

Chapter 13 Income and Price Consumption Curves

Changes of Consumption Equilibrium can be caused by the change in

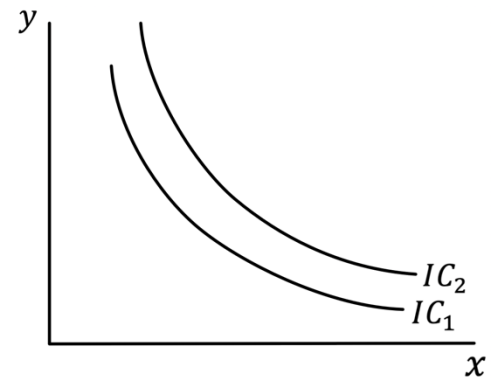
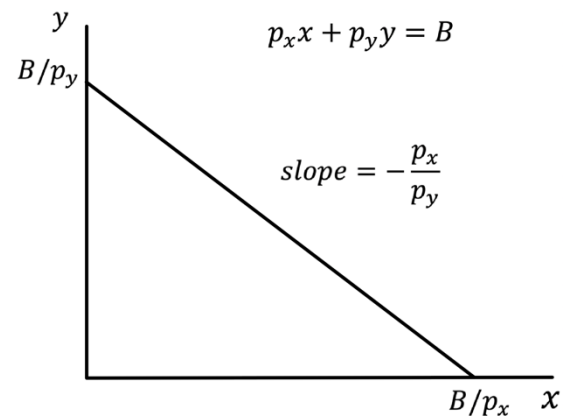
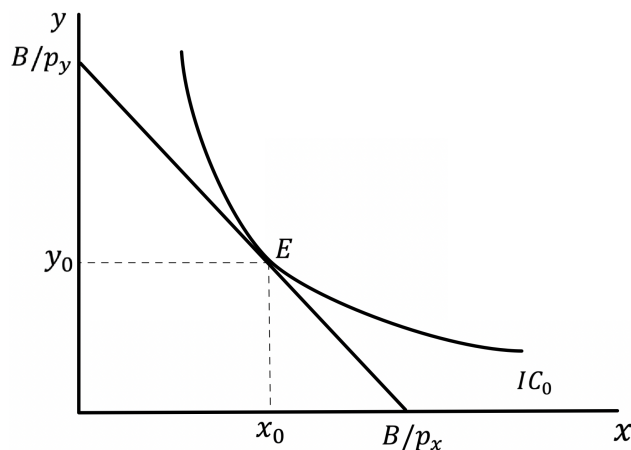
1. Income
2. Price of a good

- Only one change at a time and Indifference Curves are assumed to be unchanged.

2. Change in Price of x . p_x changes while p_y and income B remain unchanged.

The original equilibrium is at $E = (x_0, y_0)$ where the budget line is tangent to IC_0 , with equilibrium conditions:

- 1) $p_x x_0 + p_y y_0 = B$
- 2) $\frac{MU_x(x_0, y_0)}{MU_y(x_0, y_0)} = \frac{p_x}{p_y}$.



Price of x decreases from p_x to p'_x . ($p_x > p'_x$)

- New equilibrium is at $F = (x_1, y_1)$ where we have the equilibrium conditions:

- 1) $p'_x x + p_y y_1 = B \Leftrightarrow F = (x_1, y_1)$ is affordable,
- 2) $\frac{MU_x(x_1, y_1)}{MU_y(x_1, y_1)} = \frac{p'_x}{p_y}$

- When p_x decreases, the consumer always enjoys higher satisfaction. With same reason, when price of a good increases, the consumer always suffers lower satisfaction.
- When price of one good changes, the consumer adjusts consumption of both x and y to maximize his satisfaction.

