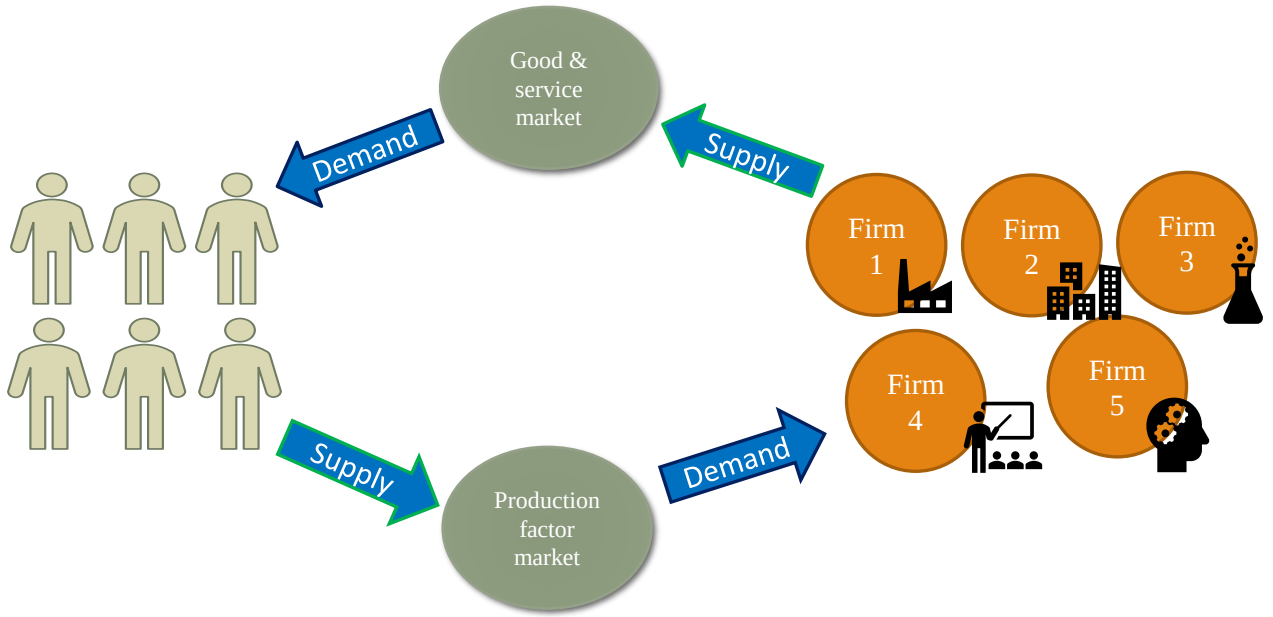
Lecture 2
: Consumer problem

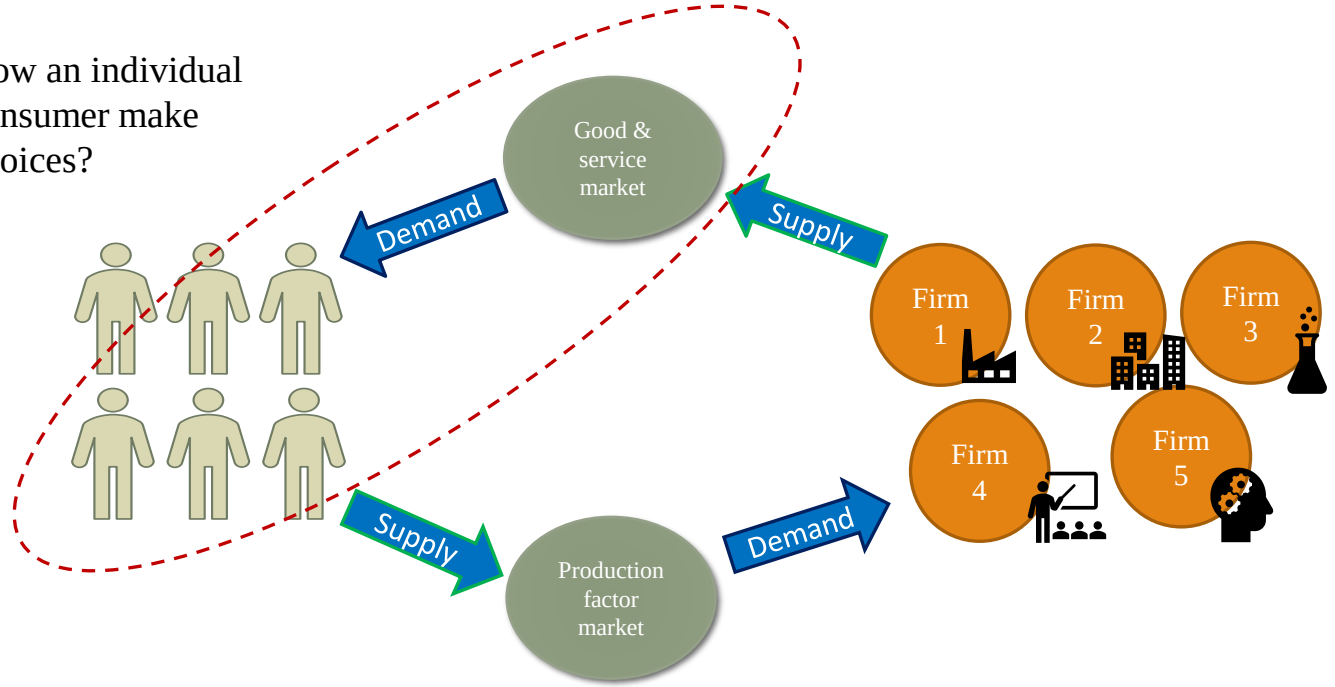
Jengei Hong

Market economy system



Consumption and demand curve

How an individual consumer make choices?



Goals

- Experiencing an economic modelling
- Understanding the concept of budgets constraint and opportunity cost
- Understanding the concepts of utility and marginal utility
- Solving the consumer’s optimization problem with the marginal analysis
- Learning the feature of optimal consumption decisions
- Deriving a demand curve

Introduction

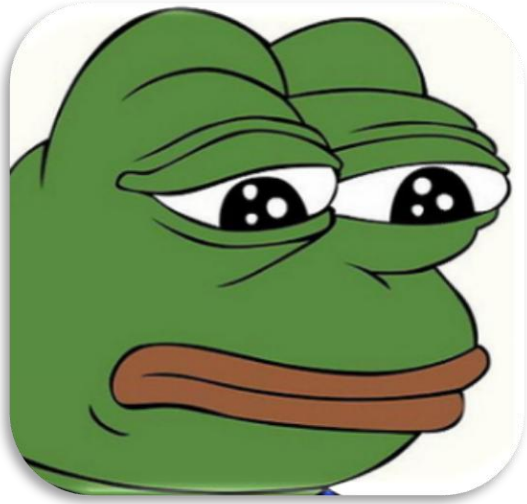
1. Model description
   - What they can choose? Budget constraint
   - What is their objective? Utility function
   - How do they behave? Maximization of the objective under the constraint (rationality)

2. Maximization of the utility subject to the budget constraint
   - Marginal analysis

3. Derivation of a demand curve

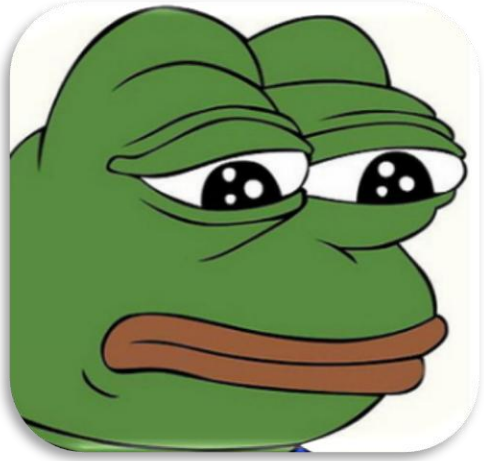
1. Budget Constraint

- Suppose there is a consumer whose name is Pepe. He is the representative agent of all customers in our society.



