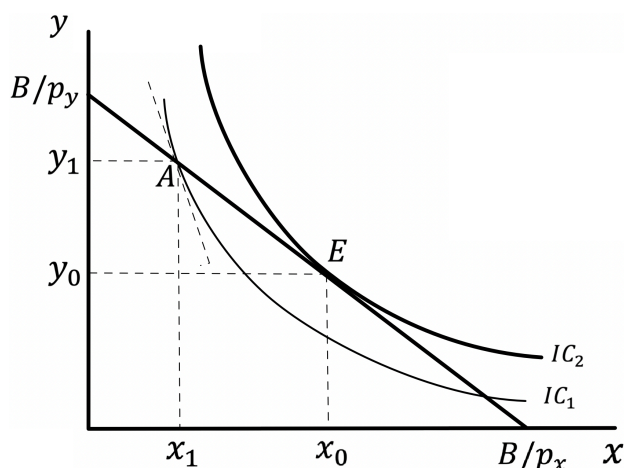
$$\begin{aligned} \text{Slope of } IC_2 &= \text{Slope the budget line} \\ -\frac{MU_x(x_0, y_0)}{MU_y(x_0, y_0)} &= -\frac{p_x}{p_y} \\ \left. \begin{array}{l} \text{Exchange rate between} \\ x \text{ and } y \\ \text{in consumer's mind} \end{array} \right\} &= \left\{ \begin{array}{l} \text{Exchange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

- 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 .

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) $\frac{MU_x(x_0, y_0)}{MU_y(x_0, y_0)} = \frac{p_x}{p_y}$, 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.



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

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

- 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 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.