EE211

Principles of Microeconomic

Weerawat Phattarasukkumjorn

Semester 1/2021

Course details

› Schedule

Section 1: Tue, Thu 08.00 – 09.30
Moodle class code: **1278**

› Instructor

Weerawat Phattarasukkumjorn, Room no. 437
weerawat@econ.tu.ac.th
Please communicate through **LINE group**, not personal.

› Evaluation

Homework and assignment	10 points
Midterm exam	40 points
Final exam	50 points

› Exam date and time

Midterm: Saturday, Oct 2 from 09.00 – 11.00 (2 hours)
Final: Friday, Dec 17 from 09.00 – 11.30 (2.5 hours)

Chapter 1

Introduction

Class #1

An economy in general

Page 4-10

Assumed scarcity

Resources are scarce.

Choices are available.

Decisions are to be made

Therefore, we have basic problems in economics.

Basic problems in economics

What to produce?

How do we know what are wanted in our society?

How to produce?

What is the incentive to produce?

To produce for whom?

How do we distribute final product?

So, how do we solve these basic problems?

Rough categorization of systems

› Central Planning

A centralized institution decides what, how to produce and holds the authority to allocate all the resources.

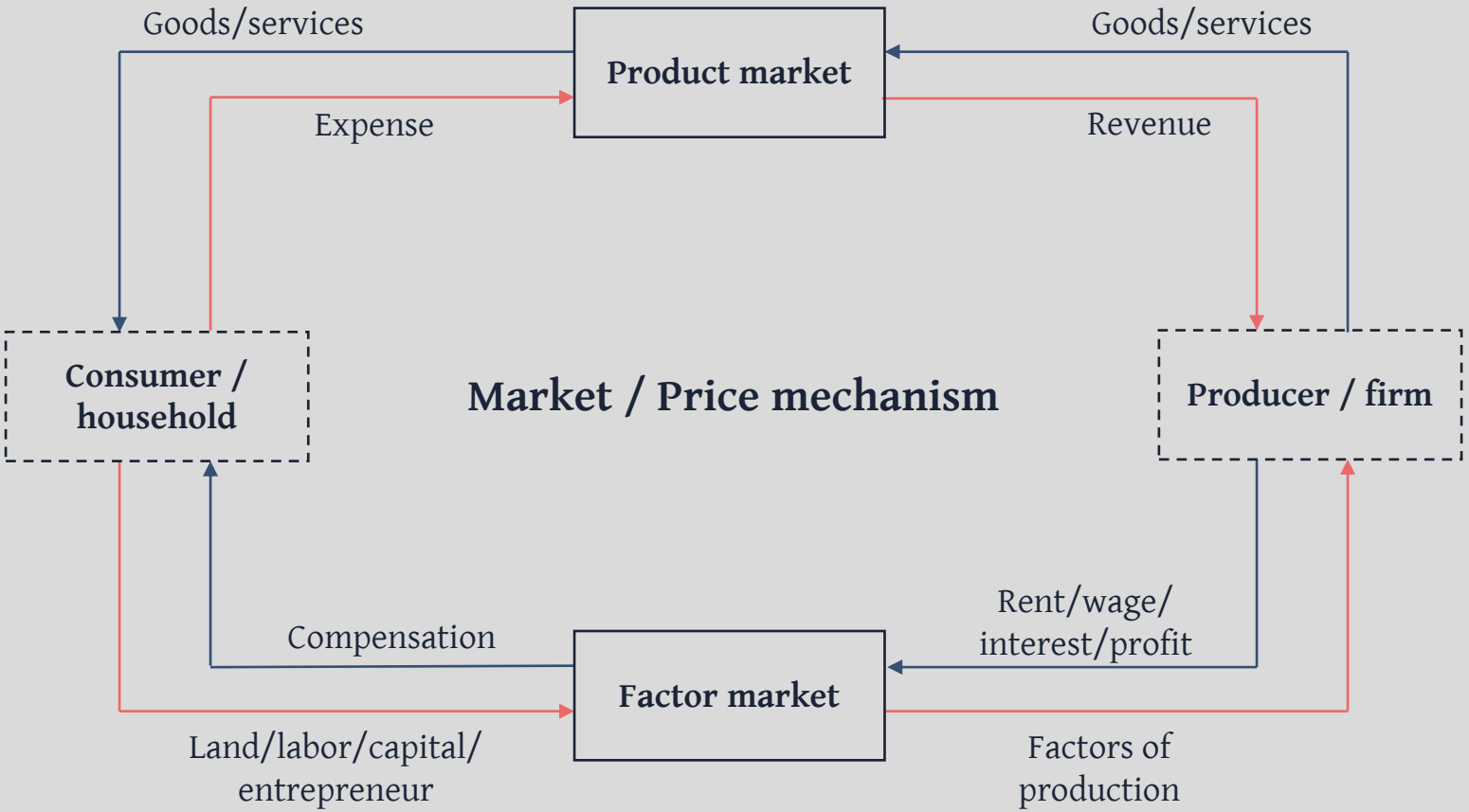
› Mixed economy

Private firms decide what and how to produce. Market mechanism is the tool for resource allocation. Economic and political institution can interfere for specific reasons.

› Market oriented

Private firms decide what and how to produce. Market mechanism is mainly the tool for resource allocation. Very few market intervention or none (but very unlikely).

Circular Flow



Economic vocabularies

› Land

A space occupied for production, not including buildings.

› Labour

Force which can be exerted and rejuvenated from a person that is used for production.

› Capital

Any other factors of production that are not included in the rest of the categories and can be stored in multiple forms such as money, saving, machinery, buildings, etc.

› Entrepreneur

A group of people dealing with management in a firm.

To answer basic questions with market

What to produce?

Private firms decide what to produce.

How to produce?

Firms act in accordance to demand and profit maximization.

To produce for whom?

Price mechanism is the main tool to allocate products and services, also factors of production.

Class #2

Opportunity cost

Page 11-20

Opportunity cost

Definition 1.1

The opportunity cost, *or* ***alternative cost***, *of making a particular choice is the value of the most valuable choice out of those that were not taken.*
When an option is chosen, the opportunity cost is the "cost" incurred by not enjoying the benefit associated with the best alternative choices.

Consider the opp. cost for these decisions made.

› Working instead of studying in a university.

› Watching He4rtRocker live instead of reviewing economics.

› Seeing movies with boyfriend/girlfriend.

Opportunity cost

Choices	Activities	Benefit	Opportunity cost
Example 1: a healthy boy			
1	Having organic salad	320	
2	Having BBQ	200	
Example 2: an enjoy-eating boy			
1	Having organic salad	-50	
2	Having BBQ	150	
Example 3: a rich boy			
1	Study economics hard	35,000	
2	Practice programming	20,000	
3	Register with a life coach	5,000	
4	Study investment	10,000	

Production possibility curve

Supposed that the total resources in a community can be used to produce 100 cars or 150 tanks. Cost for both commodities is perfectly substitutable.

› Multiple choices and infeasible choice.

› What would happen if more resources are later found?

Production possibility curve

Supposed now cost for both commodities is ***not*** perfectly substitutable.

› How this affects the PPC?

Content (Pre-midterm)

› Chapter 2: Interaction within a market

Focusing on demand, supply, equilibrium, elasticity, surplus and government intervention in a perfect competition market.

› Chapter 3: Consumer theory

Study how consumers decide when choosing (a) commodities or services, their criteria or condition how to choose for their best interest to find an equilibrium. Eventually, this will lead to how we can derive an individual demand.

Content (Post-midterm)

› Chapter 4: Production and cost

Similar to consumer, we turn our focus to producer, following the same logic of finding the optimal condition for producer to get their best interest. Firstly, we need to define a nature of production and cost.

› Chapter 5: Product/service market

Only production and cost does not cover the whole picture, we need to study producer's revenue. Unfortunately, gaining revenue is different for each type of market. This chapter will focus on how they differ.

› Chapter 6: Factor market

Closely linked to product/service market, producer's cost is derived from factors of production. How competitive factor market is can be crucial to producer's best interest condition.

› Chapter 7: Market failures

Lastly, there are so many situations market cannot efficiently allocate resources. We study real-world scenarios how market can totally fail to deliver.

What are important for out study?

› Definitions

Study and stick to the definitions as much as you can. In many cases, it would help us having clear discussion what exactly we are talking about.

› Assumptions

You might notice that studying economics can be out-of-this-world. However, conclusions drawn by an economist, especially mathematical one, is **"true"** if their assumptions hold.

› Ceteris Paribus (other things being equal)

To reduce complications in our study, we only study a change in one variable at a time, while keeping others intact.

Chapter number
Sub-chapter

How to use this handout?

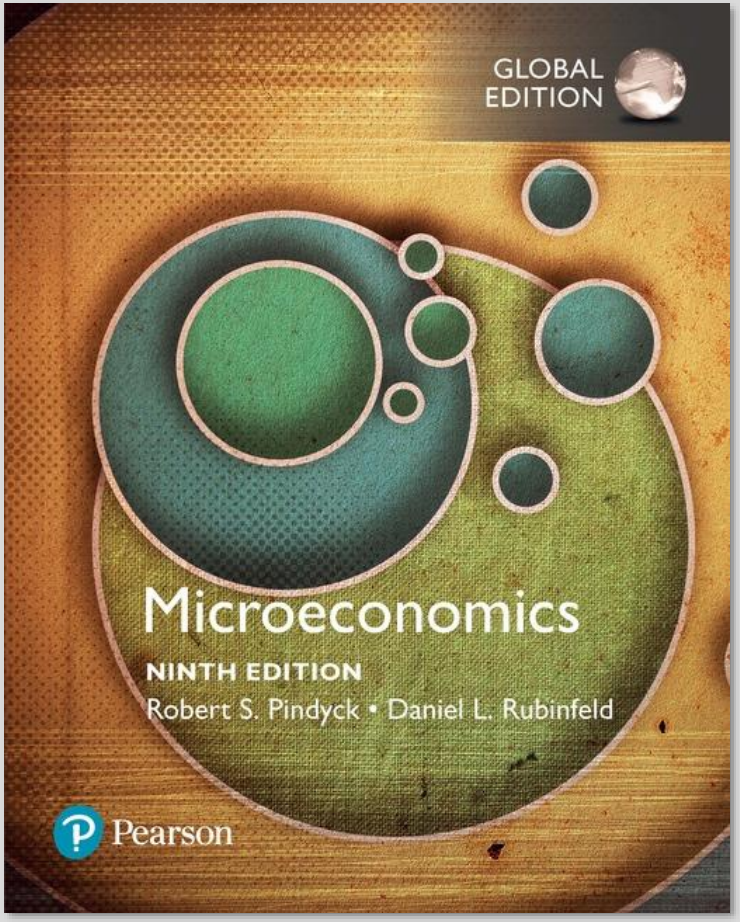
Main topic

Illustration or content

Illustration or content

Content

Main textbook



› Pindyck, R. S., & Rubinfeld, D. L. (2018). **Microeconomics**. Upper Saddle River, N.J: Pearson/Prentice Hall.

Chapter 2

Demand, supply and applications

Class #3

Demand and supply

Page 21-40

Flow of study in this chapter

› Demand, supply and equilibrium

We first try to understand the meaning of demand, supply and equilibrium. How consumers and producers react in a market and how price can be a signal for both parties.

› Elasticity

Commodities and services can be differently elastic. The implication on many studies forward will also be varied by their elasticity.

› Surplus

How to define what people gain from trade and lay out a framework to study who gains or loses when there is a change in a market.

› Market intervention

Learn how a political, economic institution can intervene price in a market, what is the implication and results for those actions.

Further reading can be found in Pindyck and Rubinfeld (2018), page 55-82 and 327-362

Market

Definition 2.1

Market *is a context where trade occurs. Buyers (consumers), sellers (producers), good or service and price are mandatory components in a market.*

Each component, mentioned above, in a market should be clearly identified because it defines market structure. For instance, varieties of pineapple markets can be

› Pineapple (fresh from the field) market.

› Canned pineapple market.

› International pineapple market

Assumptions imposed

› Static analysis

We are studying only a single change at a time. No intertemporal chain-reaction effects to be included.

› Ceteris Paribus (other things being equal)

To reduce complications in our study, we only study a change in one variable at a time, while keeping others intact.

› Perfect competitive market

General characteristics of a perfect competitive market is that there are many numbers of buyers and sellers, in which no single entity can take control over price or quantity. More information of perfect competitive market will be in the market structure section.

(1) Definition

Definition 2.2

*Demand refers to **quantity** or amount of good or service demanded by consumers at different prices in given period of time.*

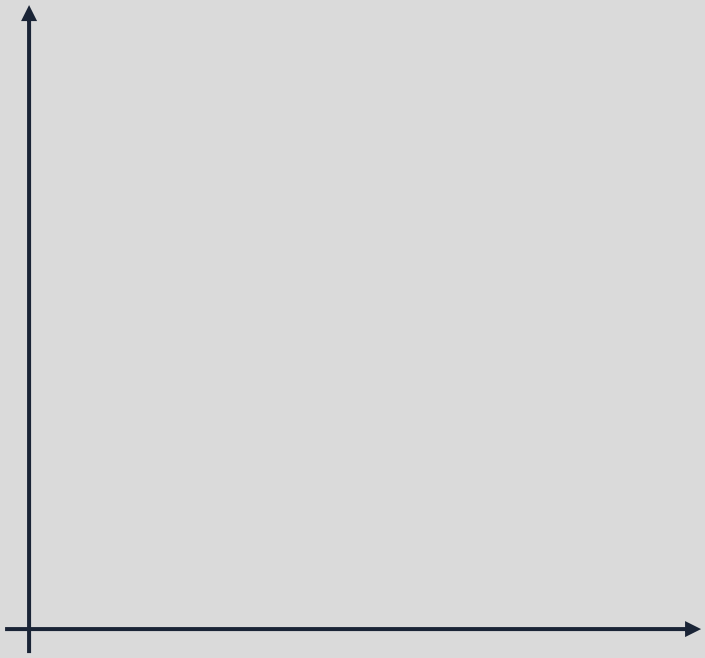
To constitute demand, it takes both **want** and **affordability**. Demand can be expressed in form of functions and equation as follows.

› $q_a = f(P)$

› $q_a = 10 - 2P$

From the equation above, we can create demand table and line.

(2) Table, line and law of demand



P	q_a
0	
1	
2	
3	
4	
5	

Definition 2.3

Law of Demand *is a claim that when price of a goods or service rises, its quantity demanded will fall and vice versa, when all other factors that can affect demand are held constant.*

(3) Price effect

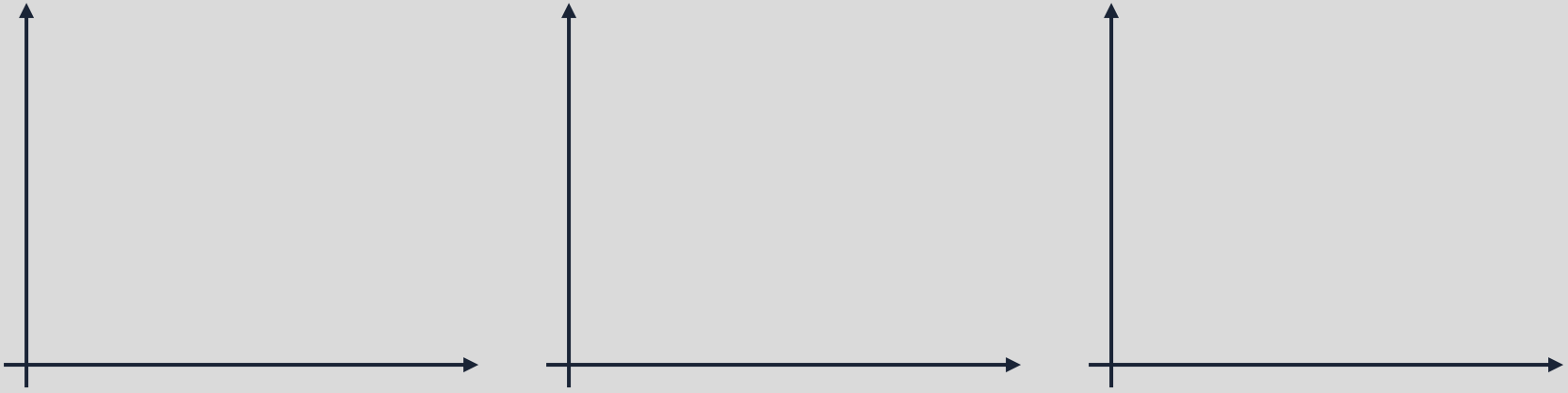
When price changes and affects quantity demanded, the result is called **price effect** (PE) which consists of two sub-effects.

› **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.

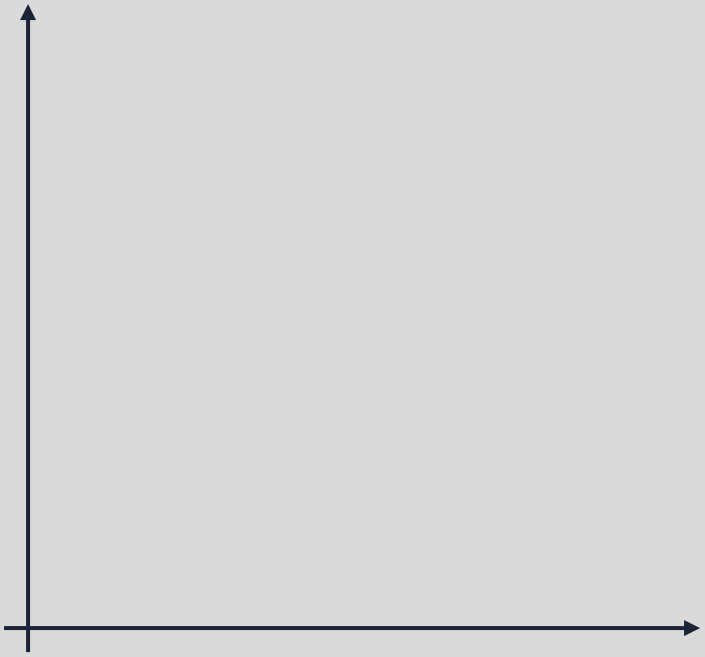
(4) Individual and market demand

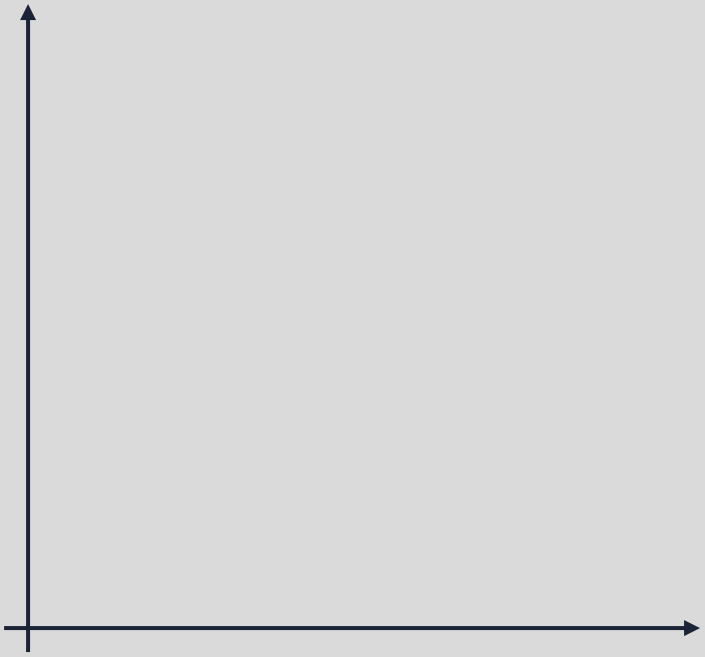
P	q_a	q_b	Q
0	12	20	
1	10	16	
2	8	12	
3	6	8	
4	3	4	
5	0	0	



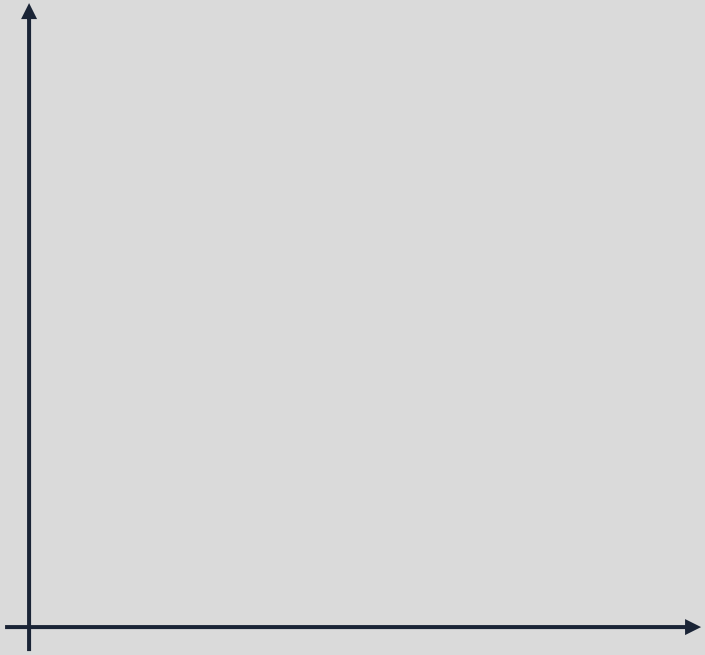
(5) Demand move and shift

Changes in demand can be divided into 2 cases: (1) Moving along the curve, caused by changes in price (2) Shifting demand, caused by external factors that are not price.





(6) Demand determiners



In which direction do these factors need to shift to in order to shift market demand to the right or increasing demand.

› Consumer income

› Consumer preference

› Price of complementary goods

› Price of substitutable goods

› Price speculation

(7) Other types of demand

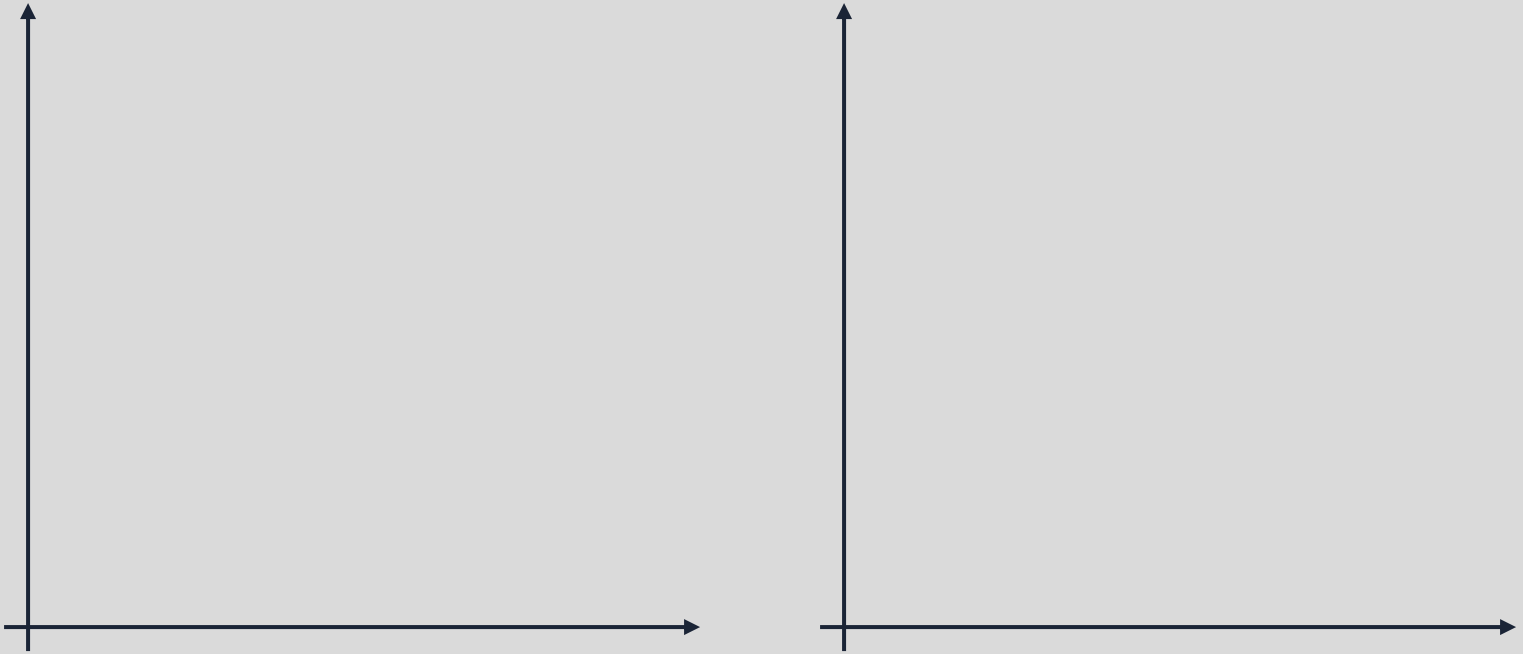
Demand can be plotted against other variables. If income replaces price, we call it **income demand**. However, income demand for normal goods and inferior goods are different.

Definition 2.4

Inferior goods *are commodities or services which demand decreases when consumer income rises, or vice versa, unlike normal goods for which the opposite is observed.*

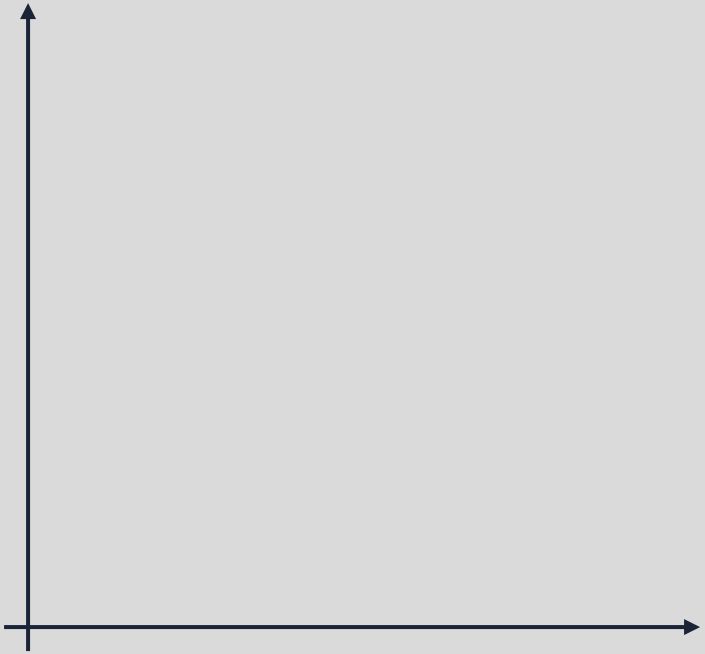
(7) Other types of demand

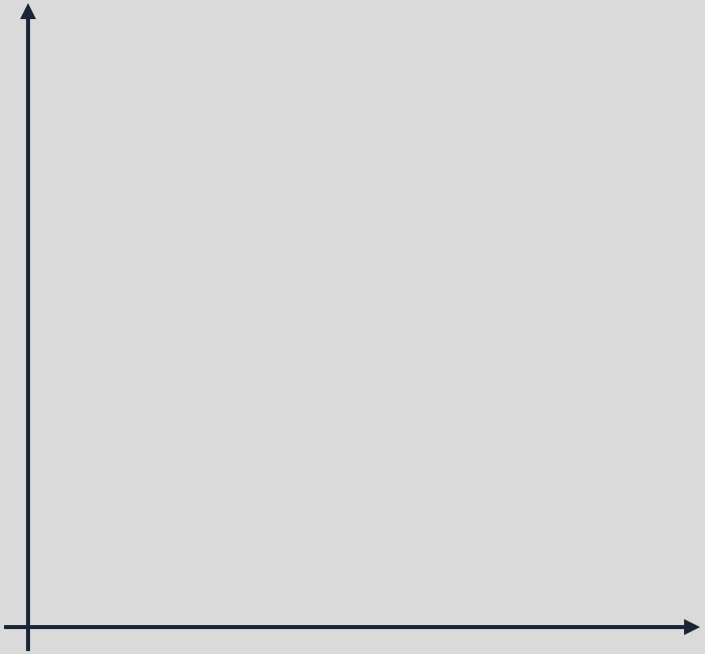
Now let's plot income demand for normal goods on the left and inferior goods on the right.



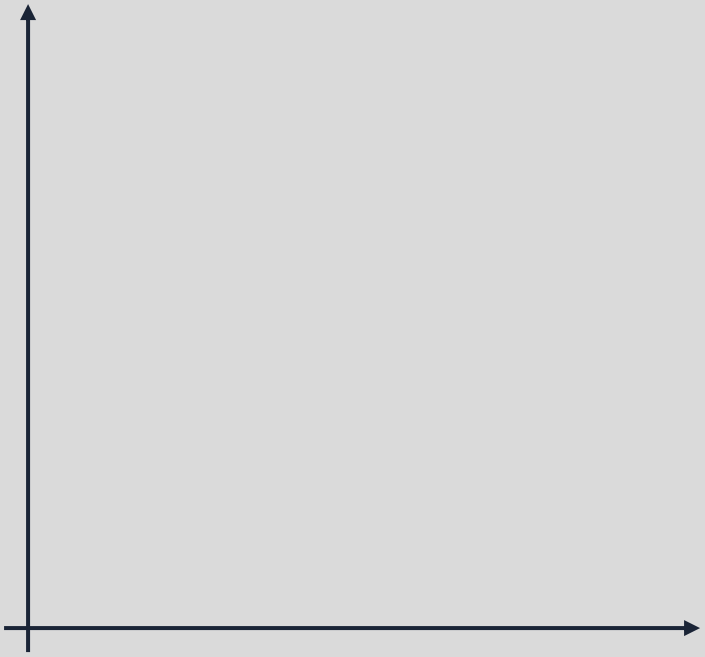
(7) Other types of demand

Demand for A can be plotted with price of B (different commodities). These goods can be both **substitute** or **complementary**.





(7) Other types of demand



Otherwise, two goods can be non-related at all.

How would demand for A and price of B be plotted?

(1) Definition

Definition 2.5

*Supply refers to **quantity** or amount of good or service supplied by producers at different prices in given period of time.*

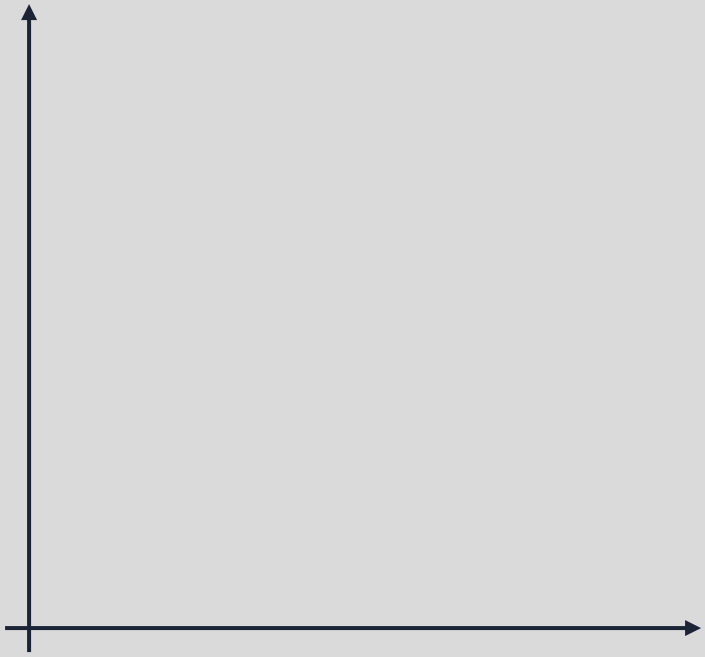
Supply can be expressed in form of functions and equation as follows, similar to demand.

› $q_k = f(P)$

› $q_k = 3P$

From the equation above, we can create supply table and line.

(2) Table, line and law of supply



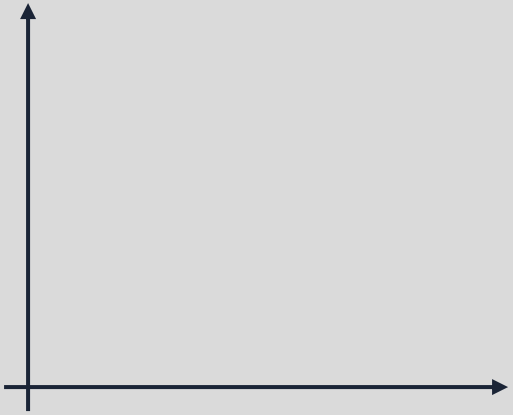
P	q_k
0	
1	
2	
3	
4	
5	

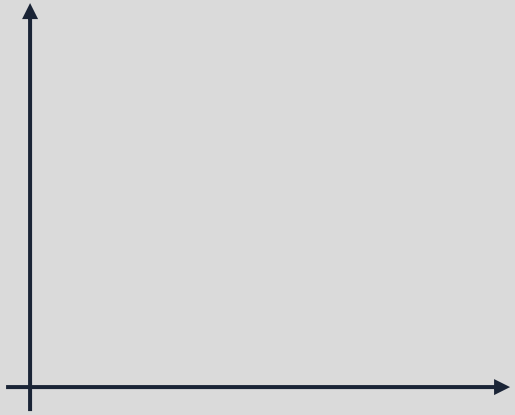
Definition 2.3

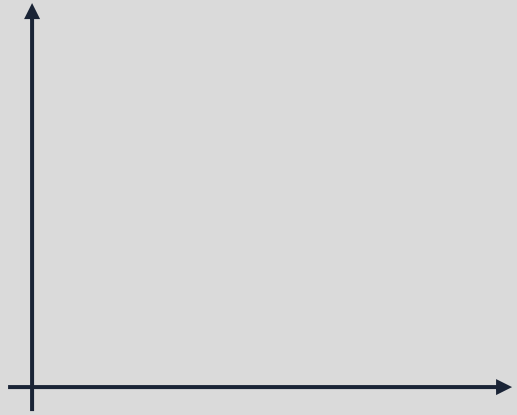
Law of Supply *is a claim that when price of a goods or service rises, its quantity supplied will also rises and vice versa, when all other factors that can affect supply are held constant.*

(3) Individual and market supply

P	q_k	q_l	Q
0	0	1	
1	3	3	
2	6	5	
3	9	7	
4	12	9	
5	15	11	

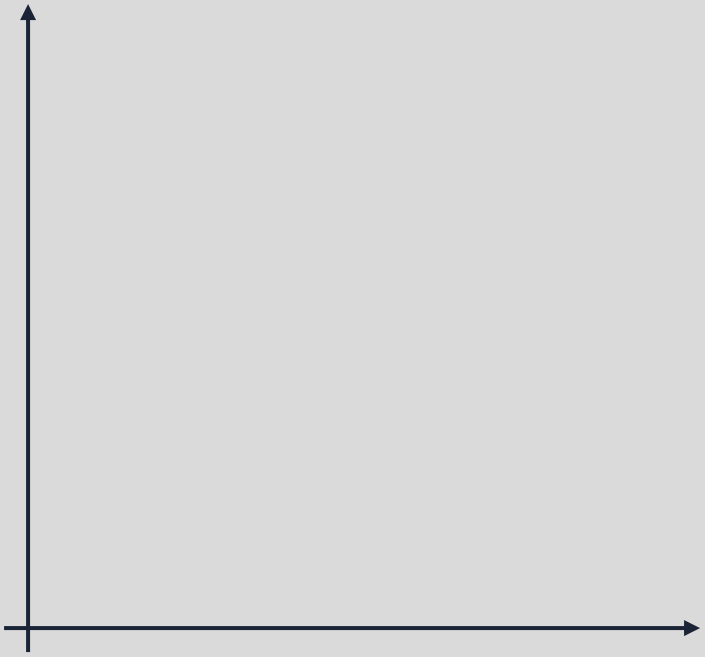


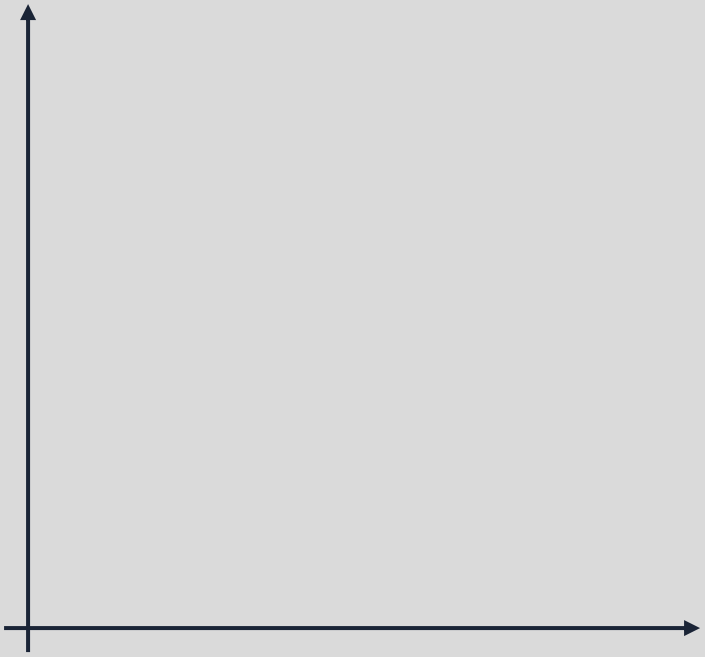




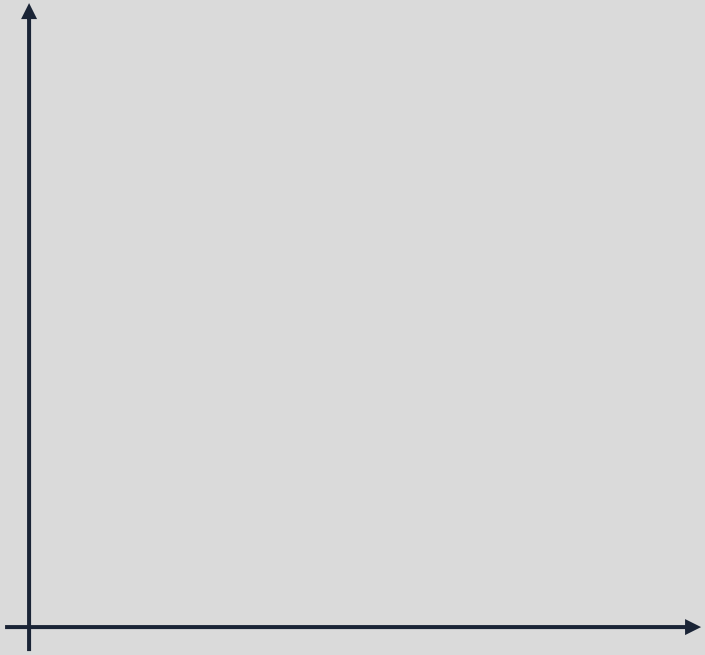
(4) Supply move and shift

Changes in supply can be divided into 2 cases: (1) Moving along the curve, caused by changes in price (2) Shifting supply, caused by external factors that are not price.





(5) Supply determiners



In which direction do these factors need to shift to in order to shift market supply to the right or increasing supply.

