



# 個體經濟學一

Microeconomics (I)

## Ch2 Consumer Choice

Making Decision: Consumers, firms, government

Rational/ consumer: maximizing satisfaction subjected to his or her constraint (budget)

preference 偏好

\* **Consumption set: the set of consumption bundles that a consumer can choose**

consumption space

commodity set

commodity space

We consider the consumption bundles with only two goods, X,Y, quantities: x,y

A consumption bundle is an order pair(x,y)

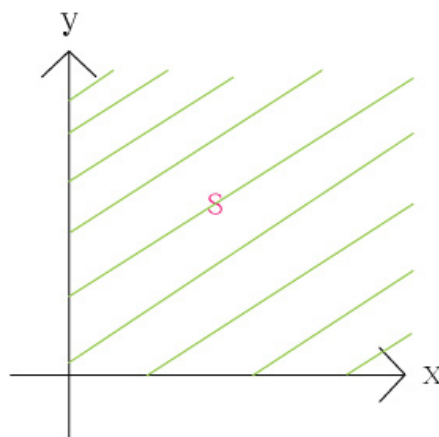


Figure6 : Consumption bundle

$$S = \{(x,y) \mid x \geq 0, y \geq 0\}$$

a consumption bundle(消費組合):  $(x,y) \in S$

(consumption basket, commodity bundle, commodity basket)

\* **Ax ions (公理)[(A1-A3)] and assumption (假設) [(a4-a7)] on preference**

(A1) Completeness 完全性

$$(x_1, y_1) \in \mathbf{S} \quad (x_2, y_2) \in \mathbf{S}$$

one and only one of the following must be true

1.  $(x_1, y_1) > (x_2, y_2)$
2.  $(x_2, y_2) > (x_1, y_1)$                      $>$ : is preferred to
3.  $(x_1, y_1) \sim (x_2, y_2)$                      $\sim$ : is indifferent to

(A2) Reflexivity 反身性

$$(x, y) \in \mathbf{S} \quad (x, y) \sim (x, y)$$

(A3) Transitivity 及物性，遞移性

$$(x_1, y_1) \in \mathbf{S} \quad (x_2, y_2) \in \mathbf{S} \quad (x_3, y_3) \in \mathbf{S}$$

$$\textcircled{\Phi} (x_1, y_1) > (x_2, y_2), (x_2, y_2) > (x_3, y_3)$$

$$\rightarrow \text{then } (x_1, y_1) > (x_3, y_3)$$

$$\textcircled{\emptyset} (x_1, y_1) \sim (x_2, y_2), (x_2, y_2) \sim (x_3, y_3)$$

$$\rightarrow (x_1, y_1) \sim (x_3, y_3)$$

$$\textcircled{\textcircled{\Phi}} (x_1, y_1) > (x_2, y_2), (x_2, y_2) \sim (x_3, y_3)$$

$$\rightarrow (x_1, y_1) > (x_3, y_3)$$

$$\textcircled{\oplus} (x_1, y_1) \sim (x_2, y_2), (x_2, y_2) > (x_3, y_3)$$

$$\rightarrow (x_1, y_1) > (x_3, y_3)$$

(a4) Continuity 連續性

$$(x_1, y_1) \in \mathbf{S} \quad (x_2, y_2) \in \mathbf{S} \quad (x_3, y_3) \in \mathbf{S}$$

$(x_1, y_1) > (x_2, y_2)$ , for any  $(x_3, y_3)$  is very close to  $(x_2, y_2)$

$$\rightarrow \text{then } (x_1, y_1) > (x_3, y_3)$$

With (A1)-(a4), 得到 Indifference curve 無異曲線

Let  $(x_1, y_1) \in \mathbf{S}$ ,

$$\text{IC}(x_1, y_1) = \{(x, y) / (x, y) \sim (x_1, y_1), \text{ for all } (x, y) \in \mathbf{S}\}$$

