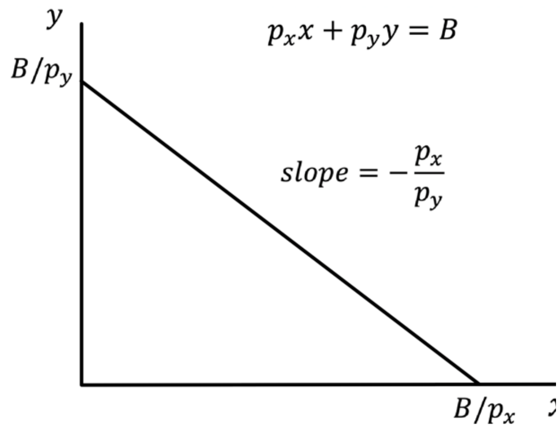
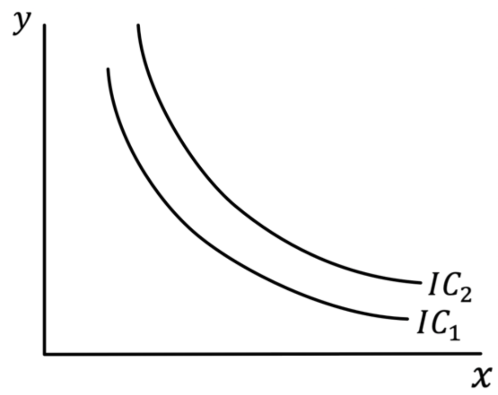
Chapter 13 Income and Price Consumption Curves

Changes of Consumption Equilibrium can be caused by the change in

1. Income
2. Price of a good



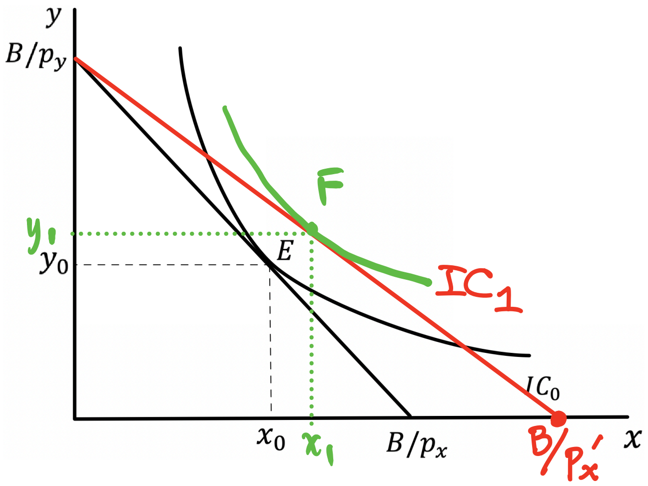


- Only one change at a time and Indifference Curves are assumed to be unchanged.

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,
MRS ~~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. because he can consume of a higher IC (IC_1) 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:

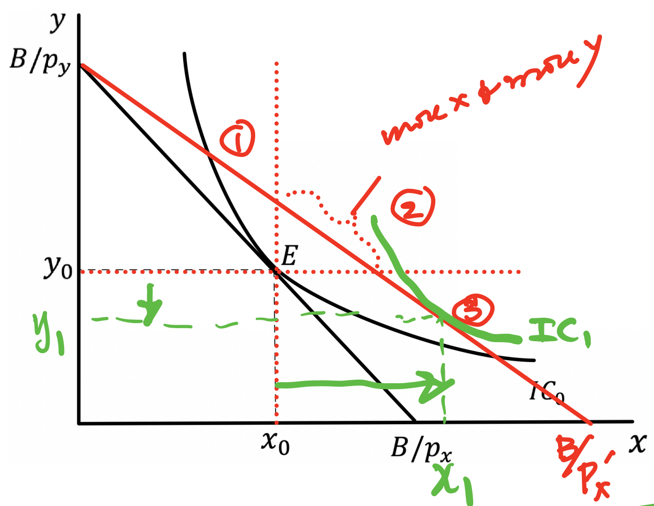
a) When p_x decreases, as shown in the previous graph above the consumer consumes from E to F