We can have the following 3 possible outcomes:

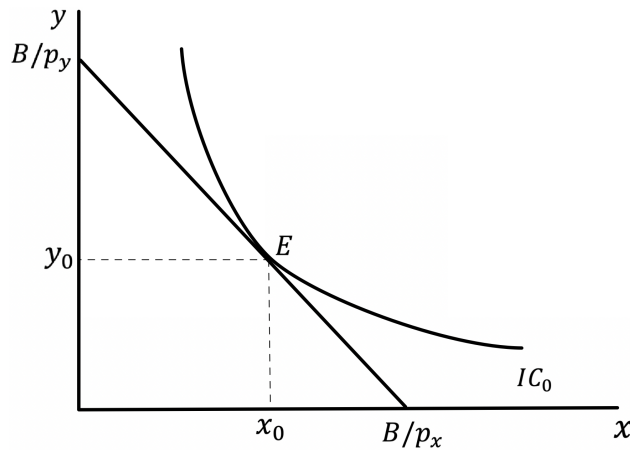
a) When p_x decreases, as shown in the previous graph above the consumer consumes

more of $x = \Delta x = x_1 - x_0 > 0$ and

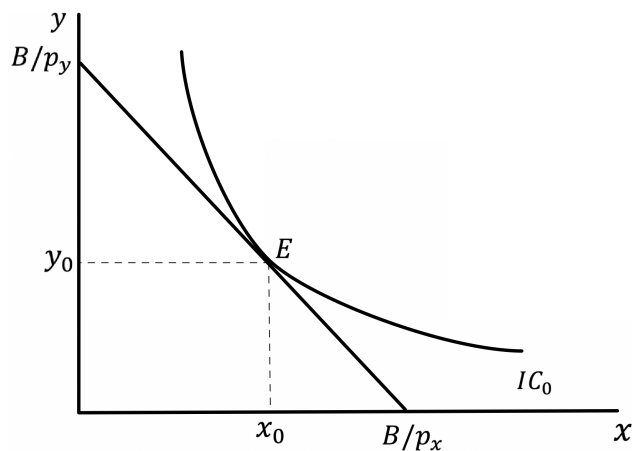
more of $y = \Delta y = y_1 - y_0 > 0$.

- p_x decreases $\Rightarrow$ buys more of x (Law of Demand)
- p_x decreases $\Rightarrow$ buys more of y (x and y are substitutes/complementaries)

b) More x and less y

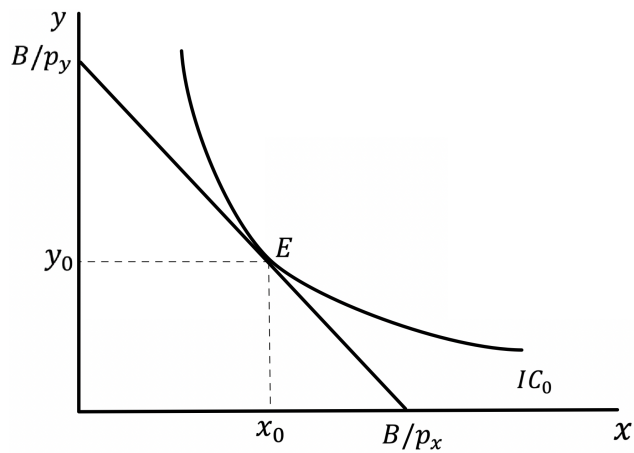


c) Less x and more y . Is x inferior?

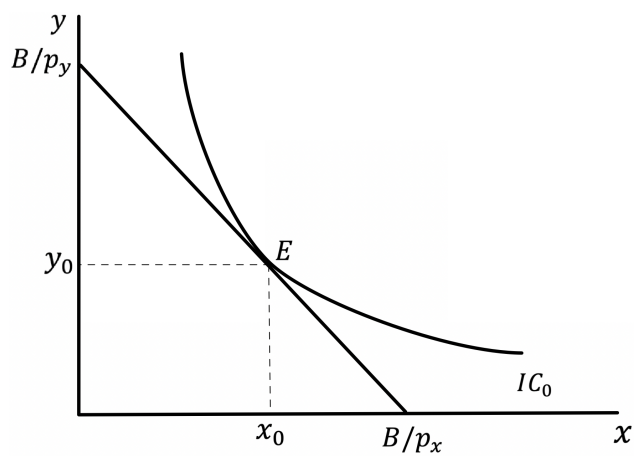


When p_x increases, we can have the following cases:

