Part 3

Consumer Theory

Principles of Microeconomics
August 2019

Introduction

Demand for consumption partly come from fundamental human need to consume goods or services in order to survive or gain a kind of well-being condition.

Acquiring various goods or services In order to meet consumers' need is according to resource allocation. For welfare states, it is mostly agreed that people should be fulfilled at two levels. Basic human right should be provided by the state, family or community. But people should also be able to seek from markets according to the satisfaction of each person because we prefer different things.

Mainstream economic theory focuses on the consumption in the market system. Therefore, this part is only a study of consumption behavior in the market system.

Content

3.1 - Consumption and Utility

Definition of consumption and utility: why we have to consume and what consumption yields.

3.2 - Cardinal Theory

Cardinal approach tackles utility as a measurable unit to show how consumer tries to maximize his/her utility.

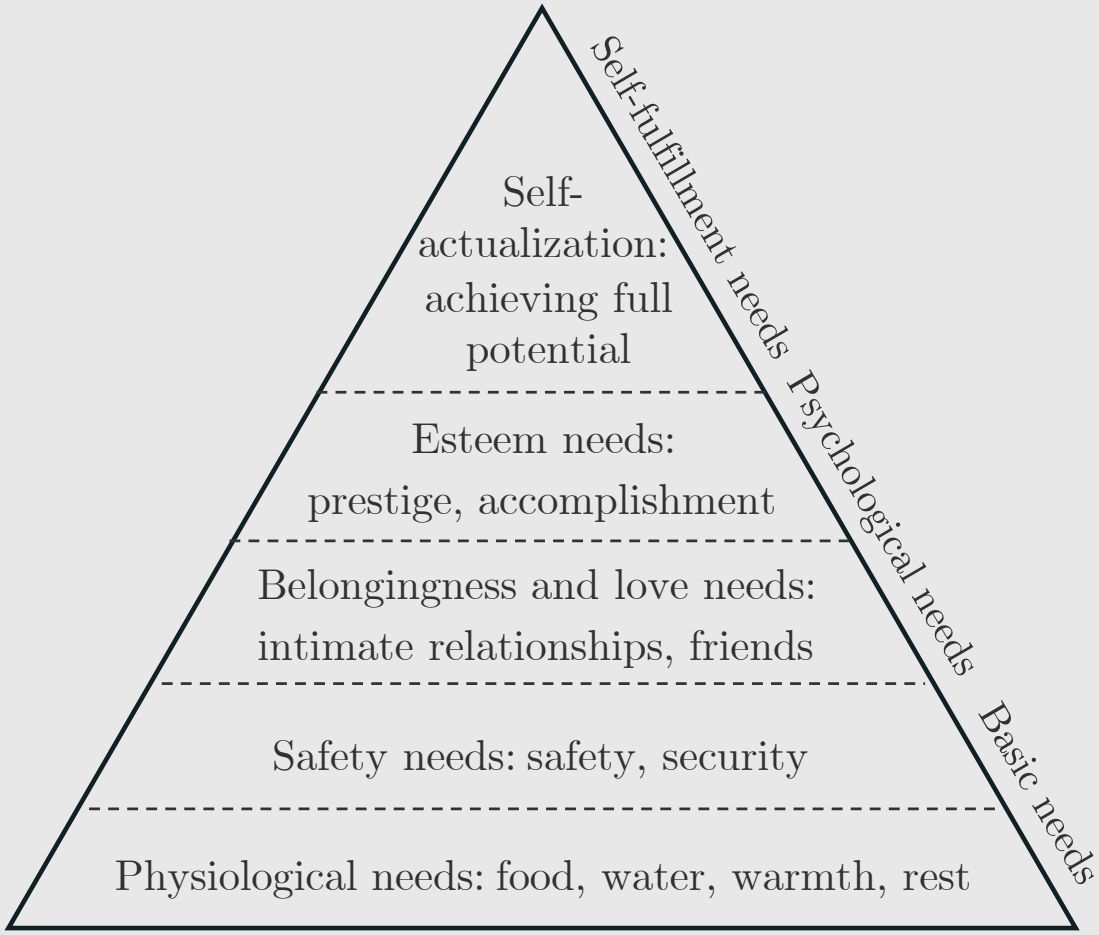
3.3 - Ordinal Theory

Ordinal approach utilizes indifferent curve and budget line to solve the issue of cardinal approach.

3.4 - Hicksian's Price Effect

Hicksian's price effect is used to analyze the effect of price change in order to understand how consumer substitute between goods and when their purchasing power increases/decrease. It also reveals that demand curve is derived from consumer's utility maximization process.

Maslow's Hierarchy of Needs



Consuming goods or services traded in a market system provides satisfaction and treats human needs through resource allocation, employing price mechanisms Therefore, the first thing that economists need to define is what consumer receive from consumption.

Definition 3-1: Utility

Utility is defined as happiness or satisfaction that a consumer receives from consuming goods or services within a period of time.

Quick question: From the definition, do you think?:
- Consuming of the same product or service yields the same amount of utility for each person?

- Is utility the same or different from usefulness?

Before we move on, some assumptions must be posed.

(1) Consumers are rational with the aim to maximize utility from consumption.

(2) Utility is measurable, countable, and combinable with unit of 'util'.

(3) Goods or services that consumers choose share the same quality in every unit consumed. (homogenous product)

(4) Goods or services are assumed to be indefinitely separated into very small unit. (Continuous)

(5) If there is a budget constraint, consumers are not yet satiated. (Non-satiated)

(6) Ceteris paribus or 'other things being equal'. Meaning that other than a change we are focus on, other factors are kept constant.

If utility is defined as a measurable unit, consuming goods or services 1 unit obtains an amount of utility. The second unit also provides another amount of utility and so on. Each utility received from each unit is different, which they can be called "marginal utility".

Definition 3-2: Marginal Utility (MU)

Marginal utility is additional utility that consumer receive from consuming one more unit of goods or services

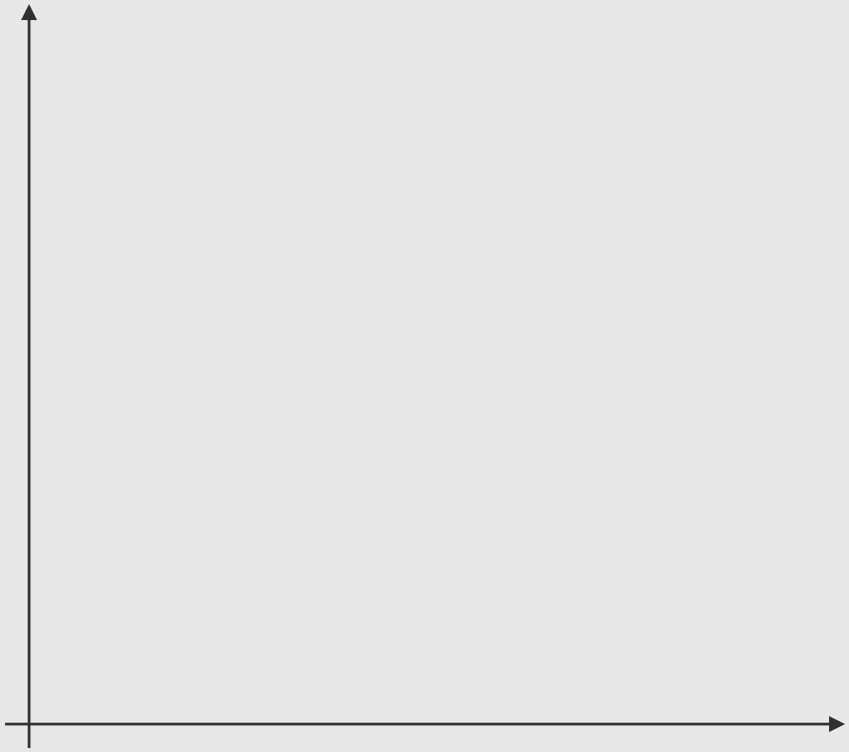
For example, Mr. A has two dishes of meal which utilize 10 and 7 utils respectively. Combining all the marginal utility, we get total utility.

Definition 3-3: Total Utility (TU)

Total utility is utility that consumer receive from consumption n units of goods or service.

Figure marginal utility			Figure total utility		
x	**TU**	**MU**	**x**	**TU**	**MU**
0	0	-	0	0	-
1	5		1		4
2	8		2		2
3	9		3		1
4	10		4		0
5	10		5		-1
6	8		6		-2

Total and marginal utility curve



Try plotting both on the same graph. Don't forget to indicate axis label.

Definition 3-4: Law of Diminishing Marginal Utility

Law of Diminishing Marginal Utility states that marginal utility from consuming a good or service within a period of time diminishes as the consumer keep consuming it.

Therefore, studying consumer is finding **a condition that would maximize consumer's utility** under different circumstances, assumed that consumer is rational.

Quick question: does the law applies for every goods and services?