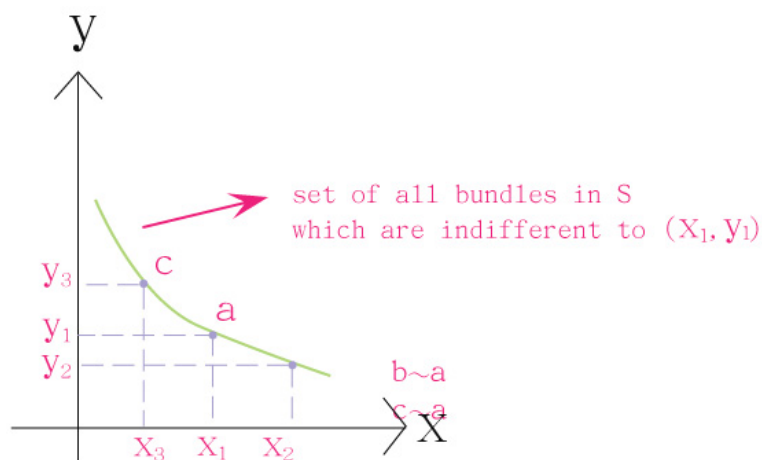


Figure 7 :

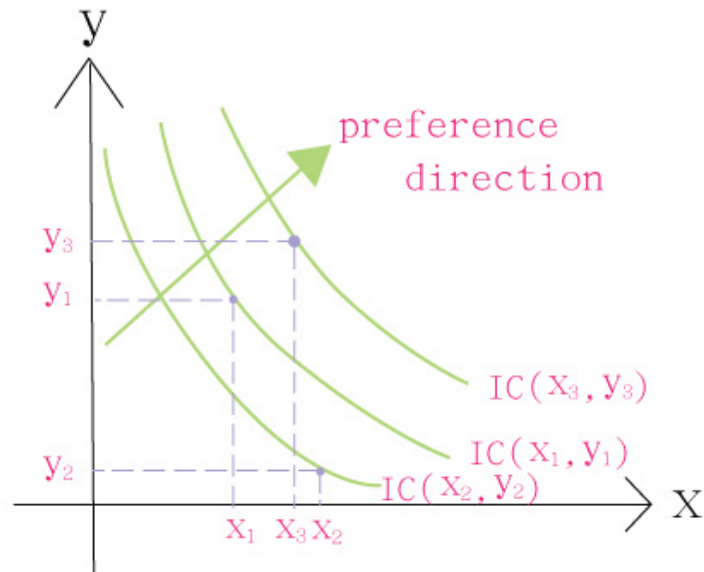


Figure 8 : Indifference Curve

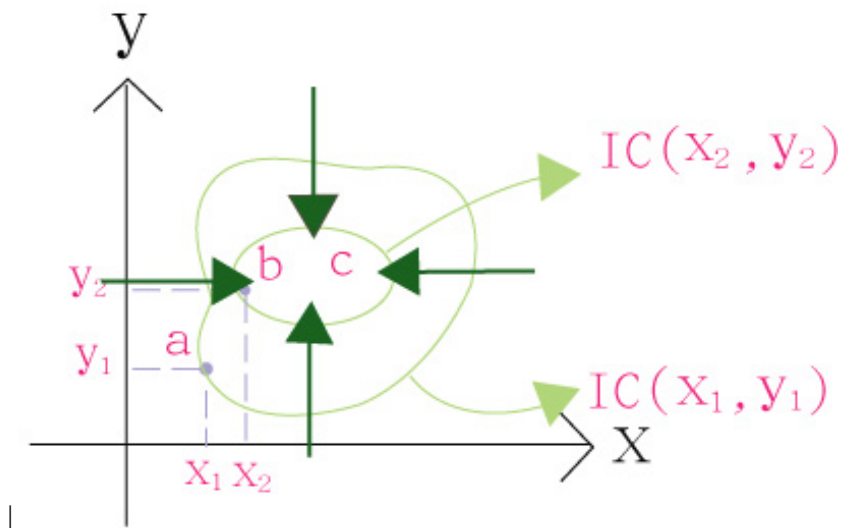


Figure 9 : Bliss point (point c)

\* **Two indifference curves never intersect**

Suppose  $IC_1$  &  $IC_2$  intersect at  $a$ ,

we know  $a$  &  $b$  are on  $IC_1 \rightarrow a \sim b$

and  $a$  &  $c$  are on  $IC_2 \rightarrow a \sim c$

(A3) Transitivity  $\rightarrow b \sim c$

However,  $b$  &  $c$  are not on the same indifference curve,

Therefore,  $b$  &  $c$  can't be indifferent to each other which contradicts with the previous  $b \sim c$  relationship.