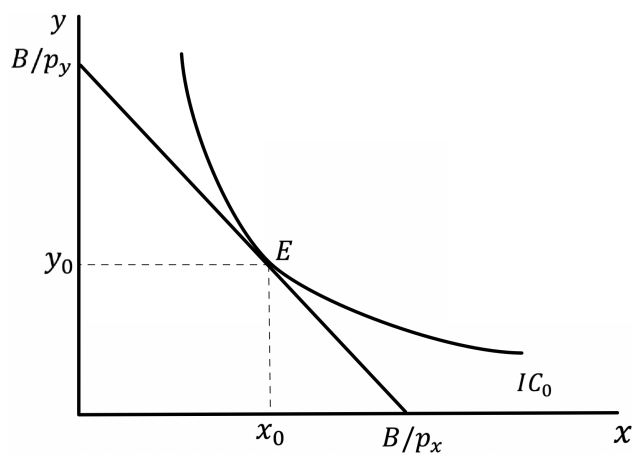
a) Less of x and less of y .



b) Less of x and more of y .

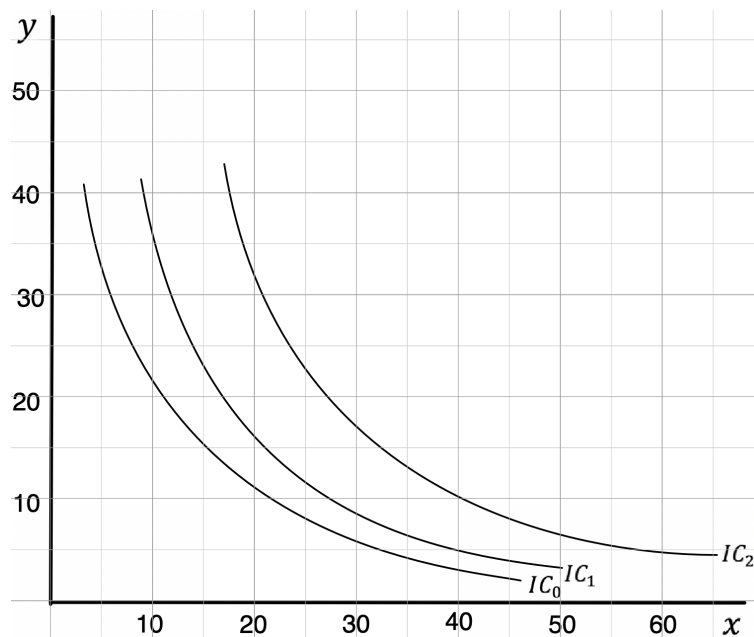


c) More of x and less of y .

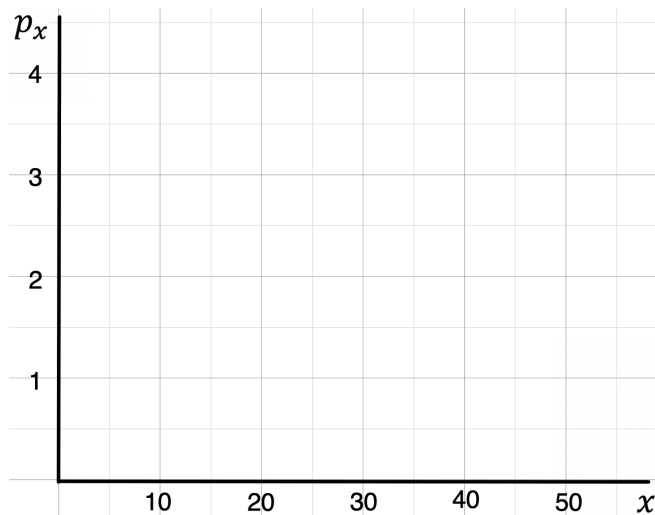


Price Consumption Curve (PCC) is a line whose every point is a consumption equilibrium for varying price p_x at given fixed price p_y and income B .