(1) Consuming a good without budget constraint

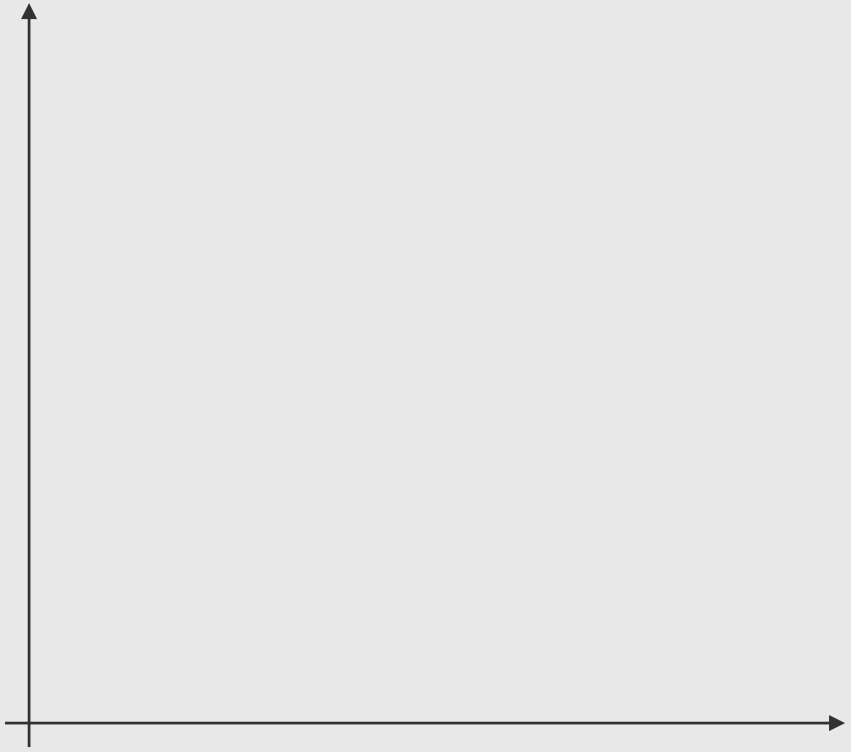


Figure marginal utility

x	TU	MU
0	0	-
1	5	
2	8	
3	9	
4	9	
5	8	
6	6	

Maximized utility condition

$$MU_x = 0$$

(2) Consuming two goods without budget constraint

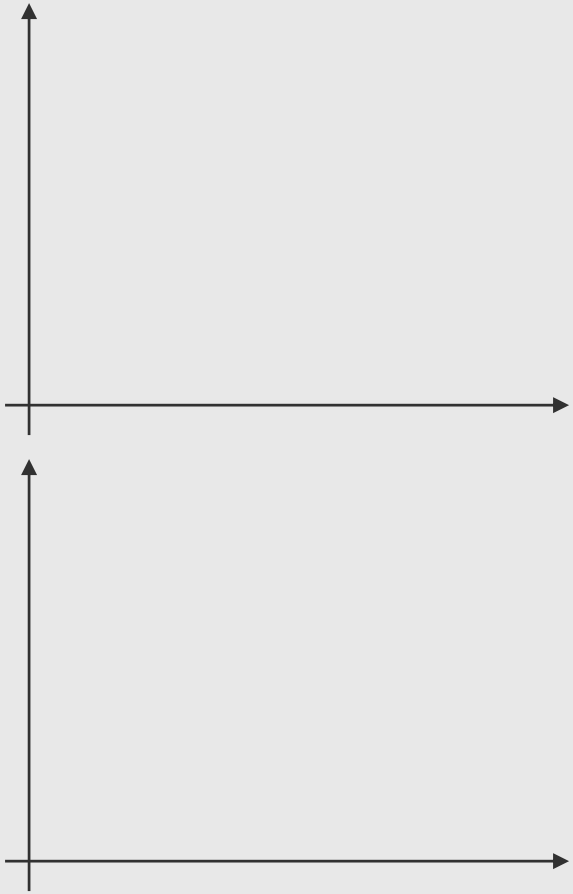


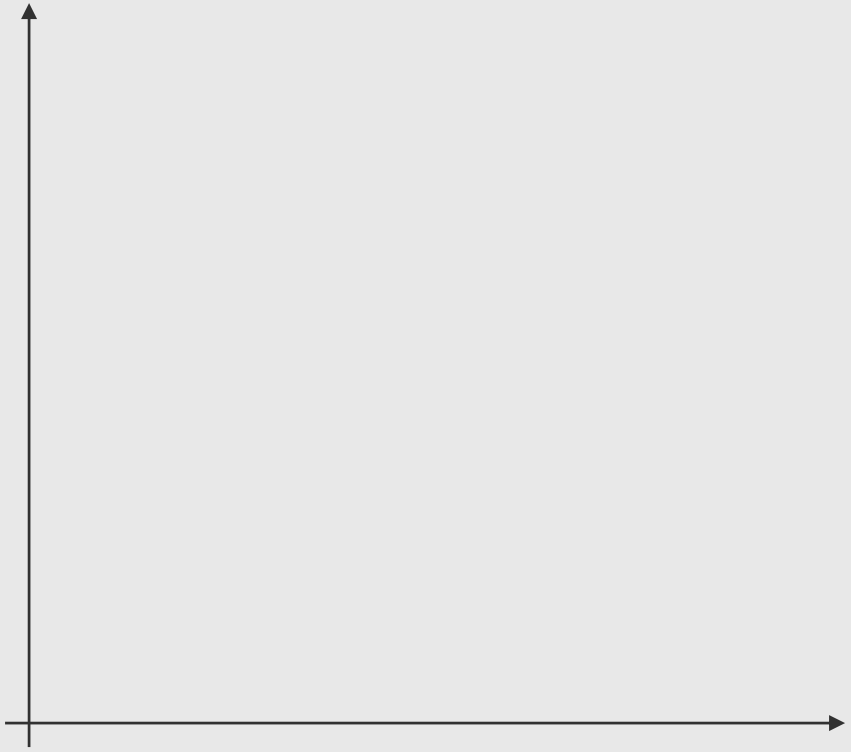
Figure marginal utility

x,y	TU_x	MU_x	TU_y	MU_y
0	0	-	0	-
1	5		10	
2	8		15	
3	9		18	
4	9		19	
5	8		19	
6	6		17	

Maximized utility condition

$$MU_x = MU_y = \cdots = 0$$

(3) Consuming a good with budget constraint



If $I=24$, $P_x=8$		
x	**TU**	**MU**
0	0	-
1	5	
2	8	
3	9	
4	9	
5	8	
6	6	

Maximized utility condition

$$\max_x U(x)\,;\, subject\ to\ \ P_x \cdot x \ \leq I$$

(4) Consuming two goods with budget constraint

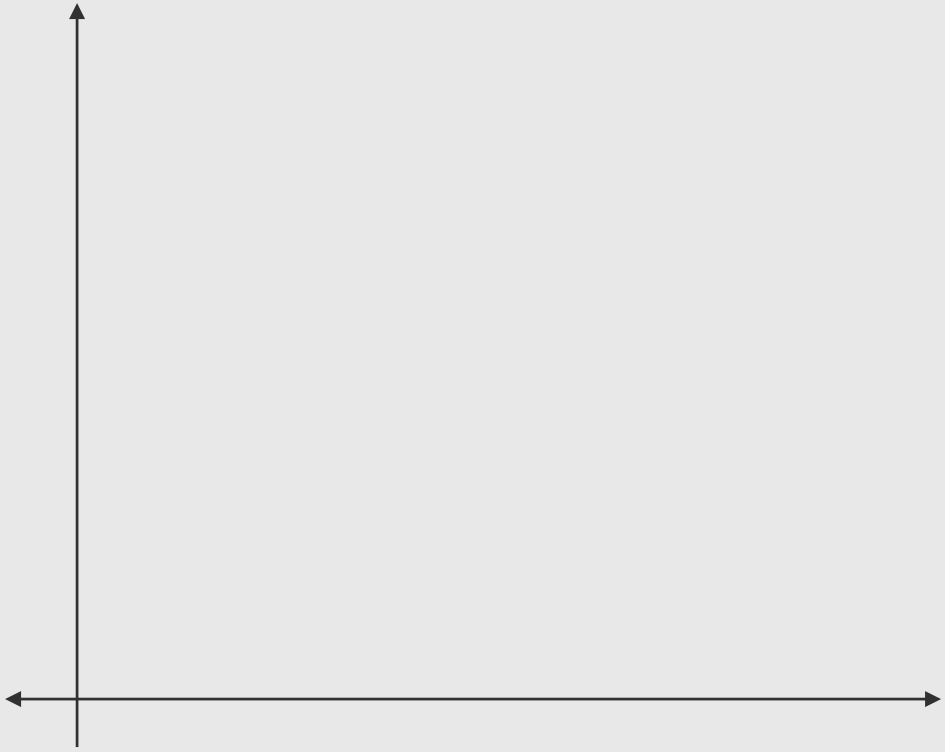
What does this consumer choose?

I	x,y	MU_x	P_x	MU_y	P_y	MU_x/P_x	MU_y/P_y	Choice	Decision	I
22	1	12	4	10	2					
	2	8		8						
	3	4		6						
	4	0		4						
	5	-4		2						
	6	-8		0						

Maximized utility condition

$$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \cdots = \frac{MU_k}{P_k}$$

Why the condition?



Assumed that on every combination of (x,y) here, the budget is totally spent and prices are constant.

Drawbacks

- The measurement of utility is problematic due to the unit of utility is not uniquely defined.

In other words, if two people are satisfied with the same goods and service but the defined level of utility may be different. For instance, Mr. A can define his satisfaction as 3 when Mr. B can define his satisfaction as 10 but they feel exactly the same.

- Adding up utility lacks reliability.

Therefore, there is another approach that can solve this problem without determining exact amount of utility as number.

Ordinal theory assumptions

(1) Consumers are rational with the aim to maximize utility from consumption.

(2) By being rational, it roughly means that consumer can tell what product they prefer and they can put them in order of preference.

(3) Goods or services that consumers choose share the same quality in every unit consumed. (homogenous product)

(4) Goods or services are assumed to be indefinitely separated into very small unit. (Continuous)

(5) If there is a budget constraint, consumers are not yet satiated (Non-satiated). In other words, the analysis satisfies Walras' Law.

(6) Ceteris paribus or 'other things being equal'. Meaning that other than a change we are focus on, other factors are kept constant.

Tools of ordinal theory

(1) Indifferent Curve (IC): derived from utility function of consuming **two substitutable goods**, mainly.

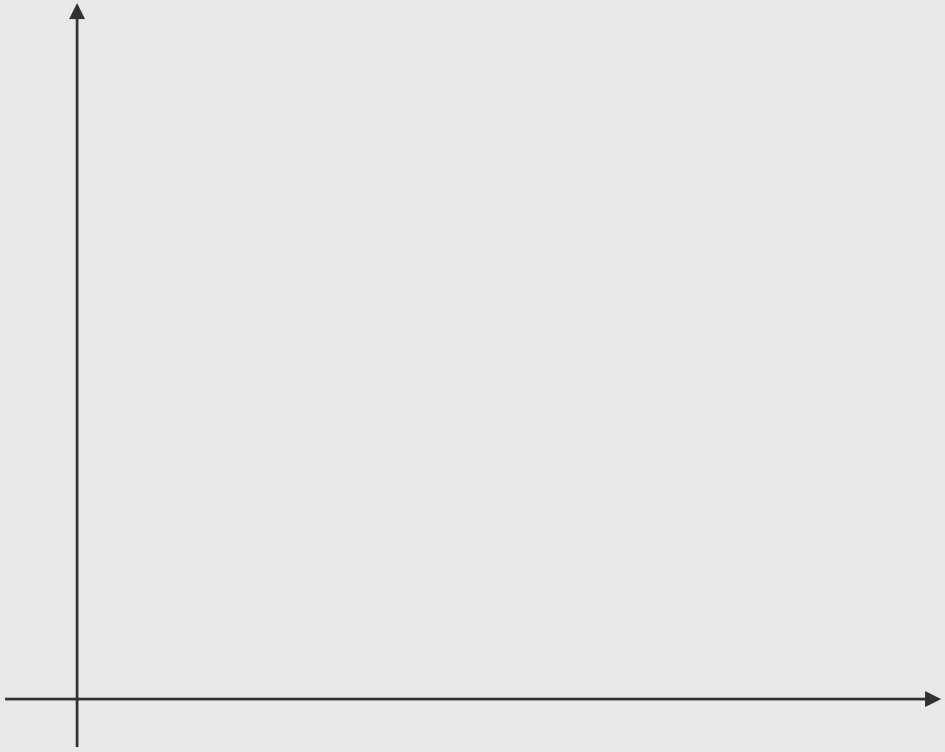
(2) Budget Line (BL): a budget constraint that sets a perimeter of consumable area.

Think about a utility function of consuming two goods

Now consider the 3D utility function from each side

There are some parts we do not need to study

(1) Indifferent curves (IC)



Characteristics

- Consumption bundles.

- Level of utility.

- ICs cannot intersect.

- ICs have negative slope and convex to the origin.

Now if we consider one IC at a time. If every consumption bundle (x,y) yield the same amount of utility. Changing those bundles results in the same level of utility. However, moving from one point to another may differ throughout an IC.

Definition 3-5: Marginal Rate of Substitution (MRS)

Marginal rate of substitution is a ratio of substitution of two goods at a point on IC curve that yields the same amount of utility.

$$MRS_{xy} = \frac{\Delta y}{\Delta x}$$

Consider the MRS_{xy} on each point of an IC.