› Factors of production price

› Technological progress

› Number of sellers

› Price speculation

Class #4

Equilibrium

Page 41-49

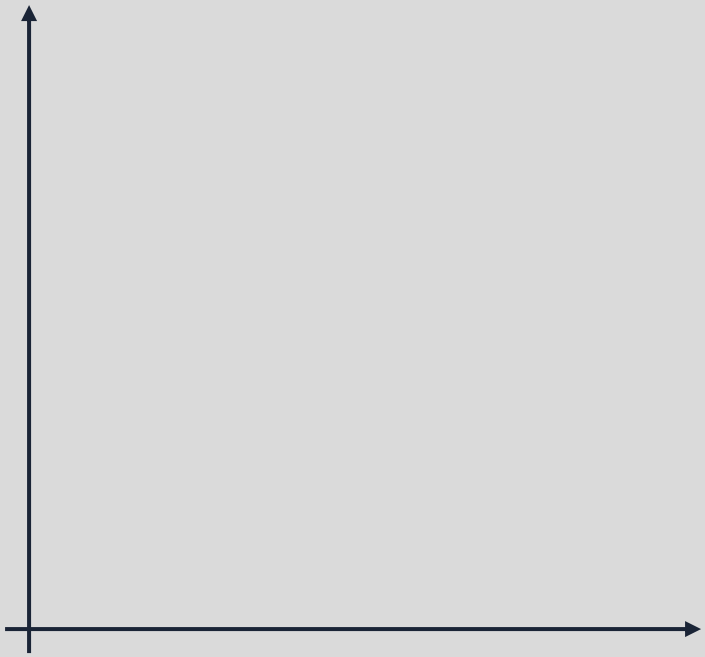
(1) Definition

Definition 2.6

There exists equilibrium price and quantity in a market, when quantity demanded and supplied are equal. Without exogenous force, equilibrium price and quantity remain stable.

At the equilibrium, Q is the total quantity traded in a market within a period of time at price P.

(1) Definition



. Try solving for the equilibrium of this system of equations.

› $Q_d = 10 - 2P$

› $Q_s = 3P$

The solution can be plotted into a graph on the left.

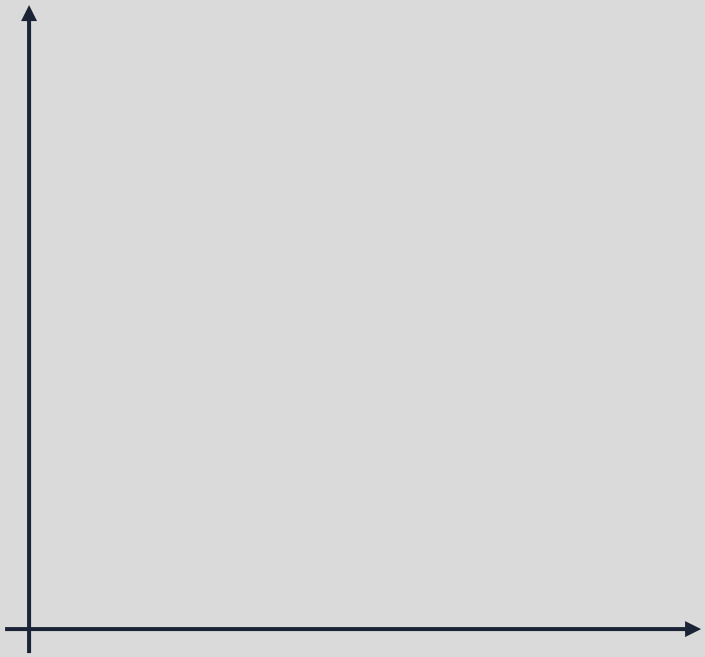
(2) Price change

If price is temporarily fluctuated 'other things being equal', it may cause excess demand or supply, but the market would adjust itself and return to its original position.

Definition 2.7

Excess demand (supply) *is the quantity demanded (supplied) exceeded equilibrium quantity at equilibrium price.*

(2) Price change

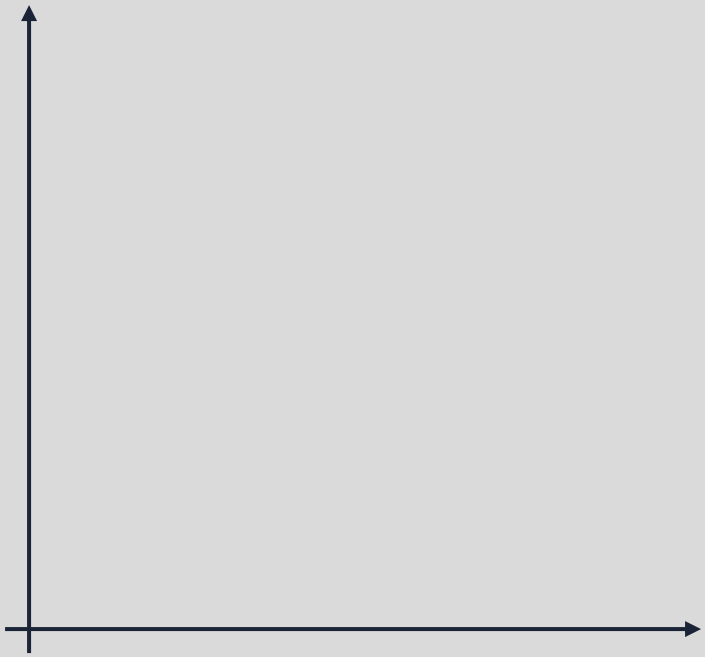


Let's see what would happen when price drops.

› Will there be excess demand or supply?

› How would the market adjust and why?

(2) Price change



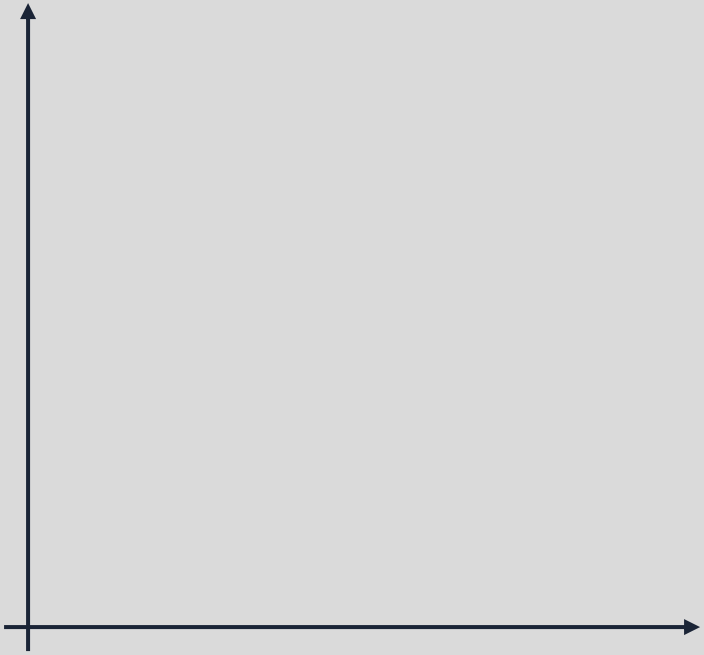
Let's see what would happen when price hike.

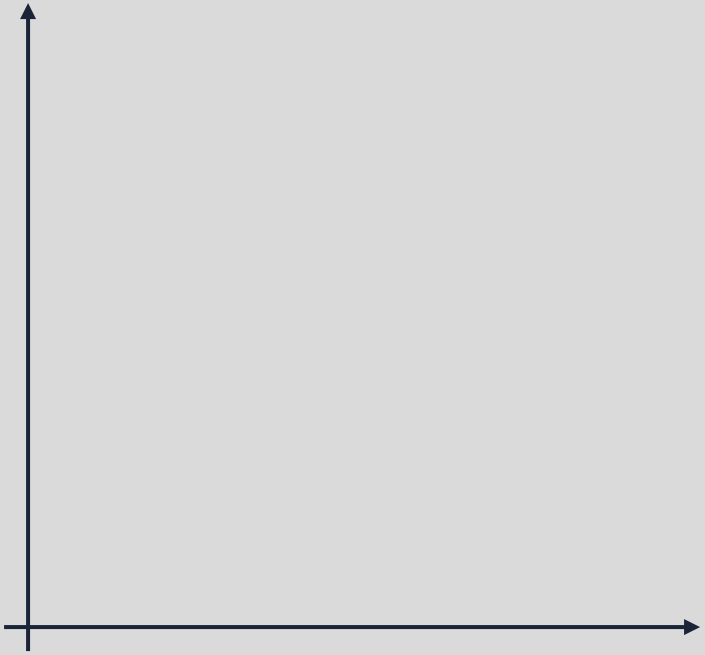
› Will there be excess demand or supply?

› How would the market adjust and why?

(3) Shifting the equilibrium

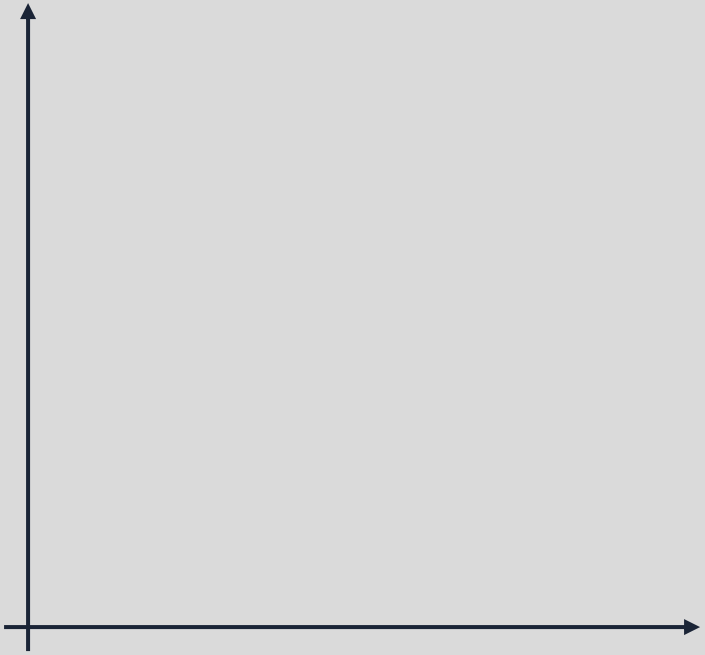
Now on the other hand if an external factor causes **demand shifts**, how would it affect equilibrium price when **demand** increase or decrease?

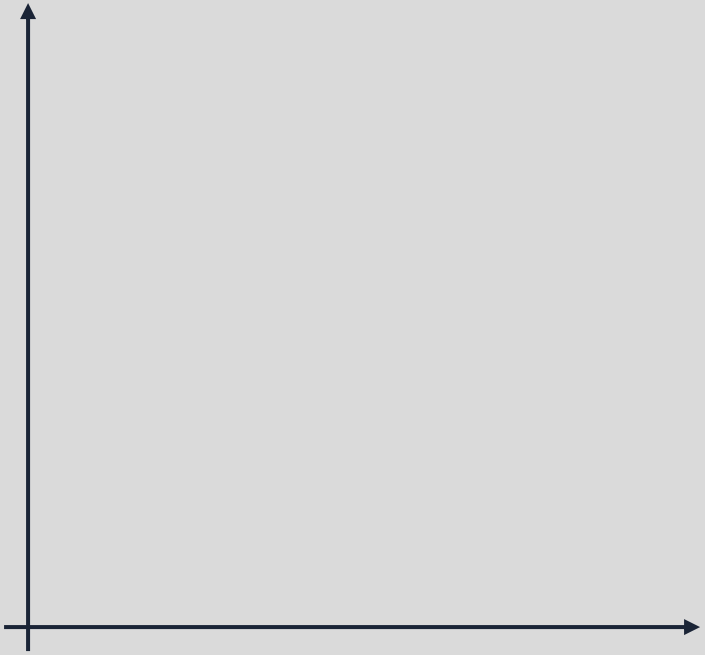




(3) Shifting the equilibrium

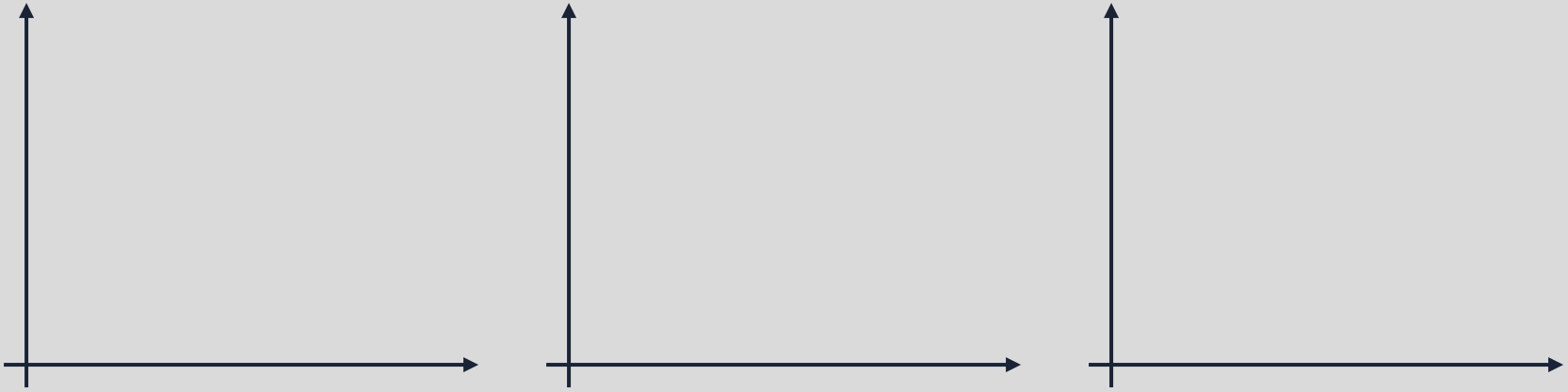
Again, if an external factor causes **supply shifts**, how would it affect equilibrium price when **supply** increase or decrease?





(3) Shifting the equilibrium

We have further scenarios which include (1) Both demand and supply increase. (2) Both demand and supply decrease (3) Demand surges but supply drops (4) Supply surges but demand drops.



You should try shifting the rest of the scenarios. A point for this topic is to show that we focus on direction based on an economic explanation, rather than precise size of the effects.

Class #5

Price elasticity of demand

Page 50-61

(1) General definition

Since economists mostly interested in price change and price determination from equilibrium, problems arise when they try to compare changes in different markets.

Supposed that there are two markets of interest, fuel oil and mobile phones market, both markets price drop 20 baht equally per unit. We can immediately see that quantity change in two markets would respond differently because there is a big gap in present prices between two goods.

Definition 2.8

Elasticity *is a measure of sensitivity of one variable variable to a change in another variable. General formula takes the form of*

$$\varepsilon = \frac{\%change\ in\ dependent\ variable}{\%change\ in\ independent\ variable}$$

(2) Price elasticity of demand

We apply the concept, then we can measure the elasticity of demand by using the ratio below.

Definition 2.9

Price elasticity of demand *is percentage change in quantity demanded for 1 percent of price increase.*

› $\varepsilon_d = \frac{\%change\ in\ quntity\ demanded}{\%change\ in\ price} = \frac{\%\Delta Q_d}{\%\Delta P}$

We can measure both point and arc elasticity of demand respectively.

› Point : $\varepsilon_d = \frac{P}{Q} \cdot \frac{\Delta Q}{\Delta P} = \frac{P}{Q} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

› Arc : $\varepsilon_d = \frac{P_2 + P_1}{Q_2 + Q_1} \cdot \frac{\Delta Q}{\Delta P} = \frac{P_2 + P_1}{Q_2 + Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

(2) Price elasticity of demand

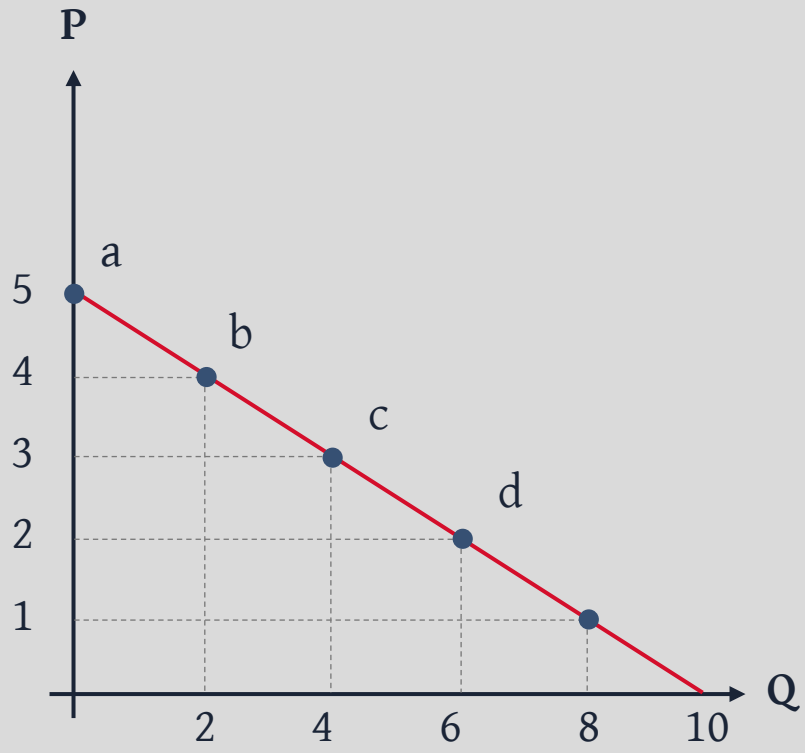


Figure out **point** elasticity on each coordinate.

› $\varepsilon_{d(\mathrm{a})} =$

› $\varepsilon_{d(\mathrm{b})} =$

› $\varepsilon_{d(\mathrm{c})} =$

› $\varepsilon_{d(\mathrm{d})} =$

(2) Price elasticity of demand

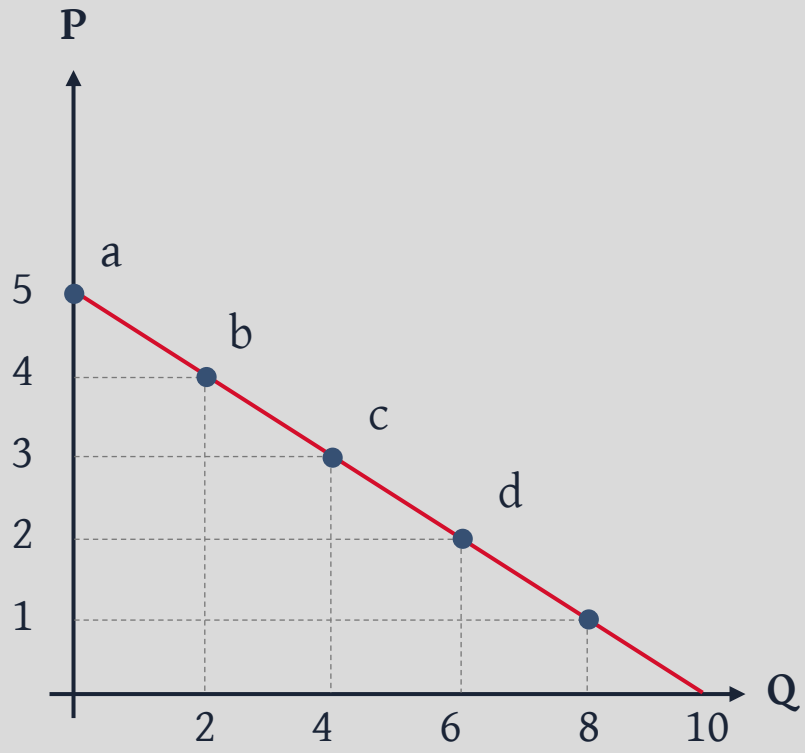


Figure out **arc** elasticity on each interval.

› $\varepsilon_{d(\mathrm{ab})} =$

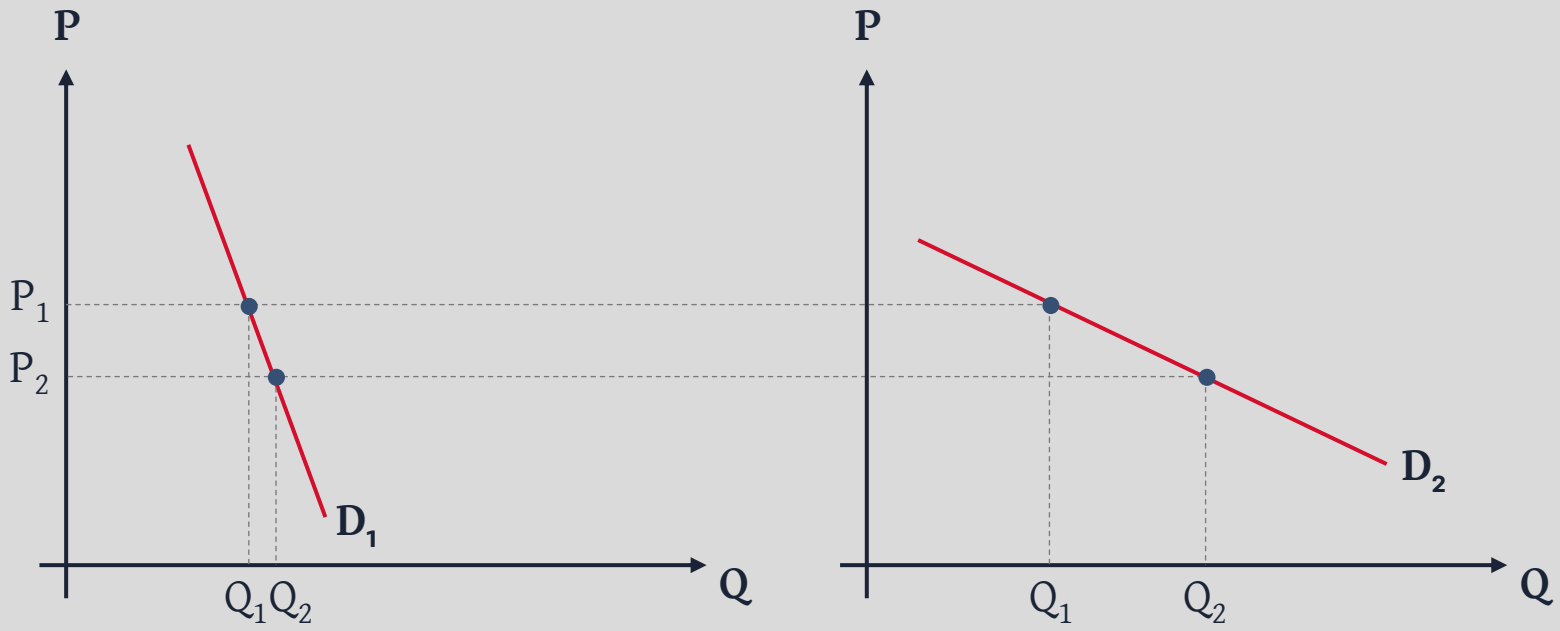
› $\varepsilon_{d(\mathrm{bc})} =$

› $\varepsilon_{d(\mathrm{cd})} =$

› $\varepsilon_{d(\mathrm{ac})} =$

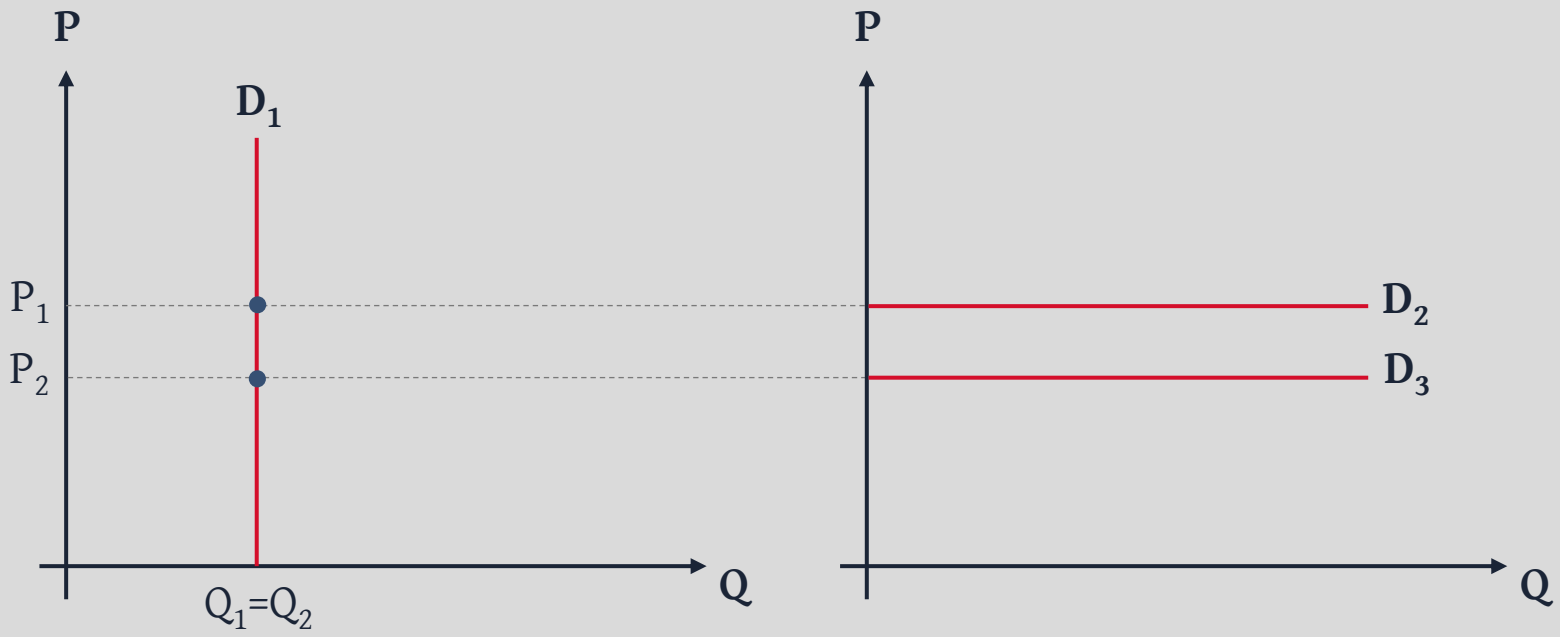
(2) Price elasticity of demand

Relative elasticity of demand can be defined by slope, with an assumption that two goods are comparable meaning that their prices are in quite equal range.



(2) Price elasticity of demand

Some goods are either perfectly elastic or inelastic.



(2) Price elasticity of demand

Commodities	ε_d
Cigarette	-0.06
Electricity (for accommodations)	-0.13
Rice	-0.15
Pesticide	-0.21
Express toll	-0.29
Fuel oil (imported)	-0.60
Rice whiskey	-1.31
Vehicle and components (imported)	-1.52

Which direction of these determiners make demand inelastic?

› Number of substitutable goods

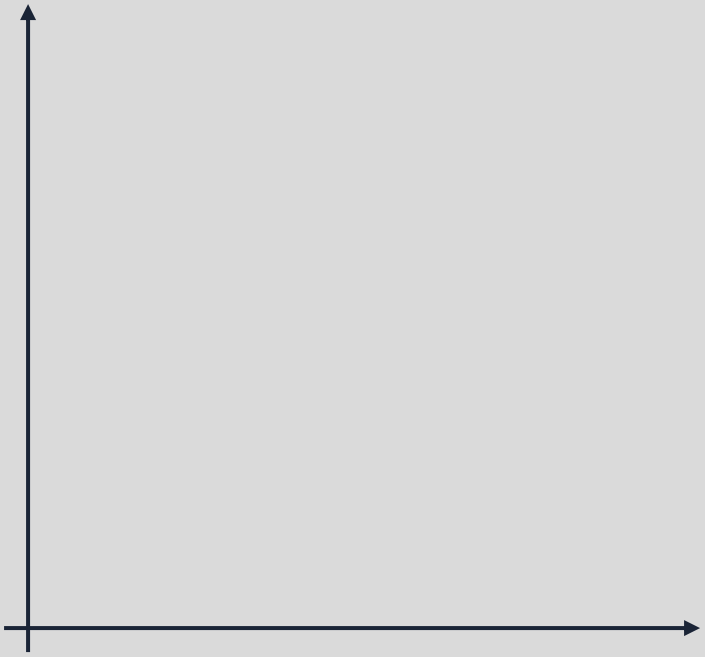
› Necessity

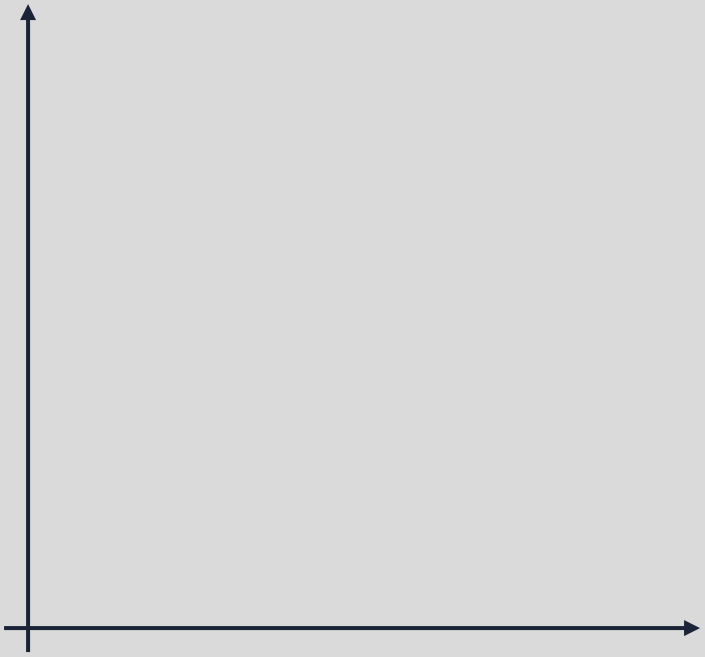
› Time frame

(2) Price elasticity and total revenue

Different price elasticity affects seller's decision to either increase or reduce price as well due to effect to revenue.

Total revenue is defined by:





(2) Price elasticity and total revenue

Mathematical proof.

(3) Other elasticities of demand

We can also apply this concept to other types of demand.

Definition 2.10

Income elasticity of demand *is percentage change in quantity demanded for 1 percent of consumers' income increase.*

› $\varepsilon_I = \frac{\%change\ in\ quantity\ demanded}{\%change\ in\ consumer\ income} = \frac{\%\Delta Q_d}{\%\Delta I}$

We can measure both point and arc elasticity of demand respectively.

› Point : $\varepsilon_I = \frac{I}{Q} \cdot \frac{\Delta Q}{\Delta I} = \frac{I}{Q} \cdot \frac{Q_2 - Q_1}{I_2 - I_1}$

› Arc : $\varepsilon_I = \frac{I_2 + I_1}{Q_2 + Q_1} \cdot \frac{\Delta Q}{\Delta I} = \frac{I_2 + I_1}{Q_2 + Q_1} \cdot \frac{Q_2 - Q_1}{I_2 - I_1}$

(3) Other elasticities of demand

We can also apply this concept to other types of demand.

Definition 2.11

Cross-price elasticity of demand *is percentage change in quantity demanded for 1 percent of price increase of another commodity.*

› $\varepsilon_c = \frac{\%change\ in\ quantity\ demanded}{\%change\ in\ another\ commodity\ price} = \frac{\%\Delta Q_d^a}{\%\Delta P^b}$

We can measure both point and arc elasticity of demand respectively.

› Point : $\varepsilon_c = \frac{P^b}{Q} \cdot \frac{\Delta Q}{\Delta P^b} = \frac{P^b}{Q^a} \cdot \frac{Q_2^a - Q_1^a}{P_2^b - P_1^b}$

› Arc : $\varepsilon_c = \frac{P_2^b + P_1^b}{Q_2^a + Q_1^a} \cdot \frac{\Delta Q}{\Delta P^b} = \frac{P_2^b + P_1^b}{Q_2^a + Q_1^a} \cdot \frac{Q_2^a - Q_1^a}{P_2^b - P_1^b}$

Class #6

Price elasticity of supply

Page 62-68

(4) Price elasticity of supply

Definition 2.12

Price elasticity of supply *is percentage change in quantity supplied for 1 percent of price increase.*

› $\varepsilon_S = \frac{\%change\ in\ quntity\ supplied}{\%change\ in\ price} = \frac{\%\Delta Q_S}{\%\Delta P}$

We can measure both point and arc elasticity of supply respectively.

› Point : $\varepsilon_S = \frac{P}{Q} \cdot \frac{\Delta Q}{\Delta P} = \frac{P}{Q} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

› Arc : $\varepsilon_S = \frac{P_2 + P_1}{Q_2 + Q_1} \cdot \frac{\Delta Q}{\Delta P} = \frac{P_2 + P_1}{Q_2 + Q_1} \cdot \frac{Q_2 - Q_1}{P_2 - P_1}$

(4) Price elasticity of supply

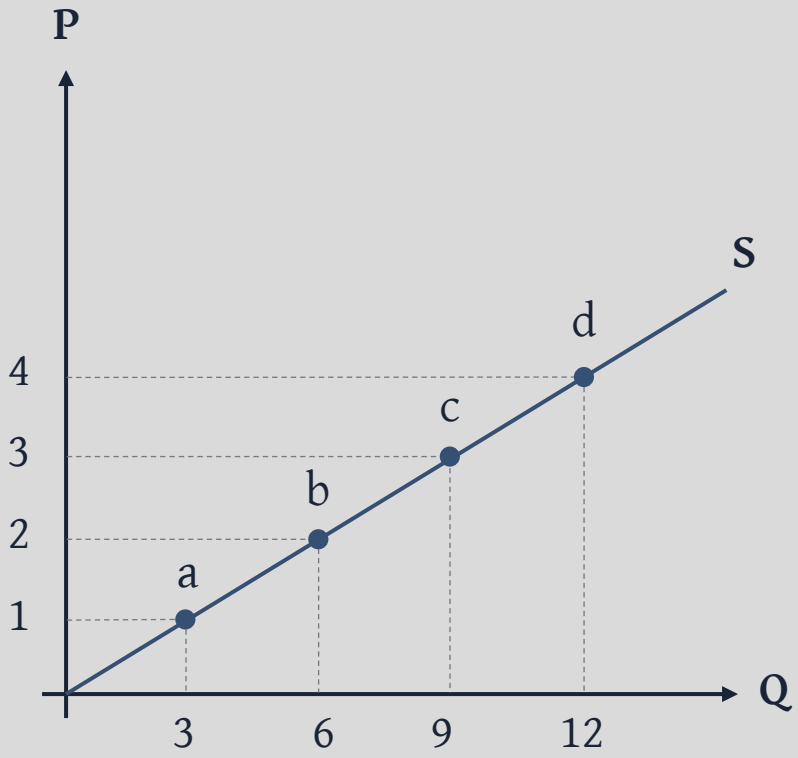


Figure out **point** elasticity on each coordinate.

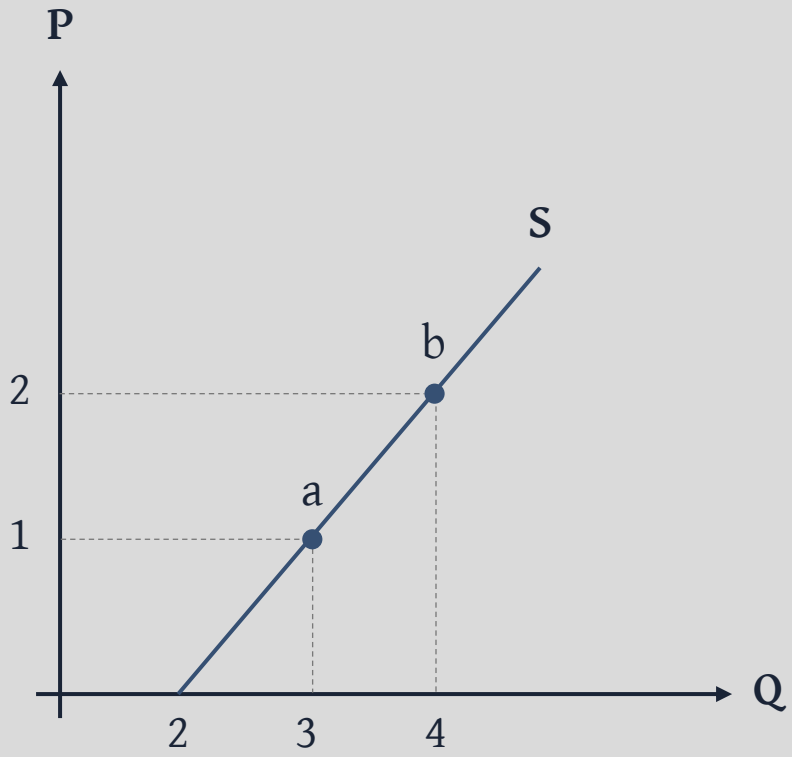
› $\varepsilon_{s(a)} =$

› $\varepsilon_{s(b)} =$

› $\varepsilon_{s(c)} =$

› $\varepsilon_{s(d)} =$

(4) Price elasticity of supply



Given a supply equation as

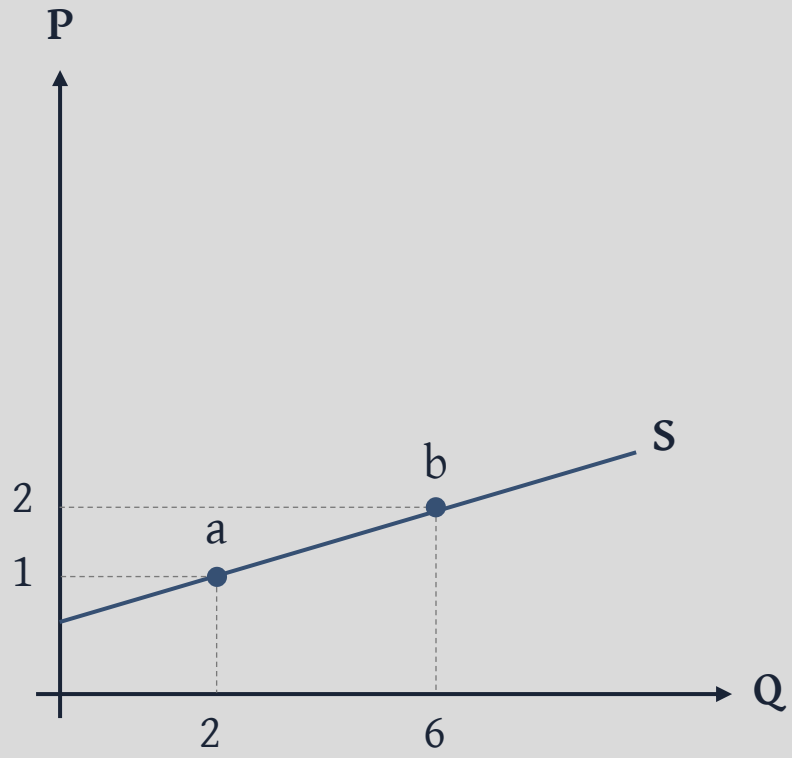
› $Q_s = P + 2$

Find point elasticity on these coordinates

› $\varepsilon_{s(a)} =$

› $\varepsilon_{s(b)} =$

(4) Price elasticity of supply



Given a supply equation as

› $Q_s = 4P - 2$

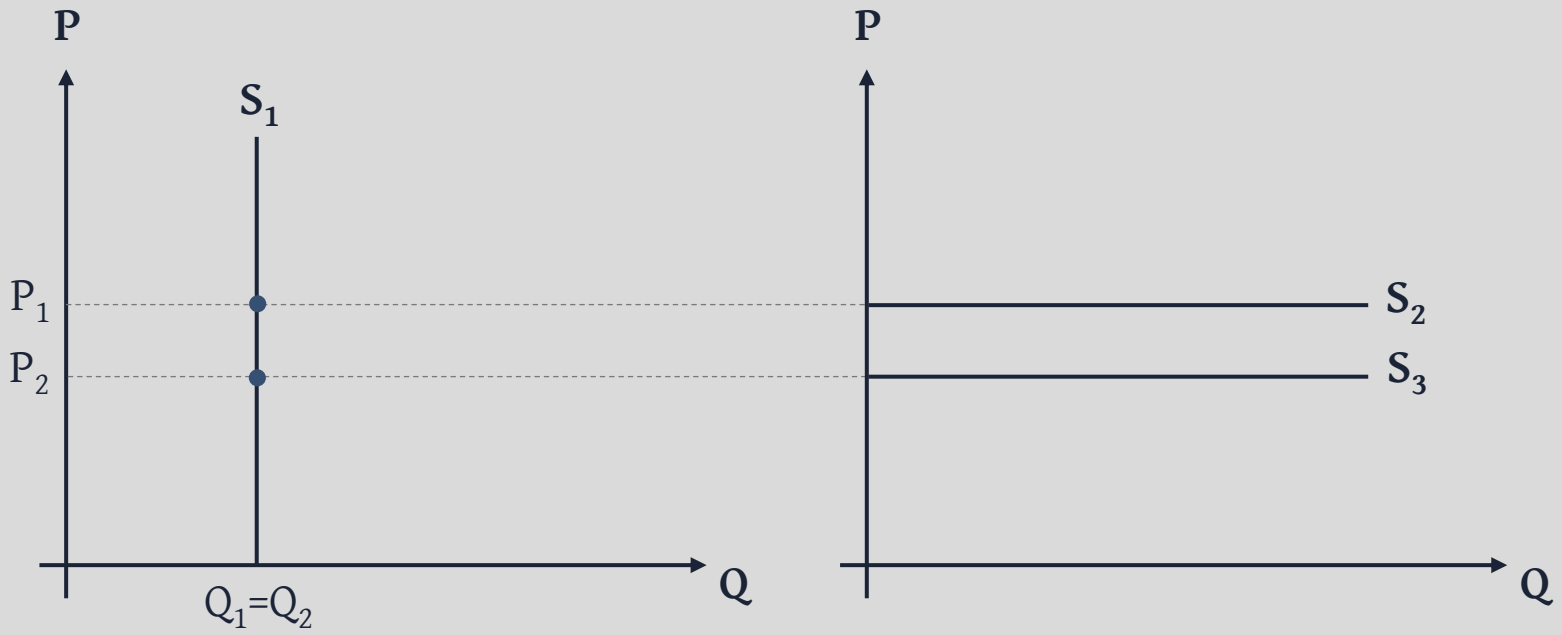
Find point elasticity on these coordinates

› $\varepsilon_{s(a)} =$

› $\varepsilon_{s(b)} =$

(4) Price elasticity of supply

There are some supple lines that can be perfectly elastic or inelastic.