- With given $p_y = 4$ and $B = 120$, we can find the following equilibria at various prices $p_x = 2, 3$ and 4 .



- We have the following relationship between the price $p_x = 2, 3$ and 4 , and the resulting quantities of x that the consumer



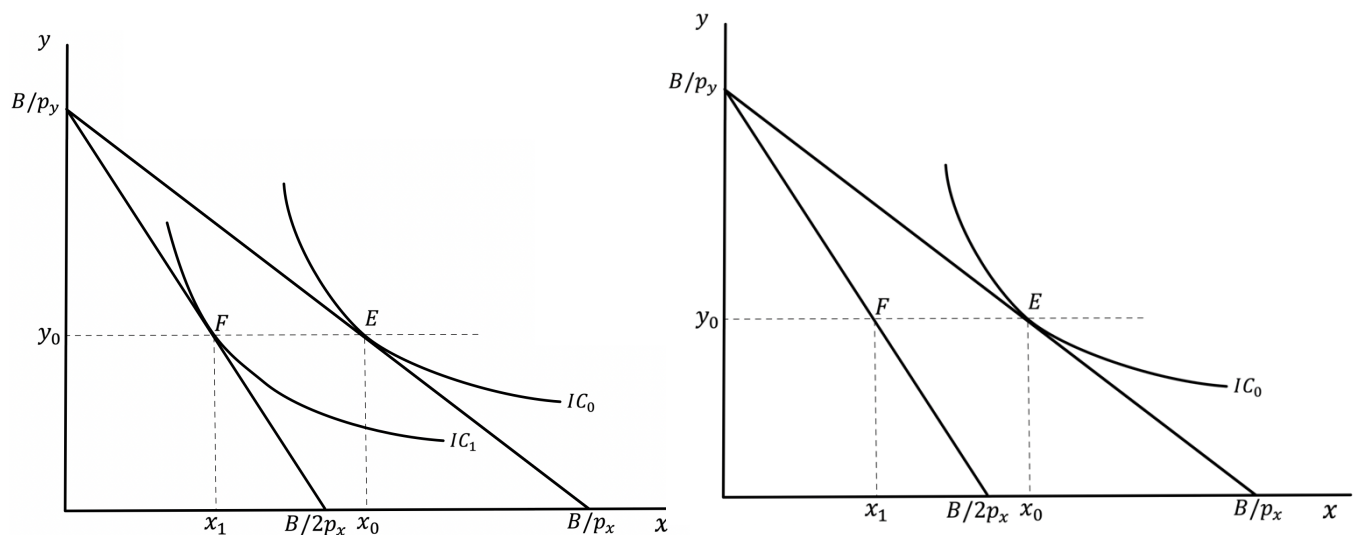
- Since a given PCC is created by varying p_x while keeping p_y and income B constant, this relationship of the p_x and the resulting quantity of x that the consumer buys with highest satisfaction with the income available.
- This relationship is the demand function as defined previously.

Properties of PCC

1. A PPC does not pass through the origin.
2. If a PPC is created by varying p_x while keeping p_y and income B constant, we will get a different PPC with a change in p_y and/or B .
3. A PCC can be created from varying p_y while keeping p_x and B constant.
4. Any two points on a given PCC can give the price elasticity of the product whose price is varying. We will discuss next for the case when p_x changes.

Any two points on a given PCC can give the price elasticity of x (p_y and B are constant)%

Let assume that we have two equilibrium points E and F being on a same PCC when p_x changes and p_y and B are constant in such a way that the line passing through them is parallel to the horizontal axis. For ease of exposition, assume that E is on a budget line $p_x x + p_y = B$, while F is on a budget line with the income $2p_x x + p_y = B$.