1. Budget Constraint

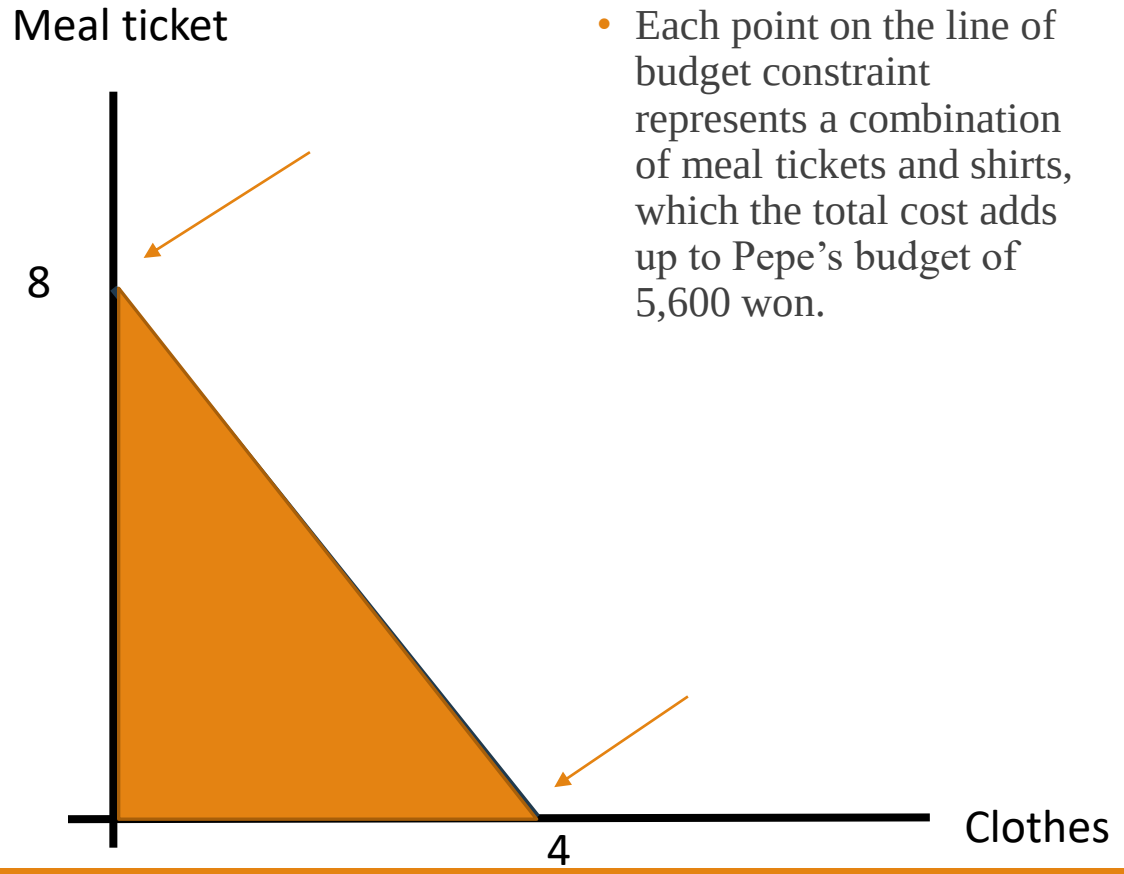
- We want to capture that consumers have a limited amount of income to spend on the things they need and want.
- Pepe has 5,600 wons in spending money each week.
- He can allocate this spending between meal ticket and shirts.
- The meal tickets cost 700 wons each, and the shirts are 1,400 wons each.



1. Budget Constraint

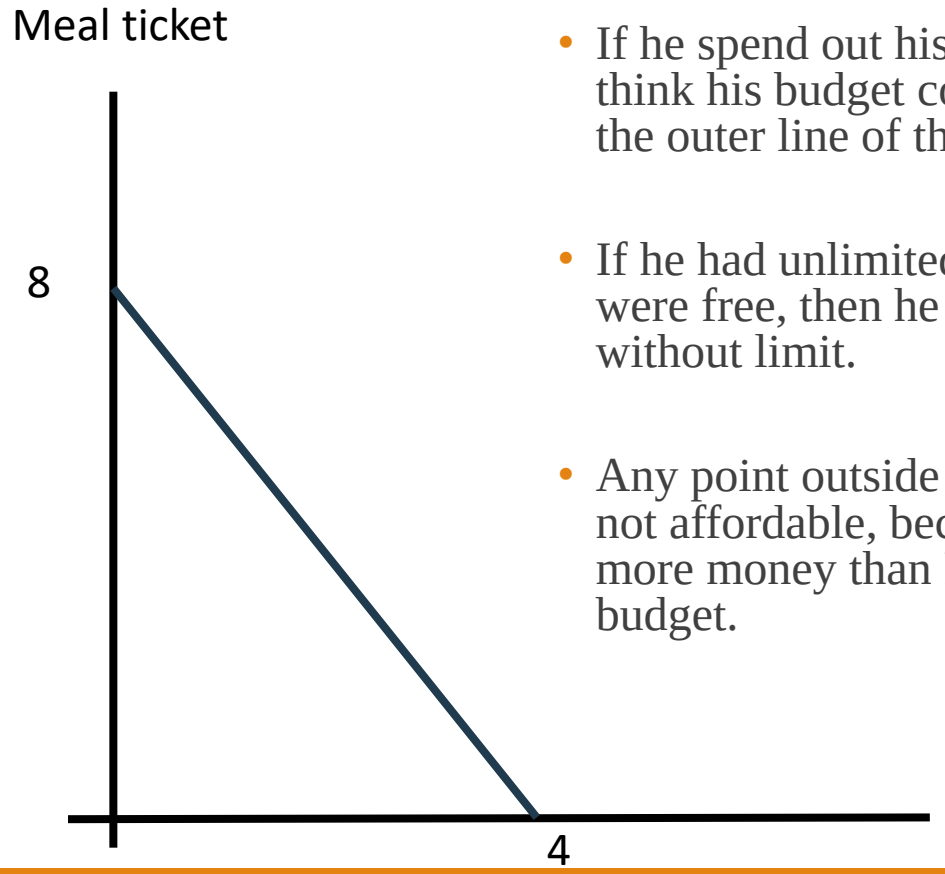
- Of course, the budget constraint diagram containing just two goods is not realistic.
- Because, in a modern economy, people choose from thousands of goods.
- However, thinking about a model with many goods can be just a straightforward extension of what we discussed here.
- The point is that there is always a trade-off problem in decisions.