Marginal rate of substitution

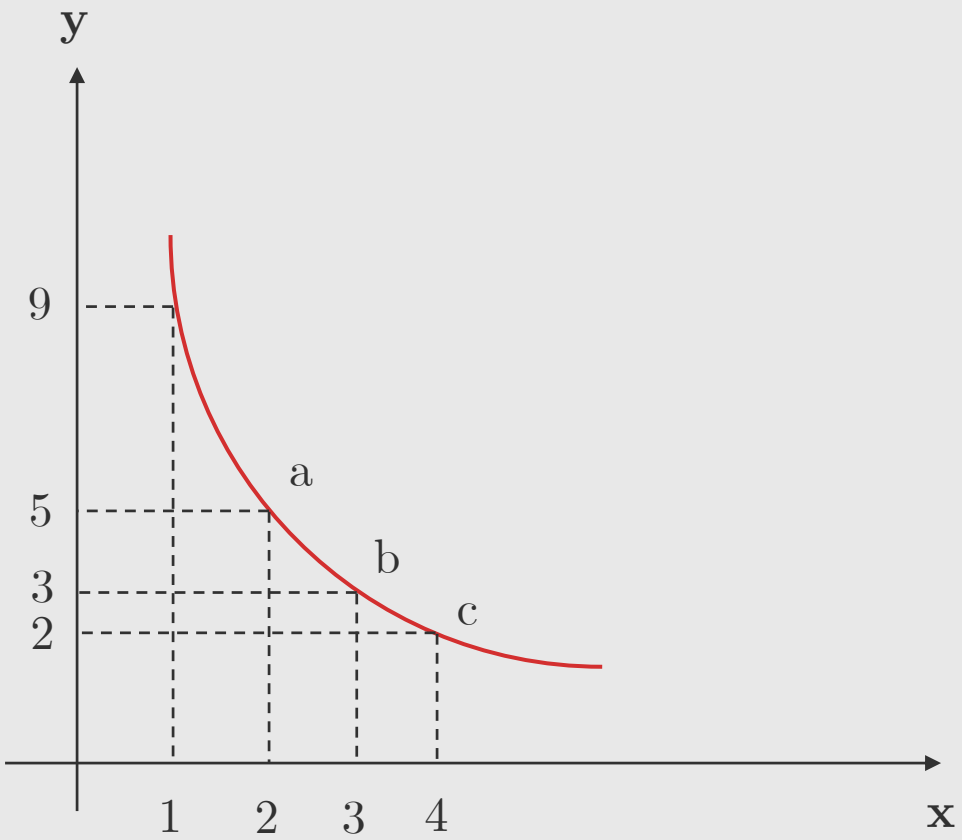


Figure out these MRS_{xy}

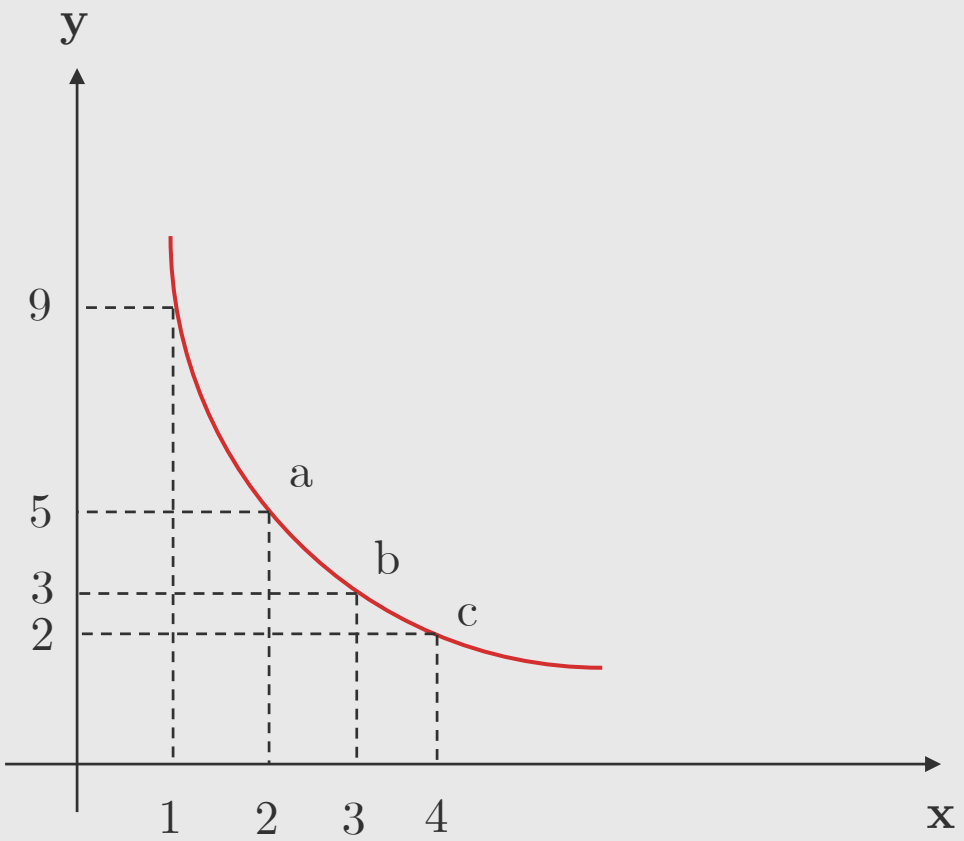
- $MRS_{xy}(a) =$

- $MRS_{xy}(b) =$

- $MRS_{xy}(c) =$

Quick question: what does this ratio mean?

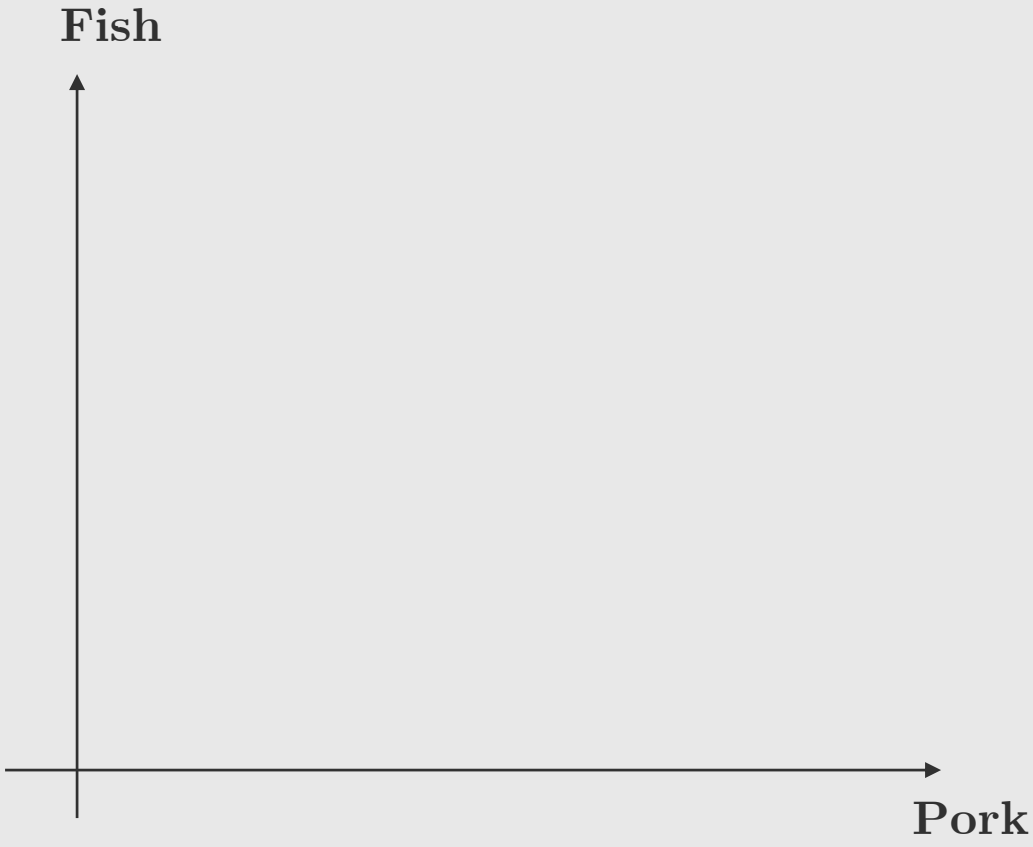
Marginal rate of substitution



How much you consume these goods matters.

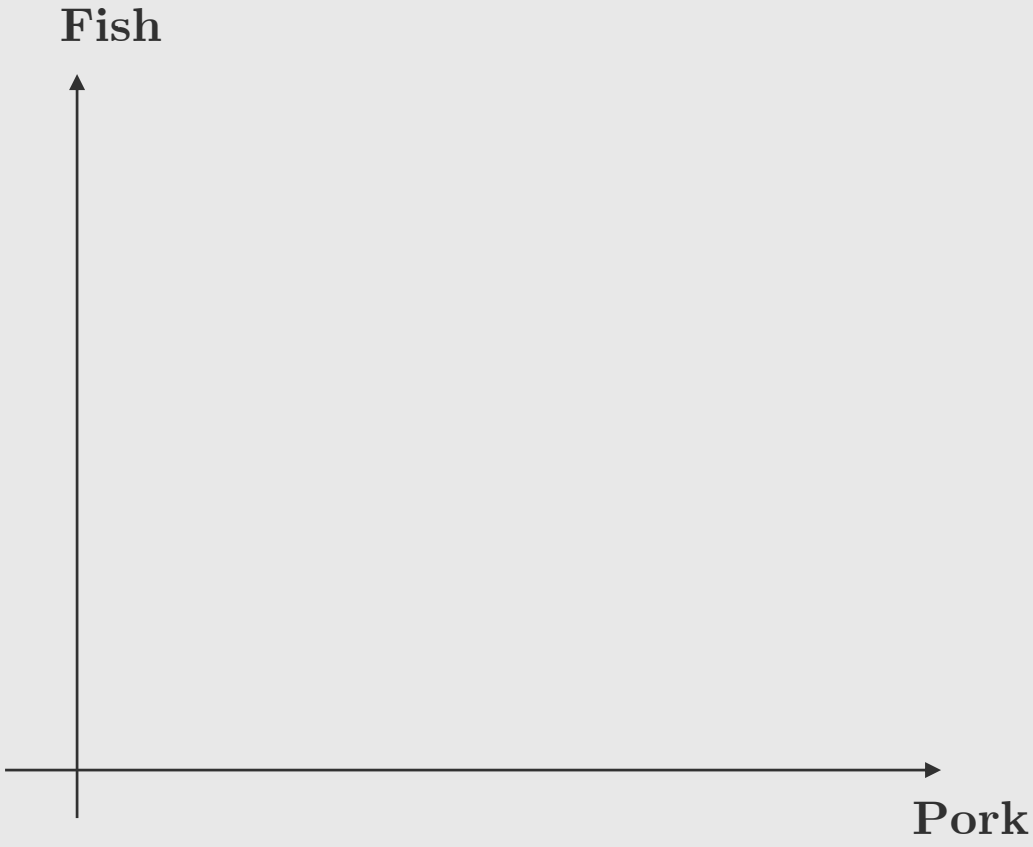
Quick question: why (absolute) MRS keeps decreasing?

MRS reflects preference



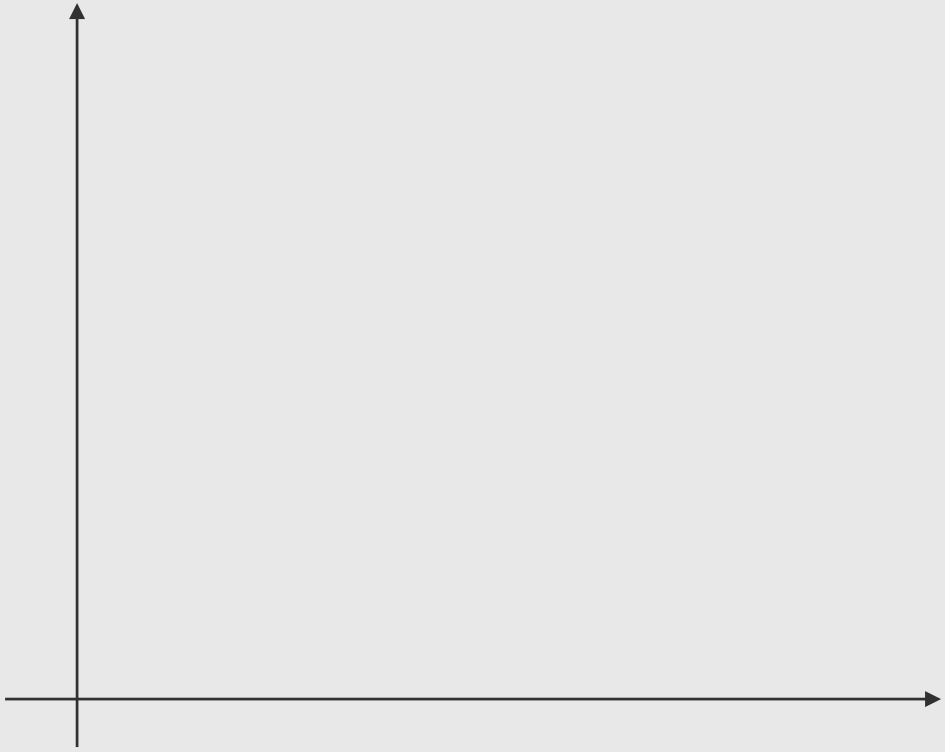
How would the IC look like if one consumer prefer fish, while another prefer pork.

MRS reflects preference



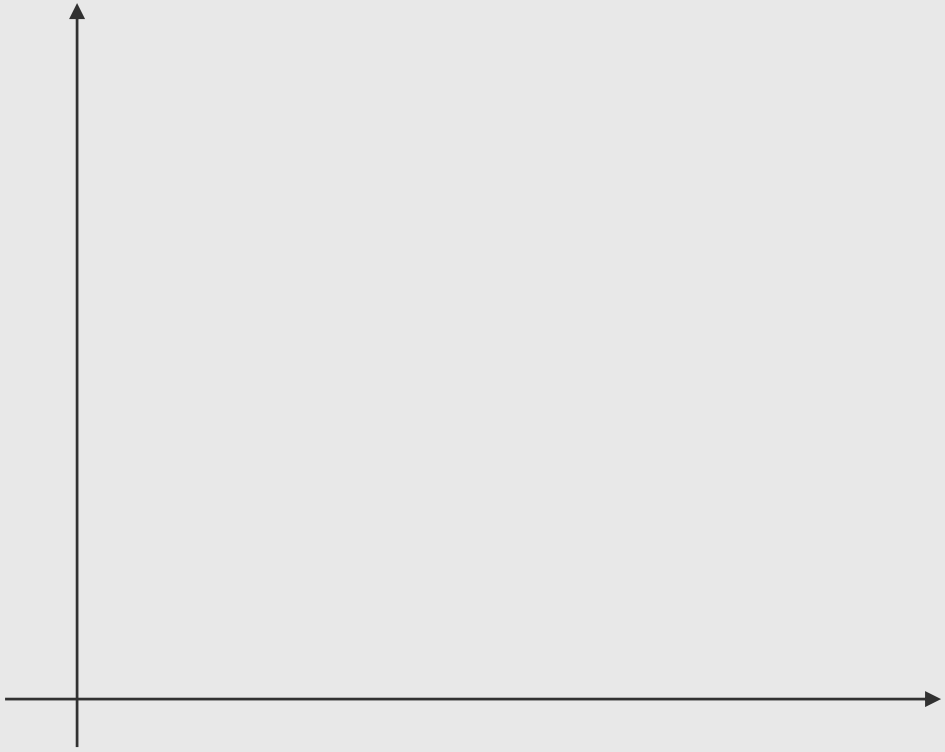
How would the IC look like if fish and pork are likely substitutable, or not likely.