(4) Price elasticity of supply

Price elasticity of supply depends on goods or services features.
Unlike demand, those characteristics are mostly related to production.
What direction of these determiners make supply more elastic?

› Cost of production

› Duration of production

› Time frame

Class #7

Surplus and price ceiling

Page 69-80

(1) Definition

As you may have seen that economists are obsessed with change in price, quantity and equilibrium. They would not matter if we are not able to interpret what comes after those events. Therefore, we need another concept to identify gains and losses for each party in a market.

Surplus is a concept that measures "social welfare" from trade in a market, which is also used to imply "market efficiency" compared to undesirable scenarios, such as government intervention or monopoly.

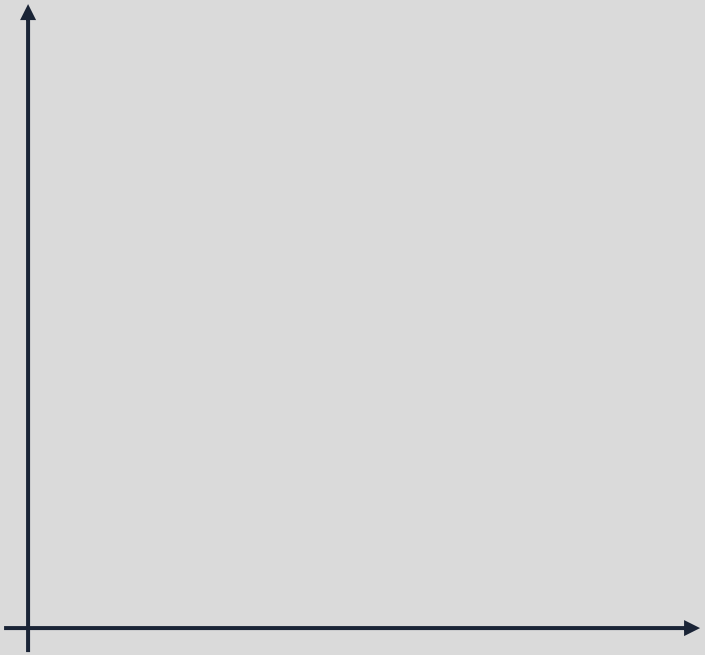
In a market, there are many groups of buyers and sellers. Buyers' preference and sellers' cost vary while market price is singular

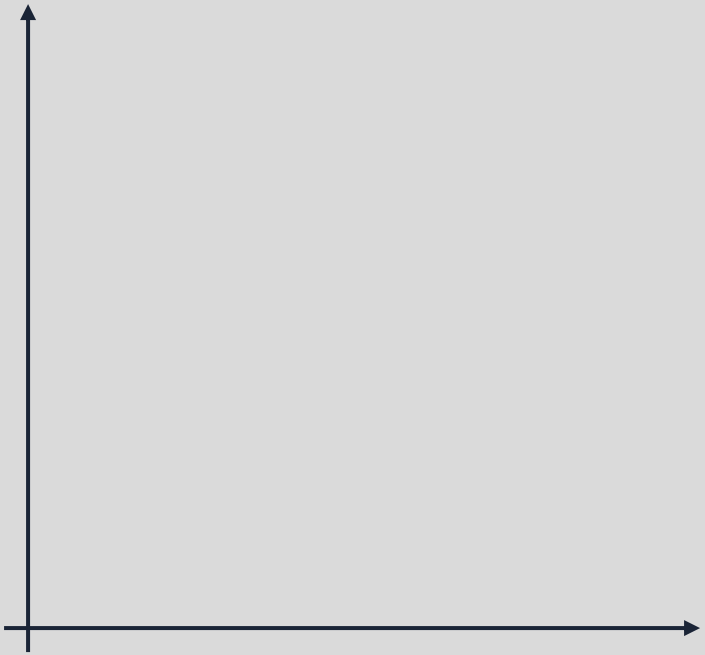
Definition 2.13

Consumer surplus *is net gain or benefit of all consumers in a market, defined by difference between willingness to pay and market price.*

(2) Consumer surplus

Firstly, we need to define what is willingness to pay to understand surplus.

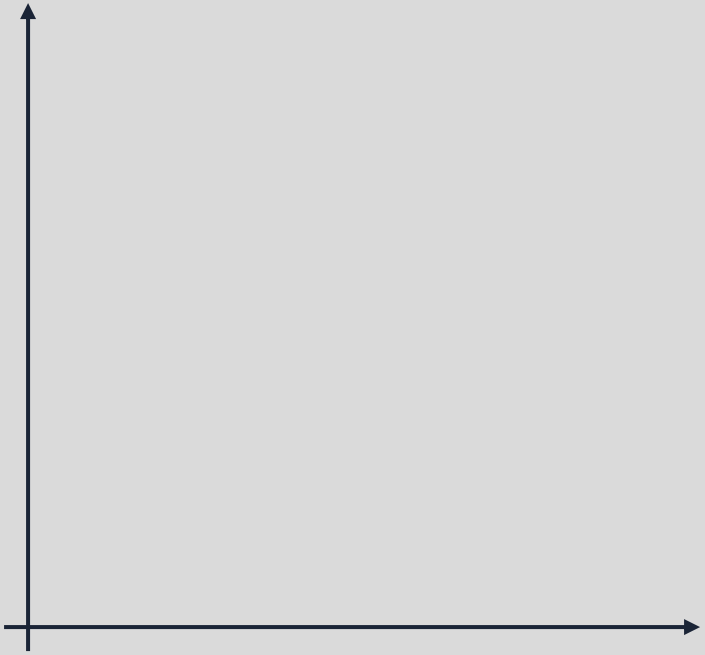


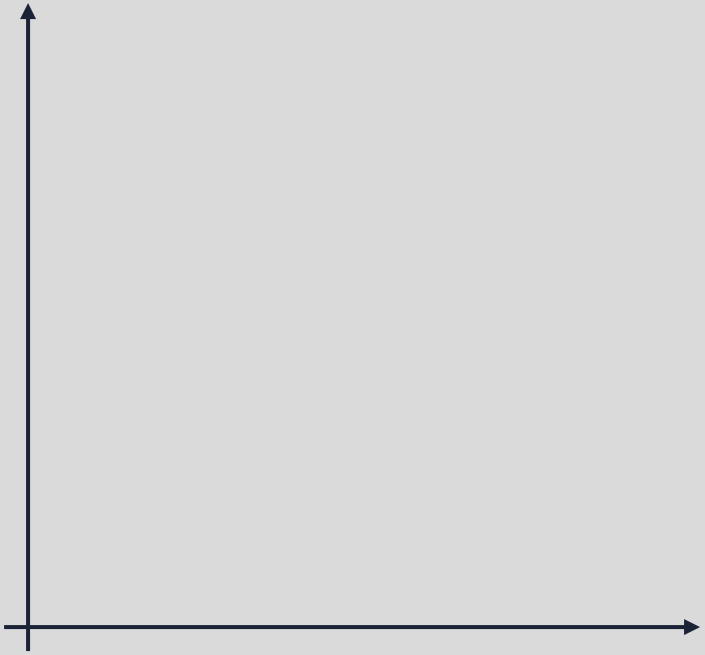


(3) Producer surplus

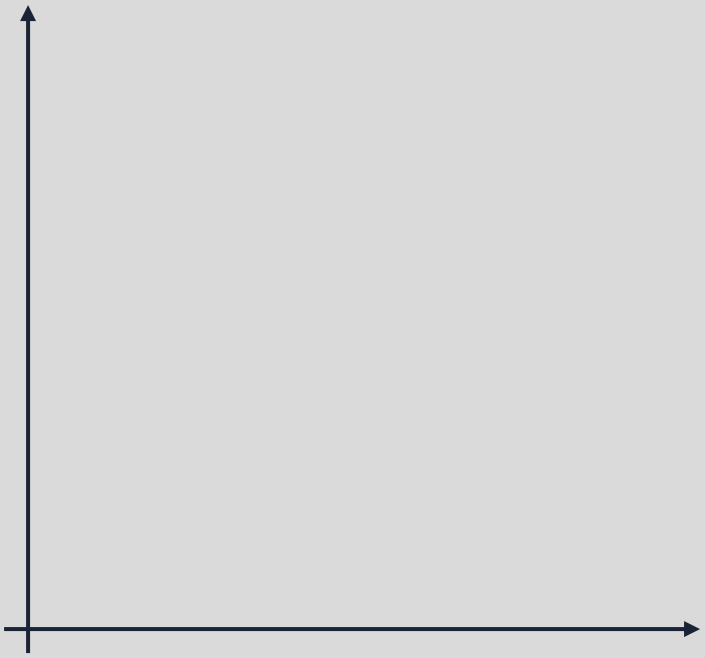
Definition 2.14

Producer surplus *is net gain or benefit of all consumers in a market, defined by difference between market price and willingness to sell.*





(4) Total surplus



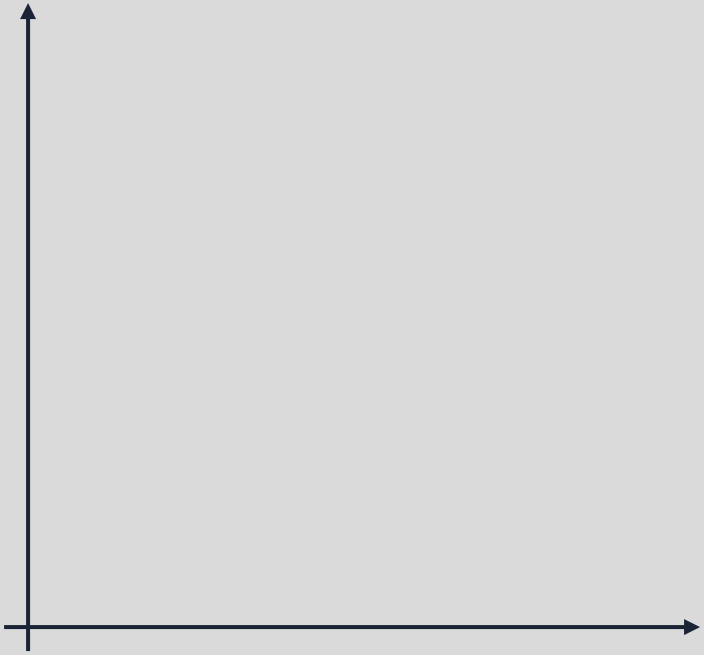
If the market is perfectly competitive, total surplus is sometimes referred as “social welfare”.

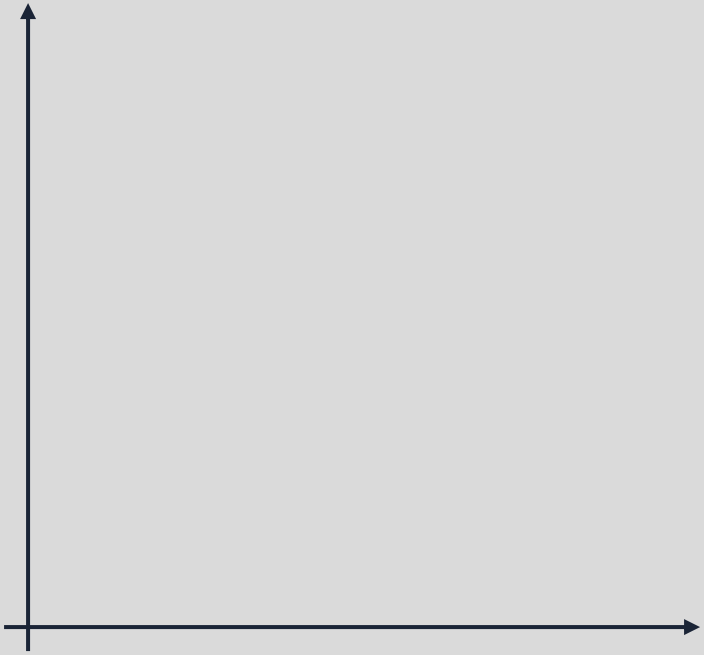
This concept is used throughout the analyses when price, quantity or equilibrium shifts.

Note that this “welfare” only means welfare gained from trade.

(5) Price change and surplus

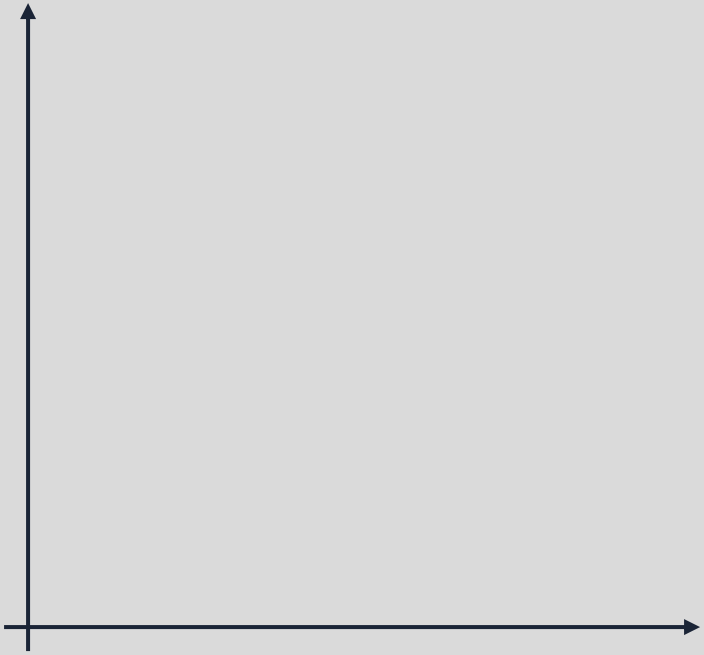
Let’s consider surplus change for each party from these cases when demand surge and supply drops.

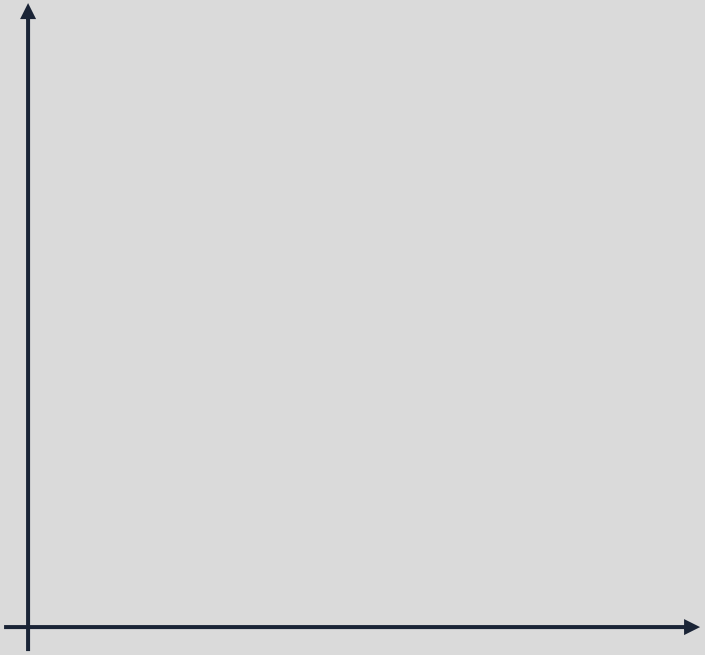




(5) Price change and surplus

Price elasticity also affects surplus for each party as well. See the cases below when demand is inelastic and supply is elastic.





(1) Problem statement

No such country relies solely on market for resource allocation. A central institution, most of the time is called “government”, or economic and political institutions are founded to intervene markets for many circumstances such as

› when market fails

› trying to stabilize price for essential commodities

› maintaining political and economic stability

› building infrastructures and public goods

There are many tools to intervene market such as price settings, government purchasing, taxing which we will analyze the consequences using surplus framework. The first one here is price setting.

(2) Price setting

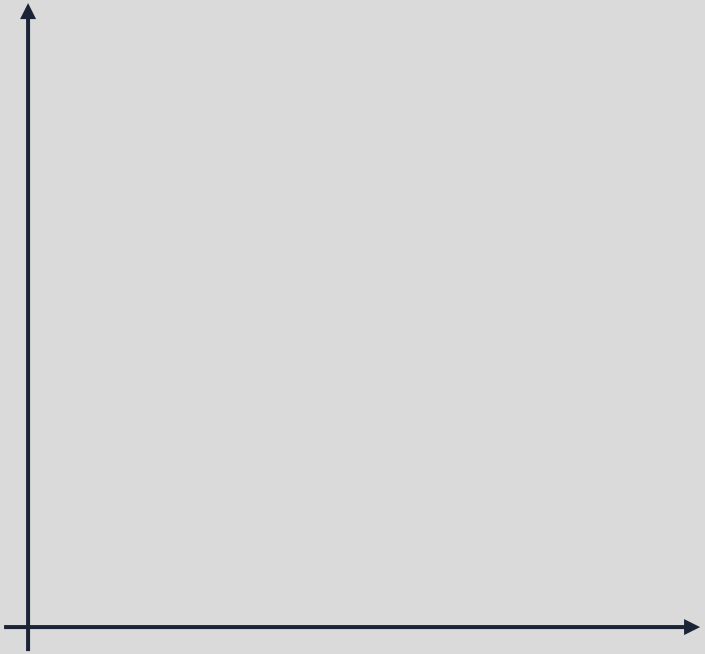
Price setting schemes can be broadly categorized as setting (1) ceiling price and (2) floor price, defined as follows.

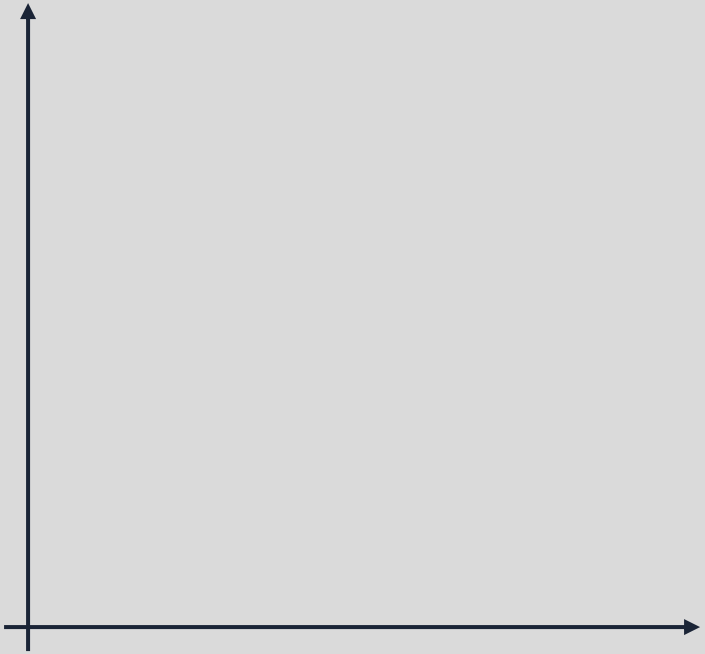
Definition 2.15

Ceiling Price *is set for any commodity not to be traded above set price. Such price is mostly set via legal channel or issued as a specialized policy.*

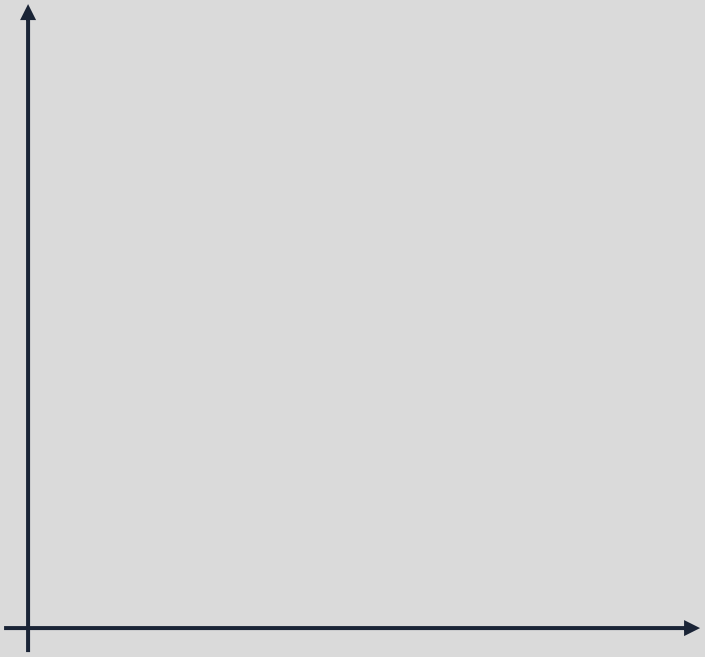
(2) Price setting

Ceiling price can be set both above and below the market price.





(2) Price setting



Now let's analyze effects on surplus when it is binding.

› It causes excess _____ .

› How does it affect equilibrium price and quantity?

› How does it alter total welfare?

Surplus	Before	After	Diff.
CS	_____	_____	_____
PS	_____	_____	_____
Total	_____	_____	_____

(2) Price setting

As you can see, there is a part of surplus which is lost after the intervention, this part is called “deadweight loss”.

Definition 2.16

***Deadweight loss**, also known as excess burden or allocative inefficiency, is a loss of economic efficiency that can occur when the free market equilibrium for a good or a service is not achieved.*

Next up, floor price can also be set for another purpose.

Definition 2.17

***Floor price** is set for any commodity not to be traded below set price. Such price is mostly set via legal channel or issued as a specialized policy.*

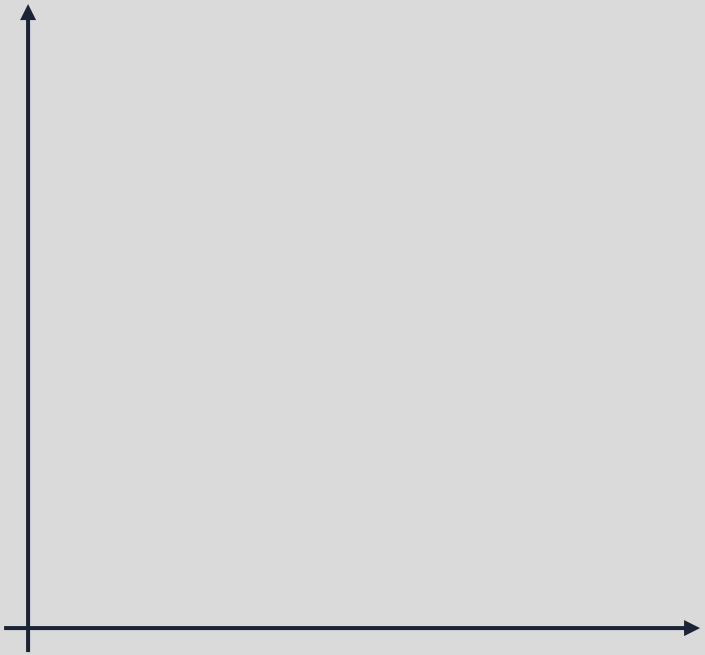
Class #8

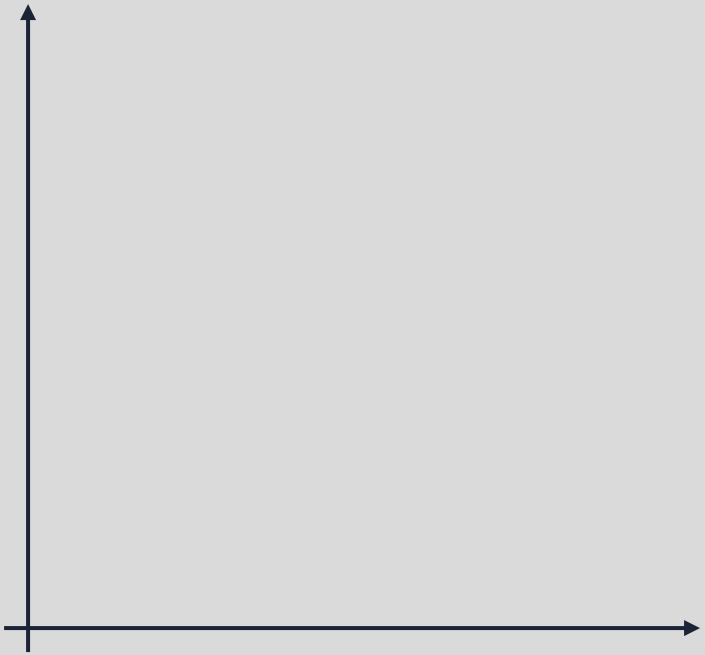
Price floor and price support

Page 81-87

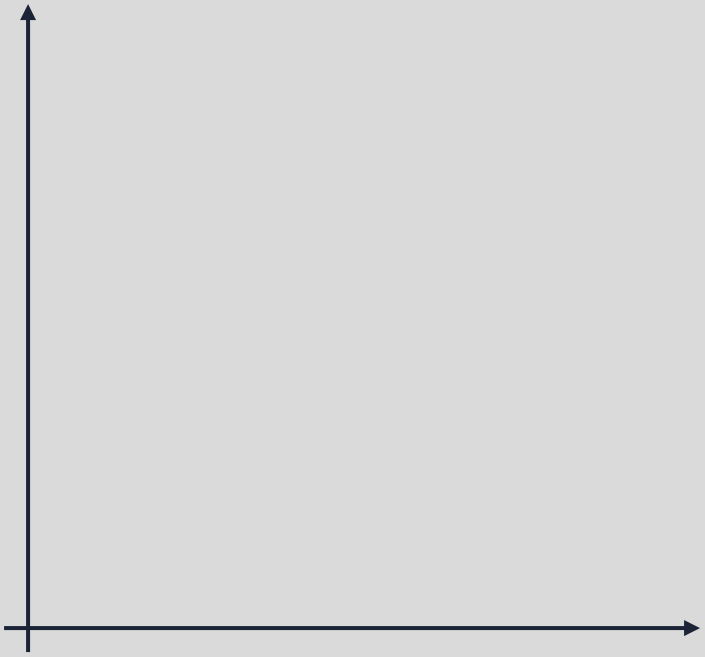
(2) Price setting

Floor price can be set both above and below the market price.





(2) Price setting



Now let's analyze effects on surplus when it is binding.

› It causes excess _____ .

› How does it affect equilibrium price and quantity?

› How does it alter total welfare?

Surplus	Before	After	Diff.
CS	_____	_____	_____
PS	_____	_____	_____
Total	_____	_____	_____

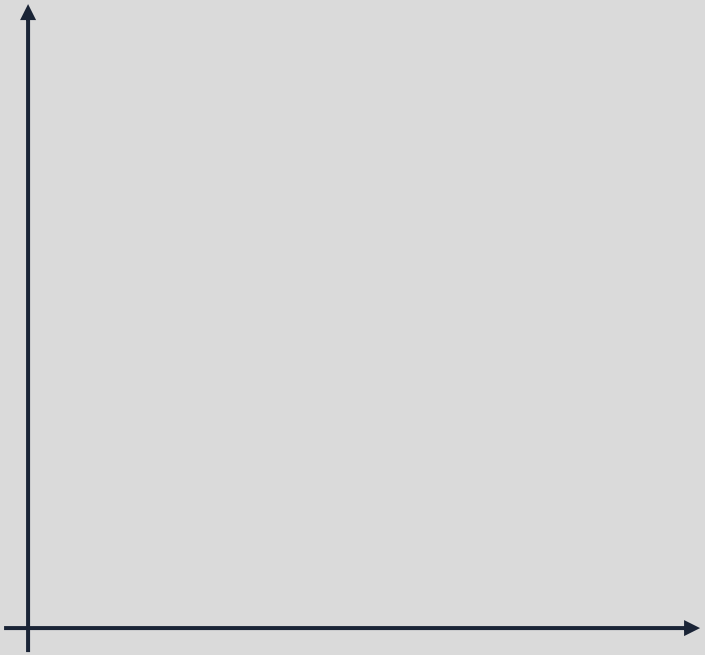
(3) Price support

Price support is very similar to floor price, instead, it can be coupled with other measures for better solution.

Definition 2.18

Price support *is either a subsidy, price control or setting a production quota, with the intention to keep market price of a commodity higher than the competitive level.*

(3) Price support



The first one is called **"government purchasing program"** which assumptions are imposed as follows.

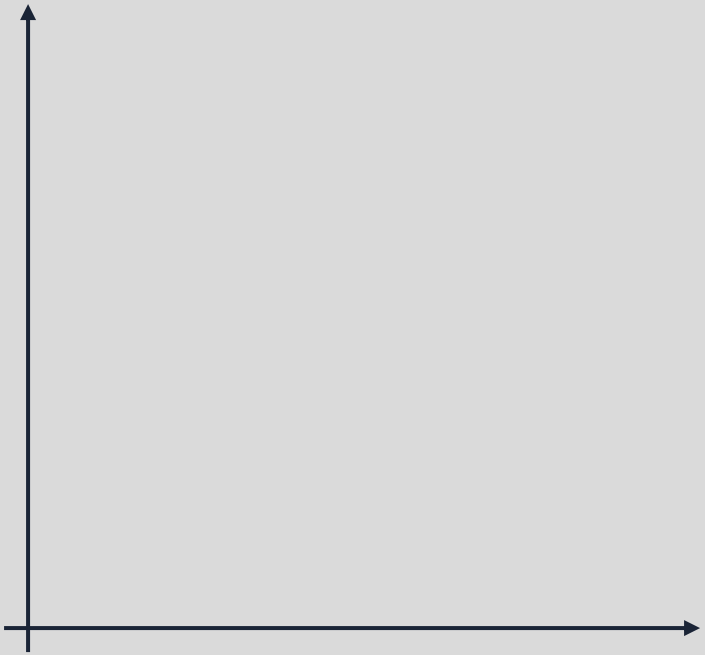
› The government set floor price above market price, raising price upward.

› There is some excess supply in the market since producer see this opportunity.

› The government buys out all the excess supply.

Surplus	Before	After	Diff.
CS			
PS			
Gov. revenue			
Total			

(3) Price support



The second one is called **"acreage limitation program"** or "production quota" which assumptions are imposed as follows.

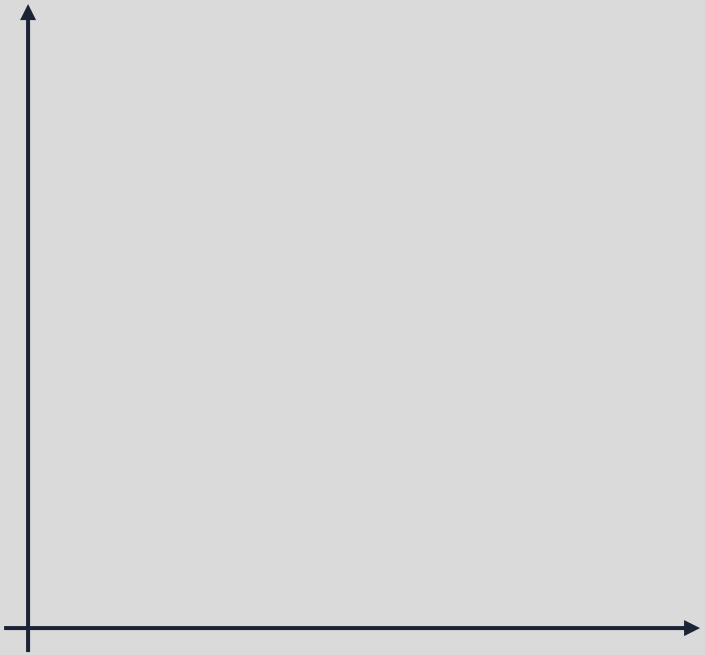
› The government chooses a limited quantity supplied, corresponding to the price level they want to raise.

› At this price, producers are signaled to produce more.

› The government pays the producers as if they can sell at that price to compensate lost surplus.

Surplus	Before	After	Diff.
CS			
PS			
Gov. revenue			
Total			

(3) Price support



The third one is called **"deficiency payment"** which assumptions are imposed as follows.

› The government signal targeted price above market level.

› At this price, producers are signaled to produce more, leading to excess supply.

› Let the exchange be as the price set. Excess supply would eventually cause price drop.

› The government pays for deficiency to the producers as their compensation.

Surplus	Before	After	Diff.
CS			
PS			
Gov. revenue			
Total			

Class #9

Tax and subsidy

Page 88-95

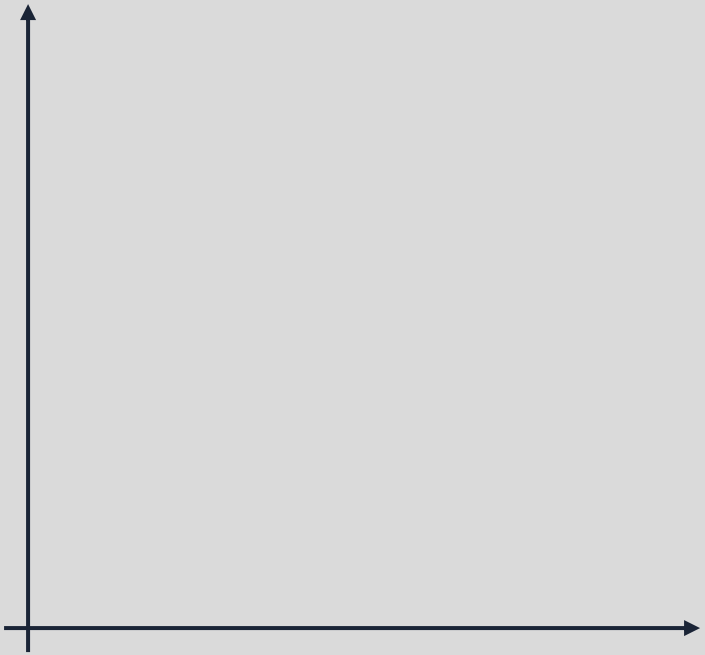
(4) Tax and subsidy

Definition 2.19

Taxation *can be fundamentally divided into unit tax, which is collected equally on each unit sold in a market, and ad valorem tax, which its amount collected based on value of transaction in a market such as sales tax or value added tax. Taxing would discourage the party taxed but subsidy works another way around.*

Since subsidy will affect market in an opposite way, this class will cover only taxation.

(4) Tax and subsidy

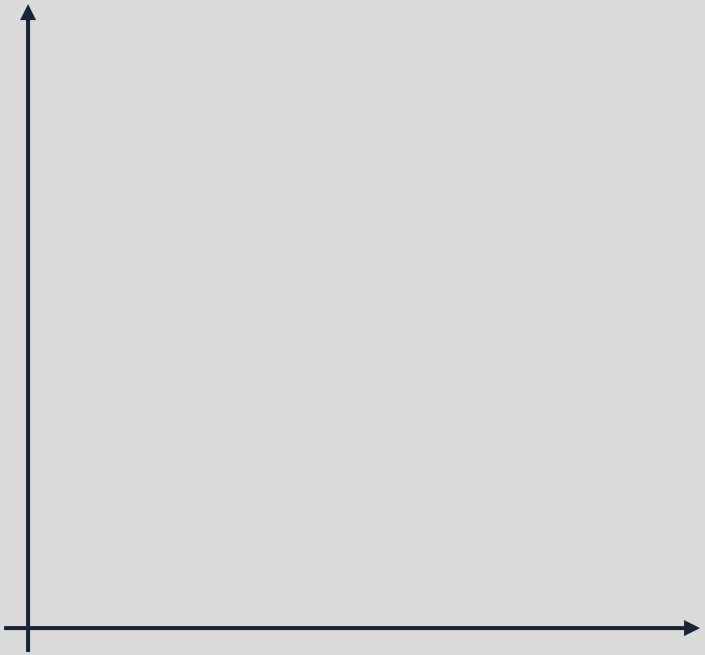


Introducing tax burden, each party would bear different level of tax burden in different scenarios.

We first look at the case when tax is **imposed on seller**.

Surplus	Before	After	Diff.	Tax burden
CS				
PS				
Gov. revenue				
Total				

(4) Tax and subsidy

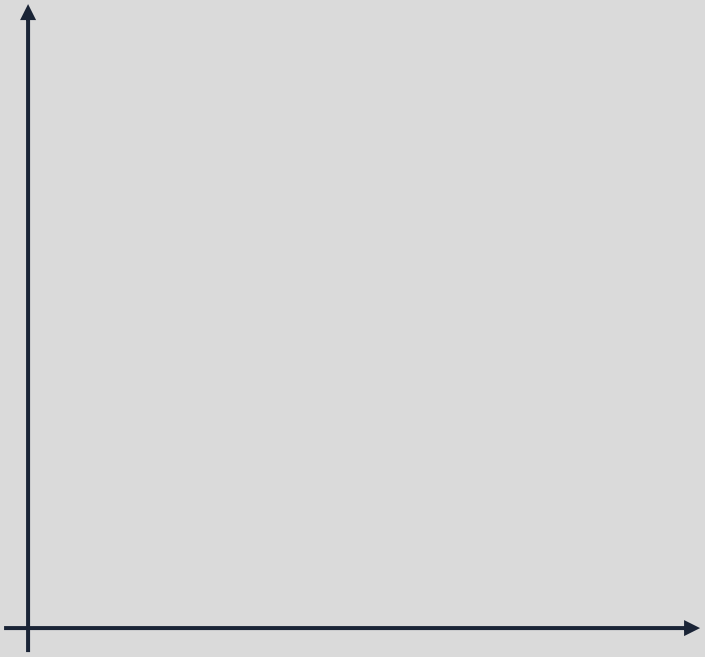


Let's see how different elasticity play which role in tax burden.