(a5) Monotonicity nonsatiation 未飽和性

More is better, no bliss point.

$$(x_1, y_1) \in \mathbf{S} \quad (x_2, y_2) \in \mathbf{S}$$

$$x_1 \geq x_2, y_1 \geq y_2 \text{ and } (x_1, y_1) \neq (x_2, y_2)$$

(A5) rules out the followings:

1. bliss point
2. belt shape indifference curve

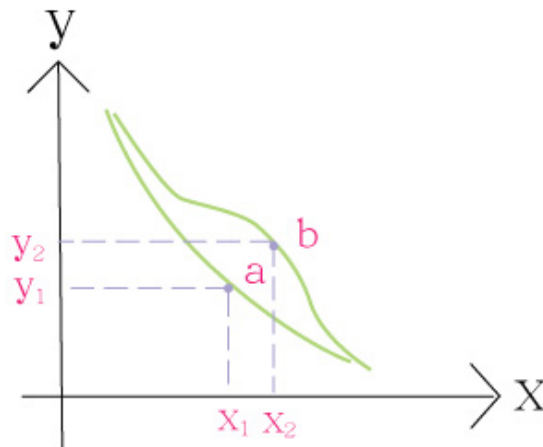


Figure 10 : Belt shape indifference curve

we can always find a bundle  $(x_2, y_2)$  such that  $x_2 \geq x_1, y_2 \geq y_1$  and

$$(x_2, y_2) \neq (x_1, y_1)$$

$$\rightarrow (x_2, y_2) > (x_1, y_1)$$

\* Indifference curve must be downward sloping

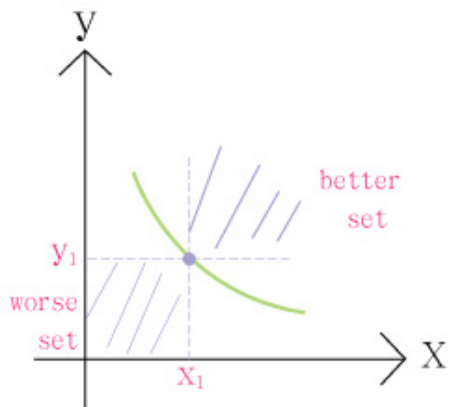


Figure 11 :

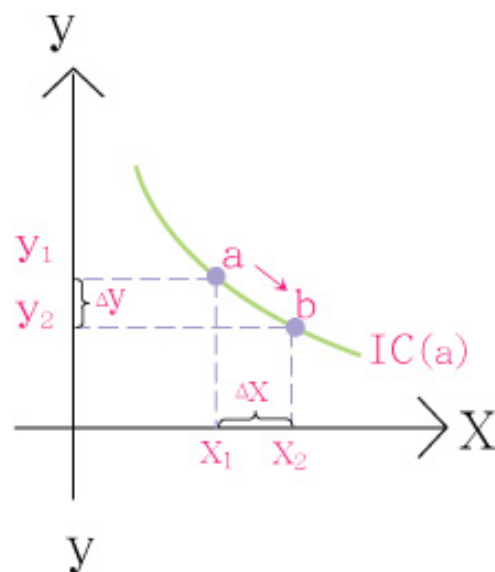


Figure 12 : Downward sloping indifference curve

a→b:  $x \uparrow, y \downarrow$

slope =  $\frac{\Delta y}{\Delta x} < 0 \rightarrow$  Marginal rate of substitution between X and Y,  $MRS_{xy}$

$MRS_{xy} = \left| \frac{\Delta y}{\Delta x} \right| = - \frac{\Delta y}{\Delta x}$  (on an indifference curve given a level of satisfaction)

$\Delta x \rightarrow 0 \quad MRS_{xy} = - \frac{dy}{dx} \Big|_{IC(a)}$

(A6) Diminishing  $MRS_{xy}$

$x \uparrow, y \downarrow$  (X substitutes for Y)

$MRS_{xy} \downarrow \rightarrow$  Indifference curve is convex

$\rightarrow$  Law of diminishing  $MRS_{xy}$

(A7) Differentiability 可微分性

Smooth indifference curve (no kinks)

$MRS_{xy}$  at a is not well defined.