MRS reflects preference



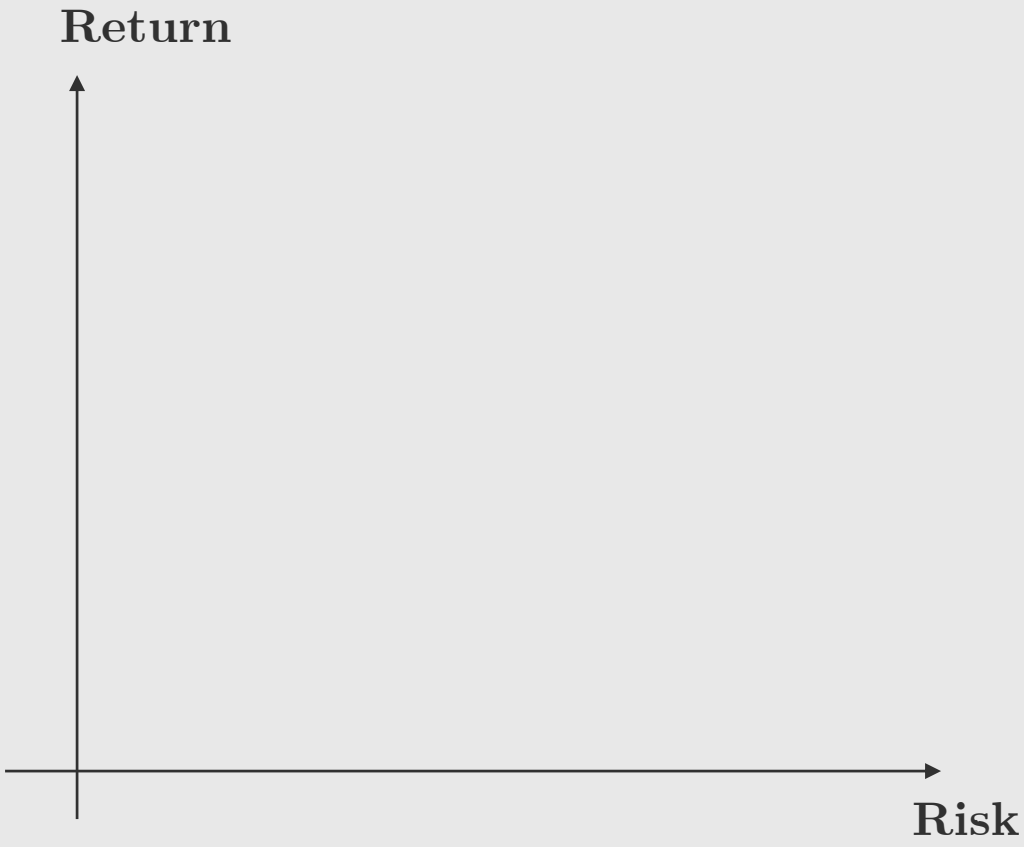
Now let's consider two **perfectly substitutable** goods. How would the IC be?

MRS reflects preference



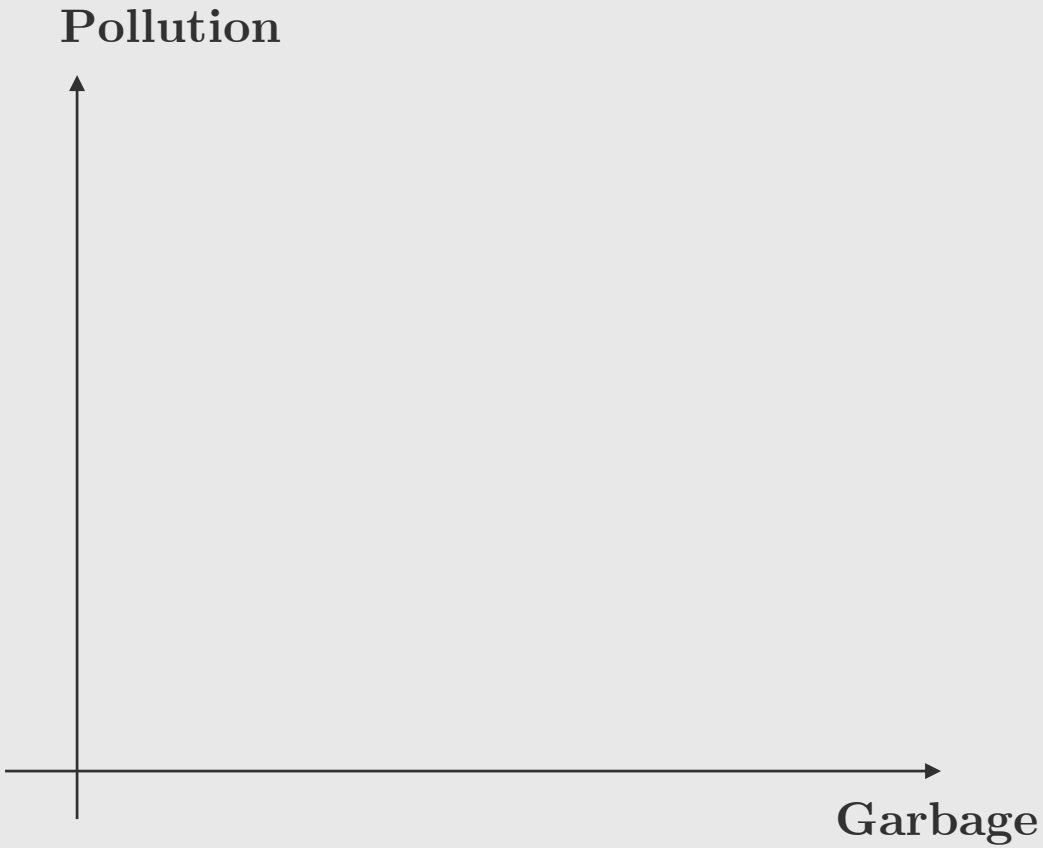
Now let's consider two **perfectly complementary** goods. How would the IC be?

MRS reflects preference



Now let's consider bad and good in case of investment.

MRS reflects preference



Now let's consider both bad.
Where is the **bliss point**?

As we learned that, in case of two substitutable goods, MRS is the ratio of substituting two goods in which resulting in the same amount of utility, it also means that.

$$\left|MRS_{xy}\right| = \left|\frac{\Delta y}{\Delta x}\right| = \frac{MU_x}{MU_y}$$

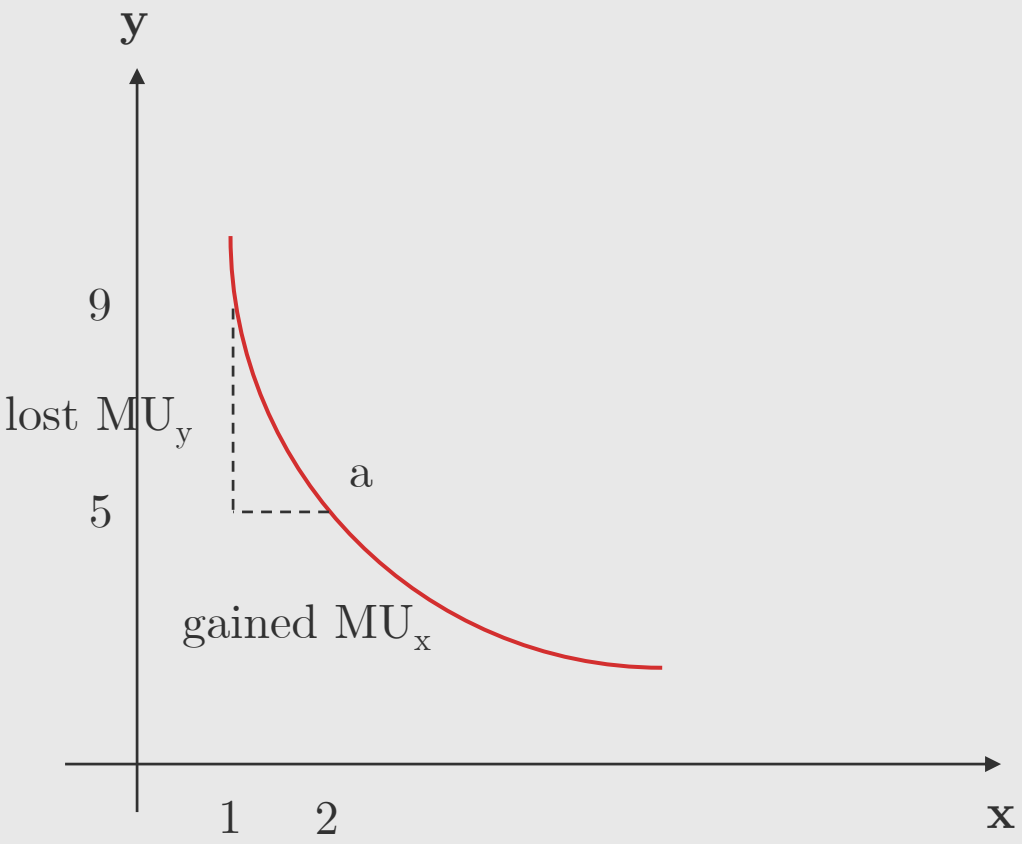
Consider an example here.

- Supposed that the MRS at one point is -4, it means that this consumer is willing to **give up 4 of y** while **receiving 1 unit of x** and yield the same amount of utility. (or it can be 16 of y and 4 of x which is the same ratio)

- When he/she gives up 4 of y, this consumer loses an amount of utility. We do not care how much it is but it is the marginal utility of that 4 y (MU_y)

- When he/she consumes 1 more unit of x, this consumer gains an amount of utility that was lost from Mu_y. Again we do not care how much but it is the marginal utility of that 1 x (MU_x).

Marginal rate of substitution

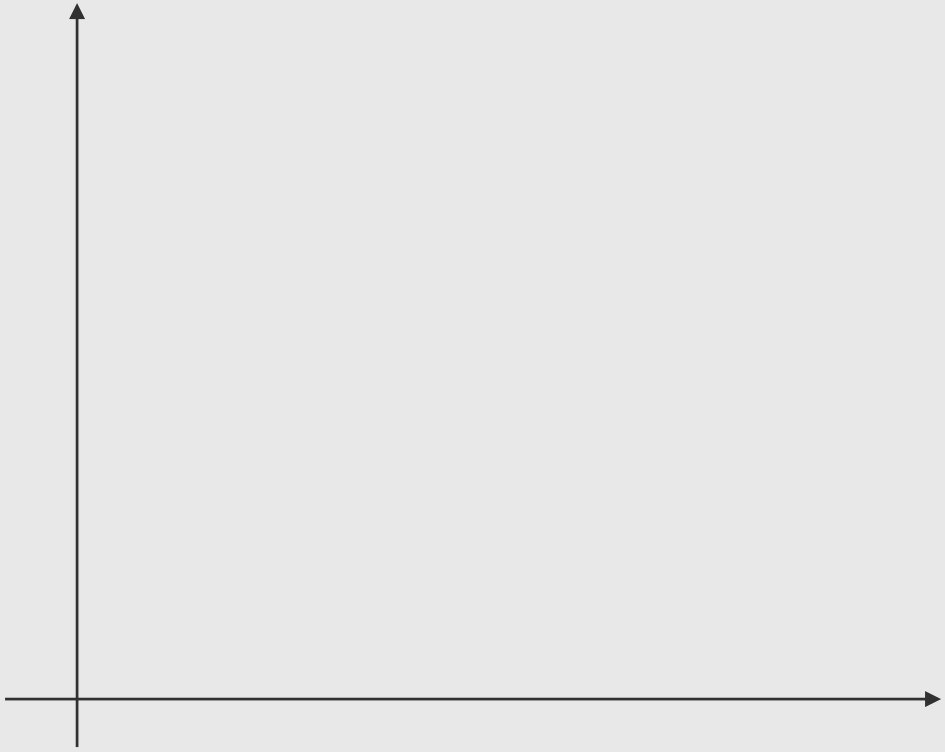


Consider point (a) corresponding to the example.

- Those MU_y and MU_x must be equal since changing consumption bundle on the same IC results in the same amount of utility.

- Therefore, it means that 1 of x received yields equal utility as 4 of y. That makes MU_x 4 times larger than MU_y.

(2) Budget Line (BL)



Budget line is the boundary of consumption that consumer is able to choose consumption bundles under a premise of budget constraint. It can be represented in the form of

$$I = P_x \cdot x + P_y \cdot y$$

Assumed that a consumer has 500 baht, price of goods x is 50 baht and price of goods y is 20 baht, draw the budget line.

Budget line has constant slope since price of goods are not according to how much goods are purchased and assumed to be fixed (for now). The slope of a budget line represent **relative price** of two goods.