1. Budget Constraint



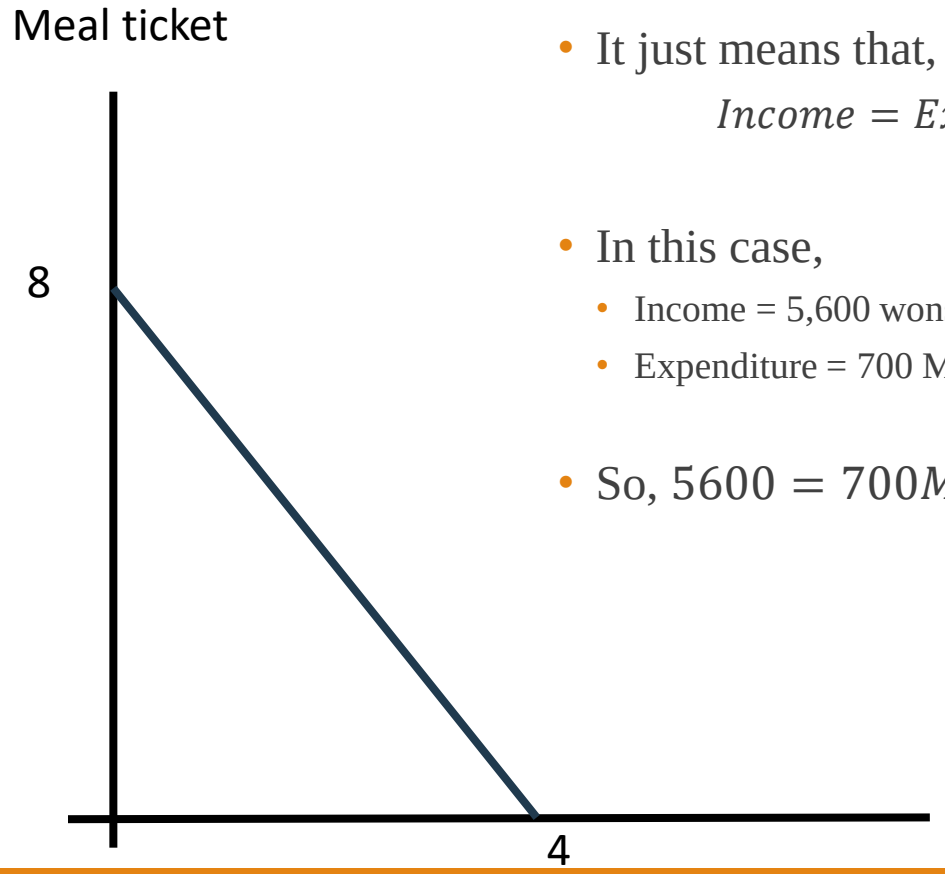
- Each point on the line of budget constraint represents a combination of meal tickets and shirts, which the total cost adds up to Pepe's budget of 5,600 won.

1. Budget Constraint



- If he spend out his budget, we can think his budget constraint is actually the outer line of the colored area.
- If he had unlimited income or goods were free, then he could consume without limit.
- Any point outside the constraint is not affordable, because it would cost more money than Pepe has in his budget.

1. Budget Constraint

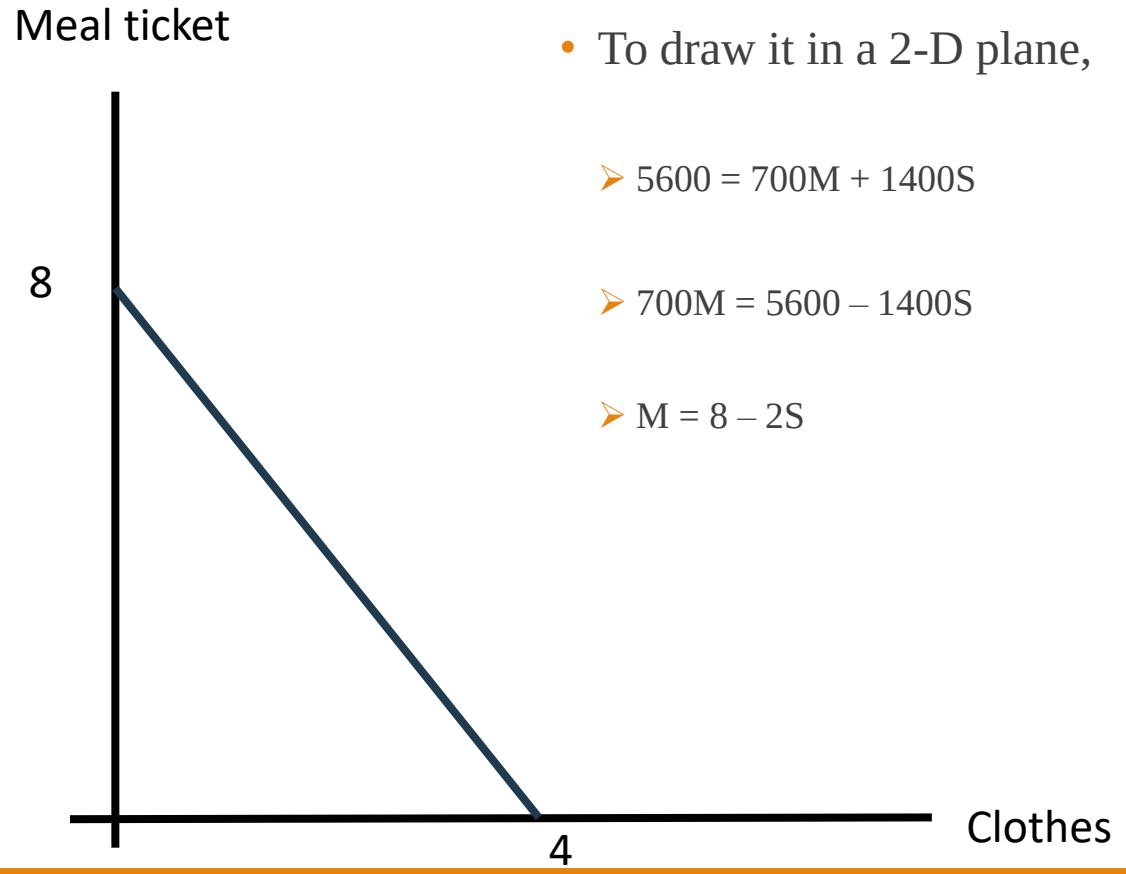


- It just means that,

  $$Income = Expenditure.$$

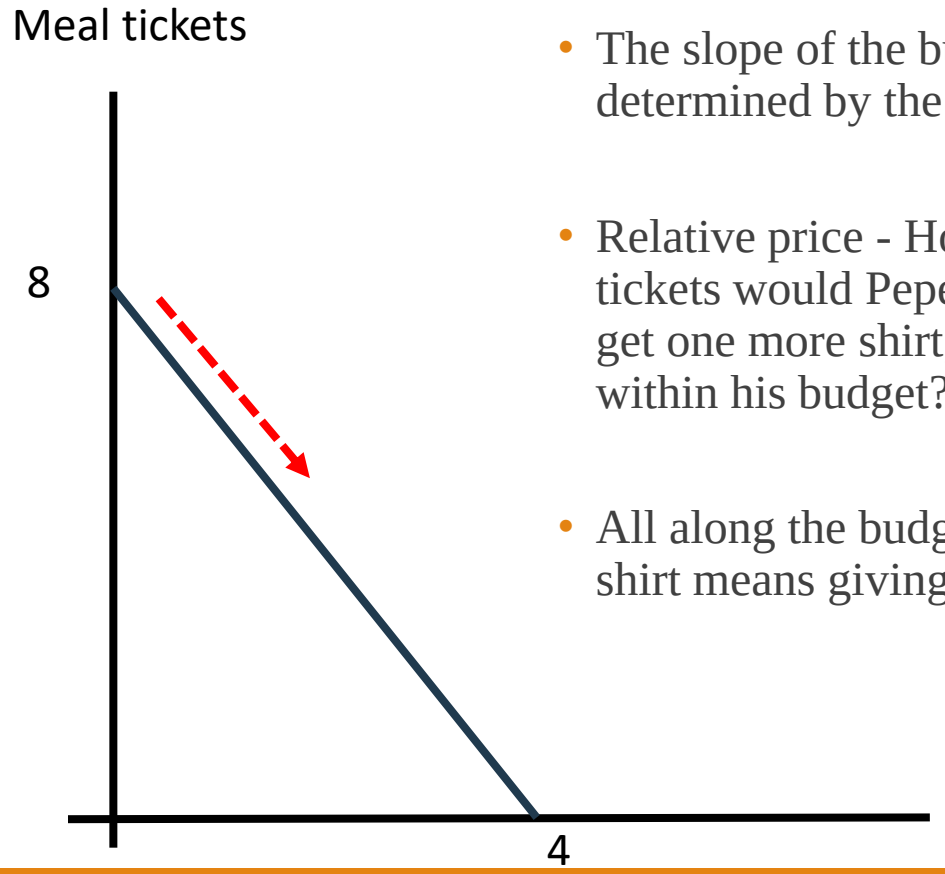
- In this case,
  - Income = 5,600 wons
  - Expenditure = 700 M + 1,400 S
- So, $5600 = 700M + 1400S$

1. Budget Constraint



- To draw it in a 2-D plane,
  - 5600 = 700M + 1400S
  - 700M = 5600 – 1400S
  - M = 8 – 2S

1. Budget Constraint



- The slope of the budget constraint is determined by the relative price.
- Relative price - How many meal tickets would Pepe have to give up to get one more shirt, while staying within his budget?
- All along the budget set, getting 1 shirt means giving up 2 meal tickets.