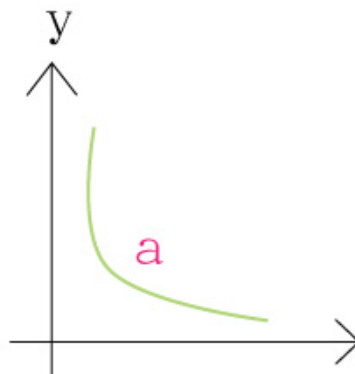


Figure 13 : indifference curve with kinks

\* **Properties of the indifference curve:**

1. negative slope
2.  $-\text{slope} = MRS_{xy}$
3. Convex ( $MRS_{xy}$  diminishing)
4. Indifference curves to the northeast represent higher levels of satisfaction
5. Indifference curves never intersect

\* **Special cases**

case 1. X (6-pack, 6 cans) and Y (box, 24 cans) are perfect substitutes

IC 為直線

x: nb. of 6-pack's

y: nb. of 24-can boxes

$$\frac{\Delta y}{\Delta x} = \frac{1}{4}, \quad MRS_{xy} = \frac{1}{4}$$

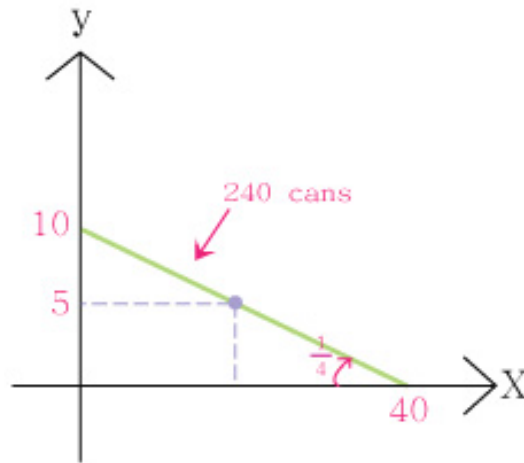


Figure 14 : Perfect substitute preference

case2. X (cups of coffee) and Y (packs of sugar) are perfect complements

IC 為 L 型

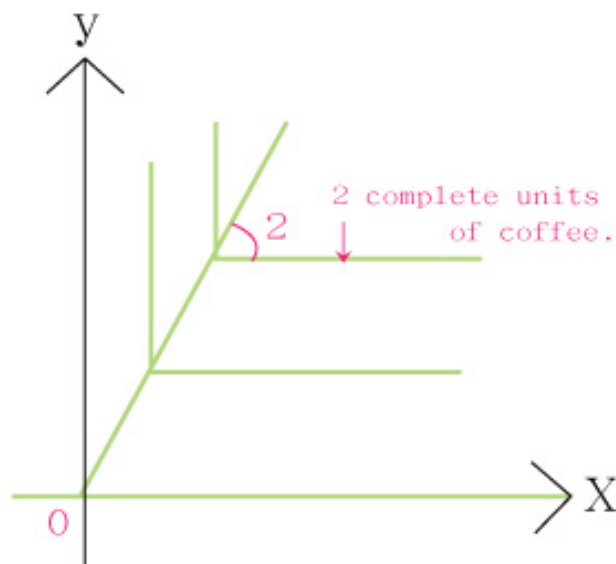


Figure 15 : Perfect complement preference

部分代替，比例不固定

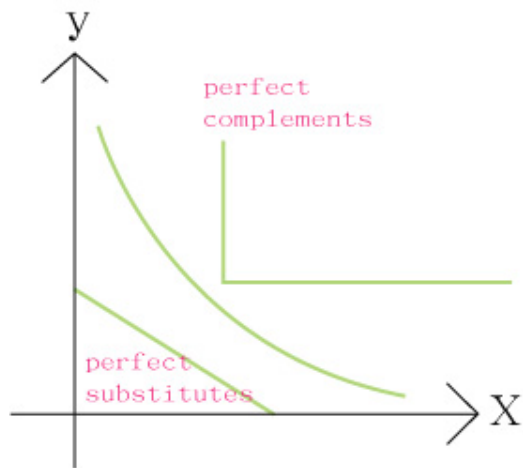


Figure16 :部分代替，比例不固定(IC<sub>1</sub>)