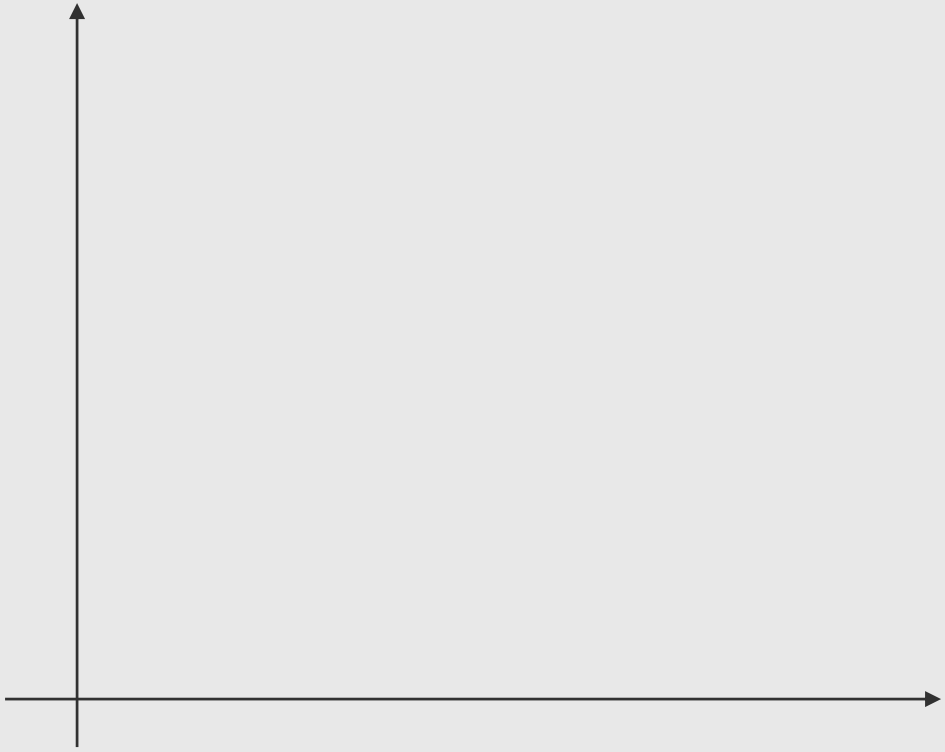
Definition 3-6: Relative price

Relative price is the price ratio of two goods or services, which is actually the slope of budget line.

$$\frac{\Delta y}{\Delta x} = \frac{P_x}{P_y}$$

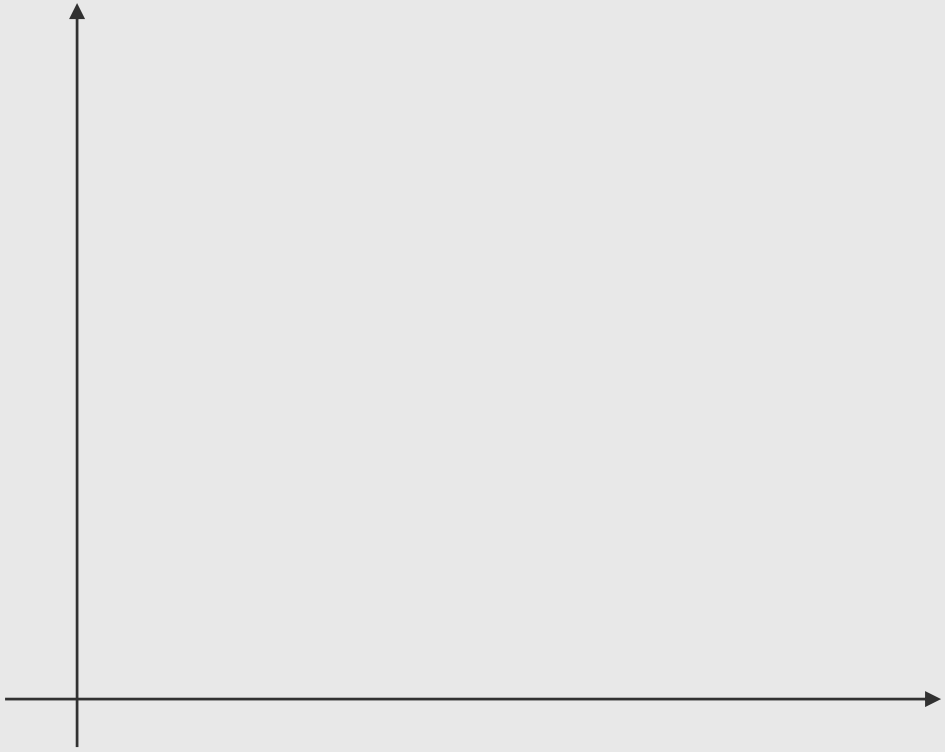
This price ratio reflects how pricey two goods comparatively. See how this ratio shifts when price change.

Relative price change



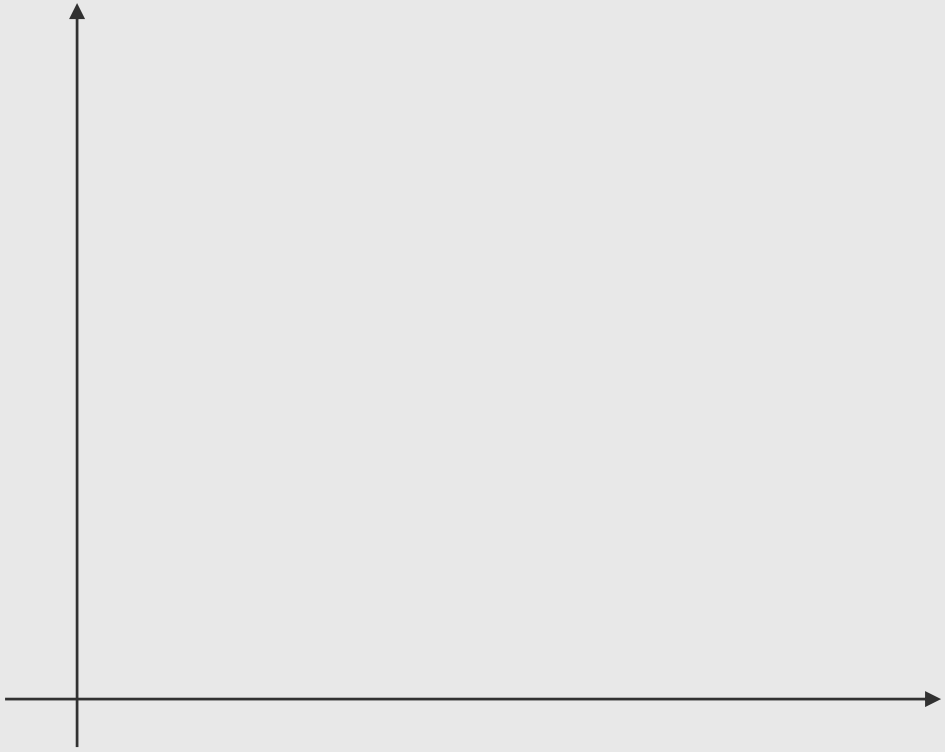
Supposed we have the same budget line, now let's assume that price of x drops to 25 baht.

Relative price change



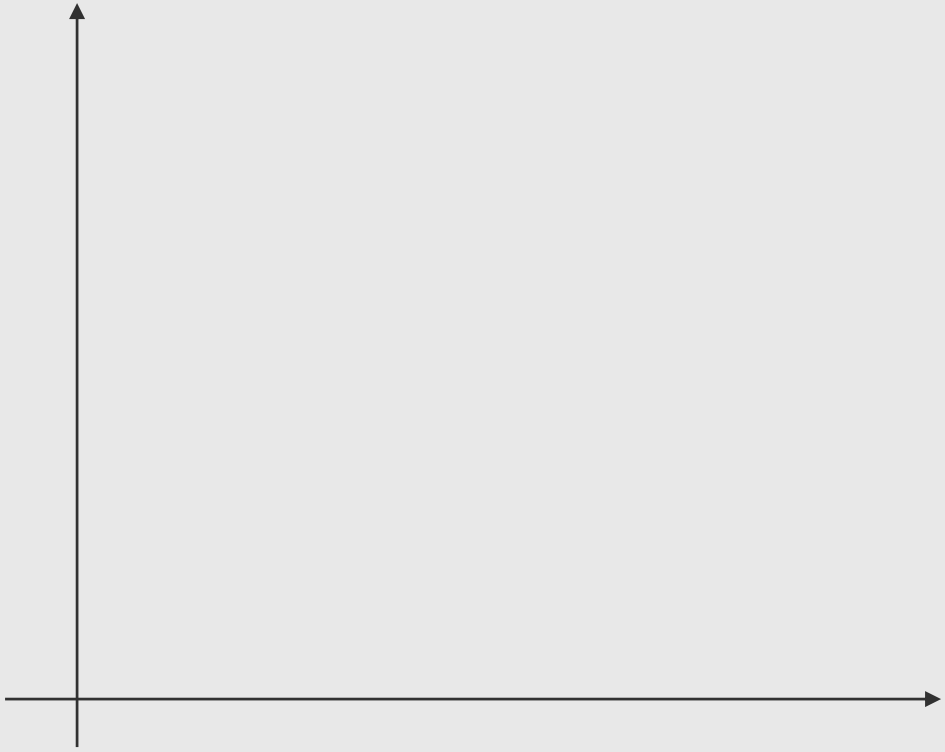
Supposed we have the same budget line, now let's assume that price of y raises to 100 baht.

Relative price change



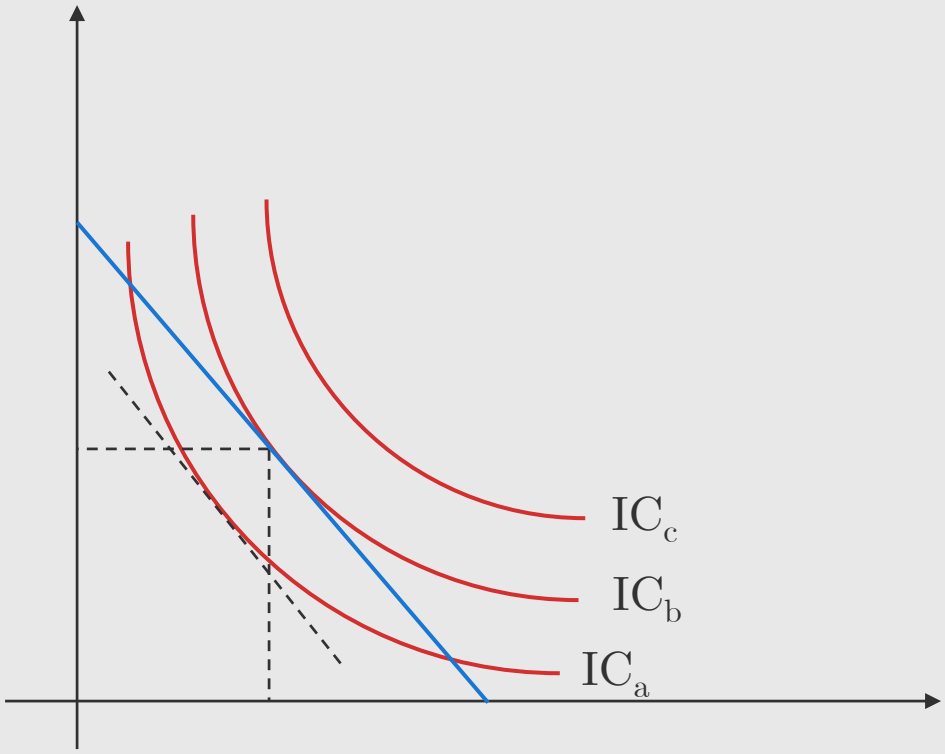
Supposed we have the same budget line, now let's assume that price of x drop to 25 baht while price of y raises to 50 baht.

Income increase/decrease



Supposed we have the same budget line, but now draw new budget lines with I=400 and I=600.

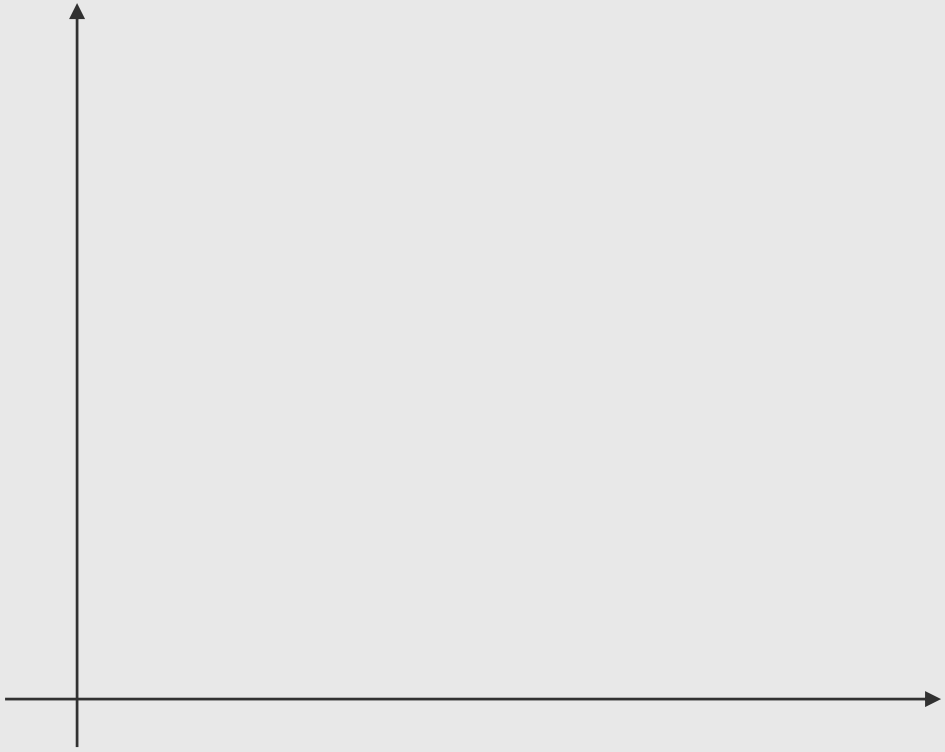
(3) Consumer equilibrium



Consumer will maximize utility under budget constraint when consuming two goods or services when an IC is tangent to the budget line.