1. Budget Constraint

- Economists call it opportunity cost.
- Opportunity cost indicate what have to be given up to obtain something. In other words, opportunity cost is the value of the next best alternative.
- For Pepe, the opportunity cost of 1 shirt is the 2 meal tickets.
- He would decide to buy one more shirt, If the value of the extra shirt exceed the value of the alternative (2 meal tickets).

1. Budget Constraint

- A fundamental principle of economics is that every choice has an opportunity cost.
- If you sleep through your economics class, the opportunity cost might be the time which would be spent to make up the class.
- If you choose to marry one person, you give up the opportunity to marry anyone else.
- In short, opportunity cost is all around us and part of human existence.

1. Budget Constraint

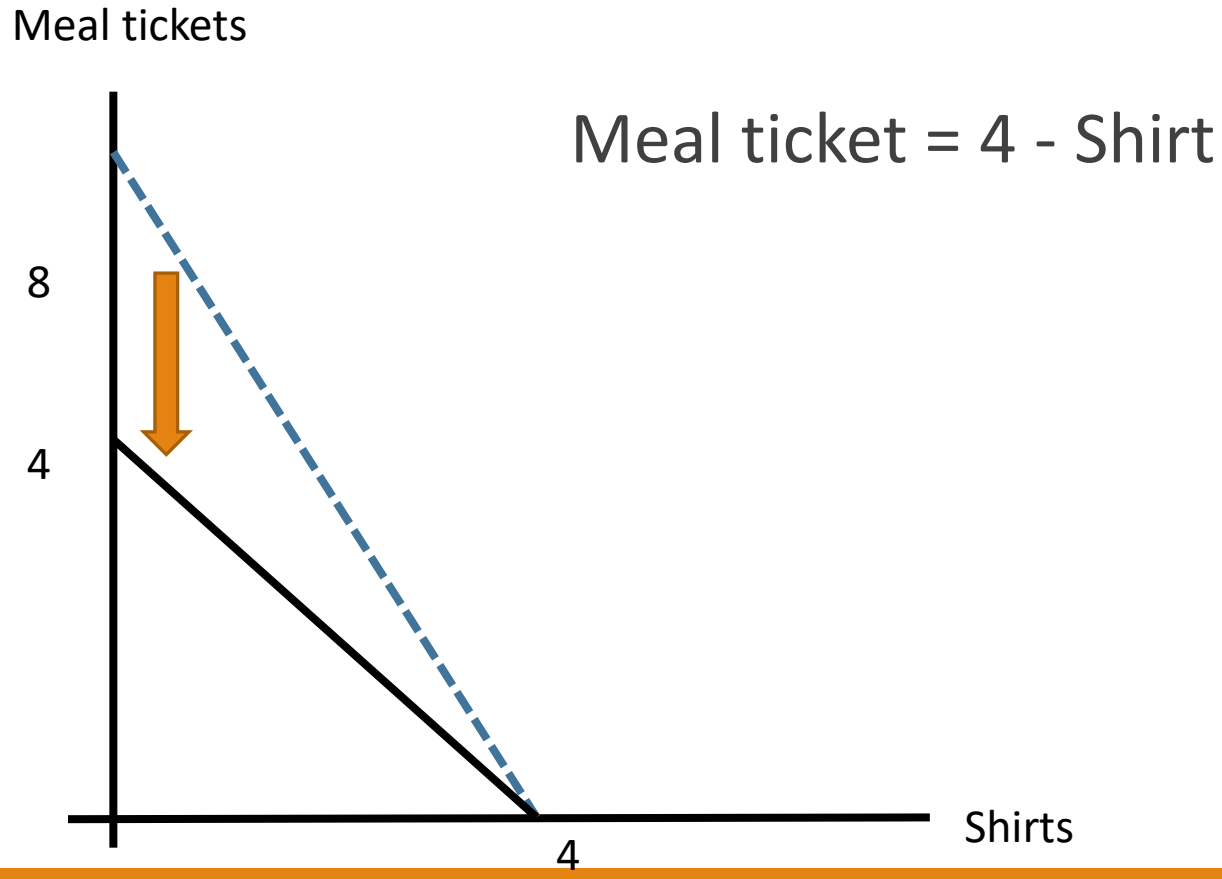
- In many cases, it is reasonable to refer to the opportunity cost as the price.

- For example, attending graduate school is the case where the opportunity cost exceeds the monetary cost. The explicit costs of attending college might be about tuition, books, room and board, and other expenses. But in addition, during the hours that you are attending class and studying, it is impossible to work at a paying job. Thus, graduate school imposes both an out-of-pocket cost and an opportunity cost of lost earnings.

1. Budget Constraint

- What if the price of a good changes?
- Suppose that, the price of bus ticket increased to 1,400 won.
- A price increase for bus tickets would have no effect on the ability to purchase Ramen.
- But it would reduce the number of bus tickets which Pepe could afford to buy.
- What happens in the budget constraint? Redraw it.