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

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

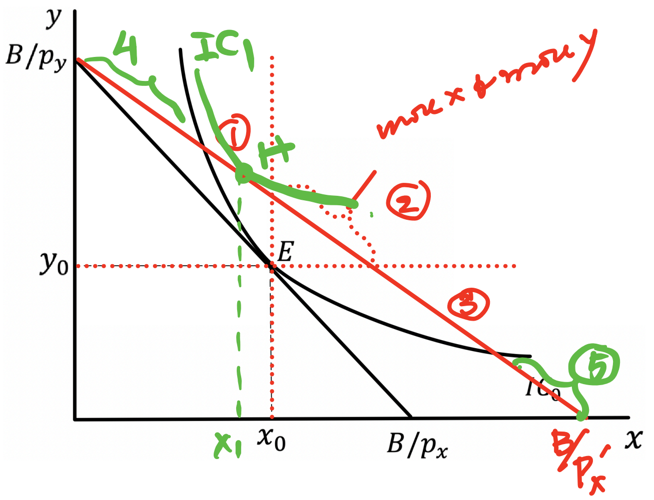
- p_x decreases $\Longrightarrow$ buys more of x (Law of Demand)
- p_x decreases $\Longrightarrow$ buys more of y (x and y are ~~substitutes~~/complementaries)

b) More x and less y



c) Less x and more y. Is x inferior? we will talk more about this.

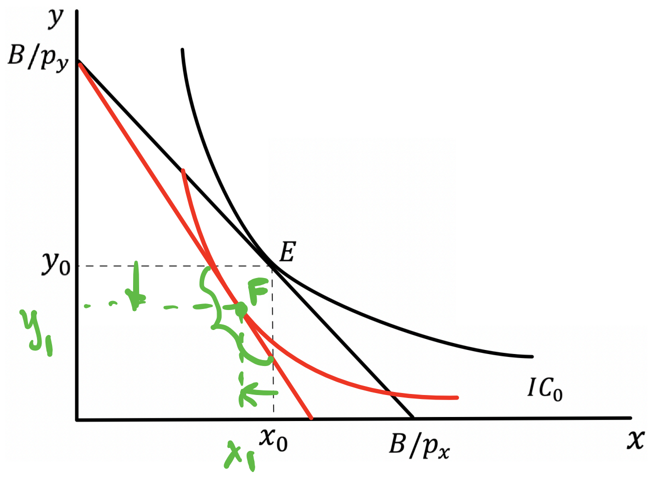
E to H, less of x



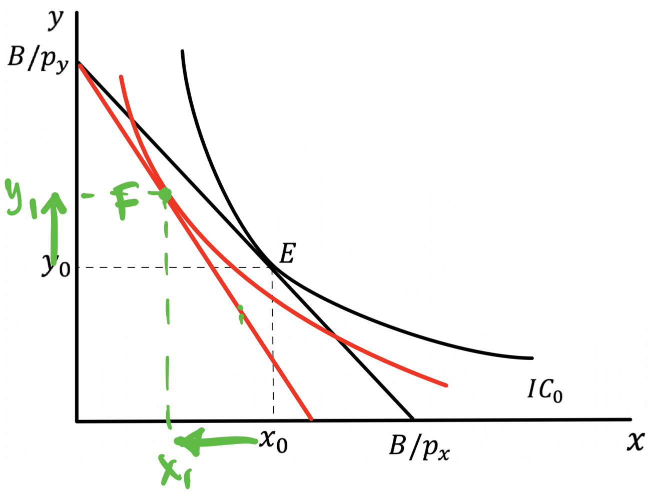
4 & 5 are impossible to have the new eq. there.