Quick question: what underlying assumption that prohibits an equilibrium on the dotted line?

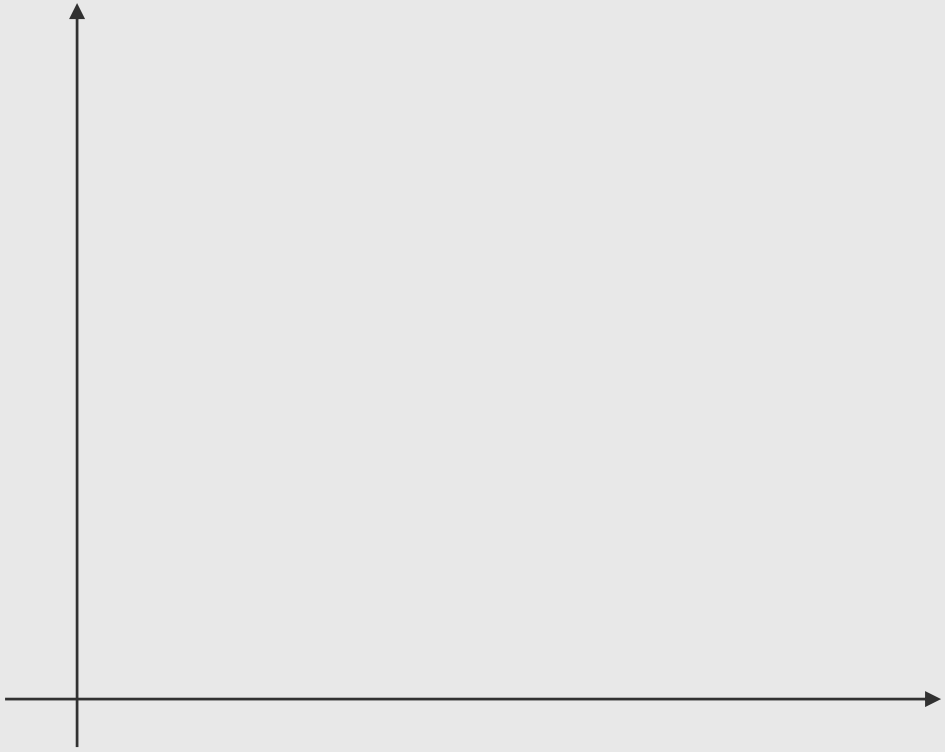
Understanding the equilibrium



(1) ICs reflects consumer's preference

Consider two different consumers here.

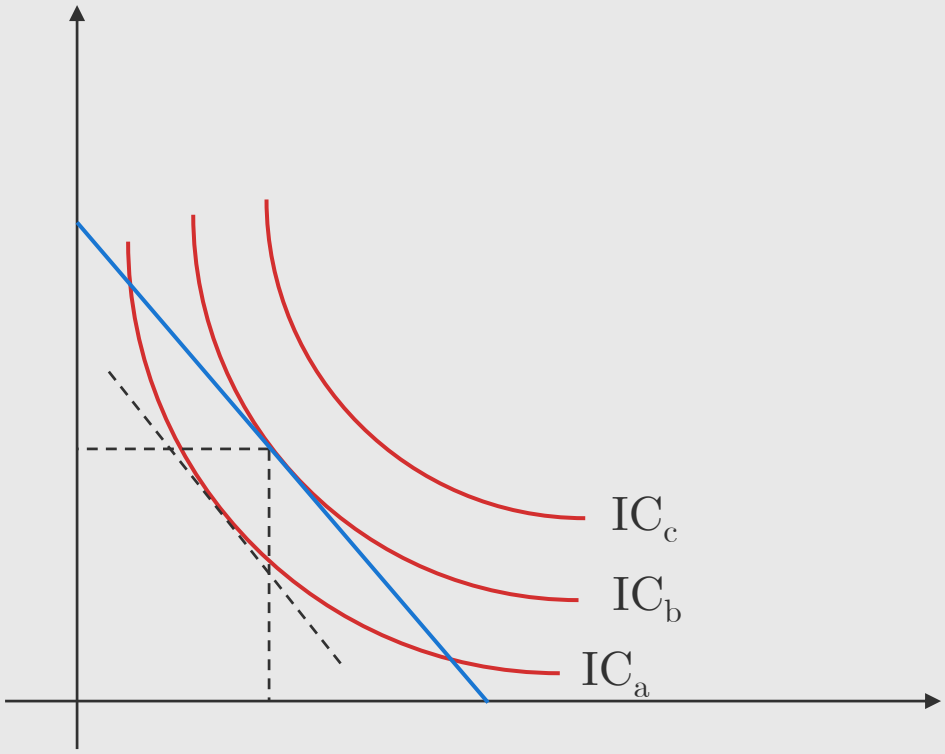
Understanding the equilibrium



(2) BLs reflects consumer's cost

Consider two different relative prices here.

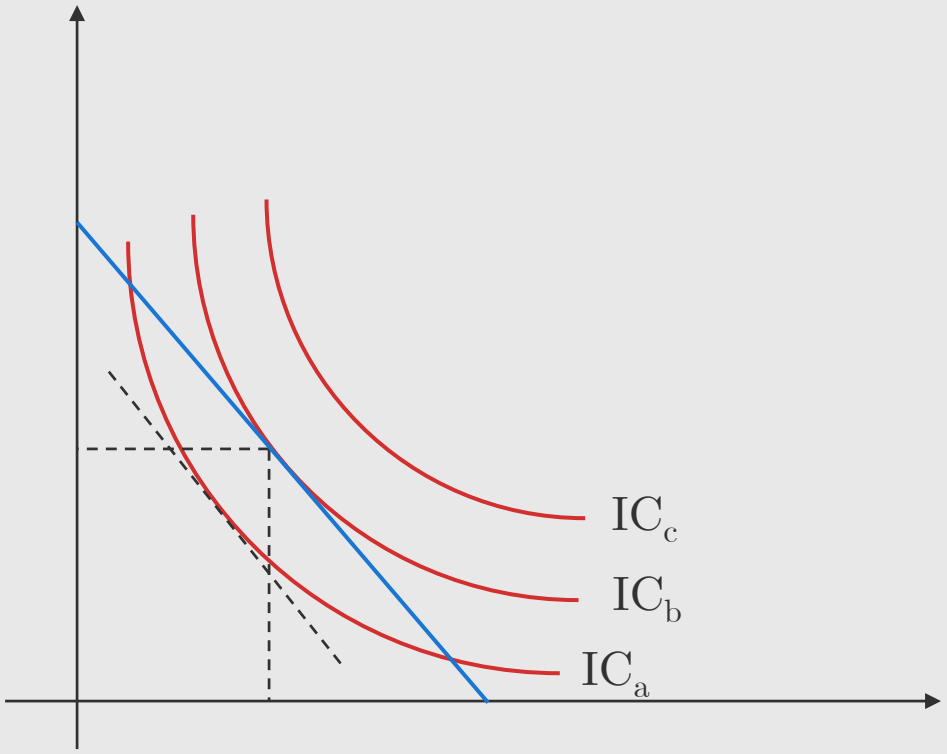
Understanding the equilibrium



(3) Why the intersects cannot be consumer's equilibrium?

Consider two intersects on IC_a

Example #1: substitutable goods



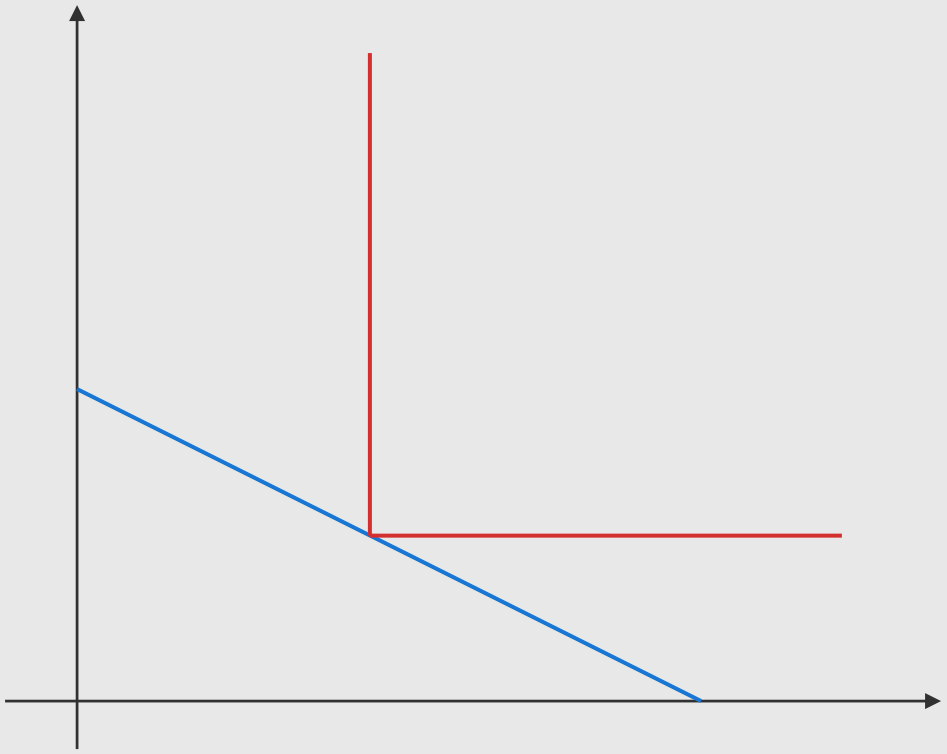
The consumption bundle that this consumer chooses makes

$$\left|MRS_{xy}\right| = \frac{1}{5}$$

If $P_x = 50$ and $P_y = 100$, does this consumer has his/her utility maximized?

Quick question: assumed Walras' Law, where is the current consumption bundle and why?

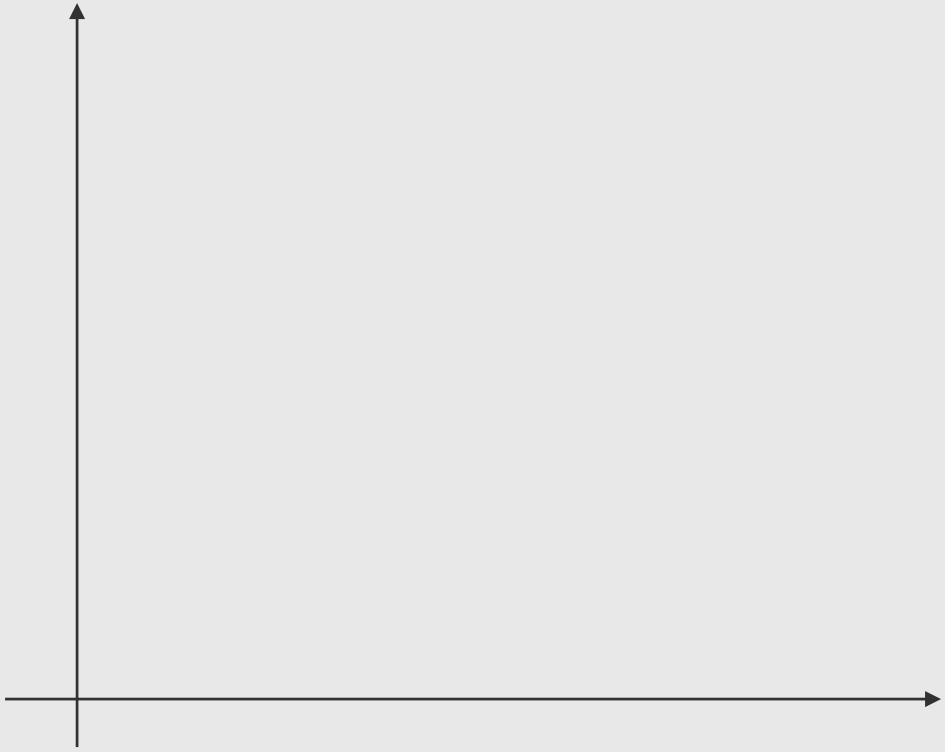
Example #2: Perfect complements



A consumer needs 1 pan and 2 turner. Given a budget of 500 bath. Price of pan is 300 bath each and 100 bath for each turner. How many pans and turners this consumer buys?