1. Budget Constraint

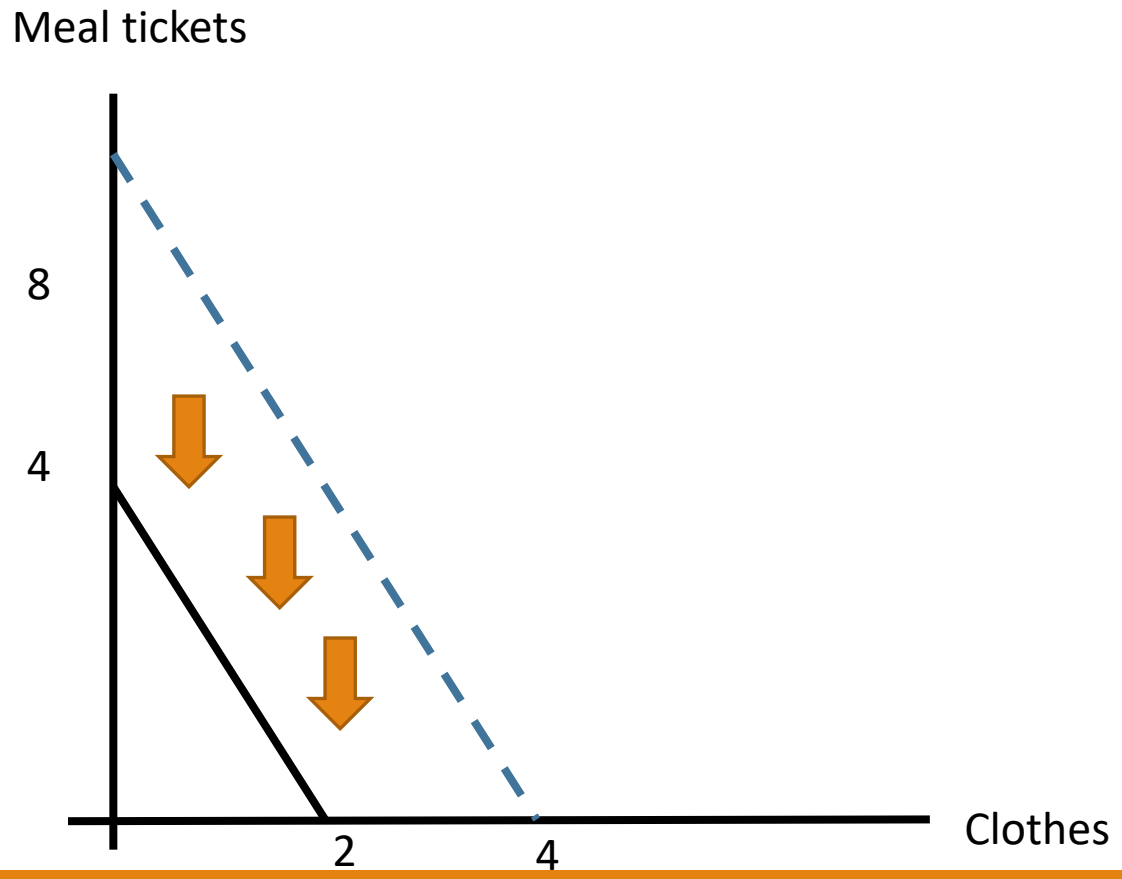


Meal ticket = 4 - Shirt

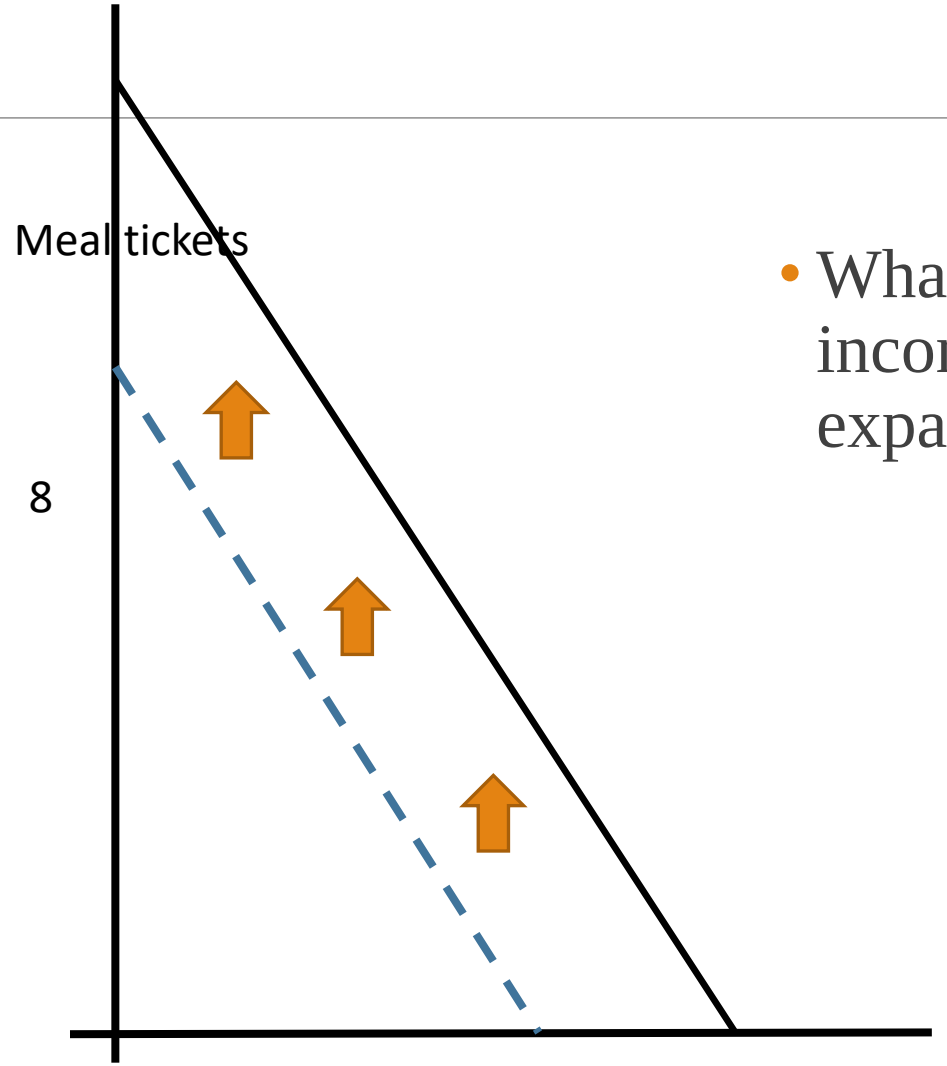
1. Budget Constraint

- What if Pepe’s income changes?
- Suppose that, his income drops as a half(=2,800 won).
- In this case, it would reduce the number of both of meal tickets and shirts which Pepe could afford to buy.

1. Budget Constraint



1. Budget Constraint



- What if Pepe's income is expanded?

2. Utility

- People desire goods and services for the satisfaction or utility from using those goods and services.
- Utility is the term which economists use to describe a person's level of satisfaction/usefulness or happiness with his or her choices.
- Of course, in our daily life, we don't measure such a thing. But, in model, it can be a quite useful instrument to replicate the underlying incentive structure of each individuals.

2. Utility

Economists assume the feature of utility

1. The more of some good one consumes, the more utility one obtains.

2. As a person consumes more of a good, the additional (or marginal) utility from each additional unit of the good declines.

2. Utility

- It is a general pattern that consumption of the first few units of good tends to bring a higher level of utility than consumption of later units.
- Suppose that you are in thirsty. You can compare the degree to which the first few drops of water relieve the thirst and the extent to which the drinking water later resolves the thirst.
- Economists refer to this pattern as the law of diminishing marginal utility.
- It means that, the utility of a person receives from consuming the first unit of a good is typically more than the utility received from consuming the fifth or the tenth unit of that same good.

2. Utility

- The law of diminishing marginal utility explains why people and societies rarely make all-or-nothing choices.
- Most of people would not say, “My favorite food is potato, so I will eat nothing but only potatoes from now on.”
- Even if you get a very high level of utility from your favorite food, if you ate it exclusively, the marginal utility from those last few servings would not be very high.