We turn to the case when tax is **imposed on seller** and the demand is **quite inelastic.**

Surplus	Before	After	Diff.	Tax burden
CS				
PS				
Gov. revenue				
Total				

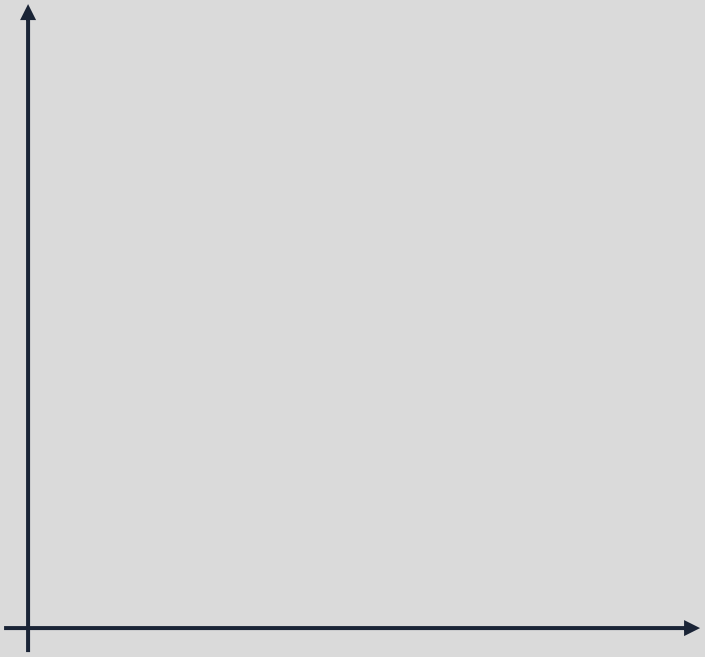
(4) Tax and subsidy



Now consider tax **imposed on seller** and the demand is **perfectly inelastic.**

Surplus	Before	After	Diff.	Tax burden
CS				
PS				
Gov. revenue				
Total				

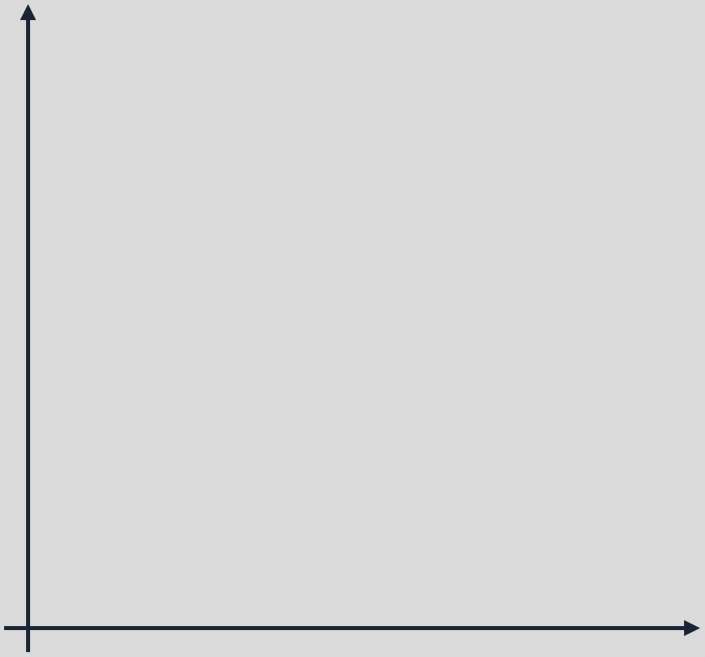
(4) Tax and subsidy



On the other hand, what happens when tax is **imposed on consumer**.

Surplus	Before	After	Diff.	Tax burden
CS				
PS				
Gov. revenue				
Total				

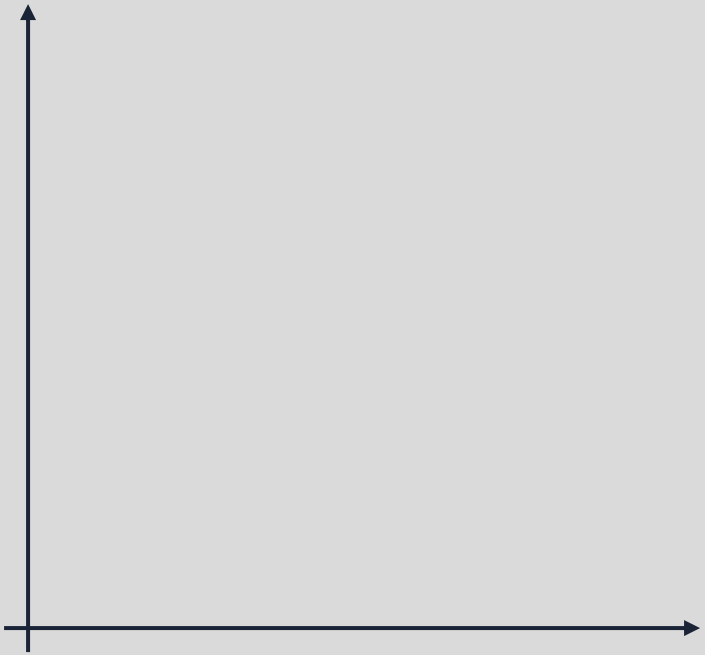
(4) Tax and subsidy



We turn to the case when tax is **imposed on consumer** and the supply is **quite elastic.**

Surplus	Before	After	Diff.	Tax burden
CS				
PS				
Gov. revenue				
Total				

(4) Tax and subsidy



Now consider tax **imposed on consumer** and the supply is **perfectly inelastic.**

Surplus	Before	After	Diff.	Tax burden
CS				
PS				
Gov. revenue				
Total				

Chapter 3

Consumer Theory

Class #10

Consumption and utility

Page 97-114

Flow of study in this chapter

› Consumption and Utility

Getting to know the concept of what consumer get from consumption and how do we define them.

› Cardinal approach

As defined in early development of consumer theory, we first look at how a cardinal approach can lead to consumer's equilibrium. What is the condition(s) that maximizes consumer's utility in different scenarios.

› Ordinal approach

Flawed approach brings in the newer one, now we do not need to define uniqueness of utility to remove most of the cons in the original approach.

› Price effect and demand derivation

When price changes, how consumer shifts his/her consumption bundle to a new one according to price effect. We study one of the theories in this class, from John Hicks.

Further reading can be found in Pindyck and Rubinfeld (2018) Part 2, Chapter 3-4.

Focus on market

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

Acquiring various products 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 theories focus on consumption in market system. Therefore, this part is only a study of consumption behavior in market.

(1) Definition

(1) Definition

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

(1) Definition

Quick questions: from the definition, do you think that

› Consuming of the same product or service yields the same amount of utility for each person?

› Is utility the same or different from usefulness?

(2) Assumptions

The study of consumers in economics is mostly divided into two broad approaches, **cardinal** and **ordinal approach**. Before we move on to study the cardinal approach, some assumptions must be posed.

› Consumers are rational with the aim to maximize utility from consumption.

› Utility is measurable, countable, and combinable with unit of 'util'.

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

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

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

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

(1) Counting utility

Supposed that we study a consumer who consumes product x, representing units of product x as a domain in a set of continuous positive real number, amount of utility U is resulted from units of product x.

We may define this relationship as a utility function as follows

› $U = f(x) = U(x)$

Once a number of x is assigned into this utility function, it will transform the units of x into a value of utility.

(1) Counting utility

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) *is additional utility that consumer receive from consuming one more unit of a product or service.*

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) *is utility that consumer receive from consumption n unit(s) of a product or service.*

(1) Counting utility

Consider an example from these tables.

x	TU	MU
1	12	
2	20	
3	24	
4	24	
5	20	
6	12	

y	TU	MU
1		6
2		4
3		2
4		0
5		-2
6		-4

(1) Counting utility

We can further define MU and TU as

› $TU_n = \sum_{i=1}^{n} MU_i$

or total utility is the totaled MU for every unit and

› $MU_i = TU_n - TU_{n-1} = \frac{\Delta TU}{\Delta x} = \frac{dTU}{dx}$

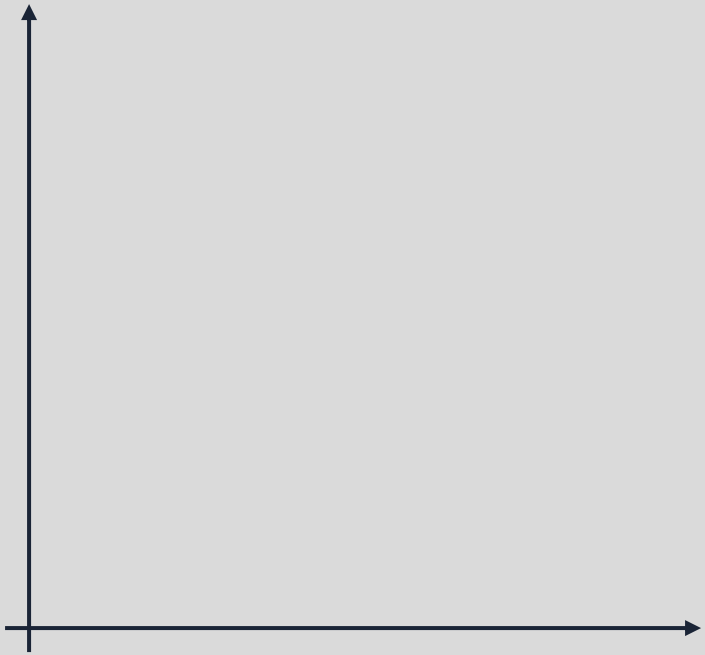
or marginal utility is a difference in total utility. In other words, marginal utility represents slope of total utility.

Now we can see that total utility is actually the utility function

› $U = f(x) = TU_n$

(2) Drawing utility

From the table, if we generalize MU and TU, the graph can be plotted here.



(2) Drawing utility

Definition 3.4

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

Quick questions: Does this trend of diminishing marginal utility always apply to every consumer products?

(3) Utility maximization

Assumed that consumer is rational, the goal of this study is to **find a condition that would maximize consumer's utility** under different circumstances. We consider 4 different scenarios listed here.

› Consuming a product **without** a budget constraint.

› Consuming a product **with** a budget constraint.

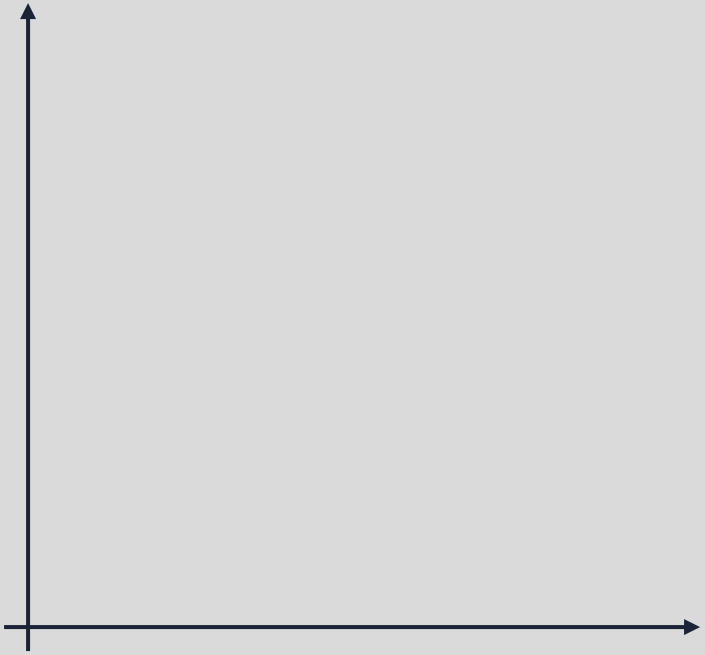
› Consuming two or more products **without** a budget constraint.

› Consuming two or more products **with** a budget constraint.

Note that two products considered are usually substitutes, but more specific cases will be introduced later.

(3) Utility maximization

Case 1: consuming a product **without** a budget constraint.

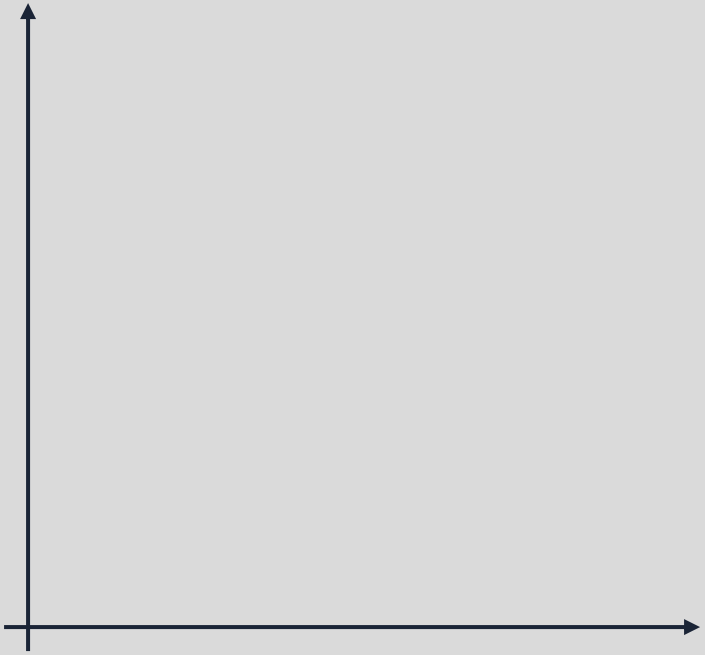


x	TU	MU
1	24	
2	26	
3	42	
4	45	
5	45	
6	42	

› The condition is

(3) Utility maximization

Case 2: consuming a product **with** a budget constraint.

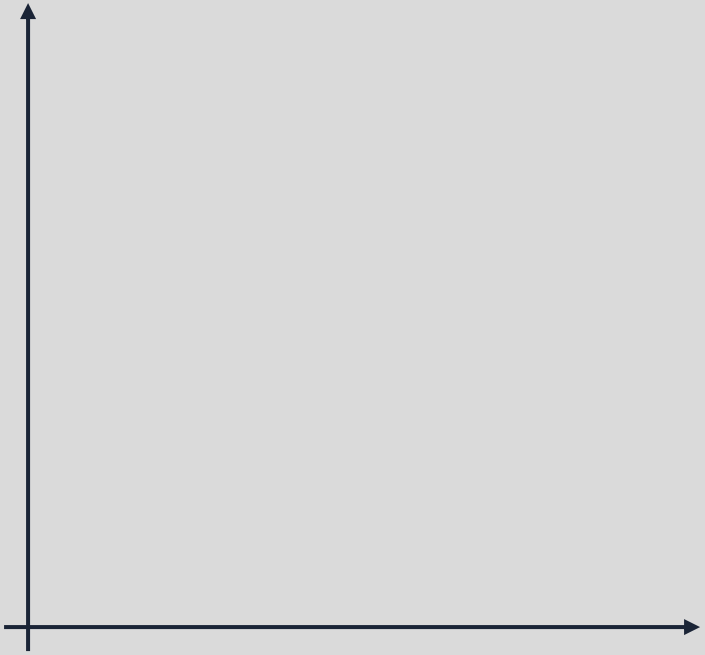


x	TU	MU
1	24	
2	26	
3	42	
4	45	
5	45	
6	42	

› Assumed that $P_x = 8$ and define income as $I = 24$, the condition is

(3) Utility maximization

Case 2: consuming a product **with** a budget constraint.

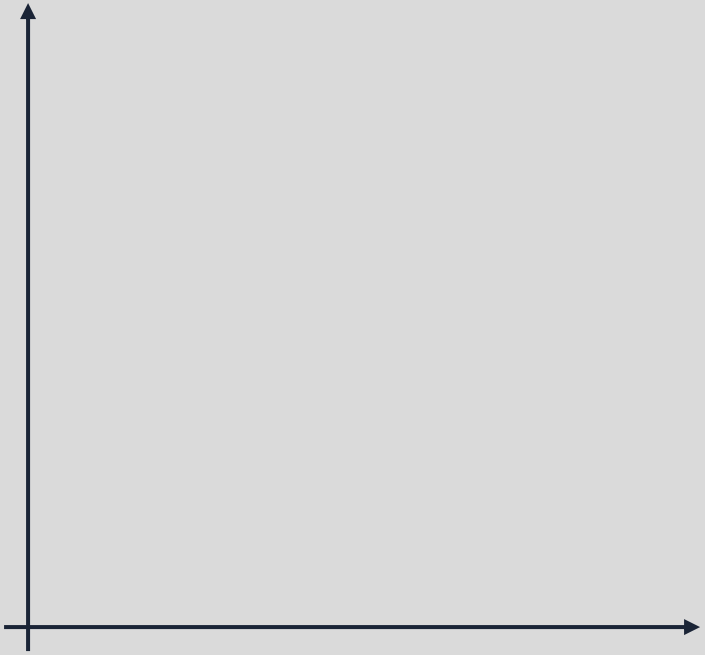


I	x^*	TU
16		
24		
32		

› Now assume that the price remains the same, while income differs, how does this affect consumer's utility maximization?

(3) Utility maximization

Case 2: consuming a product **with** a budget constraint.



P_x	x^*	TU
6		
8		
12		

› On the other hand, when income remains stable while price goes up and down, how does it affect consumer's utility maximization?

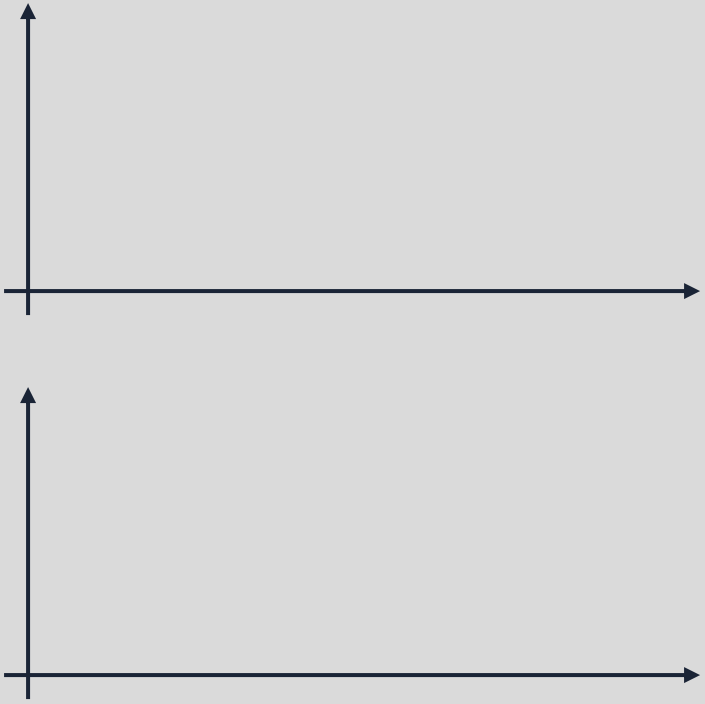
Class #11

Leading to the ordinal approach

Page 115-124

(3) Utility maximization

Case 3: consuming two or more products **without** a budget constraint.



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

› The condition is

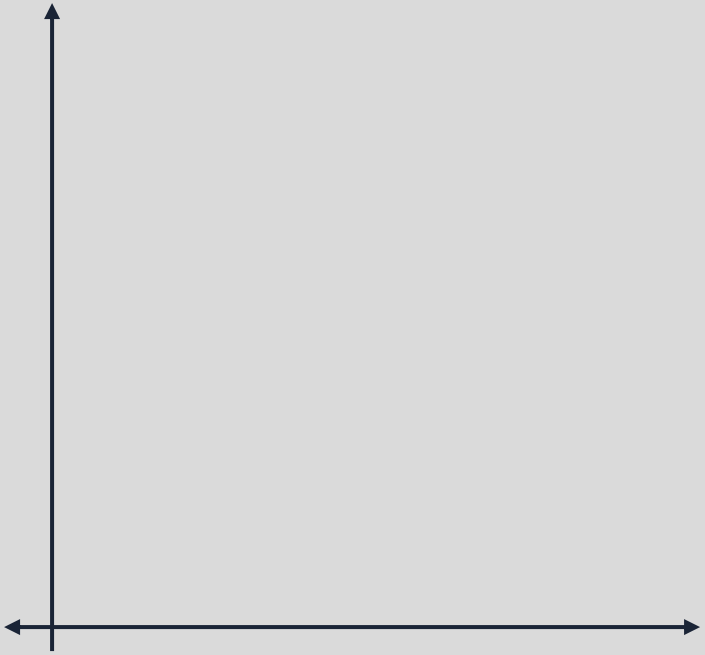
(3) Utility maximization

Case 4: consuming two or more products **with** a budget constraint.

I	x, y	MU_x	MU_y	$\frac{MU_x}{P_x}$	$\frac{MU_x}{P_y}$	choice	remaining budget
22	1	12	10				
	2	8	8				
	3	4	6				
	4	0	4				
	5	-4	2				
	6	-8	0				

› Assumed that $P_x = 4$ and $P_y = 2$, how does this consumer decide?

(3) Utility maximization



To understand why the condition satisfies consumer's maximized utility, consider the graph on the left.

Here it is assumed that every combination of (x,y) the budget is spent totally and prices are constant.

(3) Utility maximization

However, cardinal approach has a lot of drawback such as

› 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 product or 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, therefore, lacks reliability.

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

(1) Assumptions

› Consumers are rational with the aim to maximize utility from consumption.

› By being rational, it means that consumer can tell what they prefer to and they can **put them in order of preference**.

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

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

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

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

› The tools used for this ordinal theory are called **Indifferent Curve** (IC) and **Budget Line** (BL).

(2) Indifferent Curve (IC)

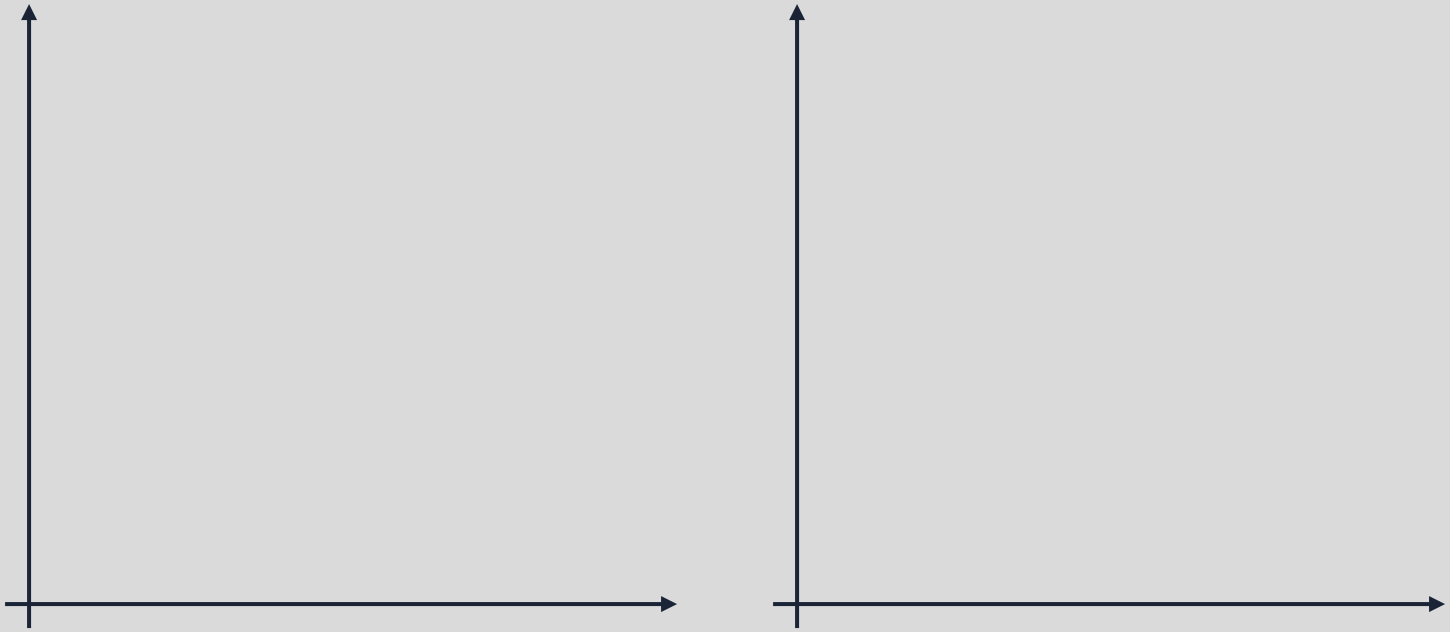
First of all, we need to create a setup for our analysis.

› Most of the time, we analyze a rational consumer, choosing a combination of (x^*, y^*) that would maximize his or her utility subject to a specific level of budget.

› x and y are substitute goods, but not perfectly, although we can analyze perfectly substitutes and complementary products as well.

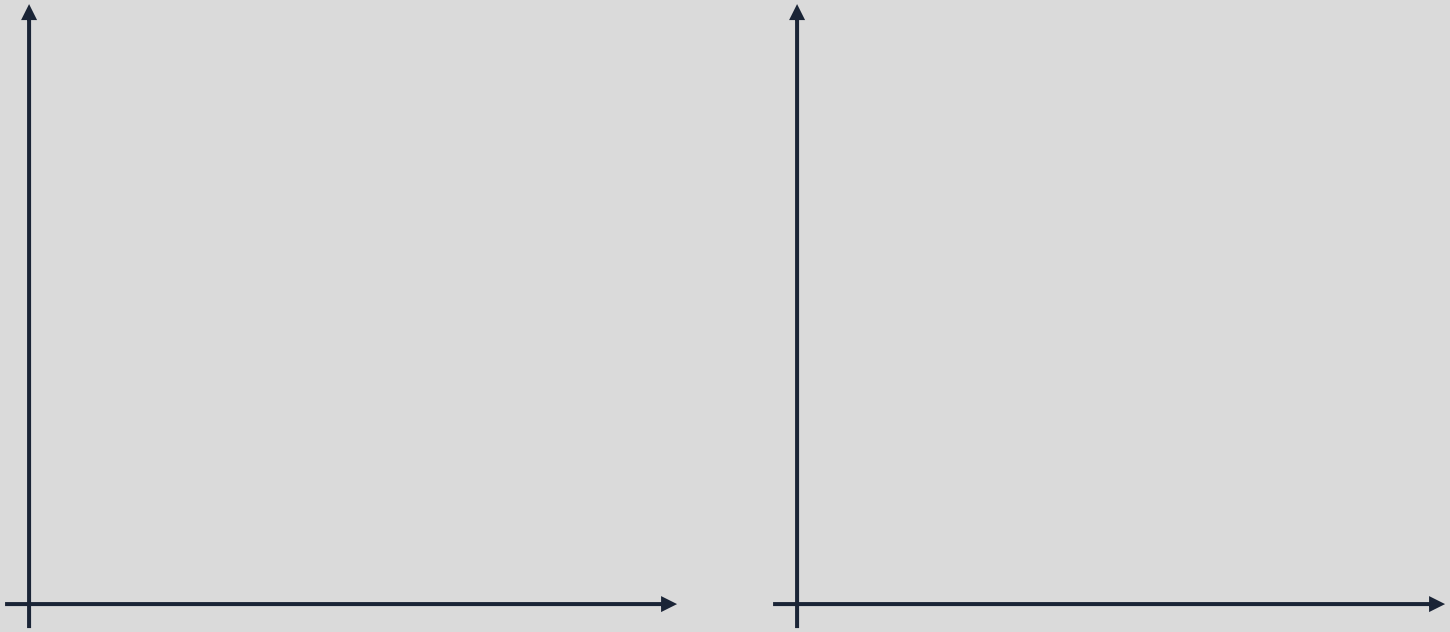
(2) Indifferent Curve (IC)

Comparing consuming one and two substitute products utility function



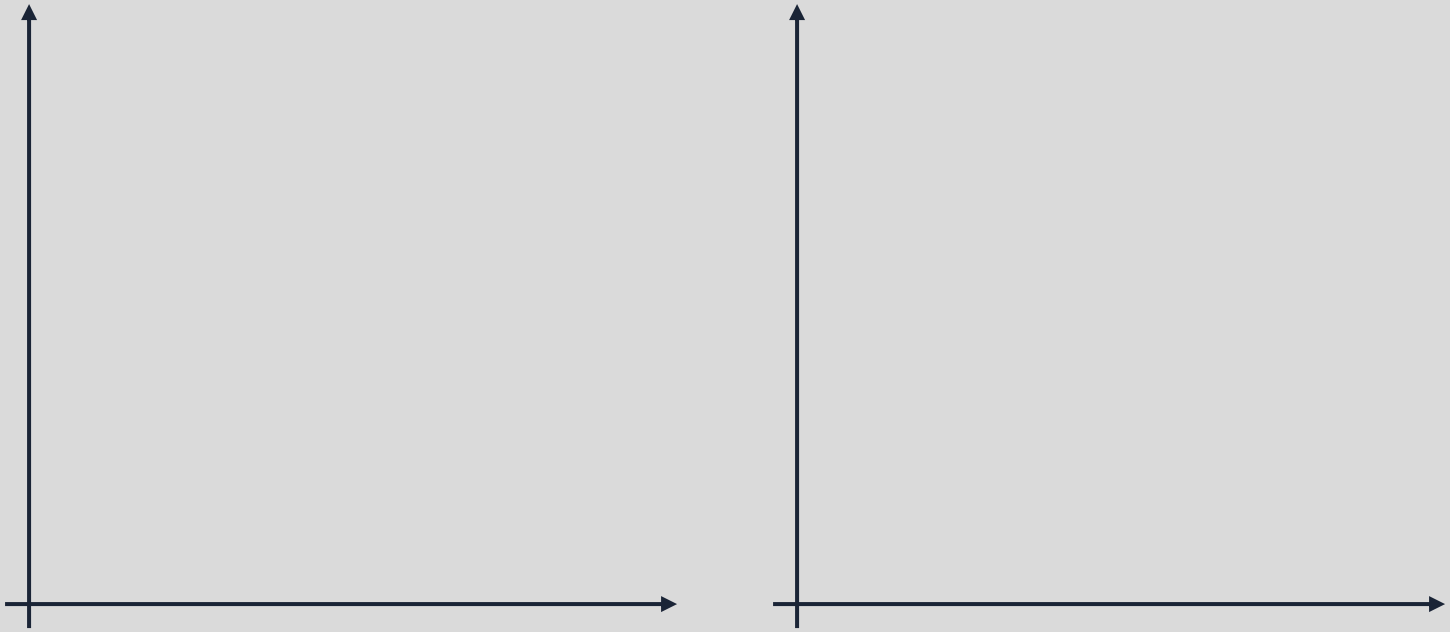
(2) Indifferent Curve (IC)

Turn the function to the side and top view



(2) Indifferent Curve (IC)

Some parts are not to be studied

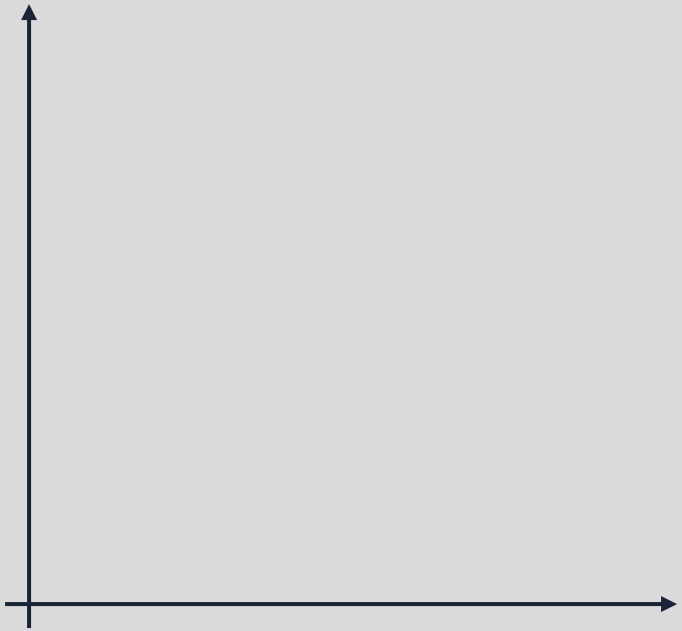


Class #12

Indifferent curve

Page 125-133

(2) Indifferent Curve (IC)



Characteristics

› Consumption bundles

› Level of utility

› ICs cannot intersect

› ICs have negative slope and convex to the origin

(3) Marginal rate of substitution (MRS)

Definition 3.5

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

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

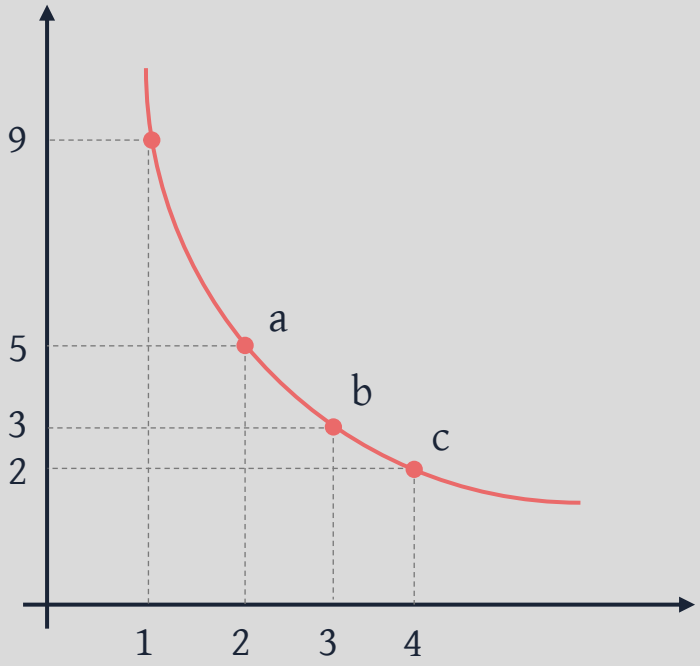


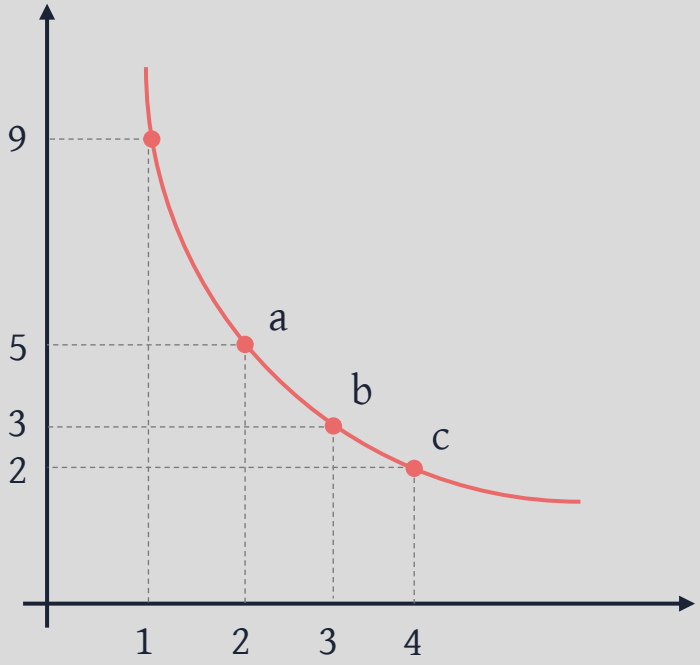
Figure out these MRS_{xy}

› $\text{MRS}_{xy(a)} =$

› $\text{MRS}_{xy(b)} =$

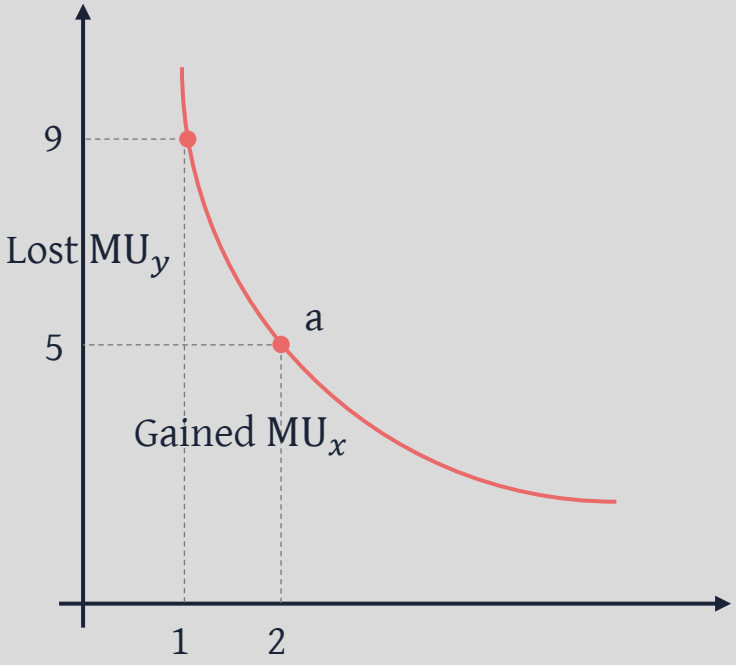
› $\text{MRS}_{xy(c)} =$

(3) Marginal rate of substitution (MRS)



Now take a look at these ratios closely again, why the (absolute) number of these ratios keep decreasing, comparing the upper left to the lower right.

(3) Marginal rate of substitution (MRS)

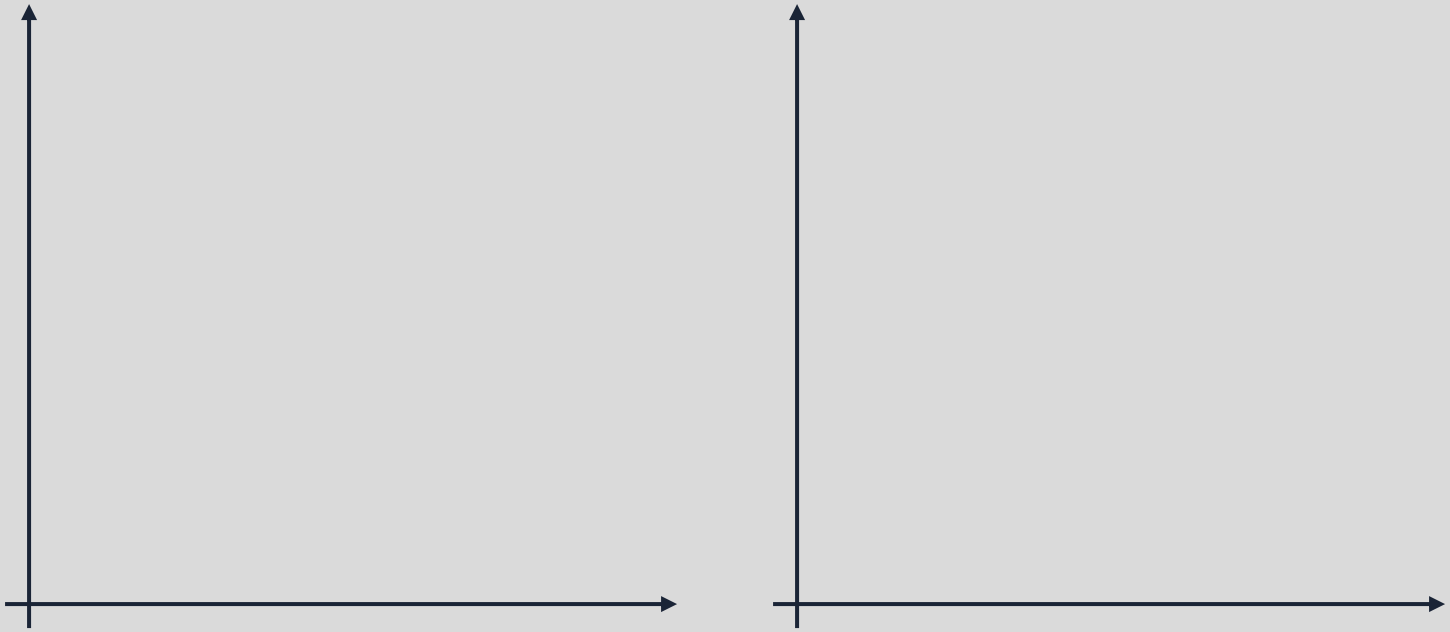


As we learned that, in case of two substitutable goods, MRS is the ratio of substituting two goods in which resulting in the same amount of utility, it also means that.