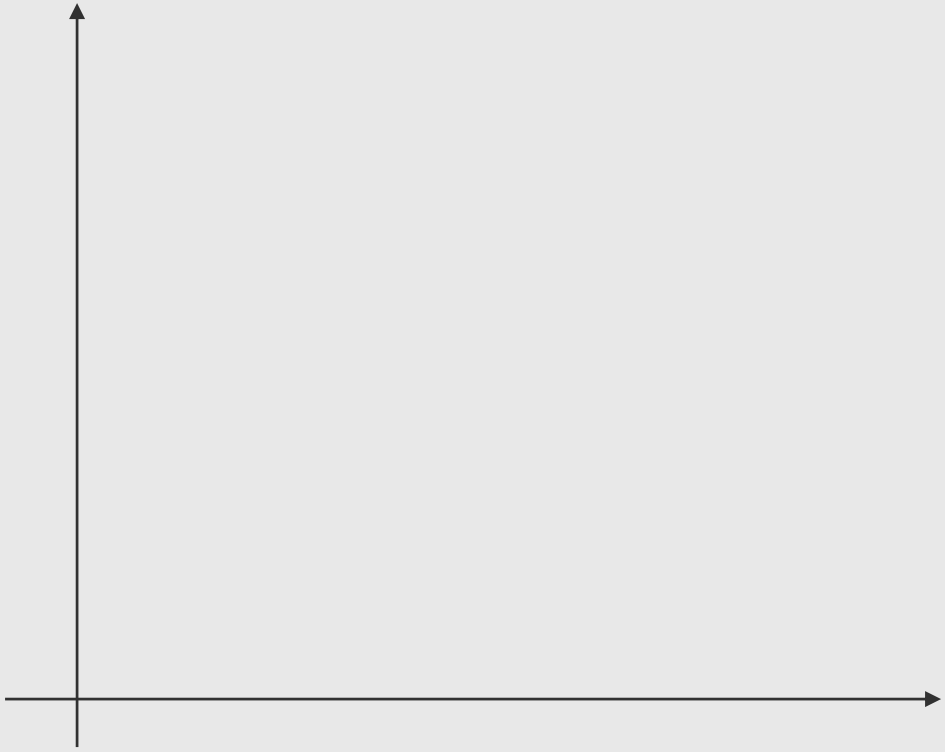
Quick question: If the budget decreases to 400, how many pans and turners this consumer buys?

Example #3: Perfect substitutions



A consumer has budget of 200 baht (only one baht coins) and need to exchange to 20 baht or 100 baht note. For this consumer, one 100 baht note equals to five 20 baht notes.

Example #4: Perfect substitutions



A consumer has budget of 200 baht (only one baht coins) and need to exchange to 20 baht or 100 baht note. However, this consumer doesn't like to carry lots of bank note. For this consumer, one 100 baht note equals to six 20 baht notes.

Intro: Revision of price effect

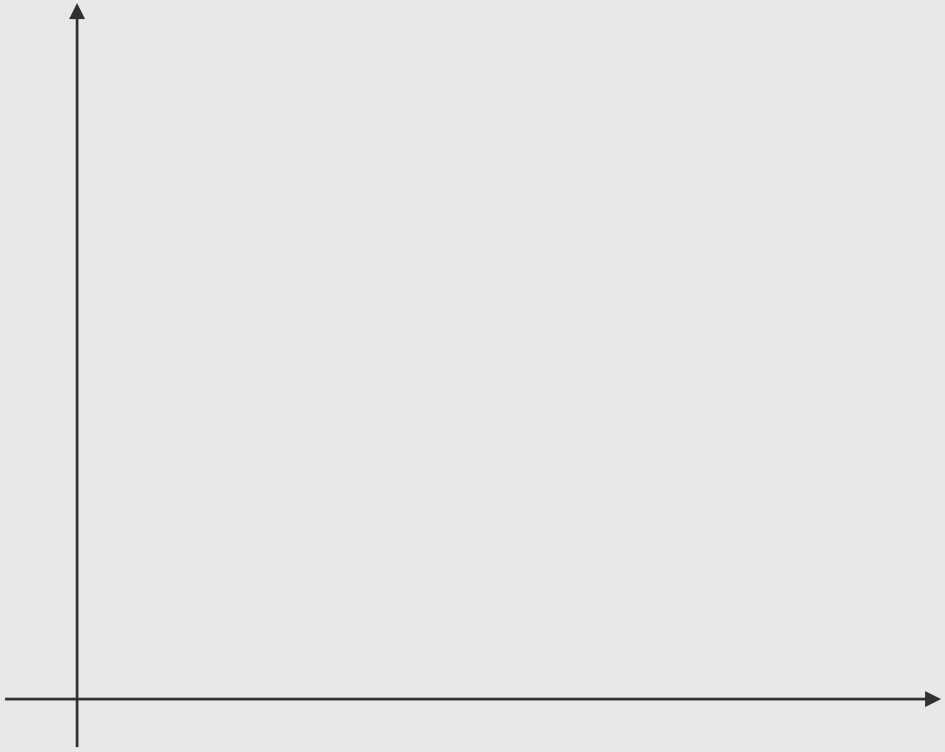
When price changes and affects quantity demanded, the result is called **Price effect (PE)** which consists of two sub-effects.

- **Substitution effect (SE)** is the effect of relative price of substitutable good. For example, if A and B are substitutable and price of good A increases (decreases), good B will relatively become cheaper (more expensive) comparing to the relative price before price change.

- **Income effect (IE)** is the effect of consumers' real income. For example, if price of good A rises (drops), consumers are considered become poorer (richer) because they lose (gain) purchasing power.

The reasons we study price effect are two folds: to differentiate different types of goods and to derive a demand function.

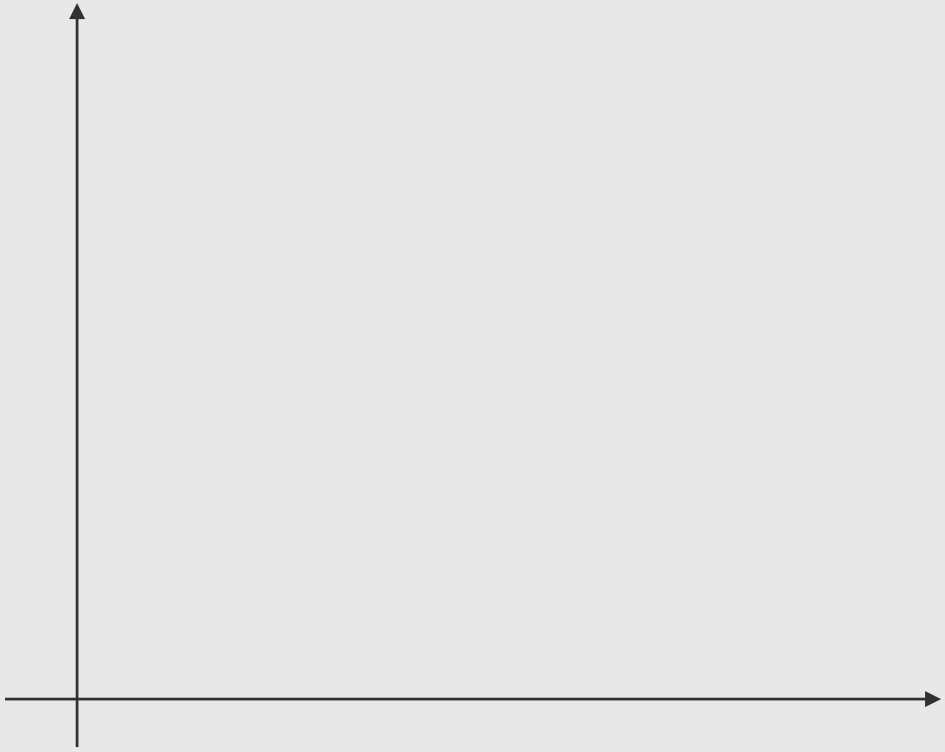
Intro: shifting the equilibrium



Let's take a look when somethings change.

Consider when x increases its price.

Intro: shifting the equilibrium

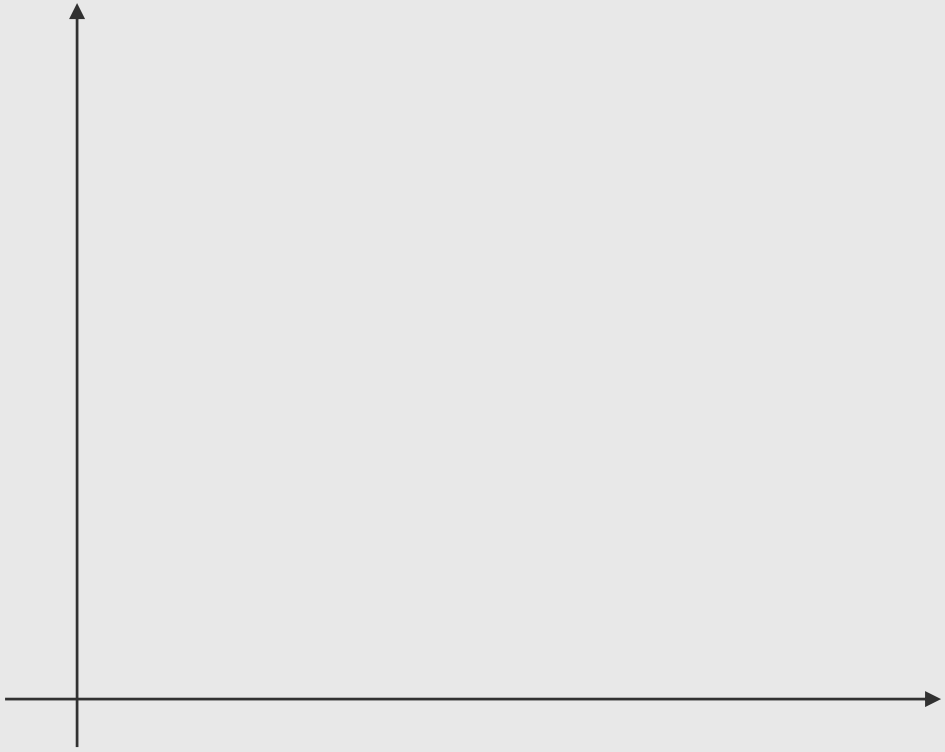


Let's take a look when somethings change.

Consider when relative price change.

This is purely **SE**.

Intro: shifting the equilibrium

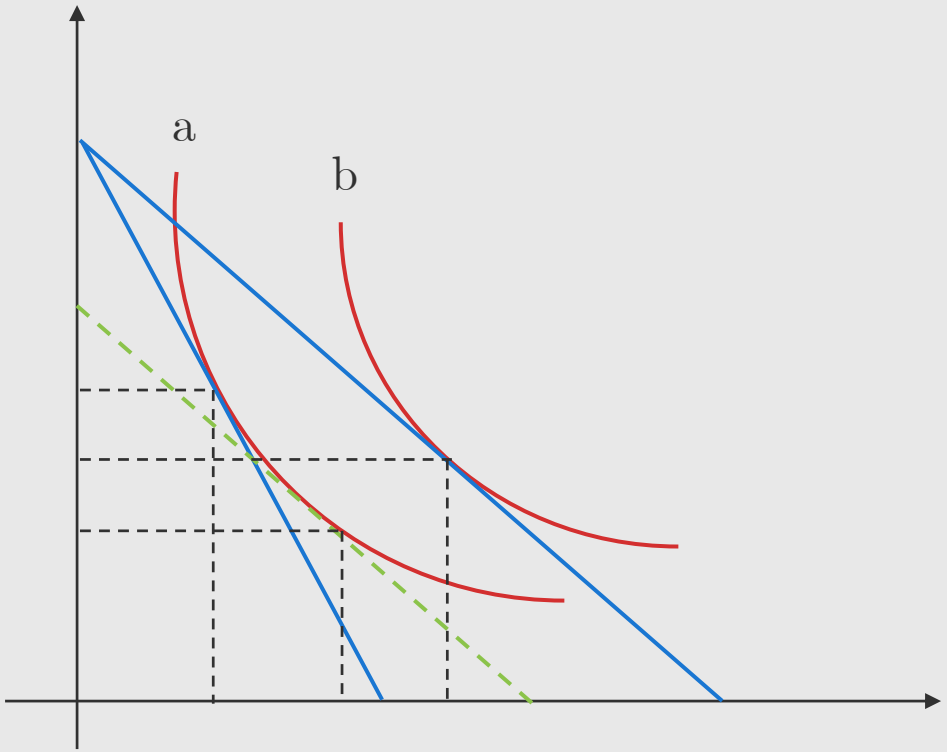


Let's take a look when somethings change.