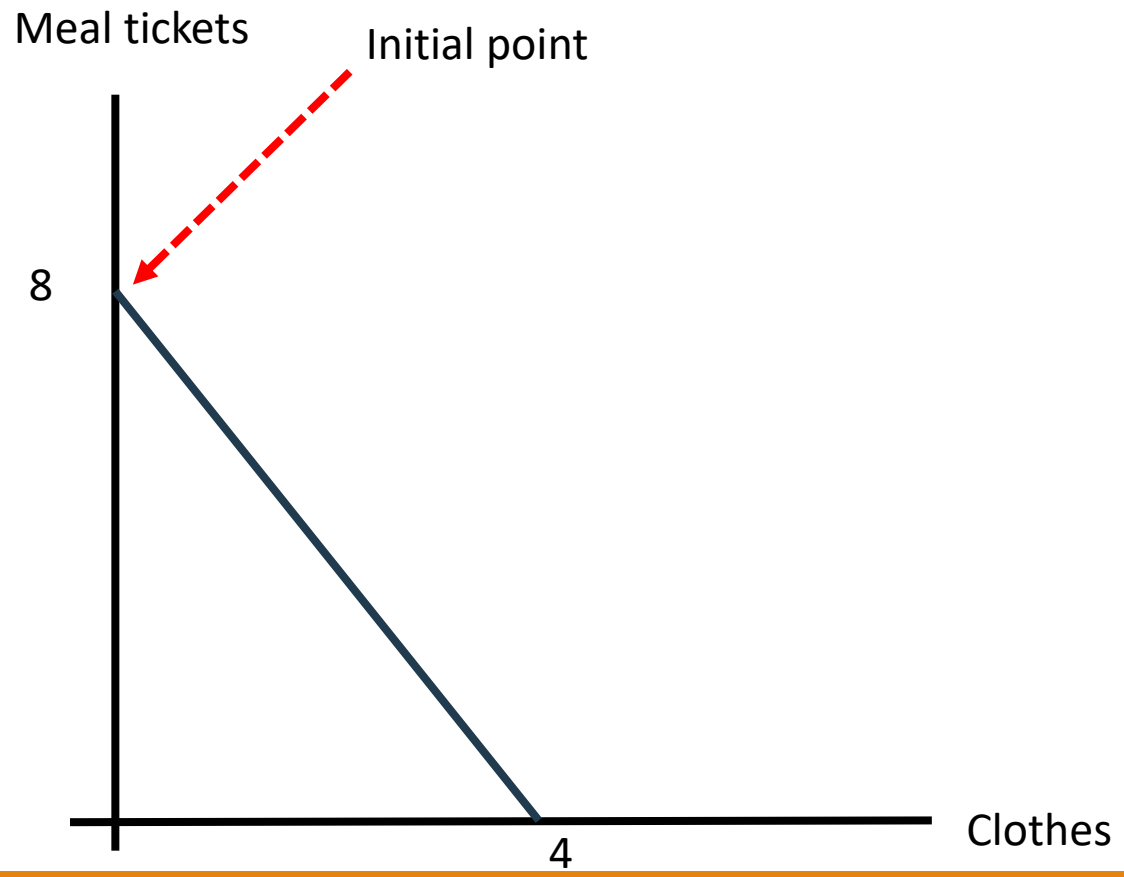
2. Utility

- An example for the marginal utilities for meal ticket (and shirt):

$$MU_M = \frac{1}{M}$$

$$MU_S = \frac{1}{S}$$

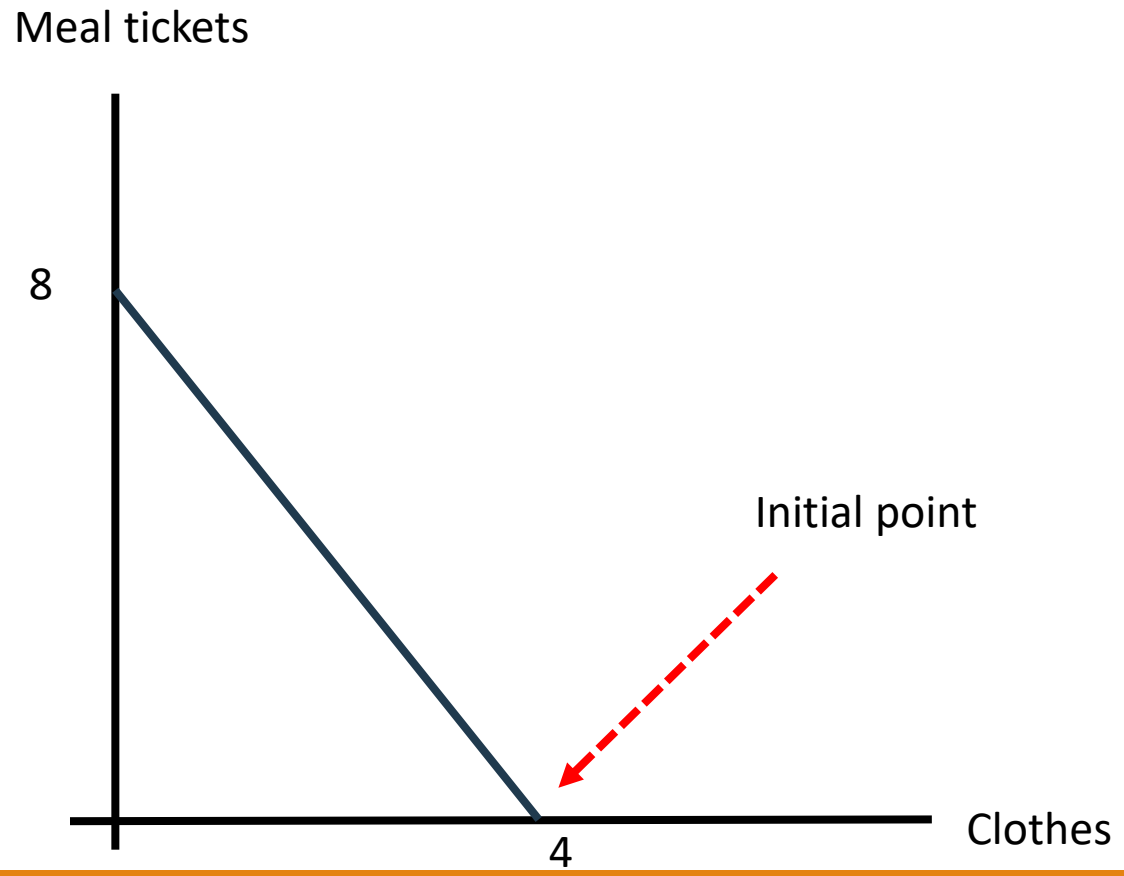
What is the optimal choice?



Marginal analysis

- The marginal approach is based on looking at the tradeoffs(measured in terms of marginal utility per spending) of consuming less of one good and more of another.
- Marginal utility of X = additional utility from consuming 1 more unit (the smallest unit we can imagine) of X
- Which decision is better? Check the marginal utilities.
- But we have to consider that the prices are different.
- Relative price indicates how much unit of Y can be exchanged with 1 more X.
- Marginal utility per spending of X = marginal utility of X / price of X

What is the optimal choice?



Marginal analysis
: Intuition for the rule of maximization 1

- Which decision is better? Comparing the marginal utilities per spending.
- Suppose an initial state of X,Y. What if $\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$? Can he/she better off (by changing in decision for X,Y)? Yes. Suppose that he/she get more X by giving up some Y.
- What if $\frac{MU_X}{P_X} < \frac{MU_Y}{P_Y}$?
- After all adjustments, we derive the rule of maximization $\boldsymbol{\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}}$.
- Note that there is no incentive to deviate from the equality condition.

Marginal analysis
: Intuition for the rule of maximization 2

- Suppose that he/she starts to spend money from 0.
- To make the best decision, he/she would choose the plan with a higher marginal utility per spending. For example, if $\frac{MU_X}{P_X} > \frac{MU_Y}{P_Y}$, he/she will choose X.
- Note that the marginal utility of one good decreases as he/she consume more. If he/she consume X more and more, $\frac{MU_X}{P_X} < \frac{MU_Y}{P_Y}$. In that case, he/she can get more utility by getting more Y and giving up some X.
- That means, if he/she is rational, he/she will stick to the condition,

$$\boldsymbol{\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y}}.$$

Marginal analysis
: The rule of maximization

- If there are other goods (which means, in more general terms),

$$\frac{MU_X}{P_X} = \frac{MU_Y}{P_Y} = \cdots = \frac{MU_Z}{P_Z}.$$

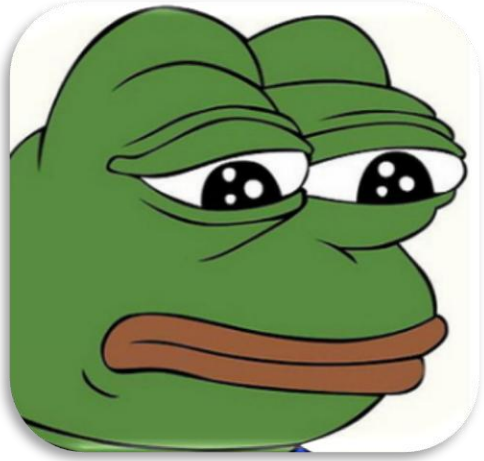
- The rule of maximization captures several important characteristics of consumers in market economy.
  - The relationship among consumptions on different items.
  - The effect of price change
  - The effect of income change
  - How the shape of marginal utilities affect consumption plan (and how the consumption plan responses to income/price change)?