When p_x increases, we can have the following cases:

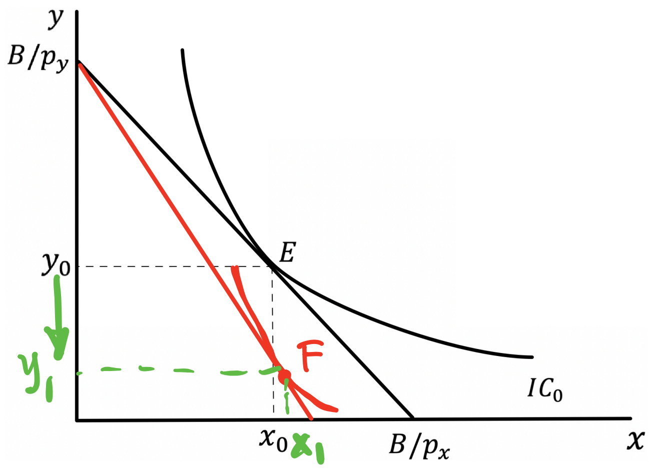
a) Less of x and less of y.



b) Less of x and more of y.



c) More of x and less of y.

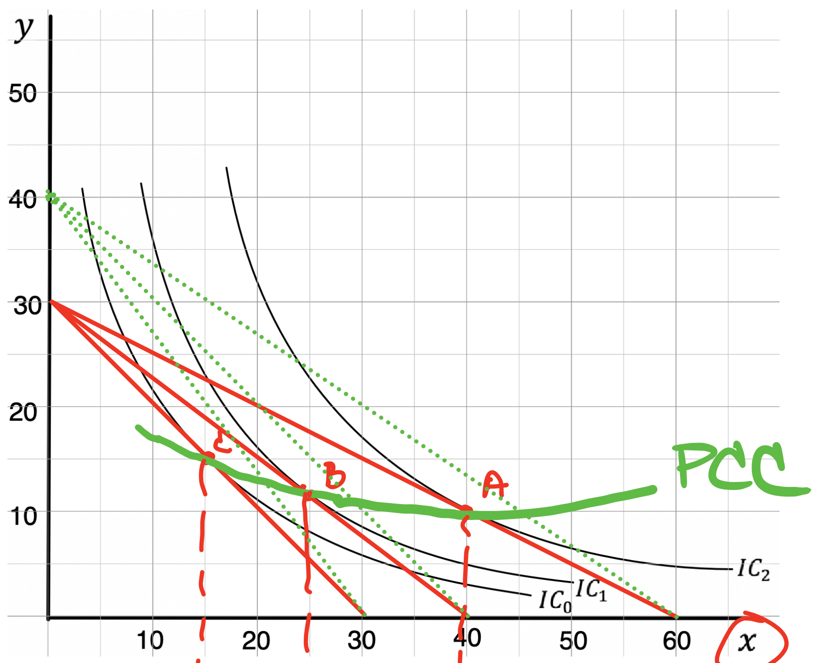


no impossible section of new budget line that the new eq. cannot be

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.

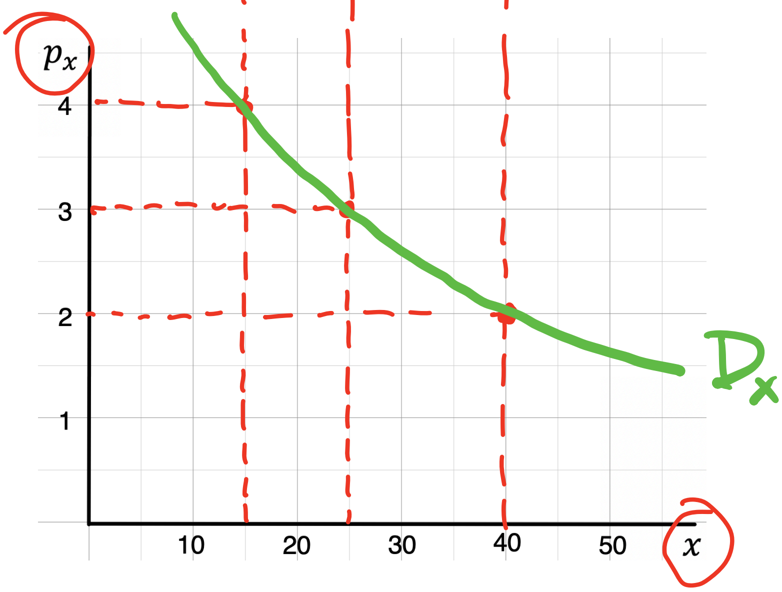
fixed

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



If price of y changes from $P_y = 4$ to $P_y' = 3$

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



Demand is relationship between price and quantity the buyer is willing – max satisfaction and able – on the budget line to buy. with all other factors – income – Taste/expectation – prices of other goods. being equal constant.