【case3】

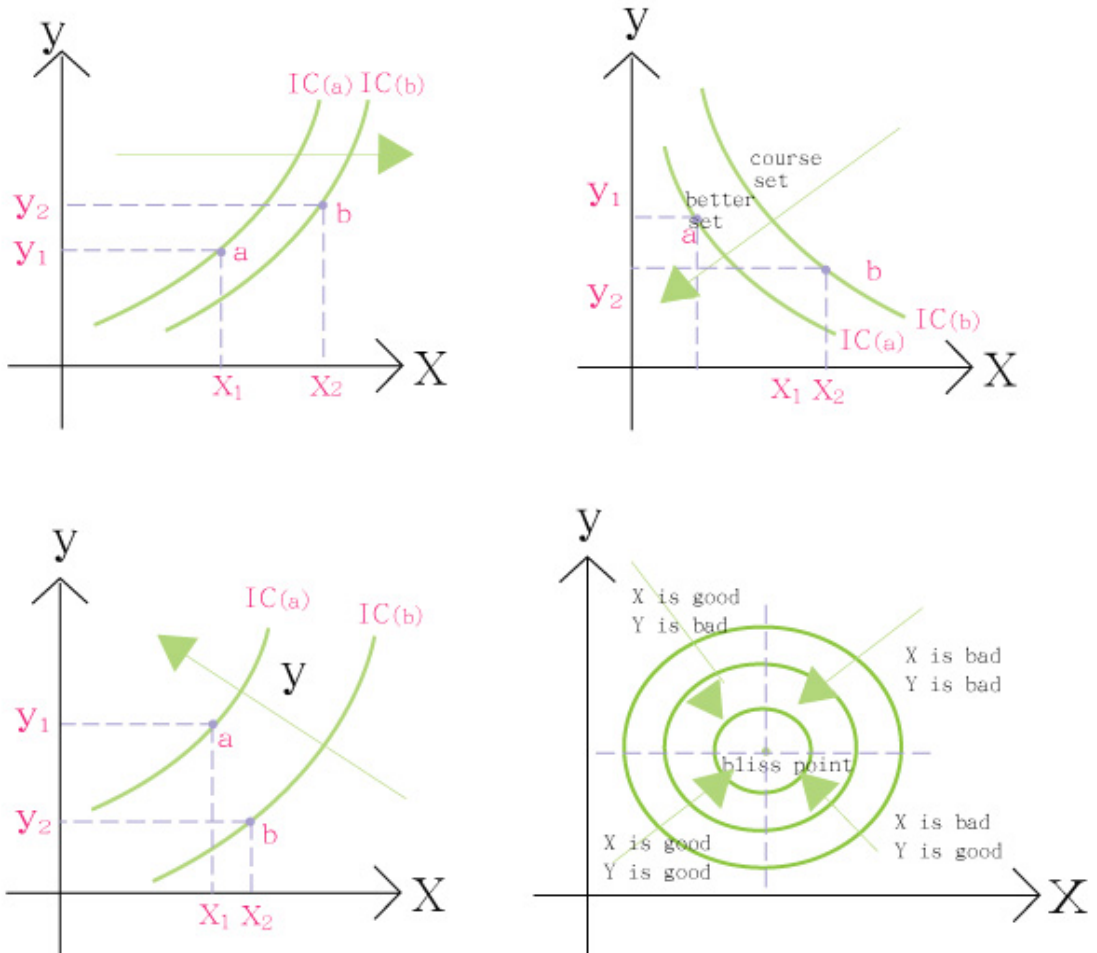


Figure17 : Indifference curve represented by different type of goods