Example : Pepe's optimal choice

- Budget constraint : $5600 = 700M + 1400S$

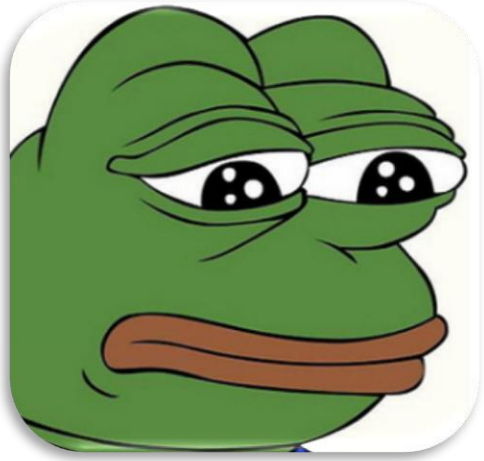
Utility function : $MU_M = \frac{1}{M}, MU_S = \frac{1}{S}$

- What is the optimal choice for M, S?

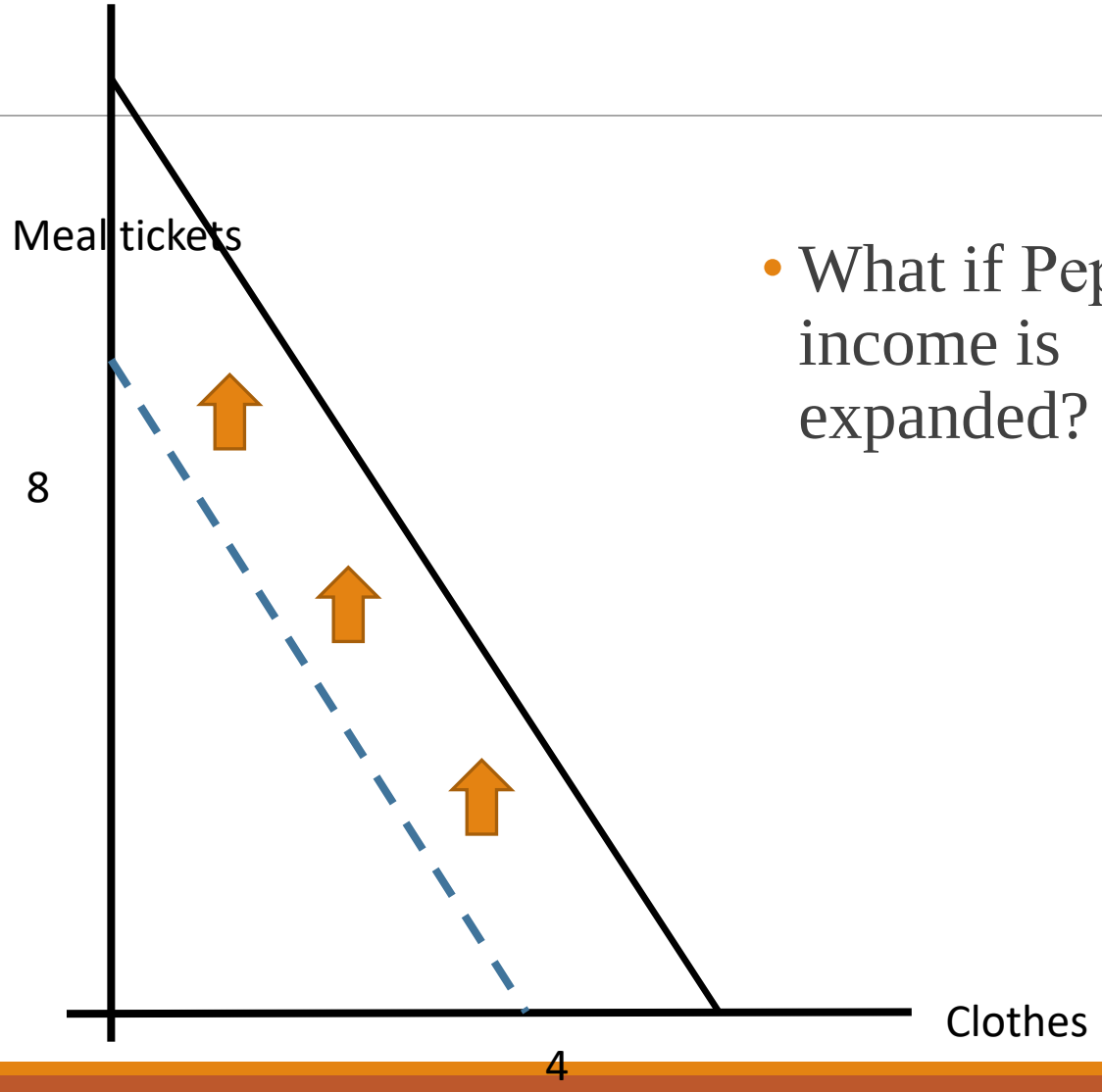


Example : Pepe's optimal choice

- Now, let's suppose that the income goes up to 11,200 won.



Example : Pepe's optimal choice



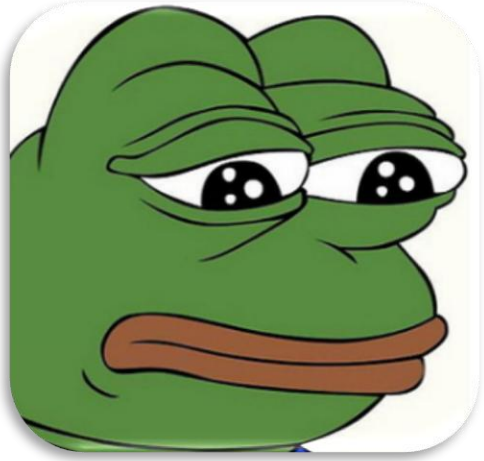
- What if Pepe's income is expanded?

Income effect

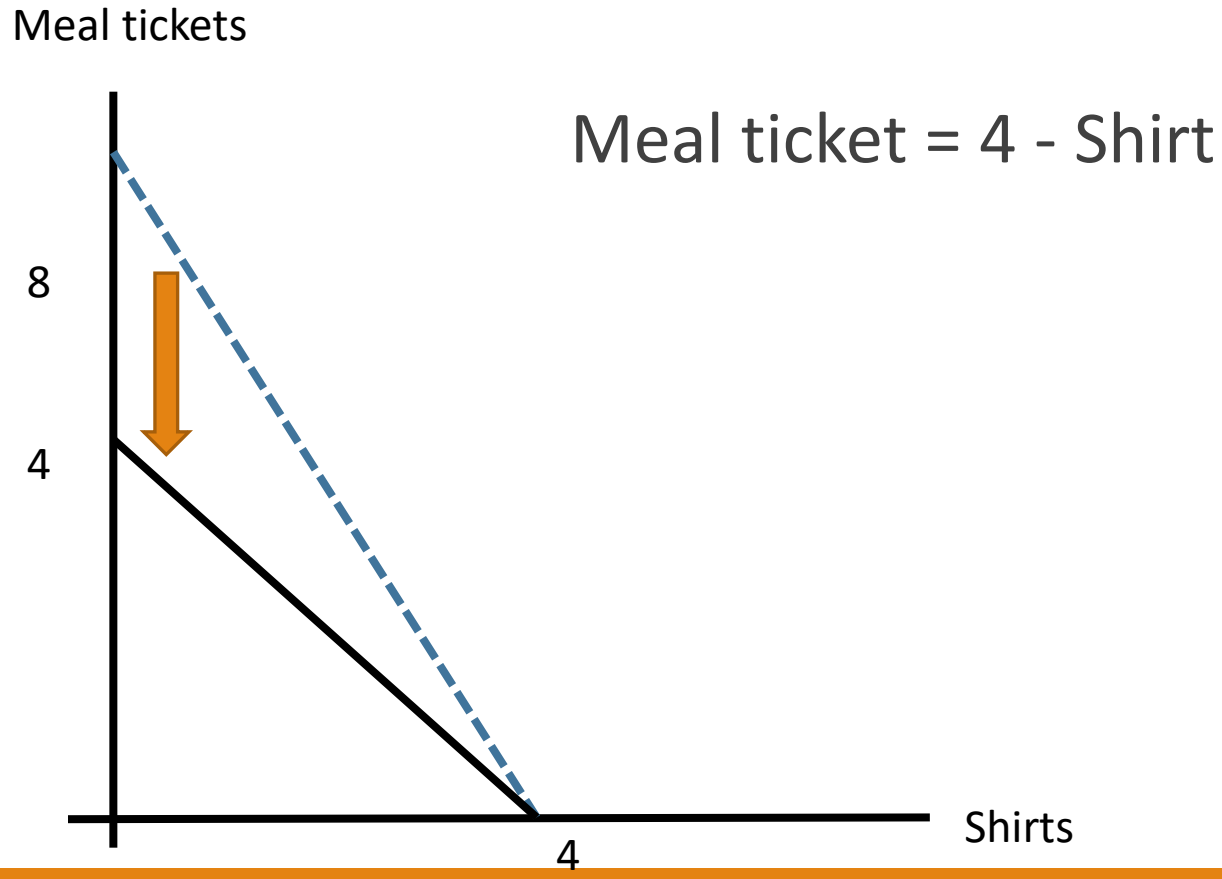
- Income effect and the characteristics of good
  - Normal goods : an increase in income causes an increase in demand (+)
  - Inferior goods : an increase in income causes a decrease in demand (-)
  - Luxury goods : an increase in income causes a bigger percentage increase in demand (++)