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

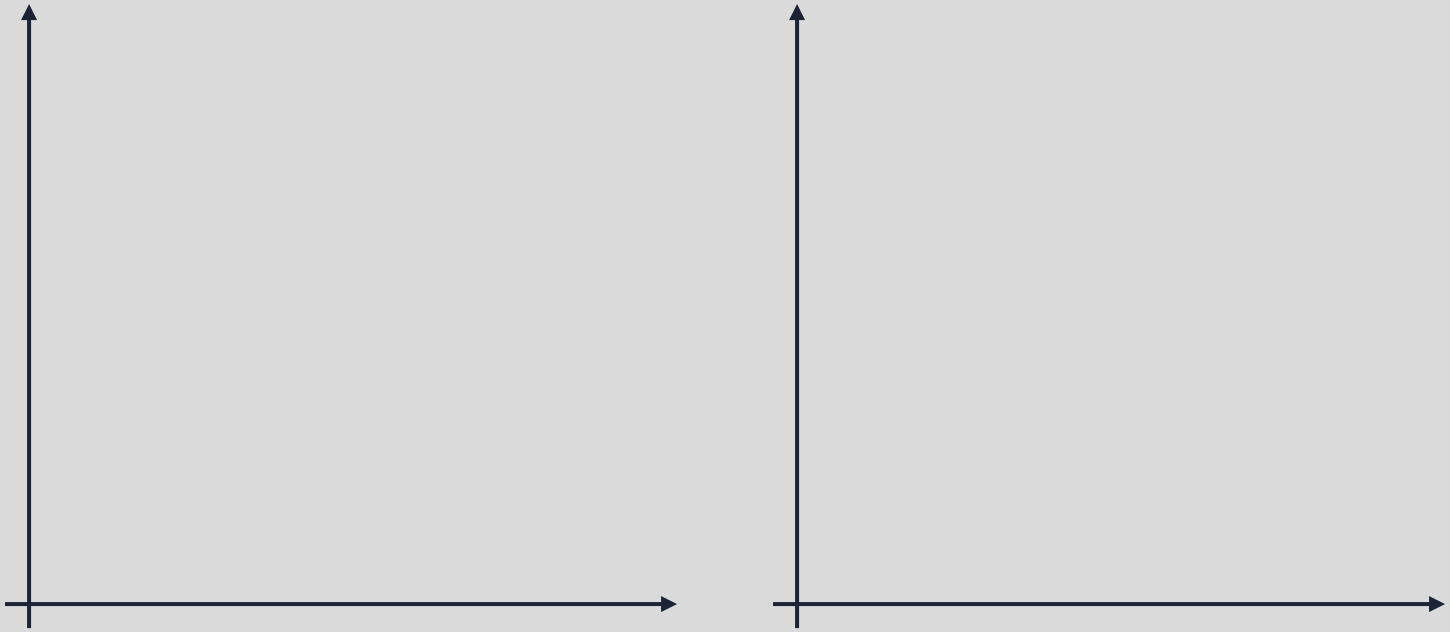
(3) Marginal rate of substitution (MRS)

Given that torque or acceleration power (x) and cargo space (y) are two attributes that represent buyers' decision, how would you draw an Audi TTS owner's IC and a Subaru XV owner's IC?



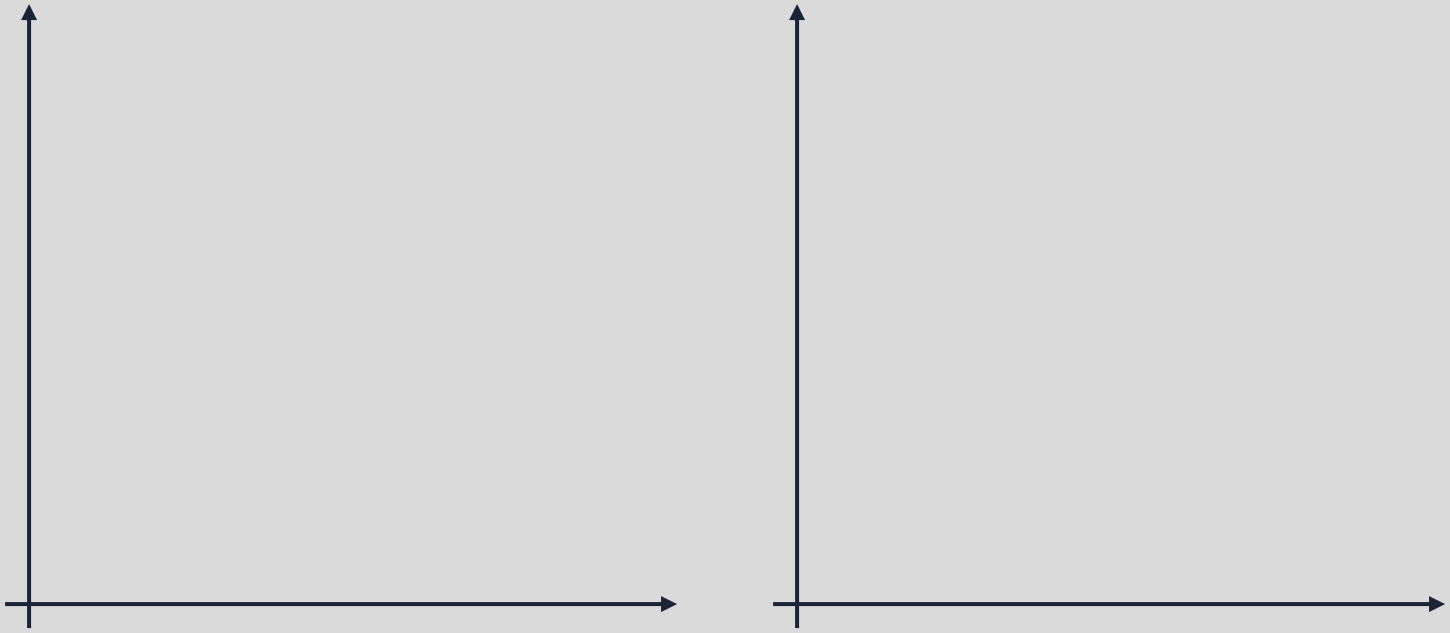
(3) Marginal rate of substitution (MRS)

Given that fish (x) and pork (y) are two types of meet which are substitutable, how would you draw an IC of a person who likes either one of them and an IC of another person who feels more indifferent.



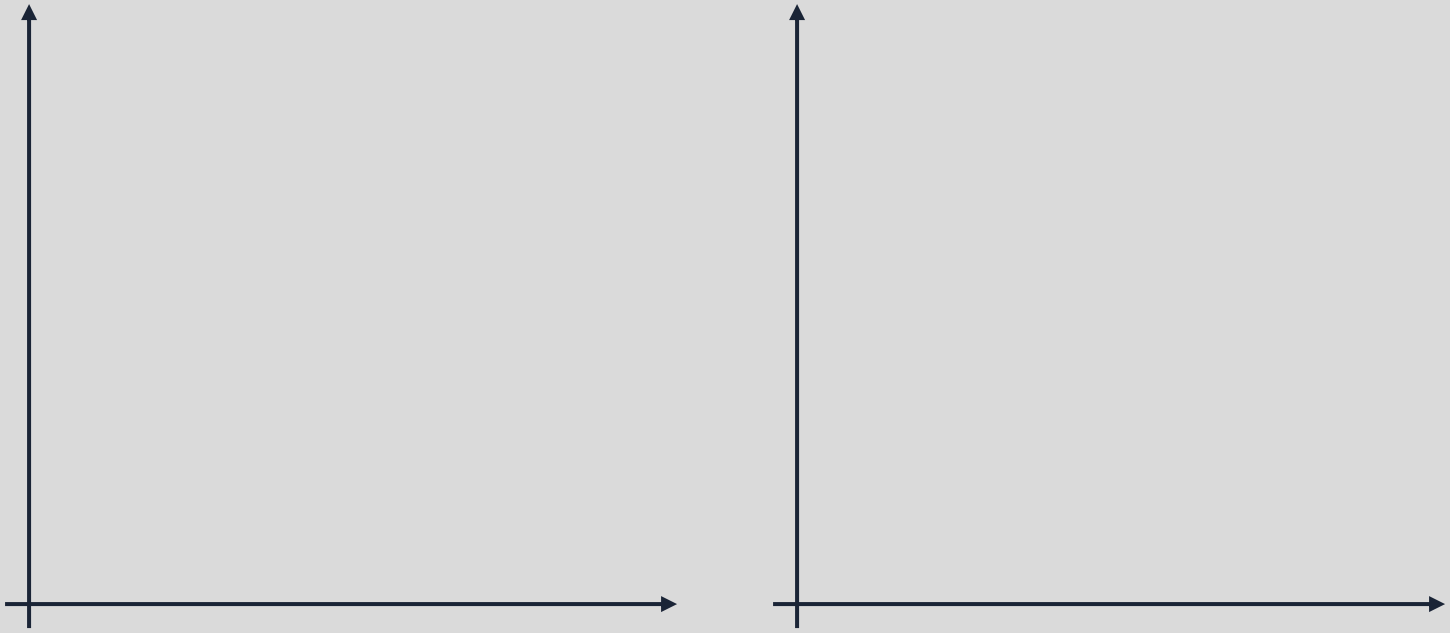
(3) Marginal rate of substitution (MRS)

There are also perfectly complementary and substitutable goods in the market as well.



(3) Marginal rate of substitution (MRS)

If any commodity is not wanted in a society, it can also be considered as **bad**.

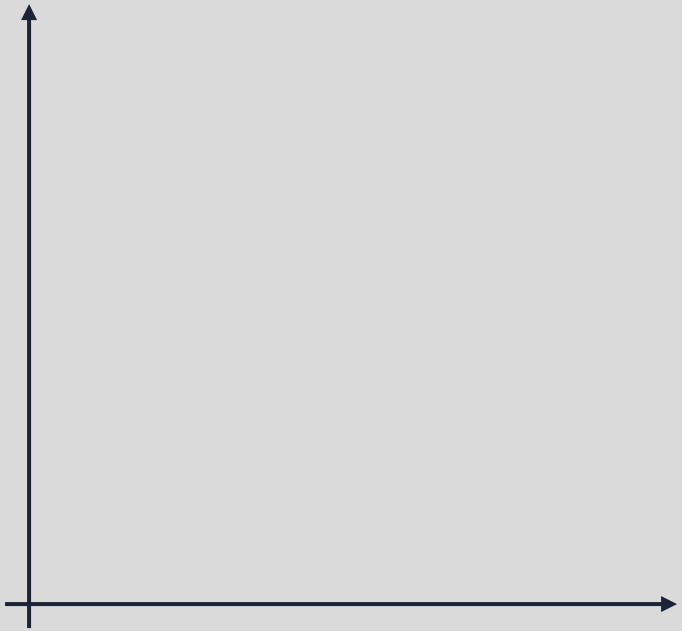


Class #13

Budget line and utility maximization

Page 134-142

(4) Budget Line (BL)



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

› $I = P_x \cdot x + P_y \cdot y$

Consider an example of a consumer who has 500 baht, price of goods x is 50 baht and price of goods y is 20 baht, draw the budget line.

(4) Budget Line (BL)

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

Definition 3.6

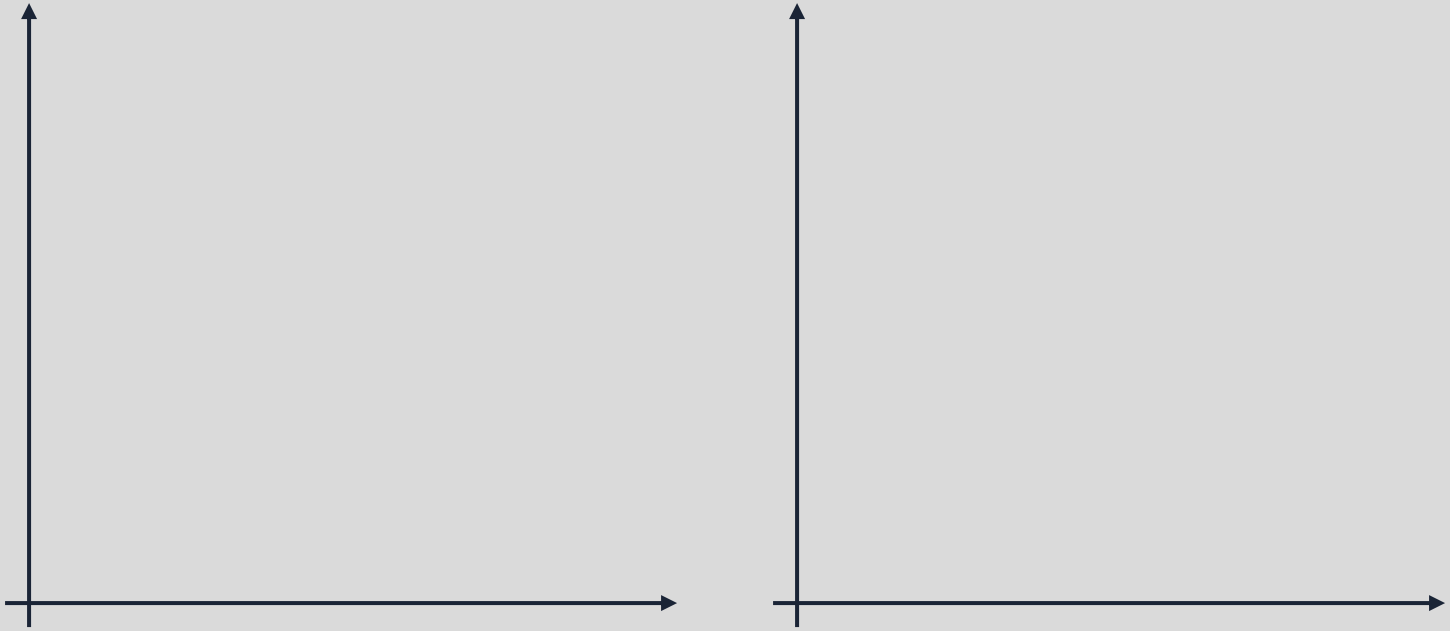
Relative price *is the price ratio of two goods or services, which is actually the slope of budget line. Sometimes it can be referred to as the* ***Marginal Rate of Market Substitution*** *(MRMS).*

› $MRMS_{xy} = \frac{\Delta y}{\Delta x} = \frac{P_x}{P_y}$

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

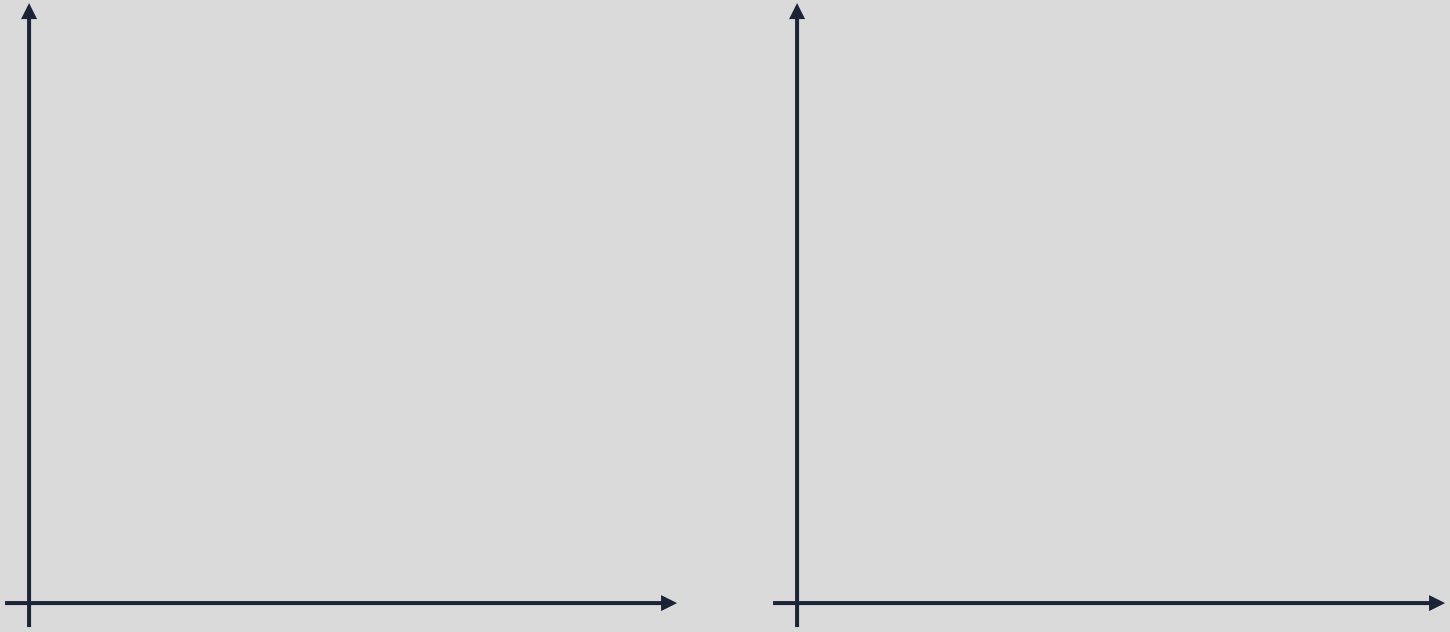
(4) Budget Line (BL)

Draw a consumer budget line who has 400 baht on the left and 600 baht on the right. Price of goods x is 50 baht and price of goods y is 20 baht.

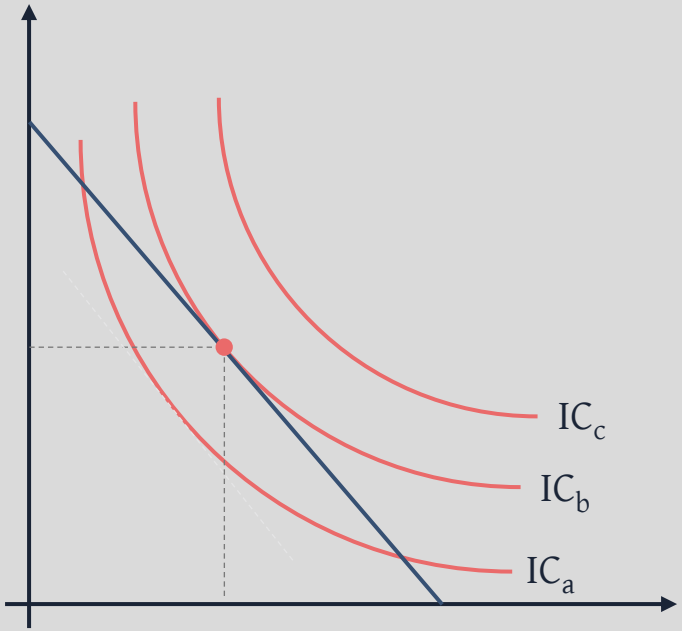


(4) Budget Line (BL)

A consumer has 500 baht. Initially, price of goods x is 50 baht and price of goods y is 20 baht. What would happen if price of x drops to 25 baht and price of y raises to 50 baht. Draw the budget line according to the change on the left and right respectively.



(5) Consumer's equilibrium



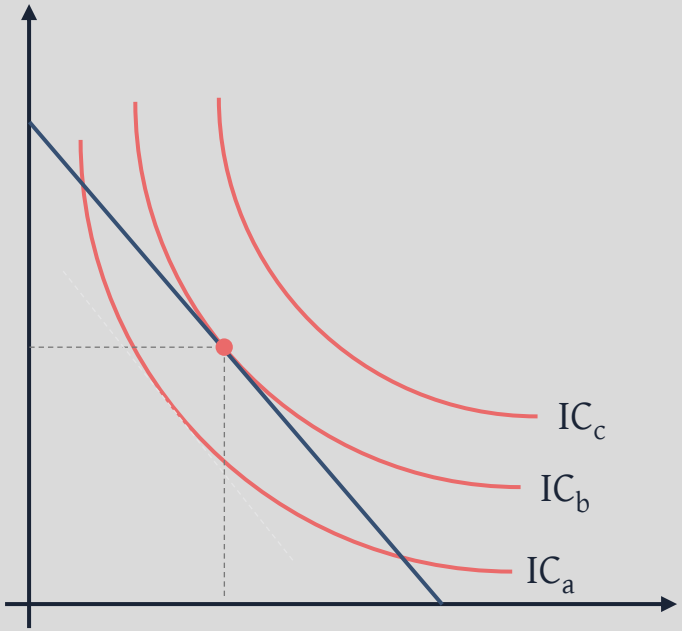
Consumer will maximize utility under budget constraint when consuming two goods or services when an IC is tangent to the budget line or

Quick questions

› Why the equilibrium cannot be on IC_c?

› What underlying assumption that prohibits an equilibrium on the dotted line, which is also tangent to IC_a?

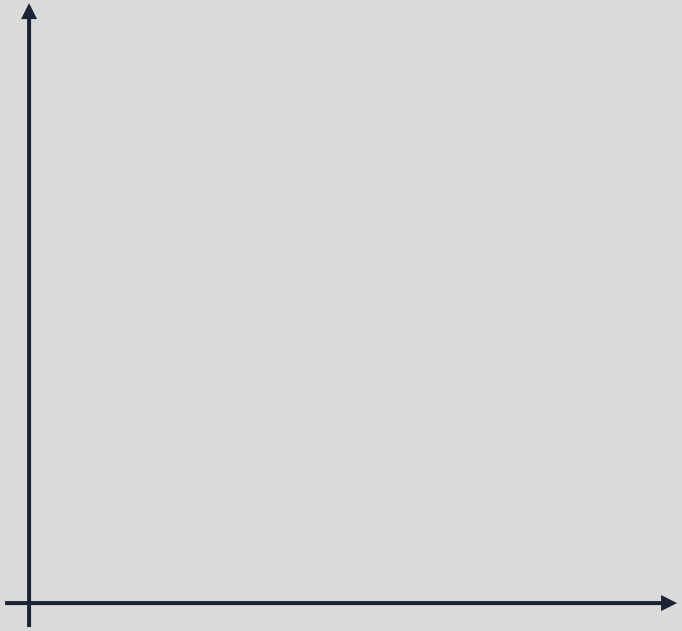
(5) Consumer's equilibrium

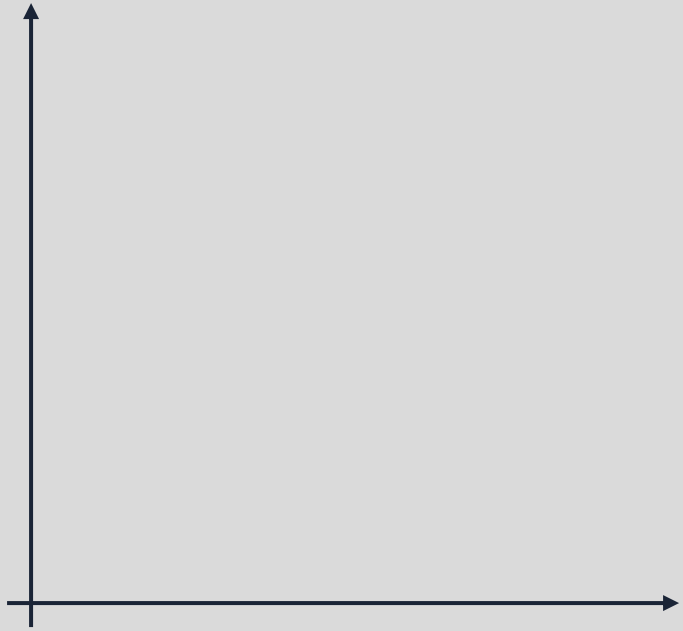


Reconsider the intersections on IC_a, then try to prove with math why they are not the equilibrium.

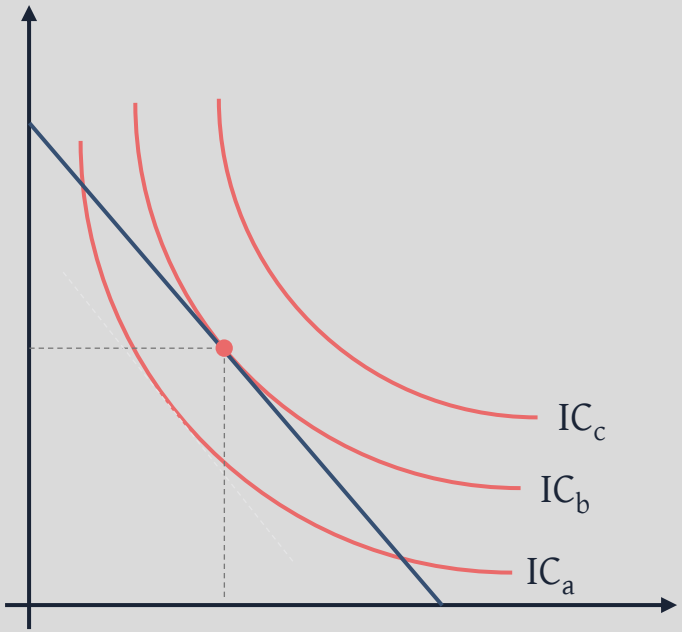
(5) Consumer's equilibrium

The equilibrium can reveal both how a consumer prefers and how the relative price is. Try illustrate both scenarios in the graphs.





(5) Consumer's equilibrium



Example: The consumption bundle that this consumer chooses makes

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

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

› Assumed Walras' Law, where is the current consumption bundle and why?

Class #14

Price effect and demand

Page 143-150

(6) Hicksian's price effect (PE)

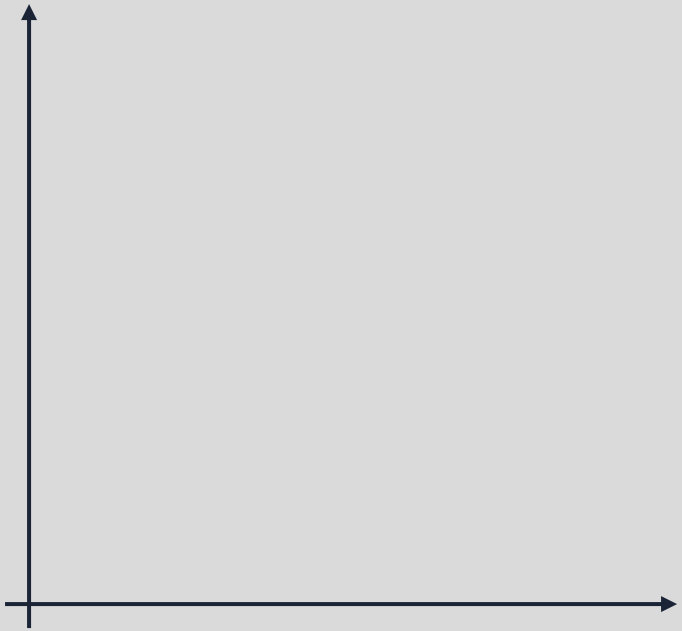
This is a little revision of price effect. When price changes and affects quantity demanded, the result is called **price effect (PE)** which consists of two sub-effects.

› **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.

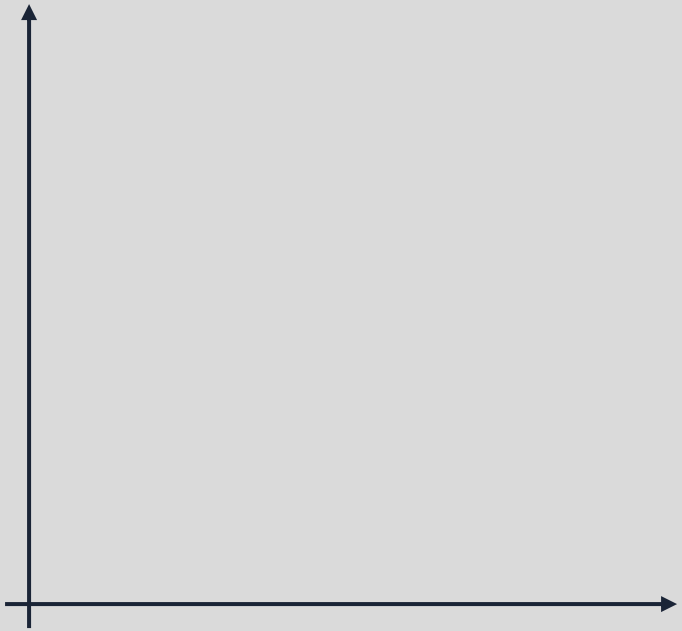
The reasons we study price effect are two folds: to understand how a consumer change his or her consumption bundle when a price changes due to these effects, which leads to deriving a demand function.

(6) Hicksian's price effect (PE)



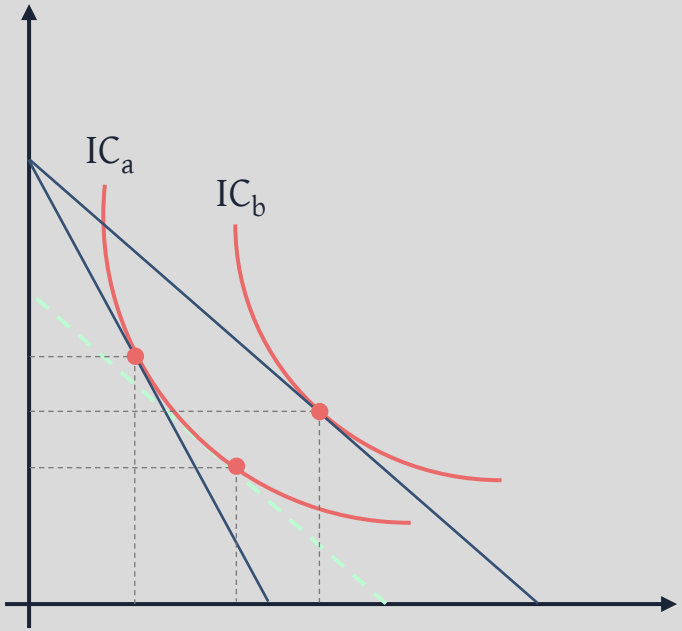
Consider when relative price of both x and y change but this consumer can still choose another bundle on the same IC, this is purely **SE**.

(6) Hicksian's price effect (PE)



Consider when income changes, this is purely **IE.**

(6) Hicksian's price effect (PE)



	x	y
SE		
IE		
PE		

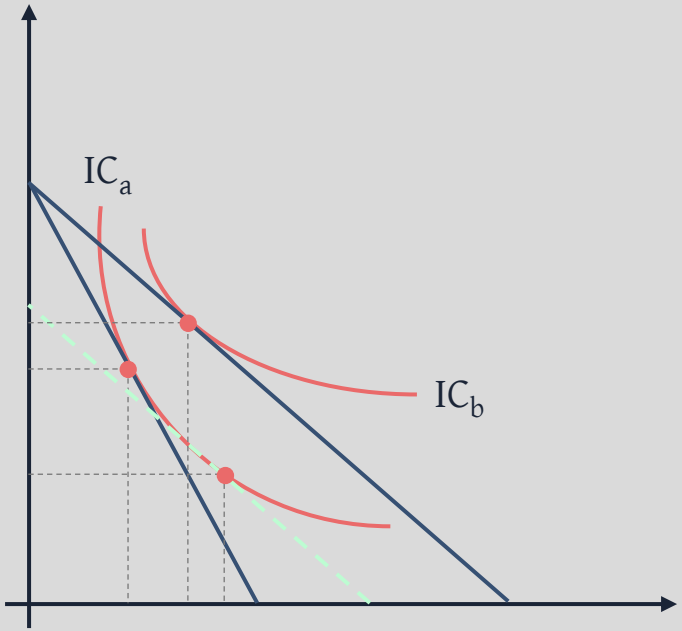
When price of x decreases. Both x and y are **normal goods**,

› 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.**

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

› From the initial equilibrium to the new one, that is **PE.**

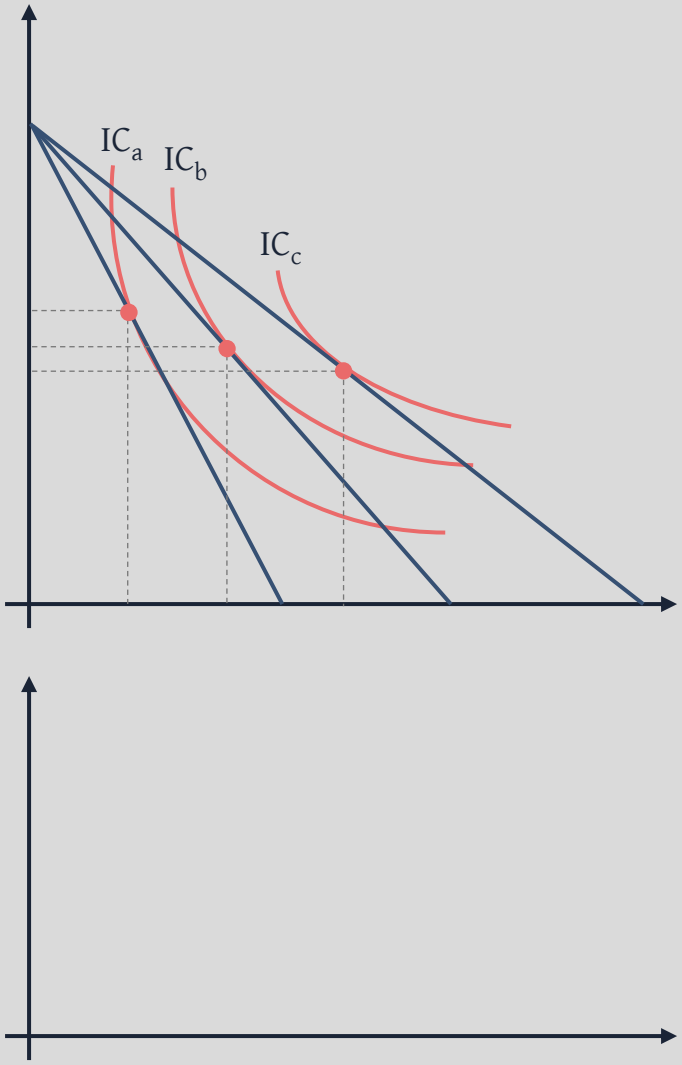
(6) Hicksian's price effect (PE)



When price of x decreases, x is an **inferior good** while y is a normal good. Repeat the same steps.

	x	y
SE		
IE		
PE		

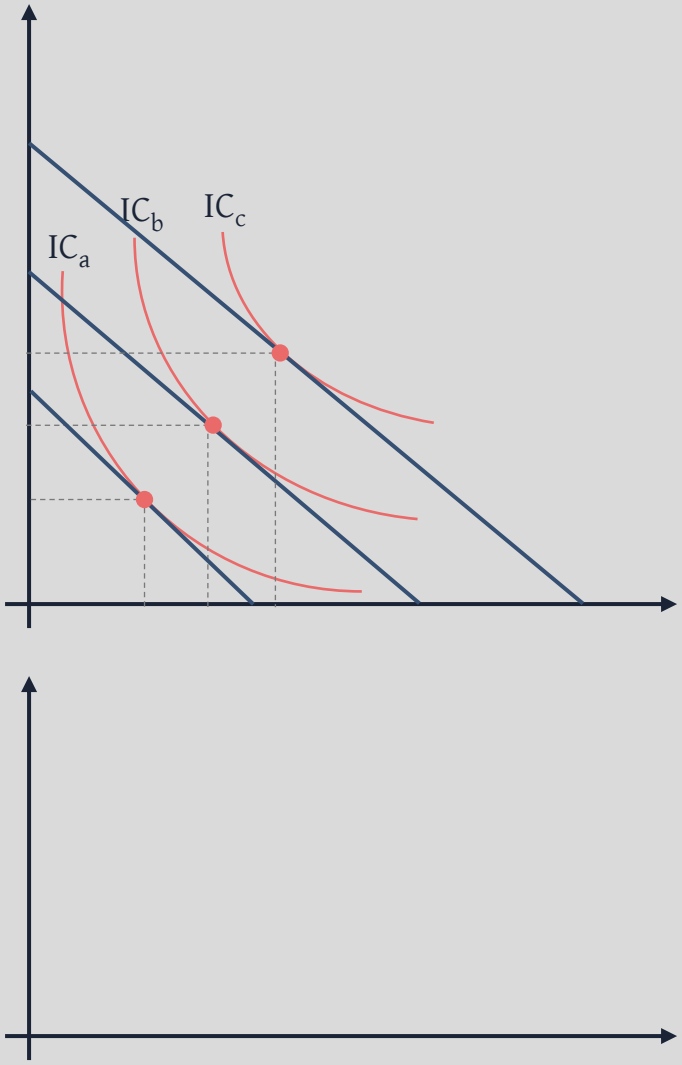
(6) Hicksian's price effect (PE)



Assumed that price of x keeps decreasing, when we draw a curve through consumer 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.

(6) Hicksian's price effect (PE)



Assumed that consuming income keeps decreasing, when we draw a curve through consumer 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 courses.

Chapter 4

Production and Cost

Class #15

Production in the short-run

Page 152-161

(1) Definitions

First thing first, we do need to know what are the composition of production.

› Firm or producer
An organization accumulating resources to create products or services to be sold in products market.

› Factors of production
Including land, labor, capital and entrepreneur.

› Production
A process of transforming factors of production into products.

(1) Definitions

Let’s come up with some examples of production.

Product	Owners of factor	Market	Production

(1) Definitions

The production process is simplified into a production function, which is defined as follows.

Definition 4.1

Production function *is a mathematical function which transforms resources into goods or services. It indicates the highest output q that a firm can produce for every specified combination of inputs. For simplicity, we assume that*

› $q = f(K, L)$

(2) Assumptions

Before we move on, some assumptions must be posed.

› Firm is assumed to be rational with its aim to maximize profit.

› Every unit of factors of production is considered equally in quality.

› Each factor of production can be indefinitely separable. (Continuous)

› In the long-run, if budget or cost is limited, the analysis will consider only the part where the satiation of production has not been reached.

› Ceteris paribus.

(1) Difference between short and long-run

Short and long-run production is not categorized by time frame of production. Instead, short run of production means that there is **at least one fixed factor** utilized, a factor which is assumed to be constant in the short-run.

Therefore, we usually assume that capital is a fixed factor while labor is a variable factor, a factor that firm can adjust its amount. The production function becomes

› $q = f(\overline{K}, L)$

Also note that return or compensation for capital is interest (r), while for labor is wage (w).