- 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

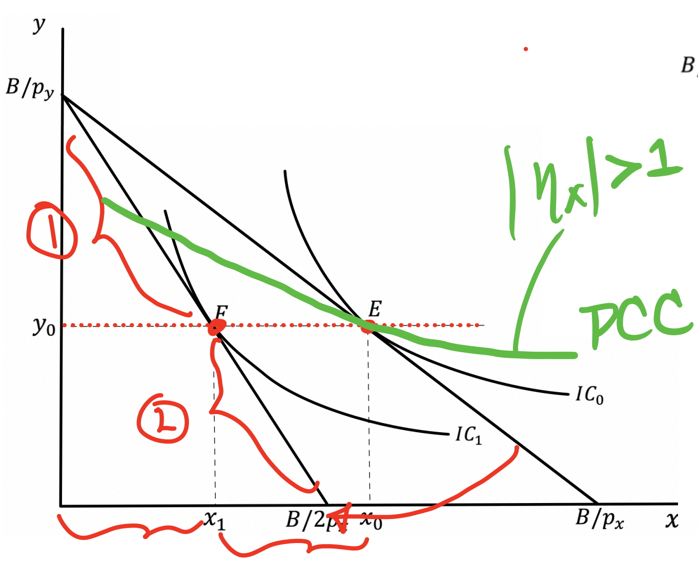
1. A PPC does not pass through the origin.
2. If a PPC is created by varying p_x while keeping p_y and income B constant, we will get a different PPC with a change in p_y and/or B.
3. A PCC can be created from varying p_y while keeping p_x and B constant.
4. Any two points on a given PCC can give the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

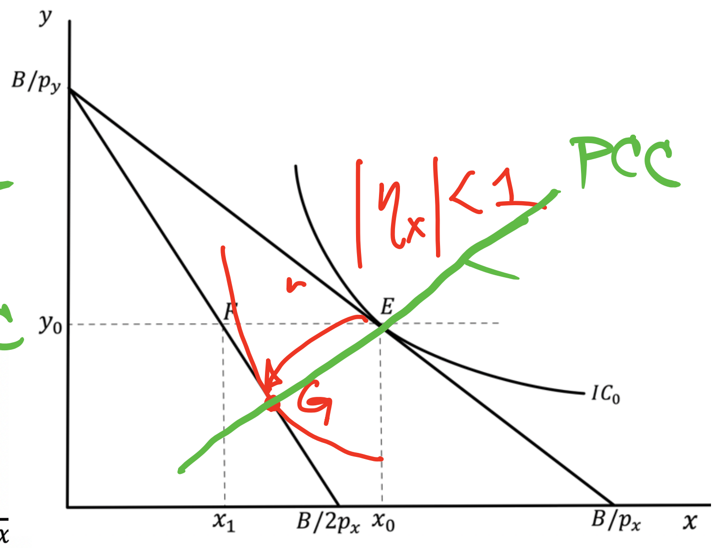
Question For PCC's that are created by varying P_x, can they intersect with different P_y's and/or B's with given IC's.

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 $2p_x x + p_y = B$.