Example : Pepe’s optimal choice

- What if the price of M goes to 1400 won ?

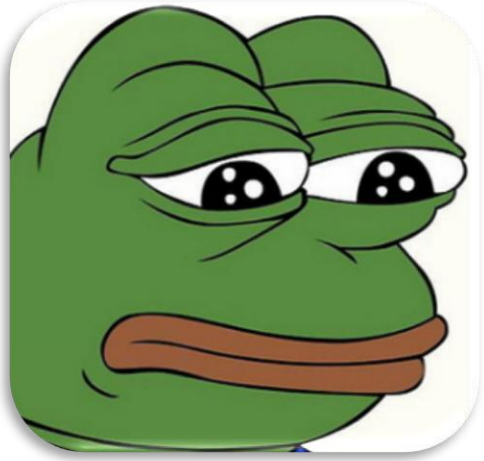


Example : Pepe's optimal choice

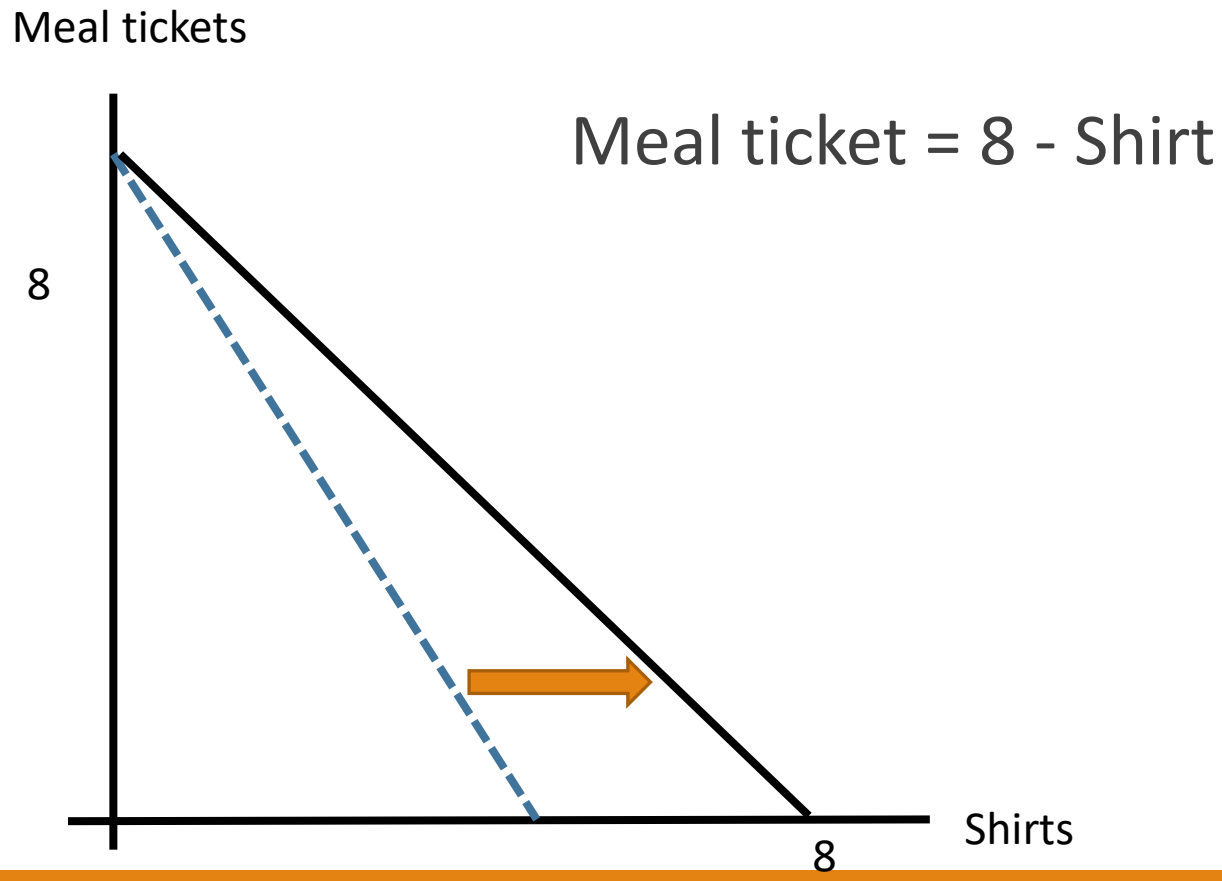


Example : Pepe’s optimal choice

- If the price of S falls to 700 won ?

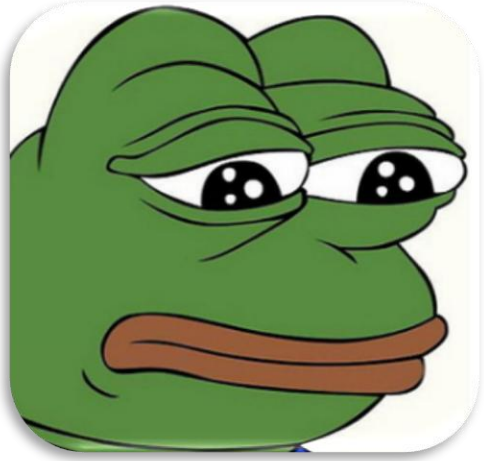


Example : Pepe's optimal choice



Example : Pepe’s optimal choice

- When a price changes,
  - Substitution effect : change in relative price (the slope in budget constraint)
  - Income effect (of a price change) : shift in real purchasing power



Price effect

- Price effect : an increase in price causes an decrease in demand (-)

  * Special case : Giffen goods – price effect (+)

- Relationship between goods
  - Substitute goods : an increase in the demand of A causes an decrease in the demand of B (-)
  - Complementary goods : an increase in the demand of A causes an increase in the demand of B (+)

- Then, consider price effect on other good
  - On substitute goods : an increase in the price of A causes an increase in the demand of B (+)
  - On complementary goods : an increase in the price of A causes an decrease in the demand of B (-)

Demand curve

- What is demand curve? The relationship between price and quantity demanded
- What is the quantity demanded? We know what occurs if consumers follow their self-interest. => The optimal decision of consumption
- Remind that price effect is negative (-).

Thanks!!