Since capital is assumed to be fixed in the short-run, the focus here is on the relation between **labor hired and number of output** ($L \Rightarrow q$).

(2) Short-run product

Definition 4.2

Total product *is total output produced from a production process and a set of input, denoted by* ***TP*** *or* ***q****.*

Average product *is the average output per variable factor, denoted by* ***AP****.*

› $AP = \frac{TP}{L}$

Average product *is the additional output from adding 1 more unit of variable factor into the production, denoted by MP.*

› $MP = TP_n - TP_{n-1} = \frac{\Delta TP}{\Delta L} = \frac{\partial TP}{\partial L}$

Each type of output is related in the following table.

(2) Short-run product

Labor (L)	Total product (TP or q)	Average Product (AP)	Marginal Product (MP)
0	0	-	-
1	3		
2	8		
3	12		
4	14		
5	14		
6	12		

From the chart, we can see that when a firm decides to add more variable factor, marginal product increases at first and then decreases later on. This nature of short-run production is governed by the law of diminishing marginal product.

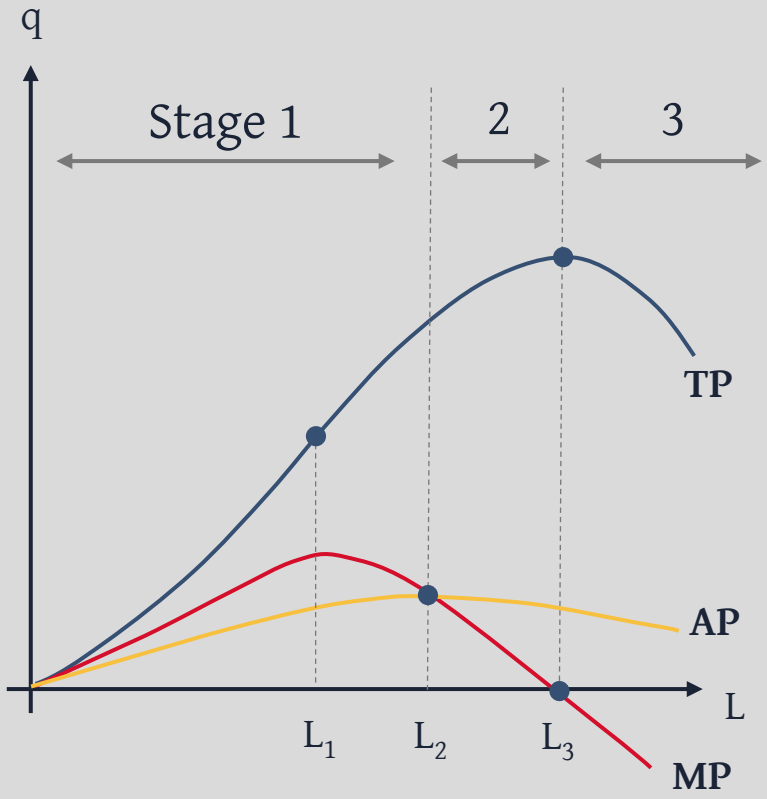
(3) Diminishing marginal product

Definition 4.3

Law of diminishing marginal product *states that in short-run, when firm increases variable factor, marginal product will increase at first then decrease until it becomes 0 and negative. The reason of diminishing marginal product is because of disproportionated use of factors of production due to the constant number of fixed factor.*

Let's consider an example.

(3) Diminishing marginal product



› What should we notice in each stage of production?

Class #16

Costs in the short-run

Page 162-170

(4) Costs in the short-run

Even though we learned that marginal product is diminishing in the short-run, seeking to maximize output is not firm's goal. (**MAXIMIZING PROFIT**)

Therefore, we need to further cost structure in the short-run. Cost is a value that one gives up to get another thing in return. For the production concept, production cost can be interpreted as **compensation or opportunity cost** for those factors since they are used for production and not otherwise.

Since we have fixed and variable cost, both are separated. We are going to consider these costs from three aspects, or term, as

(1) Total term: Total fixed cost (TFC), Total variable cost (TVC), and total cost (TC or STC)

(2) Average term: Average fixed cost (AFC), Average variable cost (AVC), and Average total cost (ATC or SAC)

(3) Marginal term: Marginal cost (MC or SMC)

(4) Costs in the short-run

Definition 4.4

Total fixed cost *is the total cost for fixed factor, denoted by* ***TFC****.*

Total variable cost *is the total cost for variable factor, denoted by* ***TVC****.*

Total cost *is both fixed and variable cost combined, denoted by* ***TC*** *or* ***STC****.*

› $TC = TFC + TVC$

(4) Costs in the short-run

Definition 4.5

Average fixed cost *is the cost of fixed factor per one unit of output, denoted by* **AFC**.

› $AFC = \frac{TFC}{q}$

Average variable cost *is the cost of variable factor per one unit of output, denoted by* **AVC**.

› $AVC = \frac{TVC}{q}$

Average cost *is the total cost per one unit of output, denoted by* **AC** *or* **SAC**.

› $AC = \frac{TC}{q} = \frac{TFC}{q} + \frac{TVC}{q} = AFC + AVC$

(4) Costs in the short-run

Definition 4.6

Marginal cost *is the additional cost when one more unit of output is produced, denoted by* ***MC*** *or* ***SMC****.*

› $MC = TC_n - TC_{n-1} = \frac{\Delta TC}{\Delta q} = \frac{dTC}{dq}$

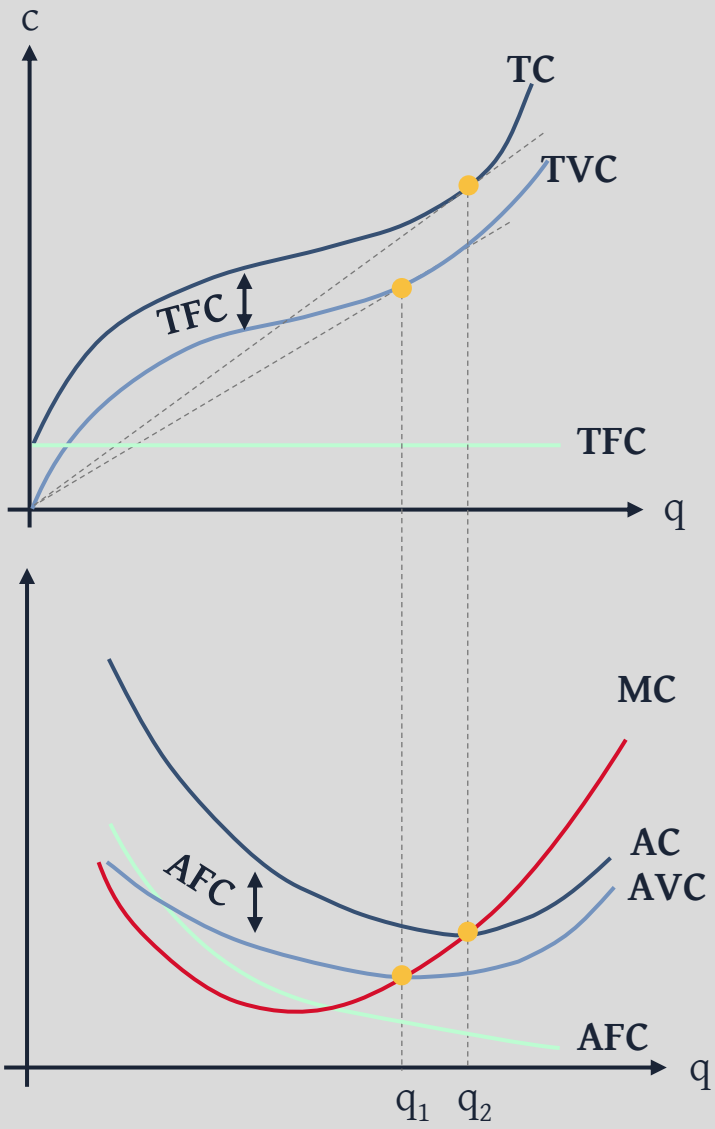
We can prove that $MC = \frac{dTVC}{dq}$

Studying cost, on the other hand, focuses on relation between **output and cost** ($q \Rightarrow c$). Now let's look at the table.

(4) Costs in the short-run

(1) q	(2) TFC	(3) TVC	(4) TC	(5) AFC	(6) AVC	(7) AC	(8) MC
0		0					
1		12					
2	25	18					
3		20					
4		24					
5		35					

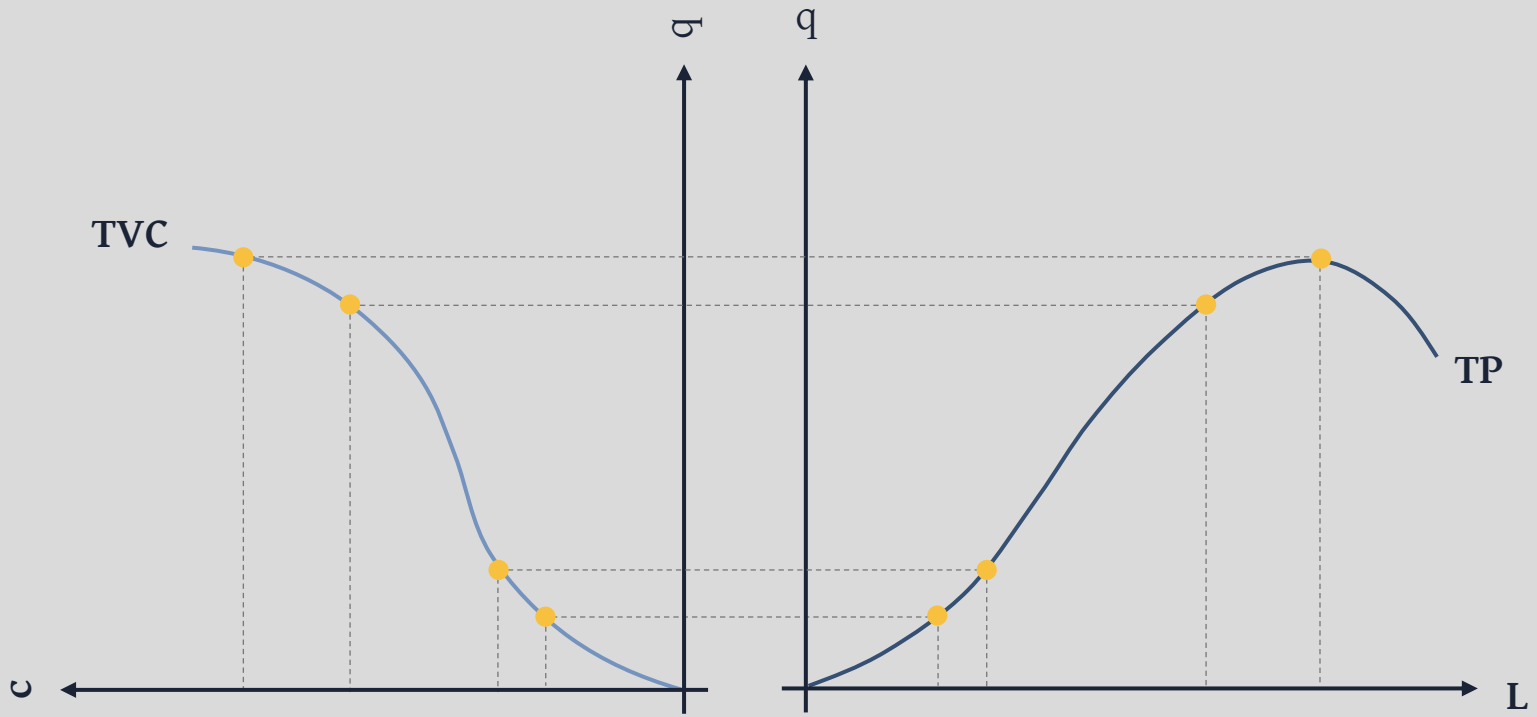
(4) Costs in the short-run



› What should we notice in costs graphs?

(4) Costs in the short-run

Now consider why MC rises, which results in TVC convexity.



(5) Summary of short-run production

› Short-run production ($L \Rightarrow q$) means at least a fixed factor is utilized.

› Increasing variable factor into the production causes marginal product to diminish due to disproportionated combination of fixed and variable factor.

› Diminishing marginal product makes it costlier ($q \Rightarrow c$) to produce one more output when firm keeps adding more variable factor.

› Diminishing marginal product causes marginal cost to rise, also total variable cost, total cost ,average variable cost, and average cost to later rise.

Again, firm's objective is not to minimize cost. We then need to study firm's revenue in order to complete producer part. However, firm's revenue varies by market structure (or competitiveness). Hence, we will study firm's revenue and profit in the products market section.

Class #17

Production in the long-run

Page 171-177

(1) Production in the long-run

On the other hand, long-run production occurs when a firm can adjust the amount of all factors of production. Production function is then represented in this form

› $q = f(K, L)$

Since firm can freely select an amount of all factors of production, the topic then shifts to how can firm select optimal combination for each level of output?

(1) Production in the long-run

Output	Capital	Labor
10	1	5
10	3	3
10	5	1
20	2	7
20	4	4
20	6	2

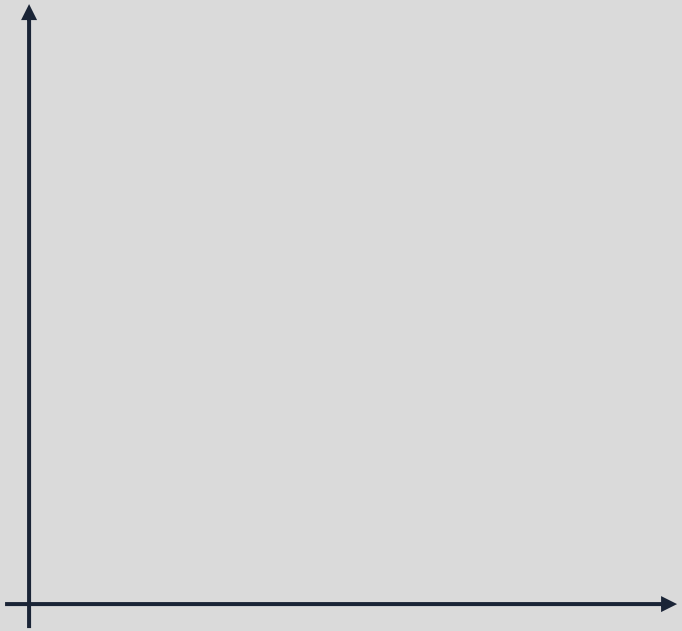
Supposed that only capital (K) and labor (L) are utilized in a production, a firm considers to produce $q = 10$ or $q = 20$, the question is how many units of capital or labor should firm utilize at each q or what is (K^*, L^*).

The table on the left-hand side illustrates many bundles that can lead to the same result.

The quick answer would be (K^*, L^*) that **minimize cost** for each particular level of q. So, we need to consider **capital and labor price** (r and w).

The tools that we are going to use to analyze is called **Isoquant** and **Isocost**.

(2) Isoquant



Characteristics

› Factors bundles

› Level of output yield

› Isoquant cannot intersect.

› Isoquant has negative slope and convex to the origin

(2) Isoquant

Definition 4.7

Marginal rate of technical substitution *is a ratio of substitution between two types of factor on a point of an isoquant that yield the same level of output.*

› $MRTS_{LK} = \frac{\Delta K}{\Delta L}$

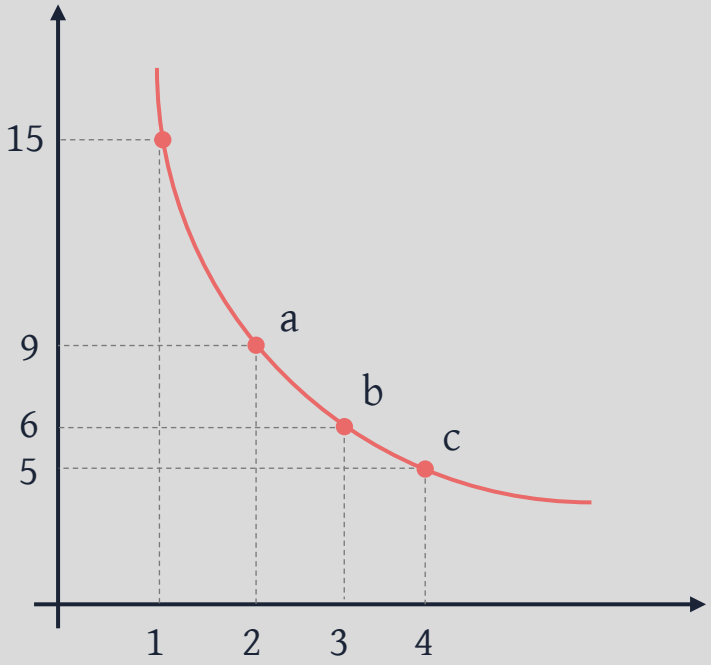


Figure out these MRTS_{LK}

› $\text{MRTS}_{LK(\text{a})} =$

› $\text{MRTS}_{LK(\text{b})} =$

› $\text{MRTS}_{LK(\text{c})} =$

(2) Isoquant

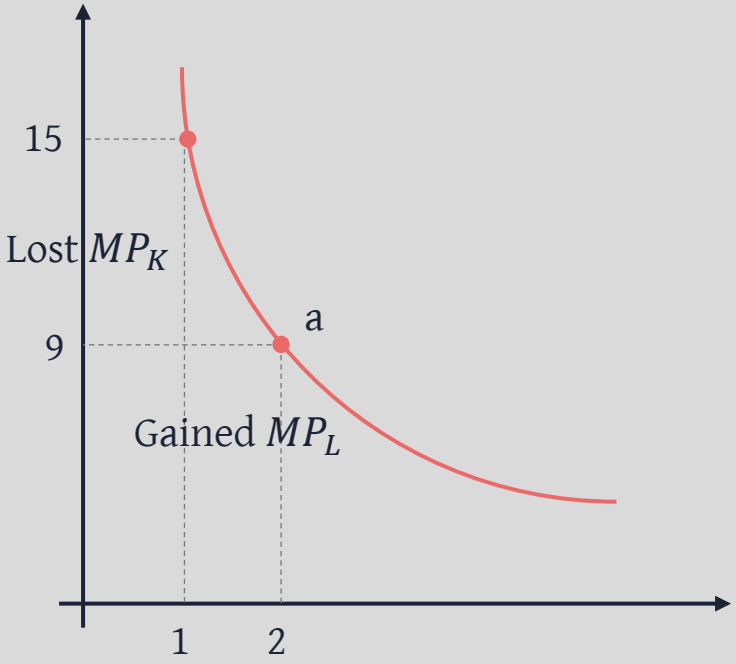
As we learned that, in case of two substitutable factors, MRTS is the ratio of substituting two factors, resulting in the same amount of output, it also means that.

› $|MRTS_{LK}| = \left|\frac{\Delta K}{\Delta L}\right| = \frac{MP_L}{MP_K}$

where MP_L and MP_K are marginal product of labor and marginal product of capital, respectively.

Consider an example here.

(2) Isoquant



› Supposed that the MRTS at one point is -6, it means that when giving up 6 of K while adding 1 unit of L into the production result in yielding the same amount of product. (or it can be 12 of K and 2 of L which is the same ratio)

› When a firm gives up 6 of K, this firm loses an amount of marginal product of capital (MP_K). We do not know how many.

› When the firm adds 1 more unit of L, this firm gains an amount of product that was lost from MP_K. Again we do not know how many but it is the marginal product of labor (MP_L) from that 1 L.

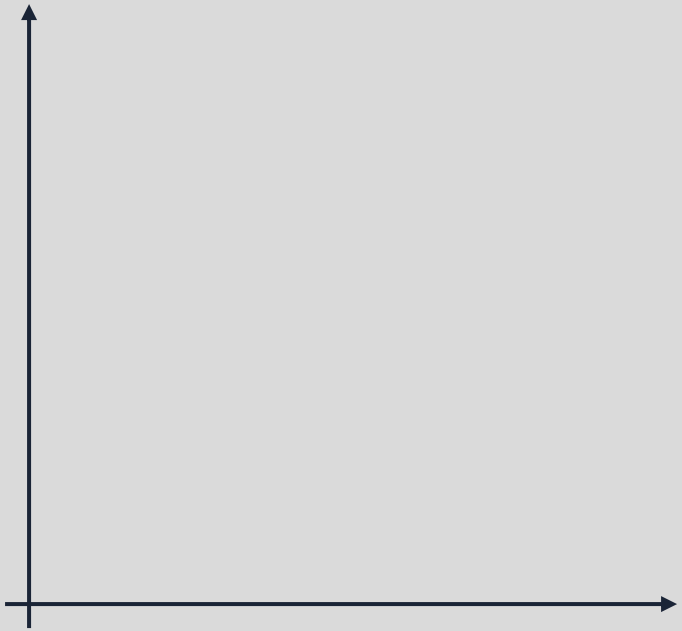
› Those MP_K and MP_L must be equal since changing factors bundle on the same isoquant results in the same amount of output. Therefore, it means that 1 unit of L can produce equal MP of 6 units of K. That makes MP_L 6 times larger than MP_K.

Class #18

Isocost, firm's equilibrium, costs

Page 178-184

(3) Isocost



Isocost is, once again, very similar to the budget line. Consider an example here.

Given that a labor costs 25 baht a day and a unit of capital costs 50 baht a day, a firm can bear 200 baht cost per day. Draw the isocost.

(3) Isocost

Isocost shows combinations of capital and labor that cost equally. Assumed that production function consists of capital and labor, total cost (TC) equals interest multiply by number of capital plus with wage multiply by number of labor or $TC = rK + wL$

Isocost has a fixed slope if, during the analysis, price of labor and capital do not change. The slope can be defined as follows.

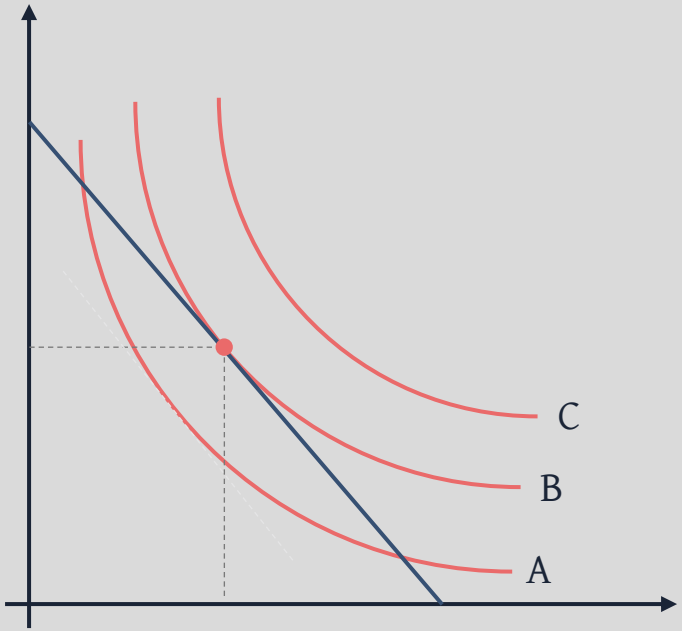
Definition 4.8

Marginal rate of market substitution *is the substitution rate of two factors given by their price or the slope of isocost.*

› $|MRMS_{LK}| = \left|\frac{\Delta K}{\Delta L}\right| = \frac{w}{r}$

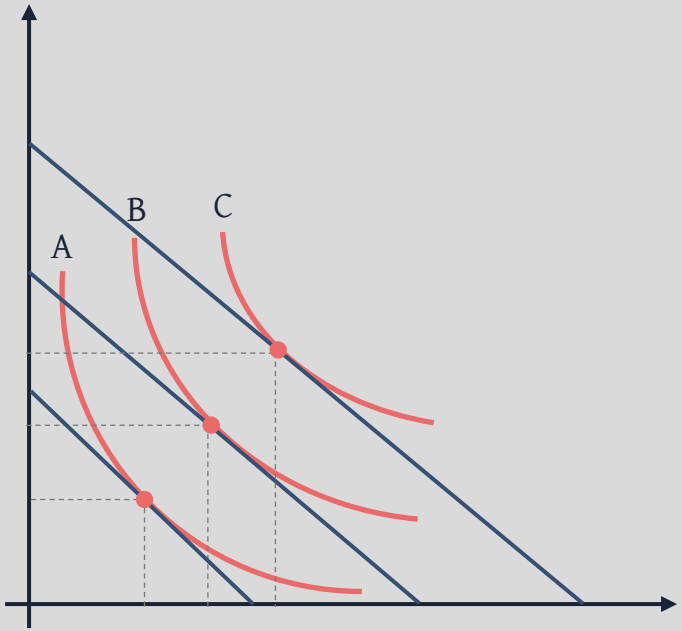
Change in isocost can be caused by change in a firm's budget, extending or shrinking isocost, and change in factor price, tilting the isocost the same way as budget line.

(4) Firm's equilibrium



For each level of output on each isoquant, a b or c, there is a specific combination between K and L that will minimize cost (K^*, L^*), which makes

(4) Firm's equilibrium



When firm can bear more cost, the number of factors of production that minimize cost can be increased to the point where new isocost tangent with new isoquant. If we draw a line connecting between each equilibrium, we will get an **expansion path**.

This expansion path is the set of optimal combinations. Each combination indicates a pair of c and q, which this c is minimized with respect to given q. We can then plot relation between c and q in the long-run production.

(5) Costs in the long-run

For every combination of c and q that minimize cost for a firm, we can derive long-run costs from the expansion path.

Definition 4.9

Long-run total cost *is the cost of all variable costs combined, denoted by* ***LTC.***

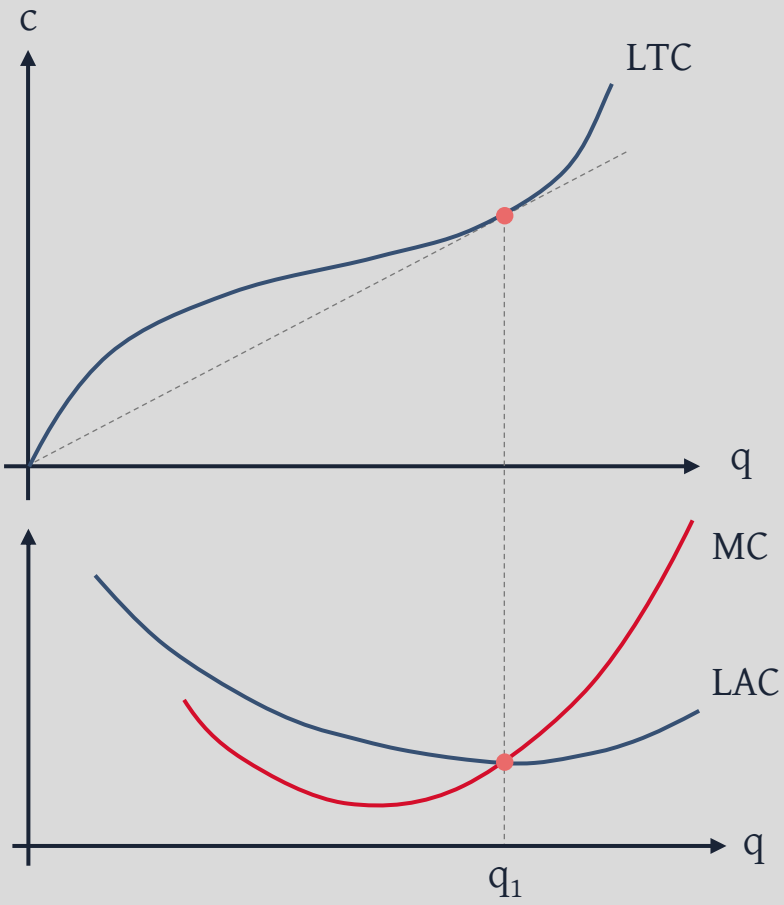
Long-run average cost *is the average of total cost per one output, denoted by* ***LAC.***

› $LAC = \frac{LTC}{Q}$

Long-run marginal cost *is the additional cost when firm produces one more unit of output, denoted by* ***LMC.***

› $LMC = \frac{\Delta LTC}{\Delta Q} = \frac{dLTC}{dQ}$

(5) Costs in the long-run



Graphing the long-run costs curve will result in the illustration on the left-hand side.

From the expansion path and long-run cost, we can further study multiple topics. The law of returns to scale is one of them to understand proportional return of output to input.

Class #19

Returns to scale and economy of scale

Page 185-191

(6) Law of Returns to Scale

Definition 4.10

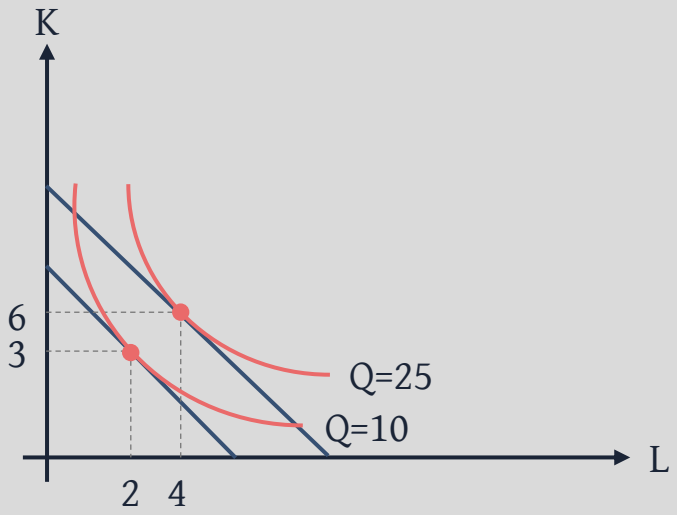
Law of returns to scale *states that when firm increases all factors proportionally, the return will be one or another as stated below (we cannot consider the case that each factor increase unequally)*

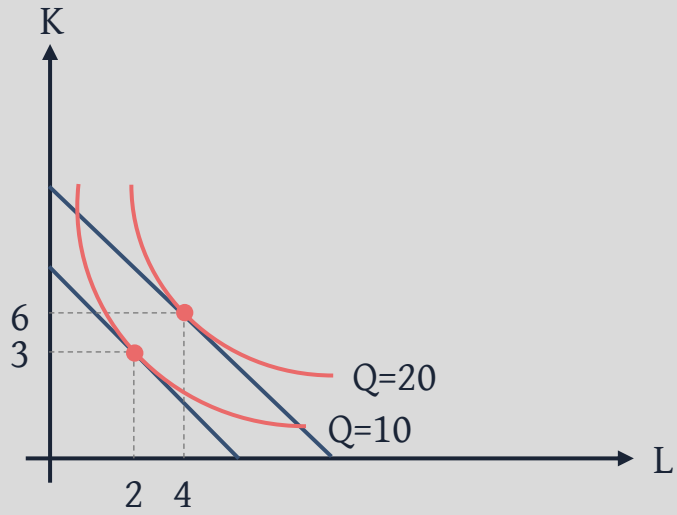
› *Increasing returns to scale (IRS) is the case that proportion of output increases more than proportion of production factors.*

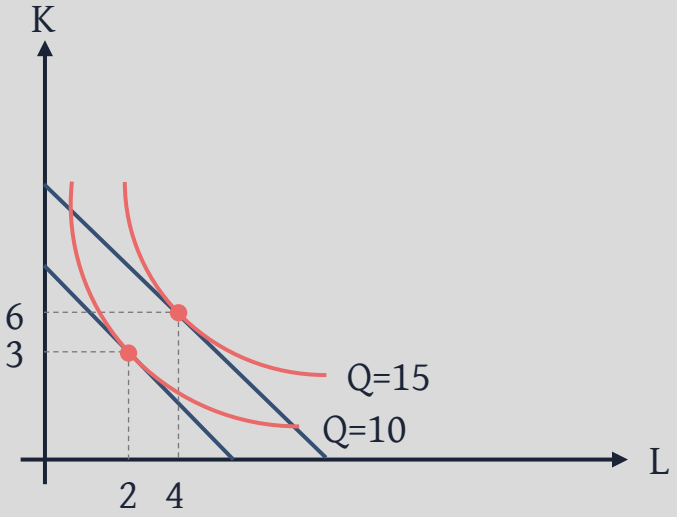
› *Constant returns to scale (CRS) is the case that proportion of output increases equally to proportion of production factors.*

› *Decreasing returns to scale (DRS) is the case that proportion of output increases less than proportion of production factors.*

(6) Law of Returns to Scale







(7) Economy of Scale

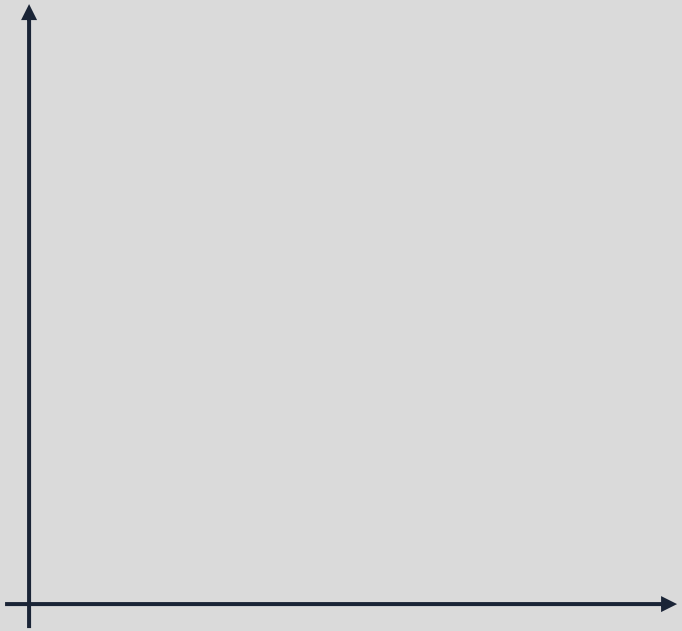
As we can see from the graph, even in the long-run, firms still encounter both decreasing and increasing marginal cost and average cost. To understand this, let's explore relationship between short and long-run first.

In the real-world scenario, firms mostly are in short-run production. Long-run production only occurs for a short period of time when firms decide to expand their production capability.

A metaphor for the situation is factory size. For example, for any industrial production, there must be some factors that cannot be adjusted immediately such as large and expensive machines or production building, setting up a new factory to expand production, or some made-by-order capital goods.

Therefore, the factory in the short-run production is when there is a capital good that cannot be adjusted, while in the long-run production is when the factory is actually expanding.

(7) Economy of Scale

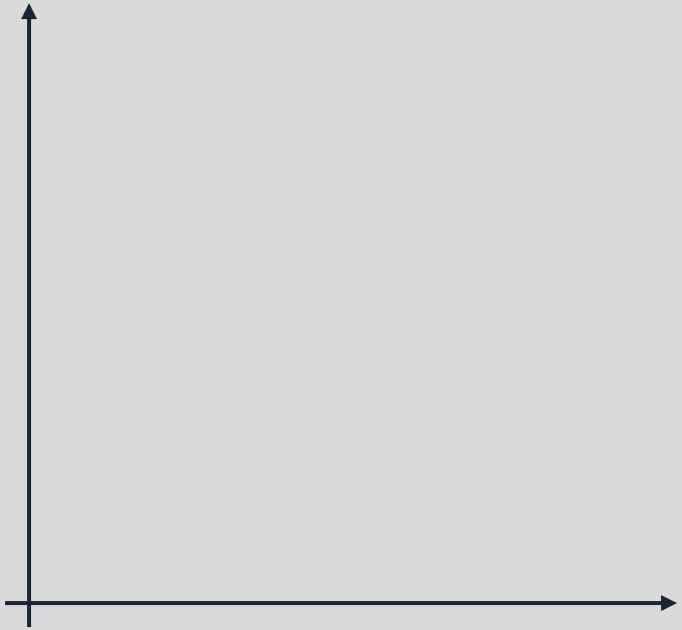


Both production stages are like the factory expansion as shown above. The short-run average cost of each line is the range that cannot be extended.

If the firm can choose unlimited factory sizes, when producing up to the lowest point of the short-run average cost, one will expand the new plant, causing the average cost to shift to another line which may result in lower the average cost level.

Therefore, the long-run average cost line is drawn from the lowest point of the average cost line.

(7) Economy of Scale



A firm gains cost advantage or economies of scale when the quantity produced is ‘not too much’ depending on each type of good or service, is a result from specialization, bulk order and other efficiency such as low search cost for material and specialized labor.

However, when firm produces ‘too much’, the opportunity cost can become higher such as search cost for labor and capital, cost of management, cost of monitoring, etc. This is the phase when a firm loses its advantage or diseconomies of scale.

(8) Summary of long-run production

› Long-run production $(K, L \Rightarrow q)$ means all factors are variable.

› To come up with long-run cost curves, it is based on a firm's decision to minimize cost for each level of q by choosing (K^*, L^*)

› Marginal and average long-run cost curves $(q \Rightarrow c)$ still rise even in the long-run production due to economies of scale.

› Returns to scale and economies of scale are related.

› Diminishing marginal product causes marginal cost to rise, also total variable cost, total cost ,average variable cost, and average cost to later rise.

Chapter 5

Product Markets

Class #20

Perfect competition

Page 193-205

Flow of study in this chapter

› Market structure

How economists categorize market according to competition and what are the interpretations of doing so.

› Perfect competition

Most repeated concept of ideal market, we structure how sellers in this market maximize it firm's profit, equilibrium in both short-run and long-run, including supply in the short-run.

› Monopoly

On the opposite side of competition, we also study situation when there is only a single seller in a market and how that affects revenue structure and the consumers' surplus.

› Monopolistic competition and oligopoly

Discuss the fundamental characteristics of these market structure, without going through much details about them.

Further reading can be found in Pindyck and Rubinfeld (2018) Part 2, Chapter 8-9 and Part 3, Chapter 10-12.

Introduction

This part will be the continuation from production and cost. We study firm's behavior to maximize profit further by looking at revenue in different types of market structure and how firms face with various scenarios. Cost part will also be heavily applied in this chapter as well.

Market is a context where transactions of goods and services occur, which can be categorized with various criteria such as

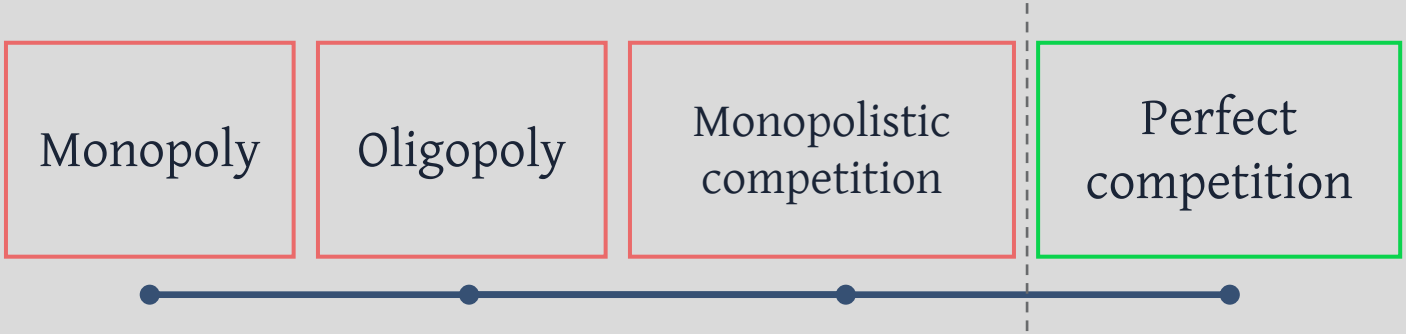
› **Time of transaction**: there are 'spot' and 'future' markets. In 'spot' market, once the transaction takes place, the delivery takes place, while in case of future markets, transactions are finalized pending delivery for future dates.