Consider when consumer income increases.

This is purely **IE**.

PE disaggregated: normal goods



When price of x decreases.
Both x and y are normal goods

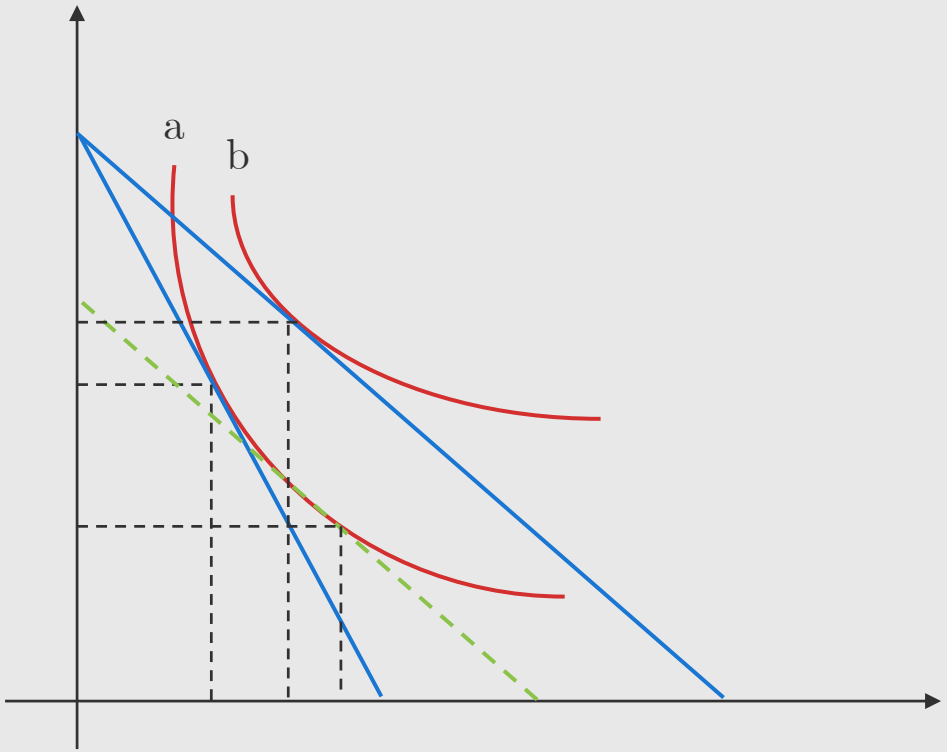
1. Create a hypothetical BL, parallel to the new budget line (new relative price) and tangent to the same IC (keep real income the same) to see **SE**

2. Shift the equilibrium to the new IC to see **IE**.

3. From the initial eq^{m} to the new one, that is **PE**.

	x	y
Substitution effect (SE)		
Income effect (IE)		
Price effect (PE)		

PE disaggregated: inferior goods

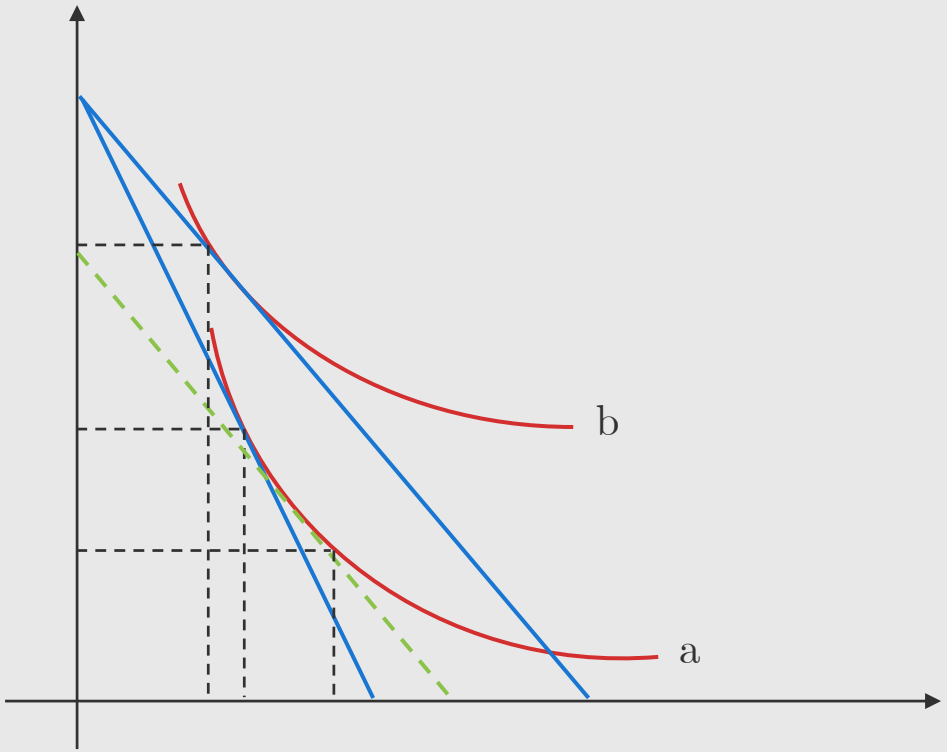


When price of x decreases.
x is an inferior good while y is a normal good.

Repeat the same steps.

	x	y
Substitution effect (SE)		
Income effect (IE)		
Price effect (PE)		

PE disaggregated: Giffen goods

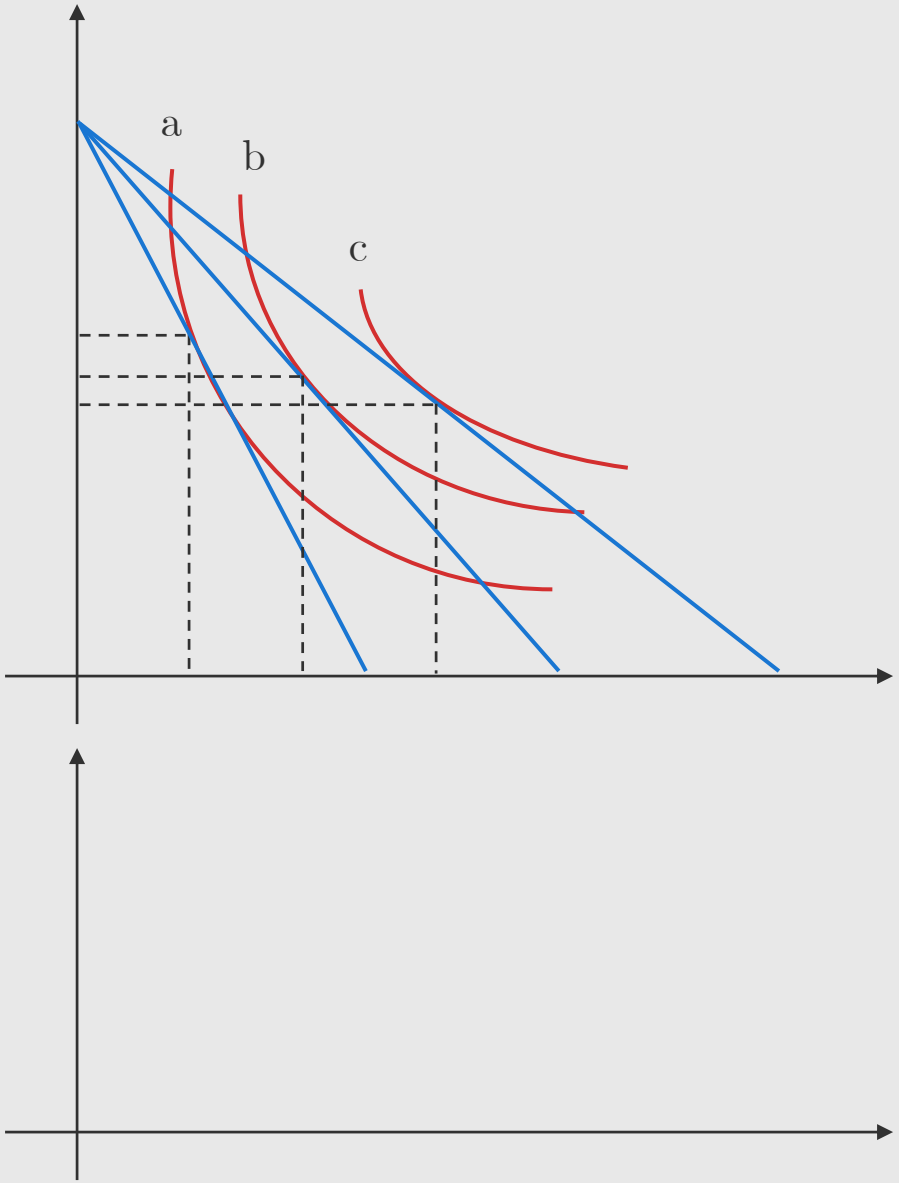


When price of x decreases.
x is a Giffen good while y is a normal good.

Giffen good's definition is that its IE is stronger than SE.

	x	y
Substitution effect (SE)		
Income effect (IE)		
Price effect (PE)		

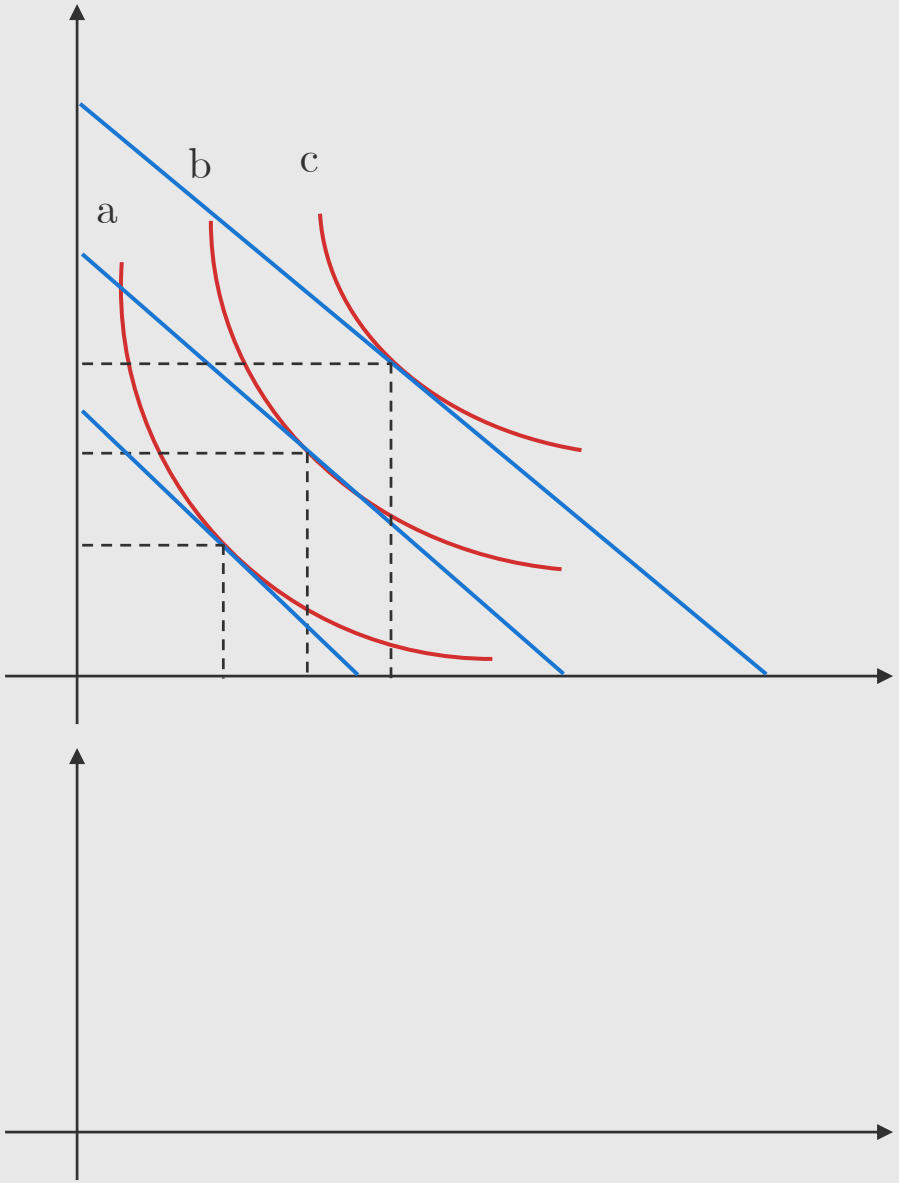
From PE to demand curve



Assumed that price of x keeps decreasing, when we draw a curve through comsumer equilibria, the curve is called **Price-Consumption Curve (PCC)**.

PCC slope indicate price elasticity of demand for x, which you will study this in other courses.

From IE to demand curve



Assumed that consuming income keeps decreasing, when we draw a curve through comsumer equilibria, the curve is called **Income-Consumption Curve (ICC)**.

ICC slope indicate types of goods x and y, which again you will study this in other course.