$P_x \to 2P_x$





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

$P_x \to 2P_x$ $\quad \Delta P_x = 2P_x - P_x = P_x$ $\quad \frac{2P_x + P_x}{2} = \frac{P_x(3)}{2}$

$x_0 \to x_1 = \frac{x_0}{2}$ $\quad \Delta x = x_1 - x_0 = -\frac{x_0}{2}$ $\quad \frac{x_1 + x_0}{2} = \frac{\frac{x_0}{2} + x_0}{2} = \frac{3}{4}x_0$

$$\%\Delta p_x = \frac{P_x}{3/2\,P_x} = 2/3$$

$$\frac{-\frac{x_0}{2}}{3/4\,x_0} = -\frac{2}{3} = \%\Delta x =$$

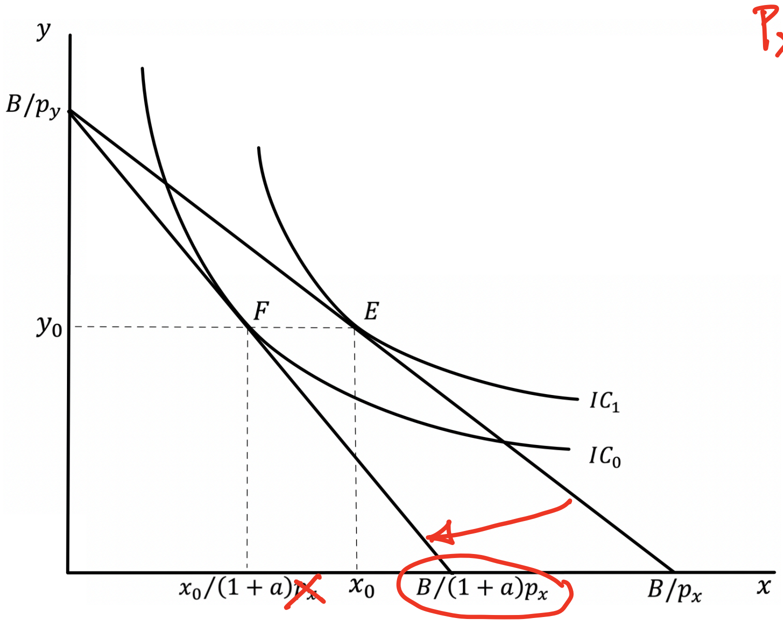
$$\eta_x = \frac{\%\Delta x}{\%\Delta p_x} = -1$$

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 $(1+a)p_x, a > 0$.

$P_x \to (1+a)P_x\ ,\ a>0.$



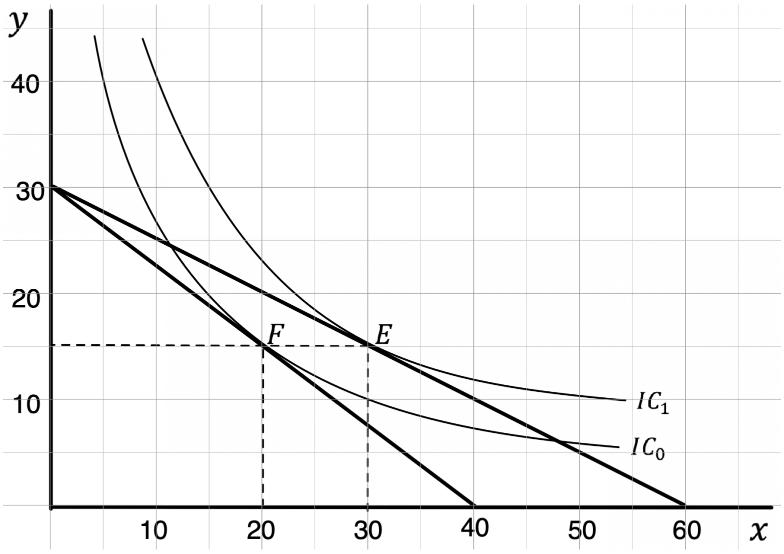
We can calculate the price elasticity of x as follows:

$$\%\Delta p_x =$$
$$\%\Delta x =$$
$$\eta_x = \frac{\%\Delta x}{\%\Delta p_x} =$$

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:

$$\%\Delta p_x =$$
$$\%\Delta x =$$
$$\eta_x = \frac{\%\Delta x}{\%\Delta p_x} =$$

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.