› **Types of product**: such as rice market, computer market, camera market, newspaper market.

› **Consumer**: premium markets consist of consumers who possess high purchasing power while other markets consist of consumers who have lower purchasing power.

Introduction

However, revenue and profit of a producer is determined by market structure, in other words, competition or number of sellers. Since we are now studying producer's condition to maximize profit, this part will focus on the specific market structure **based on number of producers.**



(1) Characteristics

For perfect competition, there are several characteristics and assumptions as follows

› Infinite number of buyers and sellers. All of them are small and have no control over market power. (Price taker)

› Homogenous products.

› Free-entry and exit.

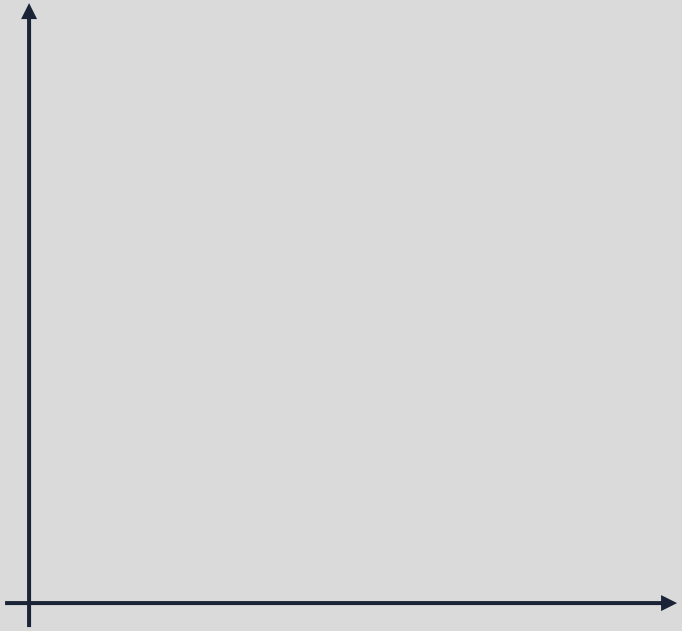
› Free flow of factors of production.

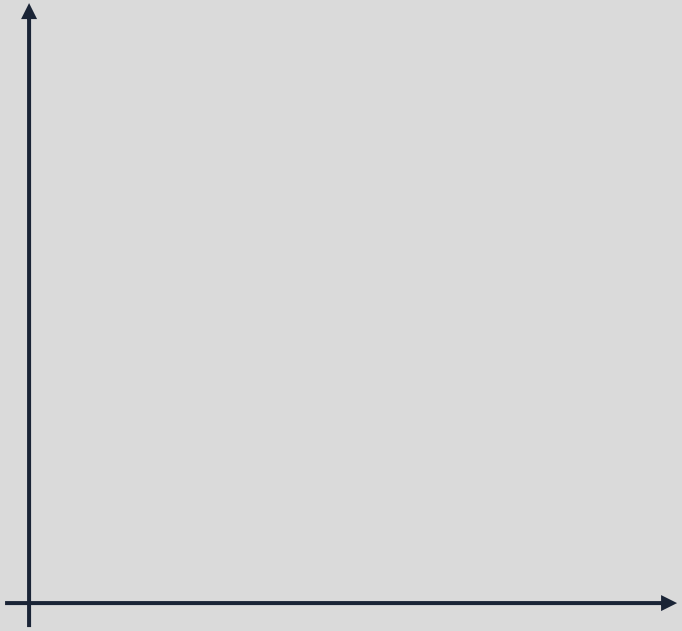
› Perfect information.

Example: can you list any product competing similarly to perfect competition

(1) Characteristics

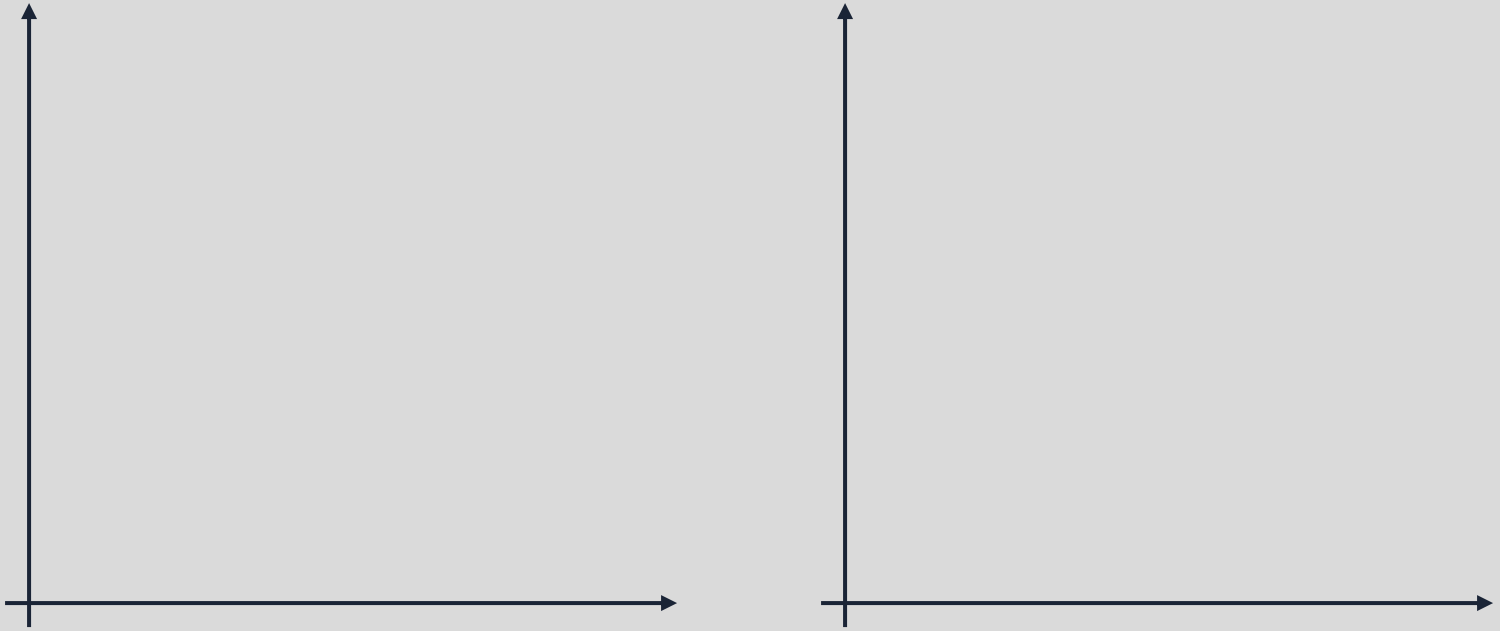
According to the ‘Price taker’ assumption, all sellers in this market accept price as a signal from the market.





(1) Characteristics

Price can be changed due to the market force without an individual intervention as an example below.



(2) Revenue

Definition 5.1

Total revenue *is total income from selling all units of goods or services, denoted by* ***TR****.*

› $TR = P \cdot q$

Average revenue *is firm's revenue per good or service, denoted by* ***AR****.*

› $AR = \frac{TR}{q}$

Marginal revenue *is additional revenue from selling more 1 unit of goods or service, denoted by* ***MR****.*

› $MR = TR_n - TR_{n-1} = \frac{\Delta TR}{\Delta q} = \frac{dTR}{dq}$

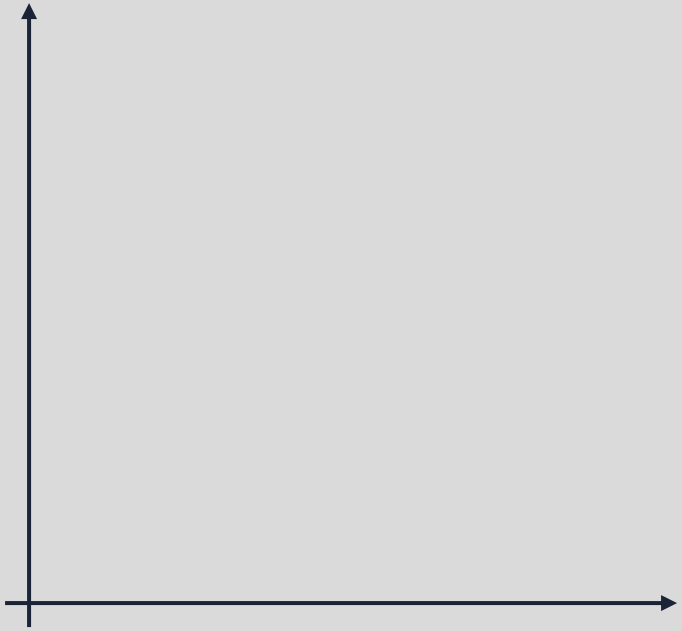
In order to understand the relationship between each type of revenue and product, the following table should help clarify.

(2) Revenue

Output (q)	Price	Total revenue (TR)	Average revenue (AR)	Marginal revenue (MR)
1	12			
2				
3				
4				
5				
6				

Now let's graph this table and see what to be notice.

(2) Revenue



Since we now have costs in the short-run and revenue, we can further define profit and find a condition that will maximizes it.

(3) Profit

Definition 5.2

Profit (loss) *is the difference between revenue and cost, denoted by* $\boldsymbol{\pi}$*.*

› $\pi = TR - TC$

In economics, we define profit a bit different from accounting.

› A firm has Excess profit when total revenue is more than total cost.
($TR > TC$ or $\pi > 0$)

› A firm has Normal profit when total revenue is equal to total cost.
($TR = TC$ or $\pi = 0$)

› A firm has loss when total revenue is less than total cost.
($TR < TC$ or $\pi < 0$)

Why do we define profit against our intuition?

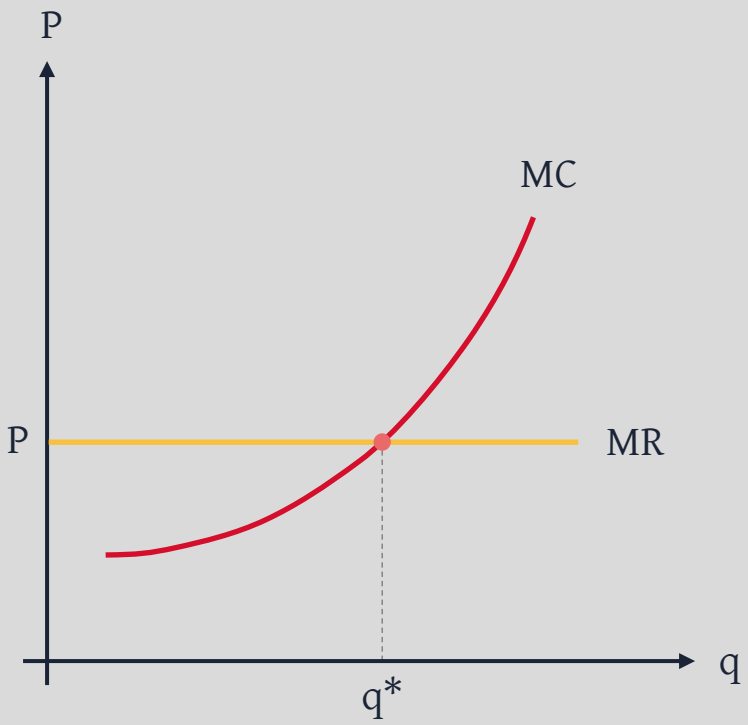
(3) Profit

Since we assumed that a firm's goal is to maximizing profit, we can prove from a simple statement here.

› $\max_{q} \quad \pi = TR - TC$

Why we consider marginal term instead of total term? Consider the following graph.

(3) Profit



Consider when

› $MR > MC$

› $MR < MC$

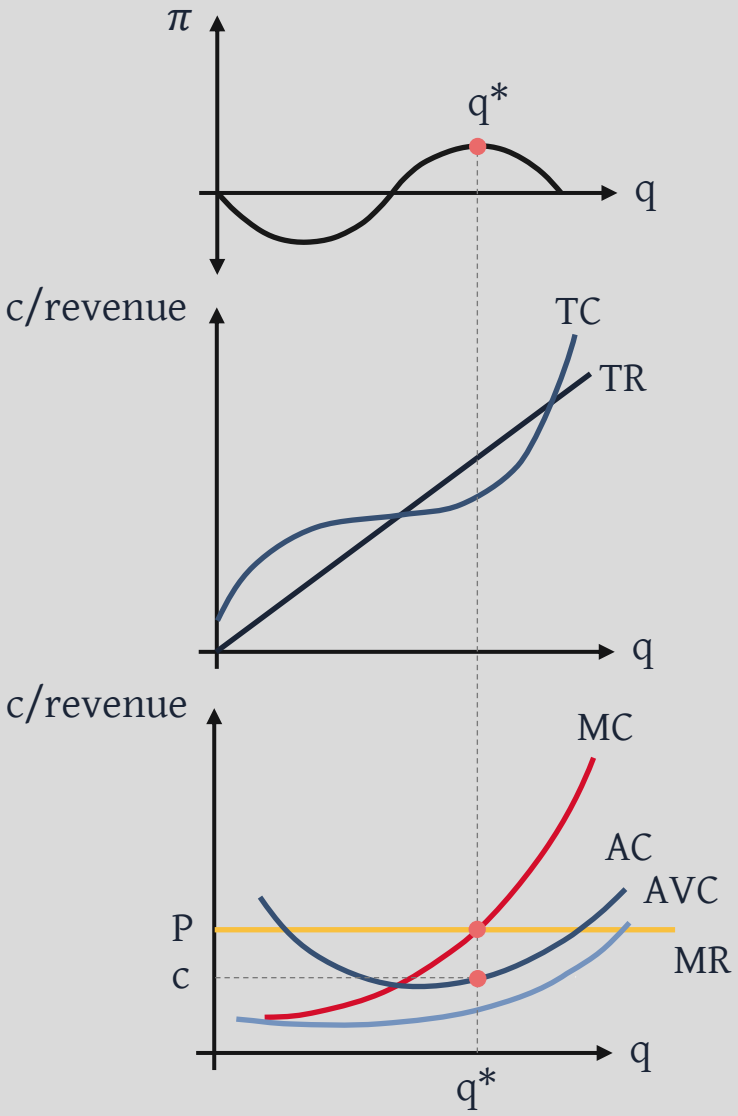
Now we are going to look at all four scenarios and firm's decision in the short-run.

Class #21

The four scenarios

Page 206-212

(4) Four scenarios: Excess profit



The top graph is (total) profit (loss) chart as a result from the middle graph.

The middle one is total cost and revenue plotted. The difference between these two is profit (loss).

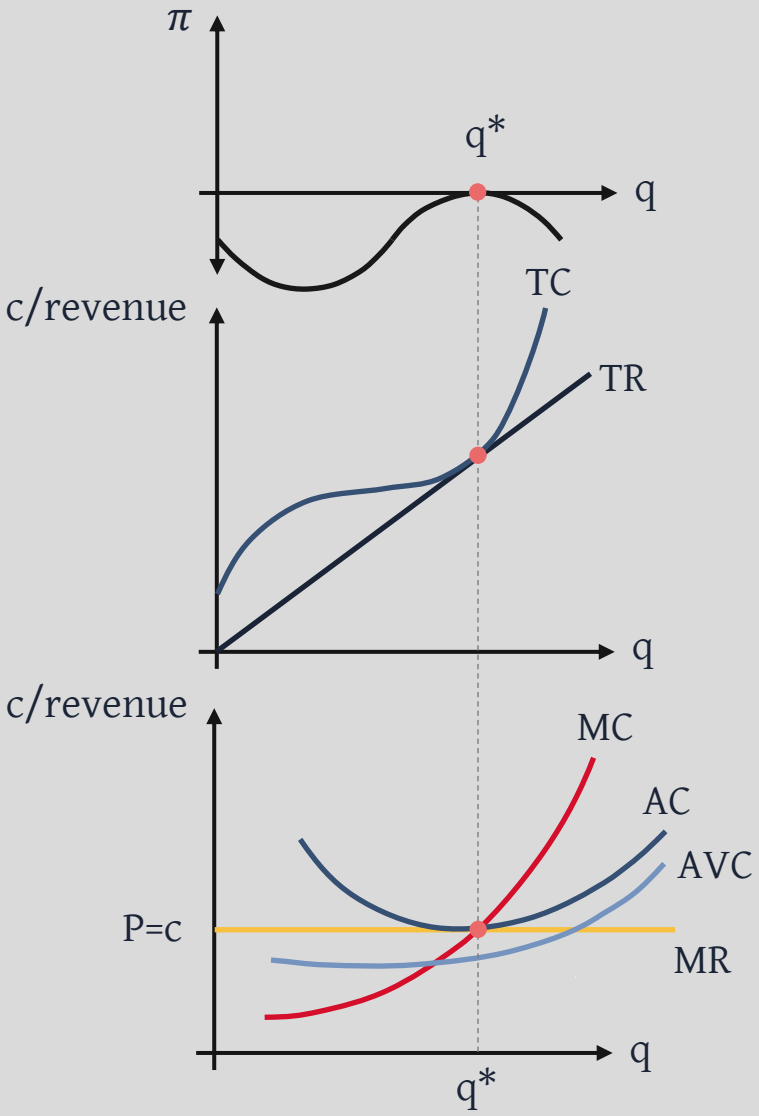
The bottom one is cost and price per unit q. From this graph, we can calculate the area of

› Total revenue:

› Total cost:

› Profit:

(4) Four scenarios: Normal profit



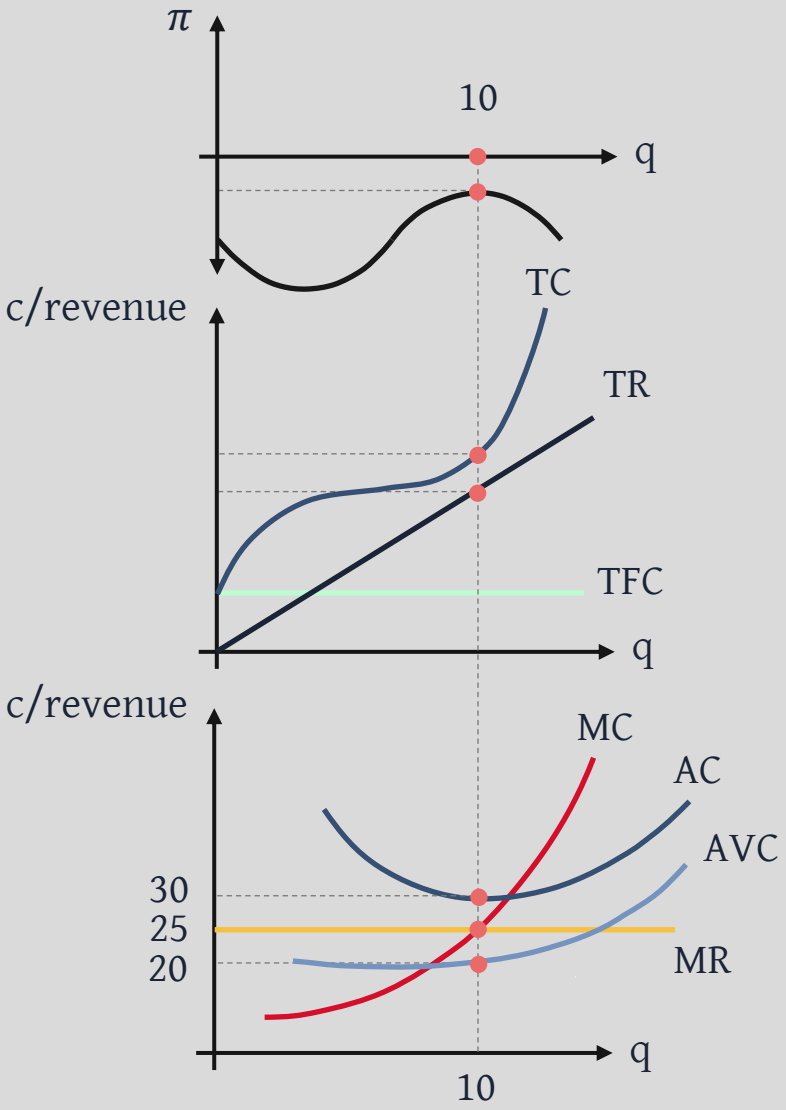
We turn our attention to the bottom graph, while maintaining the others as references.

› Total revenue:

› Total cost:

› Profit:

(4) Four scenarios: Least loss



The third scenario is quite tricky, so we are going to use numerical example here. Assume that at

› $q^* = 10$

› P = 25 / AC = 30 / AVC = 20

How much are

› TR =

› TC =

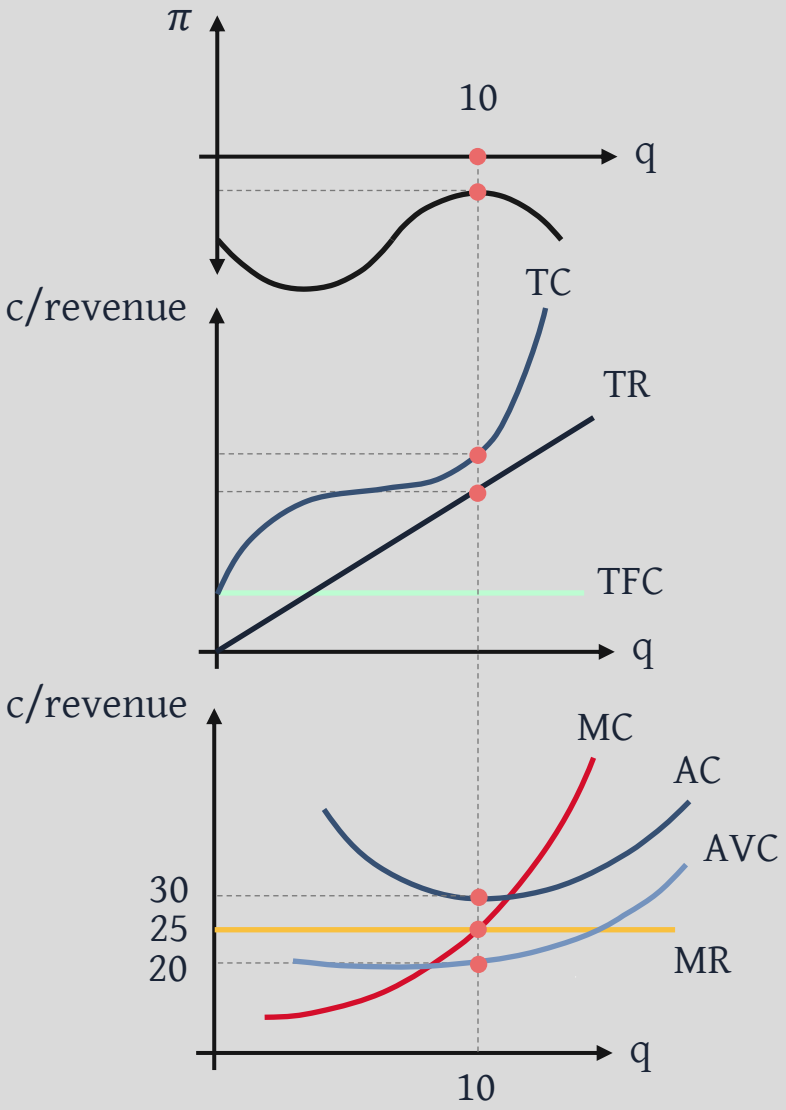
› π =

Now since TFC becomes relevant,

› TFC =

› TVC =

(4) Four scenarios: Least loss



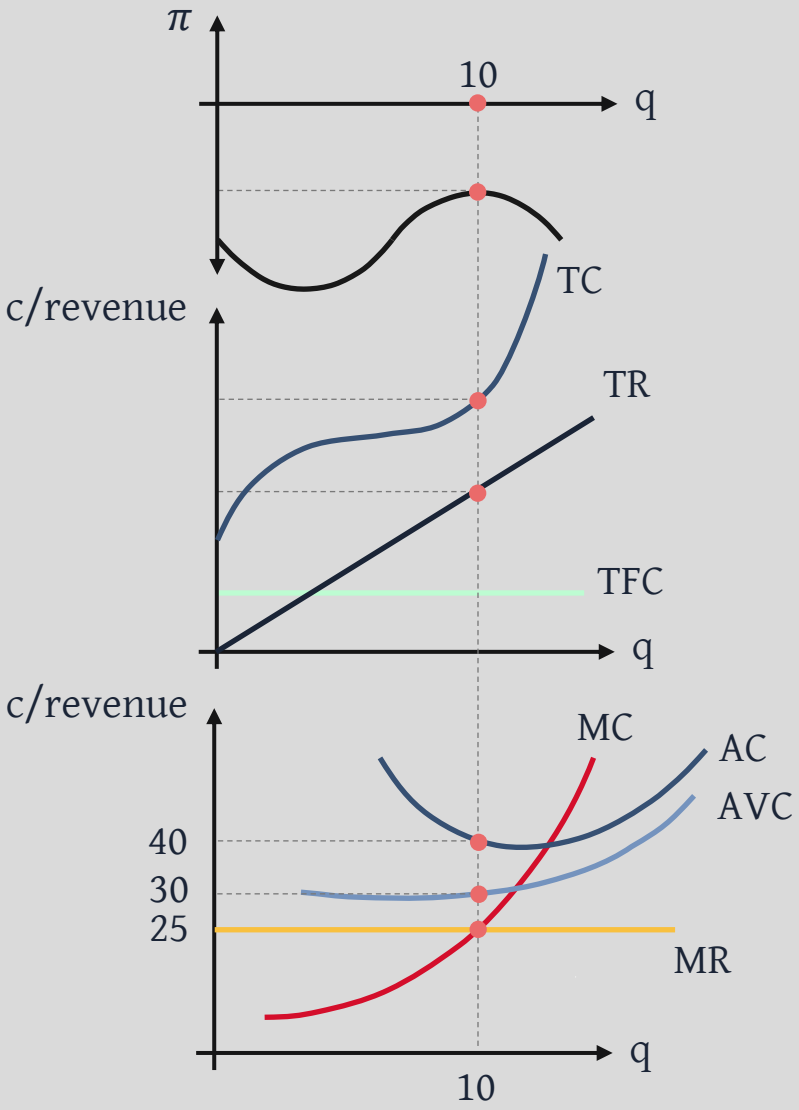
In the short-run, firm cannot adjust the amount of fixed factor at all, which means that even though there is no production, it must pay for the fixed cost. We compare loss from two cases as follows.

› Zero-unit production

› Producing and selling at q*

We can also prove that when P > AVC, a part of revenue can be used for the fixed cost.

(4) Four scenarios: Shut down



Again, we follow the same logic with least loss case. Assume that

› $q^* = 10$

› P = 25 / AC = 40 / AVC = 30

How much are

› TR =

› TC =

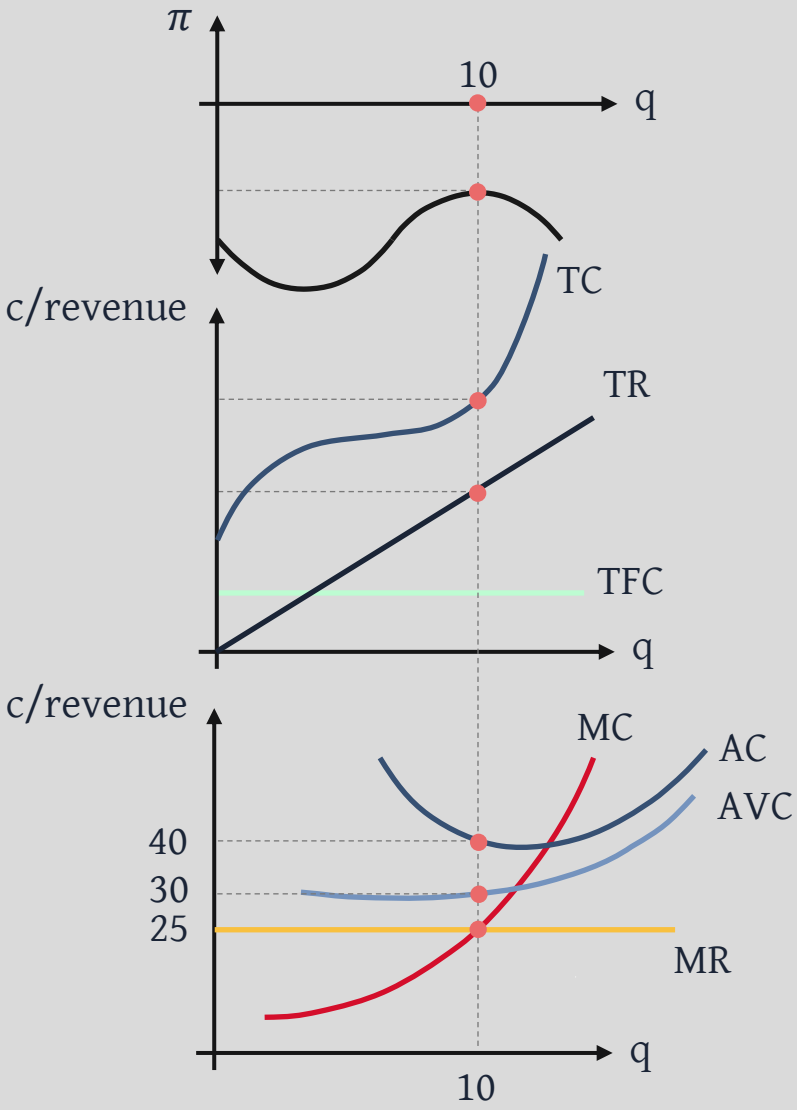
› π =

Then,

› TFC =

› TVC =

(4) Four scenarios: Shut down



Therefore, we can conclude that at MR = MC when P < AVC, revenue is less than the variable costs.

Which means that there will be loss from utilizing variable factor as well and there is no part of the revenue that can be used for fixed cost.

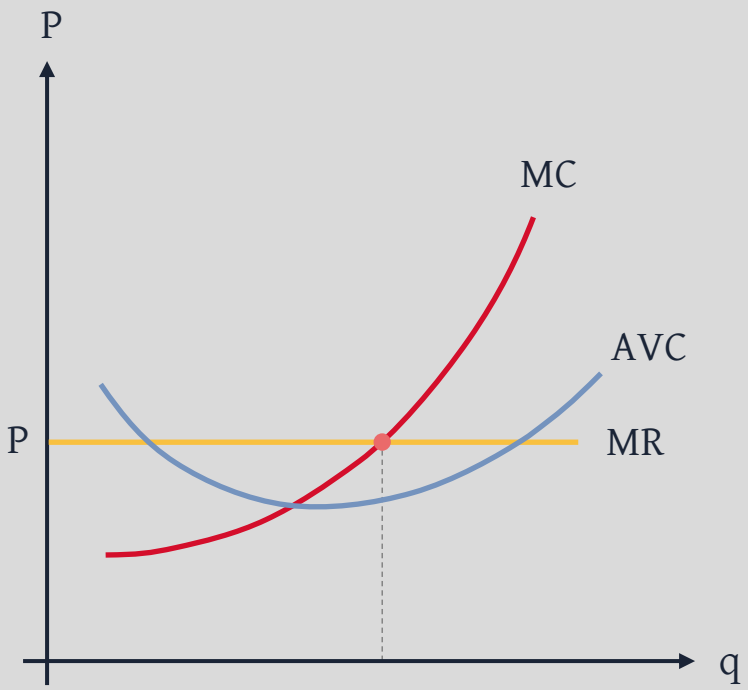
The decision for this firm will be producing at zero unit, or shut down, rather than take higher loss when producing at q*.

Class #22

Supply and the long-run

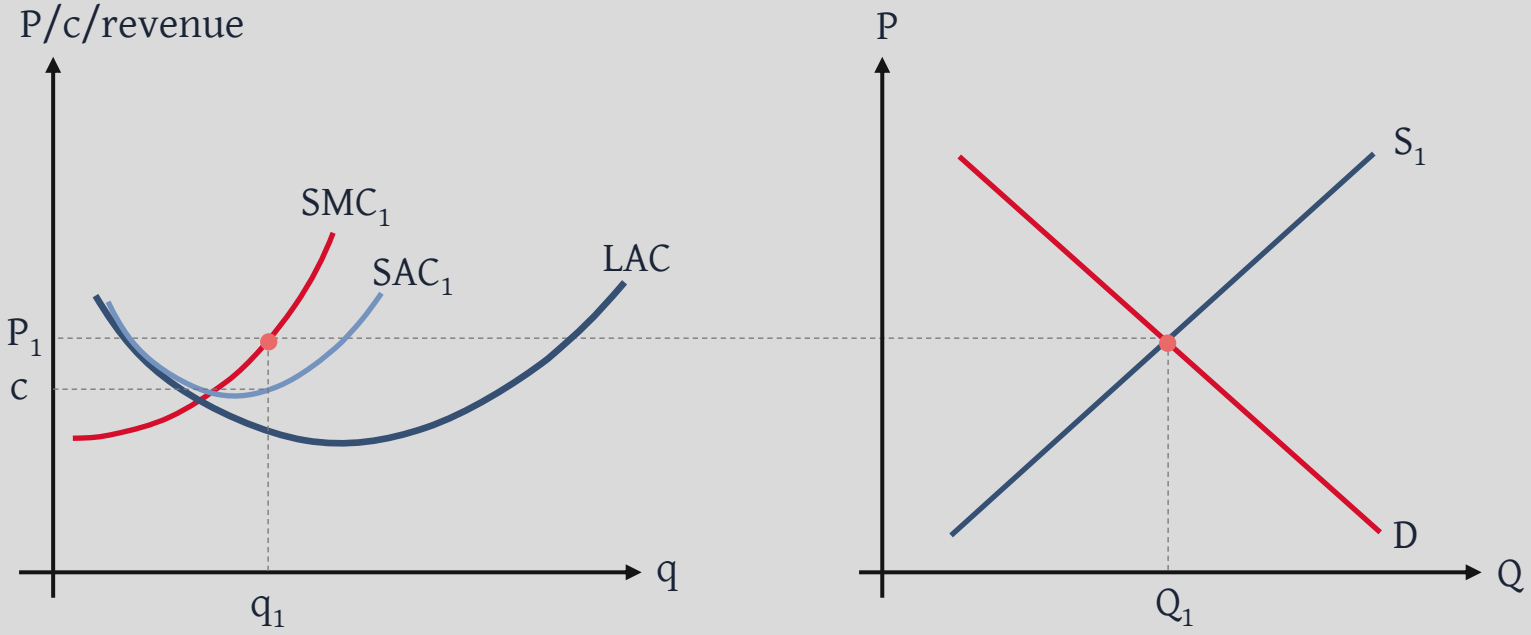
Page 213-217

(5) Individual supply in the short-run



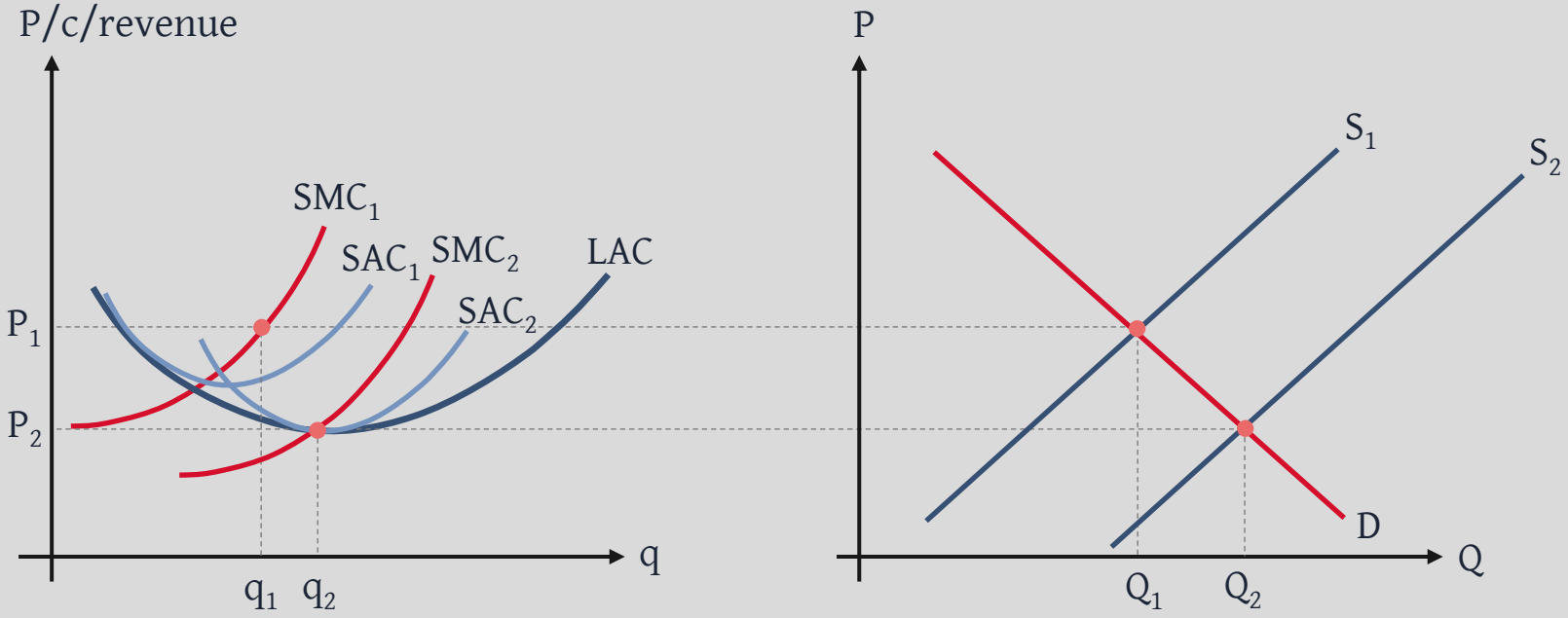
Supposed that cost structure of this firm remain the same, but there are changes in the market, causing price to rise or fall.

(6) Long-run equilibrium



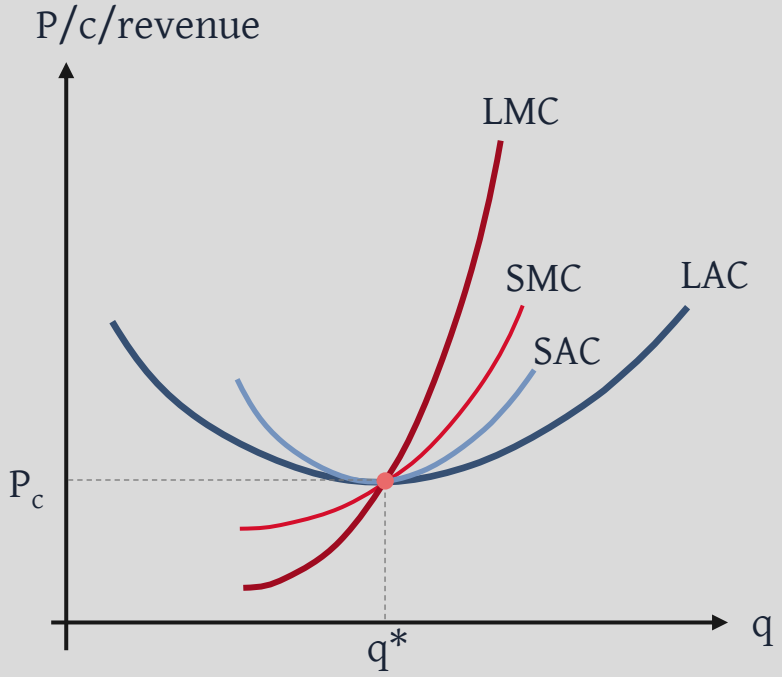
Now we turn to the long-run equilibrium for both firm and industry level. Consider this case when firms have excess profit in a market.