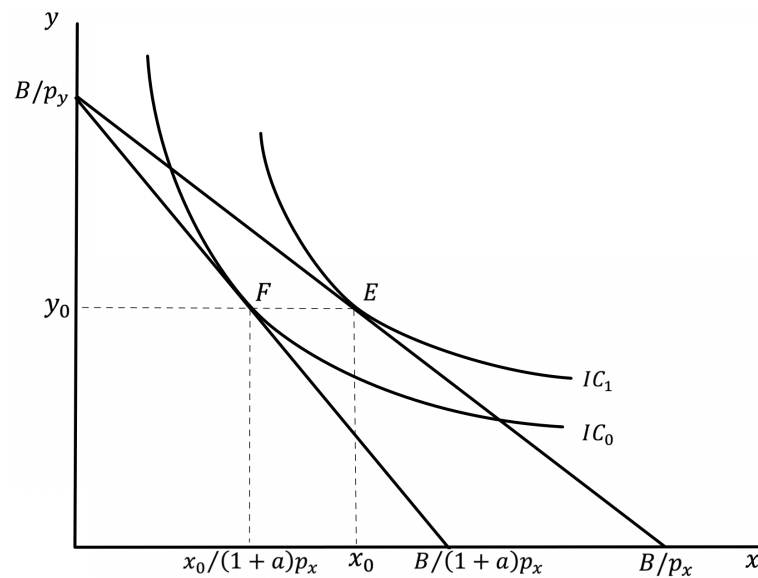
We will compute the price elasticity of x by midpoint method,

$$\begin{aligned} \% \Delta p_x &= \\ \% \Delta x &= \\ \eta_x &= \frac{\% \Delta x}{\% \Delta p_x} = \end{aligned}$$

Where should the new equilibrium be for the price elasticity to be **less than one** in absolute value?

Where should the new equilibrium be for the price elasticity to be **more than one** in absolute value?

- The following graph demonstrates the case when the price p_x changes to $(1 + a)p_x$, $a > 0$.



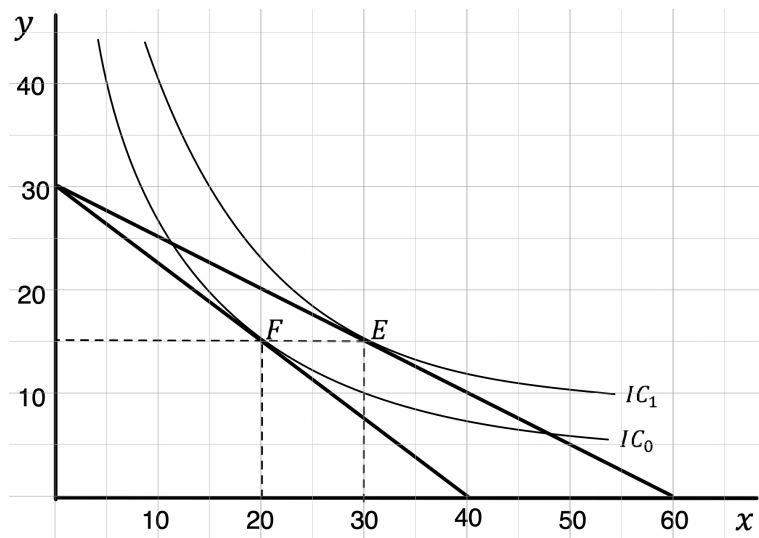
We can calculate the price elasticity of x as follows:

$$\begin{aligned} \% \Delta p_x &= \\ \% \Delta x &= \\ \eta_x &= \frac{\% \Delta x}{\% \Delta p_x} = \end{aligned}$$

Since the calculation of price elasticity is by midpoint method, we have the same conclusion when price p_x decreases.

Example: If the price p_x decreases from 3 to 2 so that we have budget line changes from

$$3x + 4y = 120 \text{ to } 2x + 4y = 120,$$



Calculation of price elasticity of x :

$$\begin{aligned} \% \Delta p_x &= \\ \% \Delta x &= \\ \eta_x &= \frac{\% \Delta x}{\% \Delta p_x} = \end{aligned}$$

HW: Demonstrate how PCC with varying p_y (fixed p_x and B) can give us the price elasticity of y to be in absolute value equal to 1, less than 1 and greater than 1.