(6) Long-run equilibrium



If there is no barrier to entry, new competitors can compete in this market in the long-run.

(6) Long-run equilibrium



In the long-run, firms in perfect competition tend to receive normal profit, and achieve the lowest point of the average cost. Notice that

› P_c = LAC = LMC

Class #23

Monopoly

Page 218-225

(1) Characteristics

› There are many buyers but only one seller (Price maker).

› Product is rarely or cannot be substituted.

› Barriers to entry due to
- Monopolist possesses main factors of production or significant materials.
- Institutional devices accommodate for monopoly such as patenting or concession.
- Some products or service is efficiently produced by one producer or ‘natural monopoly’.

› Product differentiation

Example: can you list any product or service in monopoly market?

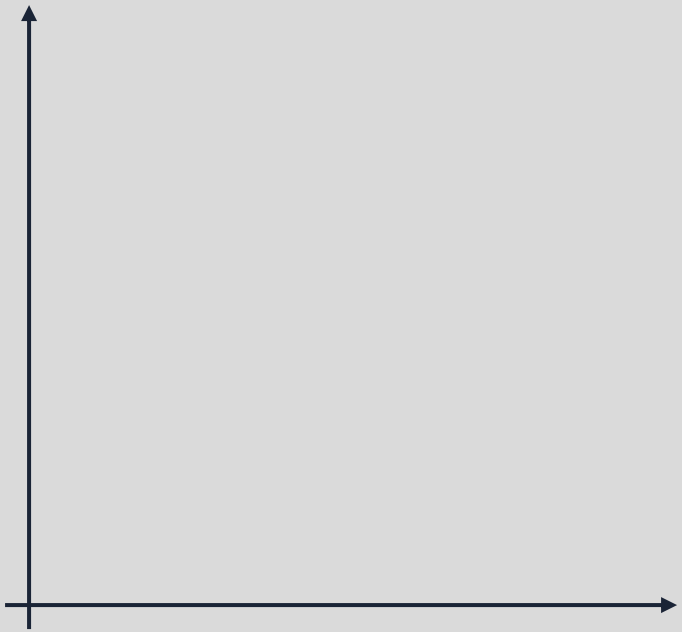
(1) Characteristics

As a price maker, monopolist can either choose only price or quantity. The following table should further define this characteristic.

Output (Q)	Price	Total revenue (TR)	Average revenue (AR)	Marginal revenue (MR)
1	25			
2	20			
3	15			
4	10			
5	5			
6	0			

Now let's graph this table and see what to see the relationship between demand and revenue curve.

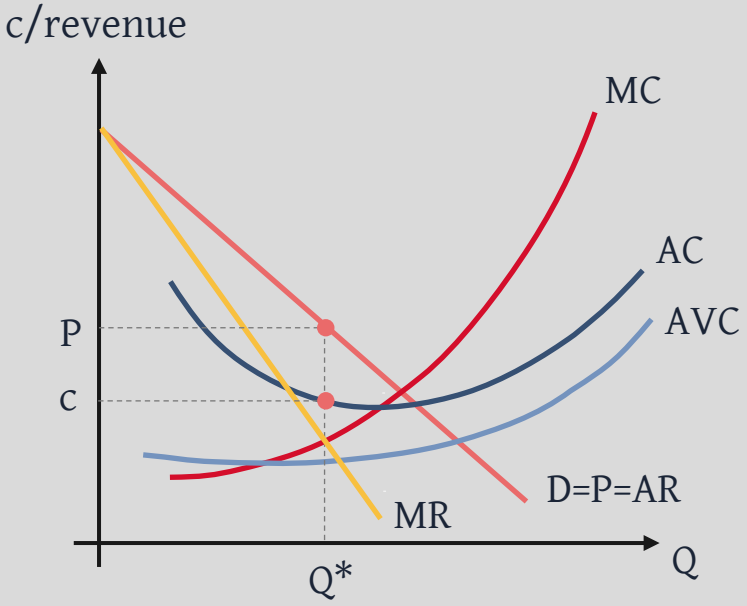
(1) Characteristics



Note: if demand is linear, marginal revenue is as twice as steep compared to demand.

› $D = P(Q) = 60 - 4Q$

(2) Monopolist in the short-run



Since considering revenue, cost and profit is similar to perfect competition, examples provided here are only a part of monopolist's scenarios. Monopolists can encounter four scenarios as firms in perfect competition.

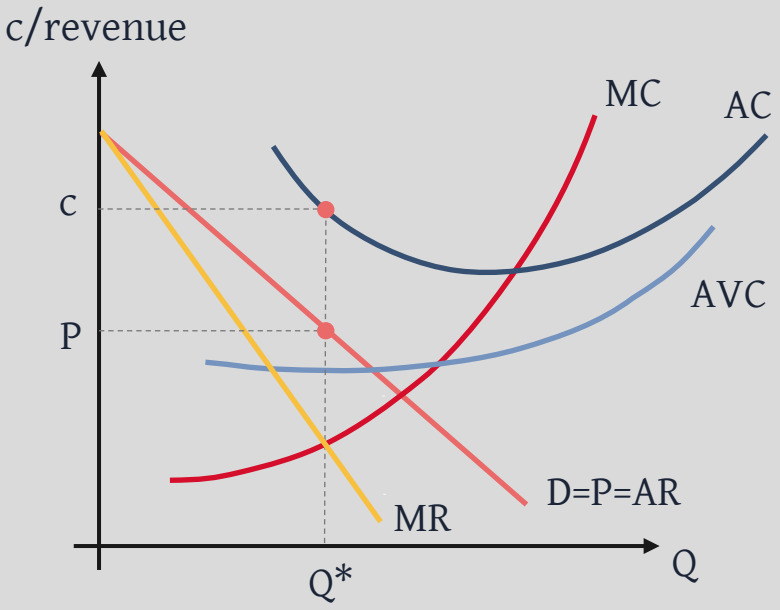
(1) indicate Q* where MR = MC and fix the quantity.

(2) Look for price per unit on the demand curve (D).

(3) Look for cost per unit on the average cost curve (AC).

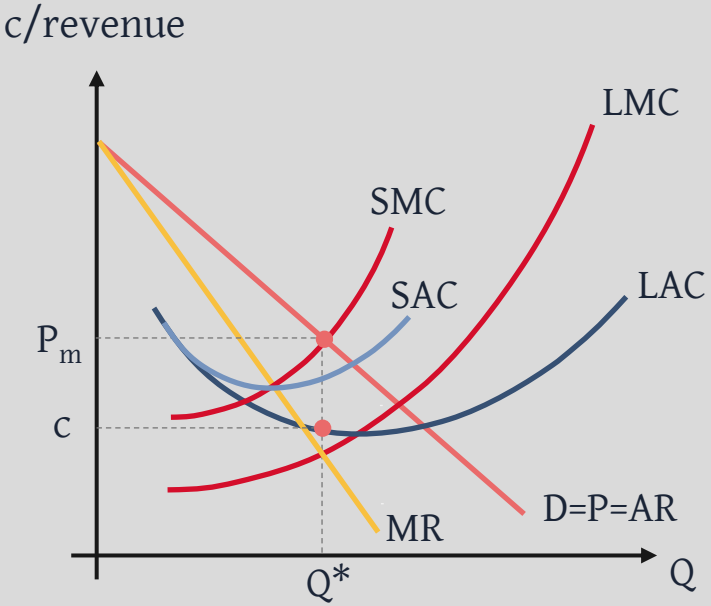
(4) See if monopolist gain or lose from the difference.

(2) Monopolist in the short-run



A monopolist can find themselves in the least loss situation as well as firms in perfect competition, but not very likely.

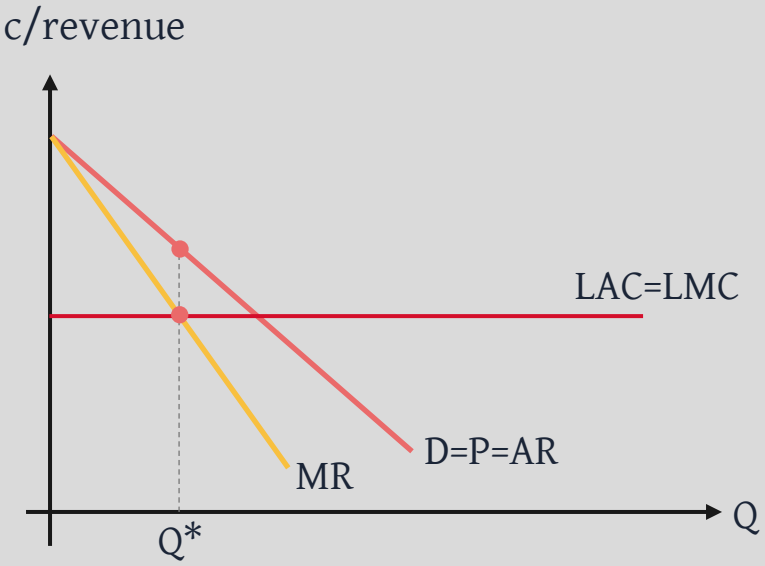
(3) Monopolist in the long-run



Since we have assumed that there are barriers to entry, monopolists tend to gain excess profit in the long-run, and therefore

› P_m > LAC > LMC

(4) Deadweight loss



Let's compare perfect competition and monopoly. Assumed that there is no advantages from market structure.

Consider surplus if the market is

› Perfectly competitive

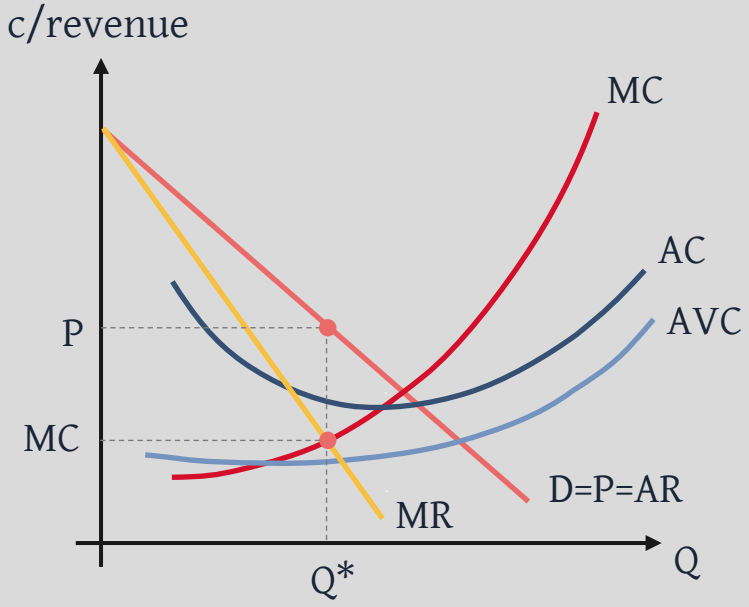
› Monopoly

Class #24

Market power and manipulation

Page 226-233

(5) Measuring market power



We can measure market power using **Lerner's index** defined as

› $L = \frac{P-MC}{P}$ where L is the Lerner's index $L \in [0,1]$

› If $L = 0$, it means that $P - MC = 0$ or there is no difference between price and marginal cost as in perfect competition.

› If $L = 1$, it means that $P - MC = P$ or $MC = 0$, there is marginal cost for this monopolist. Therefore, it possess all the market power.

› L can be large due to high P or low MC.

(5) Measuring market power

Imagine that the more either the monopolist set the price high or push the cost low, the market power this monopoly possess.

Example : Supposed a monopolist selling bottled water at 10 baht per bottle, compare the Lerner's index when this monopolist marginal cost is at 3 and 5 baht per bottle.

(5) Measuring market power

Another method is not directly a measurement of market power, but rather **concentration of a market**, known as **Herfindahl-Hirschman index** (H).

› $H = \sum_{i=1}^{N} s_i^2$

where H is the Herfindahl-Hirschman index,

$s_i \in [0,1]$ is market share of each firm

N is total number of firms in a market.

Example : A sugar industry between two towns, town A and B, has 3 sellers in each town.

Market share in town A is 50, 30 and 20 percent for each seller.

Market share in town B is 90, 7 and 3 percent for each seller.

Show that the sugar in town B is more concentrated.

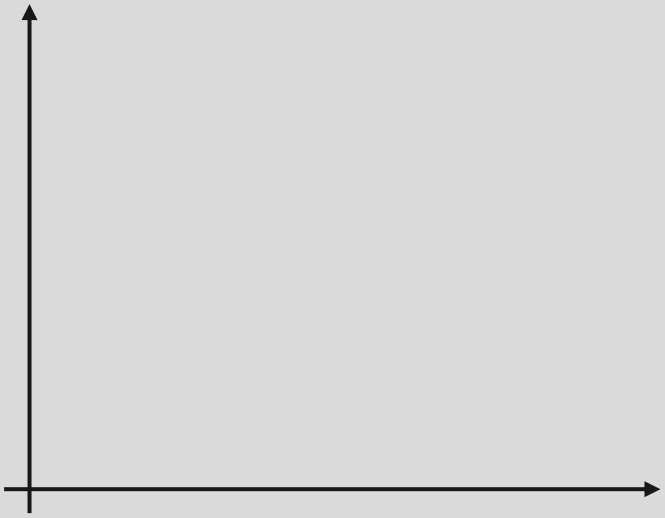
(6) Price discrimination

When a monopolist has market power and can earn excess profit in the long-run, monopolist can further manipulate market power to earn more profit.

Price discrimination is a tactic that monopolist manipulate market power to sell goods or services to different groups of consumer by characteristic of consumer, quantity, or time. They can set different price to gain profit from consumer surplus.

Price discrimination can be divided into three levels. There are also intertemporal price discrimination such as electronics devices at the beginning of its cycle can be sold at high price and cheaper later, or peak-load pricing such as plane tickets on weekdays and holidays.

(6) Price discrimination



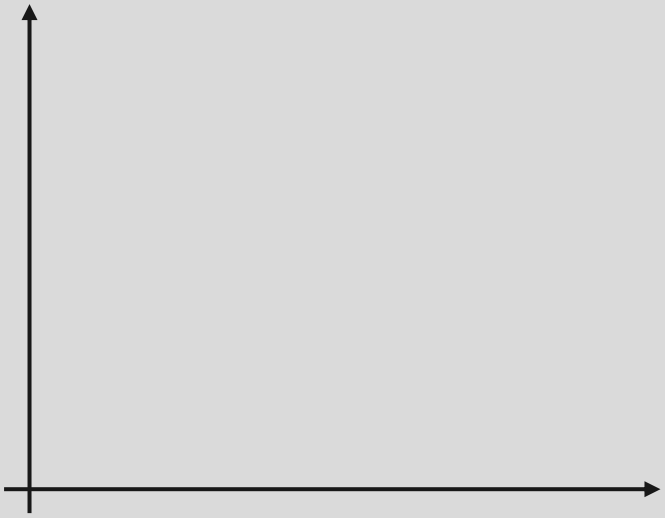
First-degree price discrimination

› Monopolist sets different prices to fit with all consumers' willingness to pay.

› Monopolist can earn all profit from consumer surplus.

› Monopolist needs to know all consumers' willingness to pay, hence, this is very unlikely practical.

(6) Price discrimination

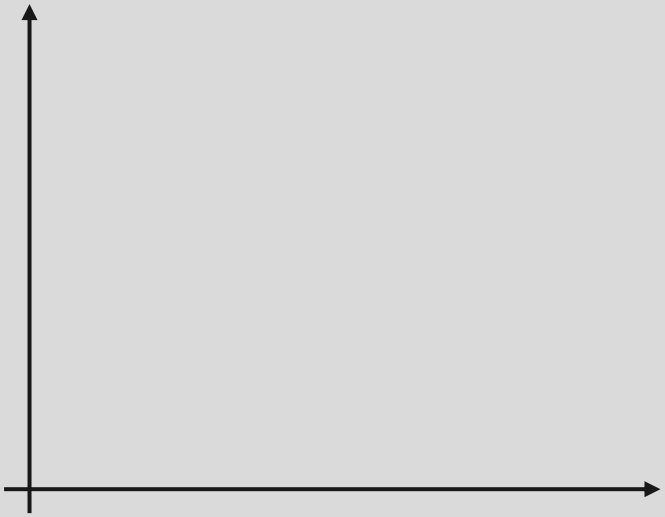


Second-degree price discrimination

› Monopolist can set prices differently for different numbers of sale.

› Monopolist can partially earn more profit from consumer surplus.

(6) Price discrimination



Third-degree price discrimination

› Consumers can be divided into at least two groups.

› Each group of consumers is differently elastic to price.

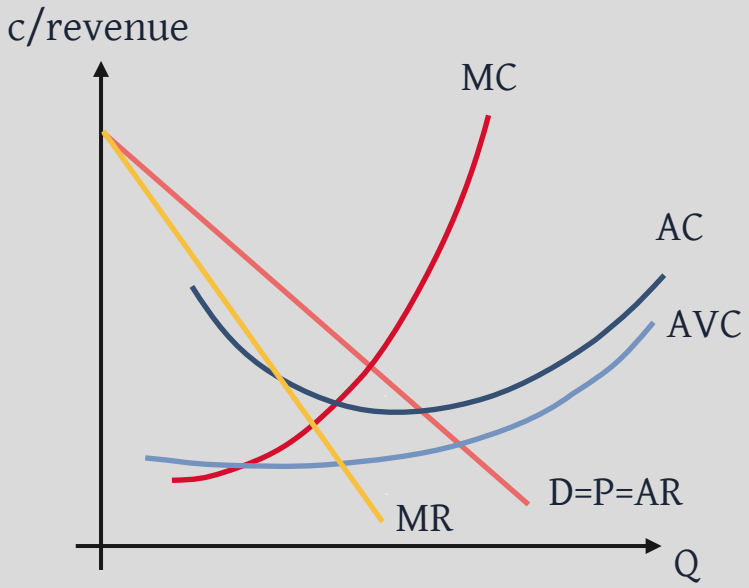
› Consumers cannot buy cheaply from one group to sell more expensively to another group. (Arbitrage)

Class #25

Intervene the monopolist and others

Page 234-239

(7) Breaking monopoly



Some markets are natural monopoly and most of them are public utility such as electricity, tap water, etc. Monopolists may be intervened to prevent taking advantage from consumers. Economic theory suggests two possible methods of price setting which are

› Ideal price : set price at $P = MC$

› Fair price : set price at $P = AC$

Setting the price to ideal price may sometimes, depending cost the cost of production, lead to loss of a monopolist. Policy maker should be careful that if the monopolist does not gain profit, product may not be remained in this market. Some subsidiary policies should also be coupled with price setting.

(1) Characteristics

› There are plenty of consumers and producers but not as many as in perfect competition.

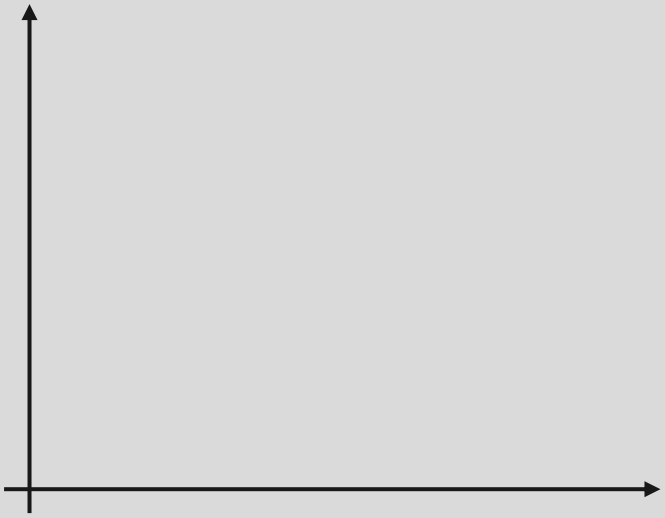
› Producers have market power, but not as much as in monopoly.

› There are minor differences between firms. Products can be easily substitutable.

› New firms can easily enter the market.

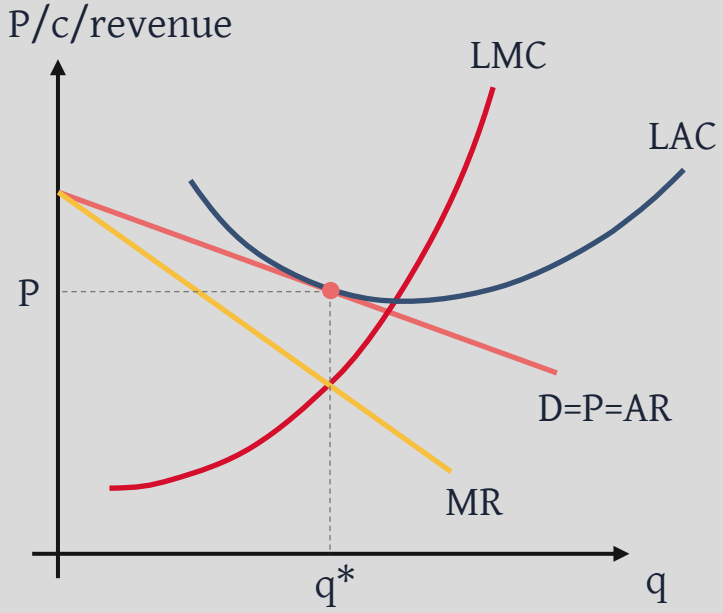
Example: can you list any product or service in monopolistic competitive market?

(1) Characteristics



Since the sellers in this market still gain some market power, but not as much compared to monopoly market, demand has a slight slope.

(2) Long-run equilibrium



As this market leans toward more onto perfect competition with many sellers and buyers, long-run equilibrium will be similar to the perfect competition but still

› $P_{mc} = LAC > LMC$

Characteristics

› Plenty of consumers but small number of producers. Oligopoly with two producers is called duopoly. Number of sellers needs not to be exact but rather depends on market share.

› Decision of one producer affects others' decision in the market

› Products can be both similar (Pure oligopoly) or differentiated (Differentiated oligopoly)

› Barriers to entry

Example: can you list any product or service in oligopoly market?

Chapter 6

Factor markets

Class #26

Factors market, MRP and VMP

Page 241-254

Flow of study in this chapter

› Understanding factor markets

First, we lay fundamental concept and comparison between product and factor market to further deepen the marginal concept.

› Demand for factors of production

Now we turn to firms side, who demand for factors of production and study how firms decide to choose each factor.

› Supply for factors of production

On the other hand, households are the agents supplying factors of production. Here we only cover basic understanding of each factor.

› Interaction between product and factor markets

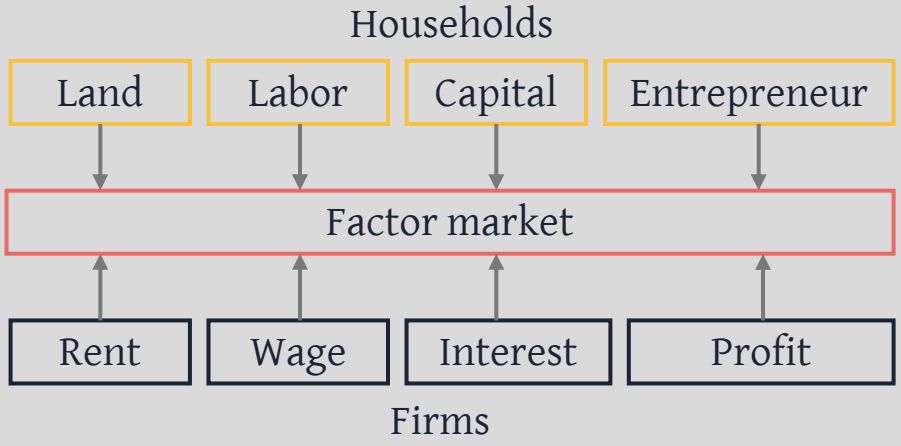
We attempt to understand how demand and supply for factors of production interact with product markets.

Further reading can be found in Pindyck and Rubinfeld (2018) Part 3, Chapter 14.

Introduction

Similar to the product markets, factor market is a context where factors of production are ‘traded’. The opposing aspect of these markets is the position of buyers and sellers

Firms now demand factors of production for their production process while households are willing to supply their factors of production. In return, households get compensation back as the opportunity cost. In other words, price is still a mechanism to settle down the agreement for those who demand and supply the factors.



Introduction

Factor market and product market are connected in almost every possible ways. Let's consider these examples.

› If middle classes in urban area grow in size, meaning that their purchasing power increases. There can be more demand for accommodations, leading to a higher demand for construction service, and lastly, more demand for labors which results in increasing wage.

› Assumed that the Bank of Thailand increases policy rate, both saving and lending rate also increase. The opportunity cost for capital becomes higher resulting in higher products and services price.

Methods used to study factor market are very similar to product market. Following Neoclassical school of economics, we rely on marginal analysis to study demand and supply side as we did in the previous chapters. Comparing with product market would portray how we are going to deal with this market, illustrated below.

Introduction

Product market

Buyers (households)	Sellers (firms)
› Assumed rationality, maximize utility.	› Assumed rationality, maximize profit.
› Marginal benefit = marginal cost.	› Marginal benefit = marginal cost.
$\frac{MU_x}{P_x} = \frac{MU_y}{P_y} = \cdots = \frac{MU_k}{P_k}$	$MR = MC$
Demand for products	Supply for products

Factor market

Buyers (firms)	Sellers (households)
› Assumed rationality, maximize profit.	› Assumed rationality, maximize utility.
› Marginal benefit = marginal cost.	› Marginal benefit = marginal cost.
Demand for factors	Supply for factors

(1) Definition

Therefore, the study will follow as usual, by considering demand for factors of production at first.

Definition 6.1

Demand for factors of production *is quantity of factors of production demanded by firms, at different level of price in a period of time.*

The interesting aspect of this demand for factors is that it is called '**derived demand**', meaning that this demand is derived from product demand, instead of genuinely demanded by firms. Logic of studying demand is as follows.

(1) Definition

› Firms demand factors of production for their production process, while seeking to maximize profit in product market.

› Having more quantity of factors leads to more output, while also increases the cost of production.

› A criterion to decide how many number of factors of production should be utilize depending on

Marginal benefit: how much revenue gain from having an increment unit of factor = **Marginal cost**: how much does it cost to have an incremental unit of factor.

(2) Marginal Revenue

For simplicity, firms only utilize capital and labor for their production. Hence, mainly we will focus on labor as in the short-run, labor is more flexible and most of the time we take labor as a variable factor.

Definition 6.2

Marginal revenue product *is additional revenue that a firm receive, from selling marginal product, when an incremental unit of factor is added into production process, defined as*

› $MRP = MP \; x \; MR$

where

MP *is marginal product from an incremental factor*

MR *is marginal revenue from selling a product.*

(2) Marginal Revenue

Example : In a perfect competition, $MR = 10$. Hiring 1 more unit of labor yields 2 units of marginal product. Find the MRP

What if a firm hires 2 more units of labor resulted in 3 united of marginal product, find the MRP.

(2) Marginal Revenue

Product market plays a very important role here. A firm in a perfectly competitive market and a monopoly has different level of market power. Hence, we define another variable to measure '**value**' of product below.

Definition 6.3

Value of marginal product *is the value of the marginal product in a market when an incremental unit of factor is added into production process, defined as*

› $VMP = MP \ x \ P$

where

MP *is marginal product from an incremental factor*

P *is price of product in a market.*

(2) Marginal Revenue

Example : In a perfect competition, $P = 10$. Hiring 1 more unit of labor yields 0.5 units of marginal product. Find the VMP

(2) Marginal Revenue

We firstly need to imposed an assumption that

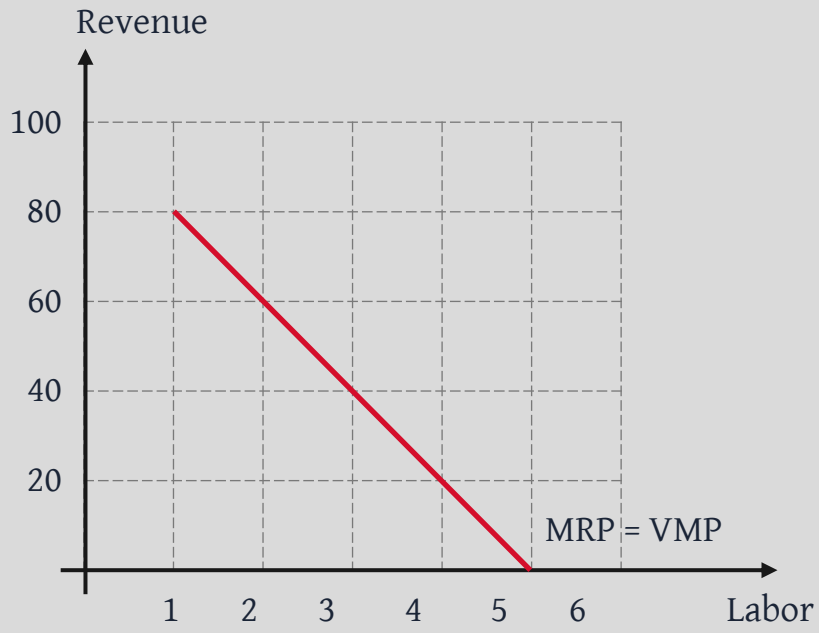
› Factor market is perfectly competitive.

› Product market can be both perfect competition or monopoly.

For perfect competition, we can be sure that $MRP = VMP$ since $MR = P$. However, for a monopoly case, $MR < P$, and therefore, $MRP \neq VMP$. See the example of tables and plots below.

(1) L	(2) q	(3) MP	(4) MR	(5) MRP	(6) VMP
1	8				
2	14				
3	18		10		
4	20				
5	20				
6	18				

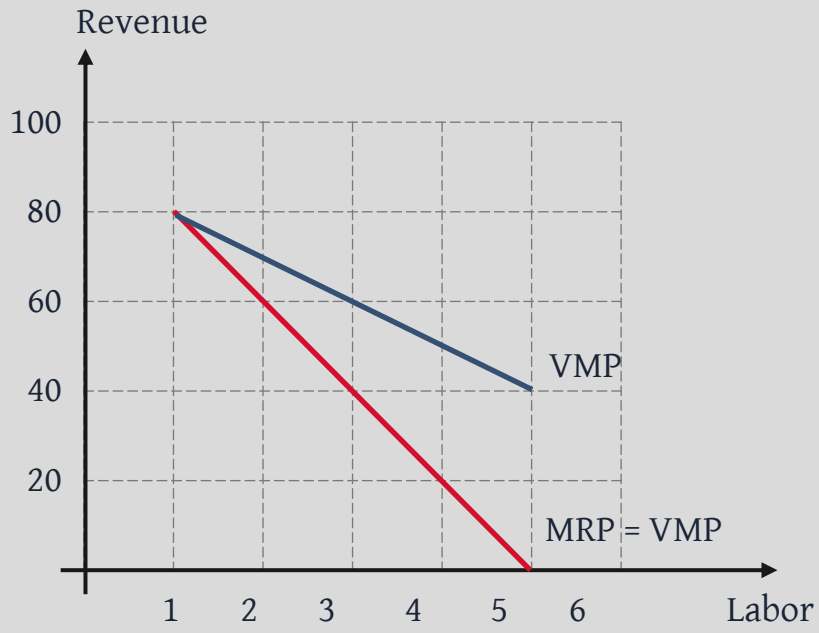
(2) Marginal Revenue



Since we are considering only labor, we are going to plot a relationship between MRP and L as follows.

What would happen to MRP when price increases while marginal product remains constant?

(2) Marginal Revenue



Recall that in a monopoly market, price and marginal revenue are two separate lines, resulting in $MR < P$ and $MRP < VMP$ as portrayed in the follow figure.

Class #27

Demand and supply for factors

Page 255-263

(3) Marginal Cost

Let's go back to analyze perfect competitive market, we have the marginal benefit part already. So, another part is the marginal cost, defined as

Definition 6.4

Marginal factor cost *is marginal cost for adding an incremental unit of factor into the production.*

› $MFC = \frac{\Delta TFC}{\Delta L}$

where

TFC *is total factor cost*

L *is number of factor (in this case, labor)*

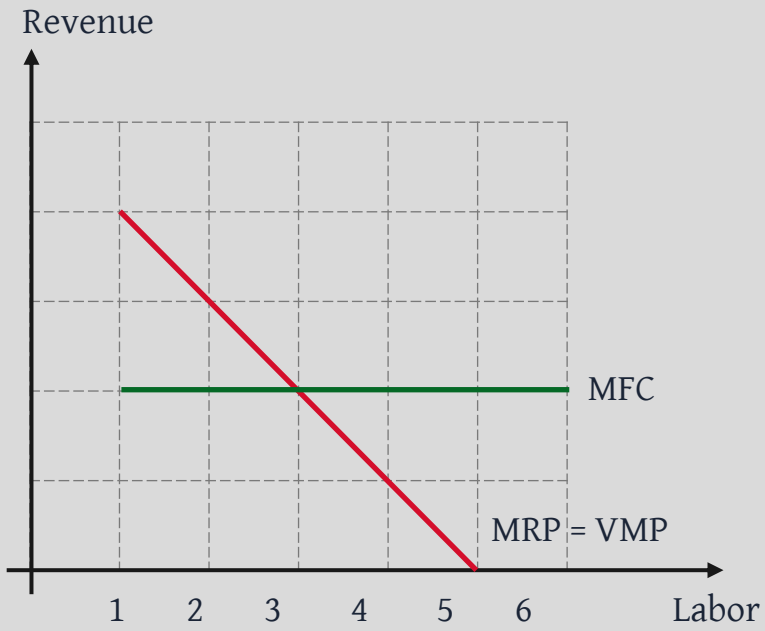
(3) Marginal Cost

Example : In a perfect competition, given that wage is 350 baht a day, find the MFC when a firm hires 2 more units of labor.

We can also, for the case of labor, define that

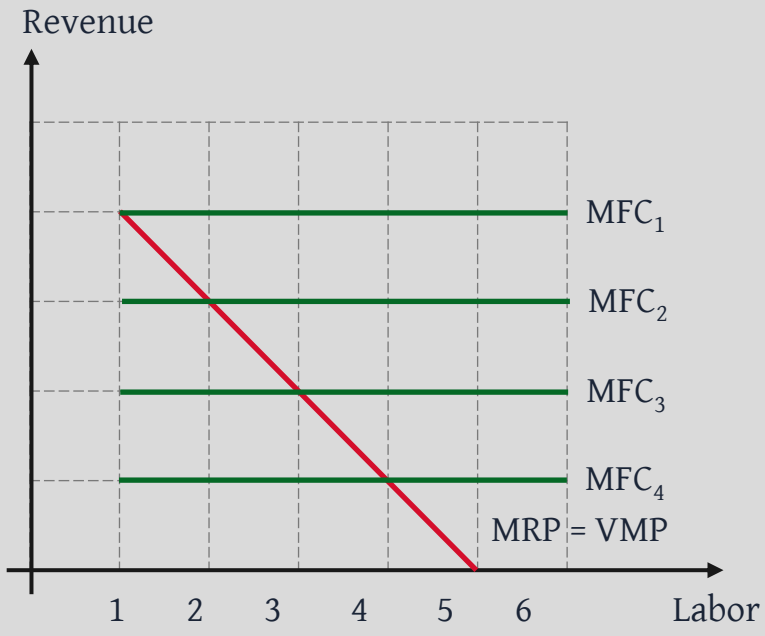
› $MFC =$

(3) Marginal Cost



Since we assumed that factor market is perfectly competitive, both firms (demand) and households (supply) are price taker. Therefore, wage is consistent no matter how many units of labor a firm hires. We can then plot MFC as in the figure here.

(4) Equilibrium



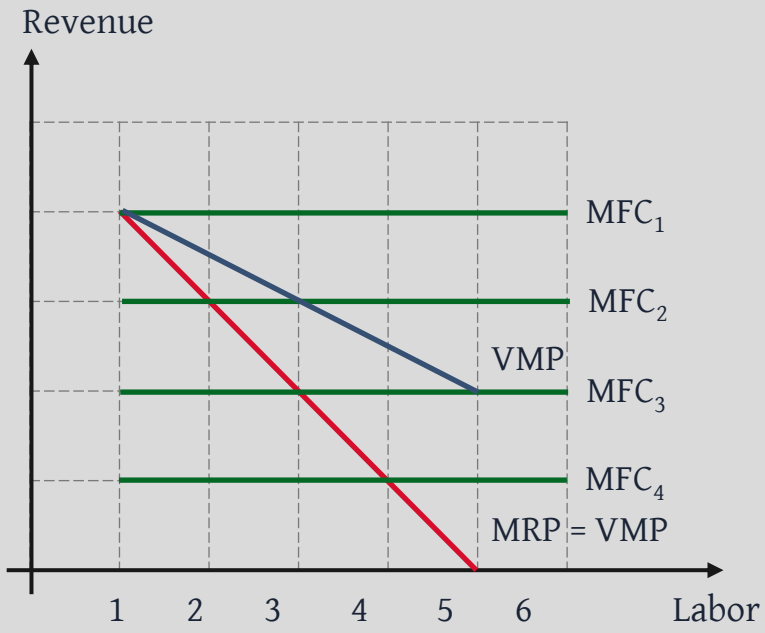
Firms will maximize their profit when the marginal benefit and marginal cost are equal. For this case,

› $MRP = MFC$

Assumed that product price remains constant, if we alternate wage, resulting in different level of MFC, each of the intersection represent firm's equilibrium.

Therefore, MRP is firm's demand for factor of production (or labor in this case).

(4) Equilibrium



Value of the product exceeds marginal revenue for a monopoly, implying that if a monopoly set the optimal quantity when $MR = MC$, the marginal cost compensated for factors of production is less that the market value of the product. This can be considered as an '**exploitation**'. We can see this concept clearer when we explore firm's equilibrium.

We can see clearly from this graph that when a product market is monopoly, there is a difference between value and cost of factor. It means that the further distance creates more exploitation. This seems fit with real-world scenarios.

Introduction

Supply for factors of production can be separately, roughly, analyzed by each factor. First of all, we define the supply as follows.

Definition 6.5

Supply for factors of production *is quantity of factors of production supplied by households, at different level of price in a period of time.*

Introduction

Each factor has a different specification. We should discuss each of them briefly here. For non-human factors, they are land and capital.

› **Land**, as a factor of production, is a space occupied for a production. Land may not be very elastic in the short-run but can be more elastic in the long-run. When land becomes more and more occupied, the elasticity becomes closer to zero. Price for land is rent, therefore, supply and rent are easily understandable that they directly vary.

› **Capital** price is interest rate. Therefore, this is quite easy because in economics, the higher the interest rate, the higher the saving and also supply for capital.

Introduction

Now for human factors, they are labor and entrepreneur. Most of the basic analyses leave entrepreneur out of the equation. Here we also assume their supply works the same way as labor supply.

To understand labor supply, we consider labor economics 101 with the assumptions here.

› People are rational, seeking to maximize their utility in everyday life.

› Choices are between to supply labor or to have some leisure.

› To supply labor is not the goal of receiving utility, but to gain compensation to further consume. We can then turn working hours to level of consumption, assumed that we have more budget to spend in product market as we work more. So, the choices become between consumption and leisure.

› We are constrained by time.

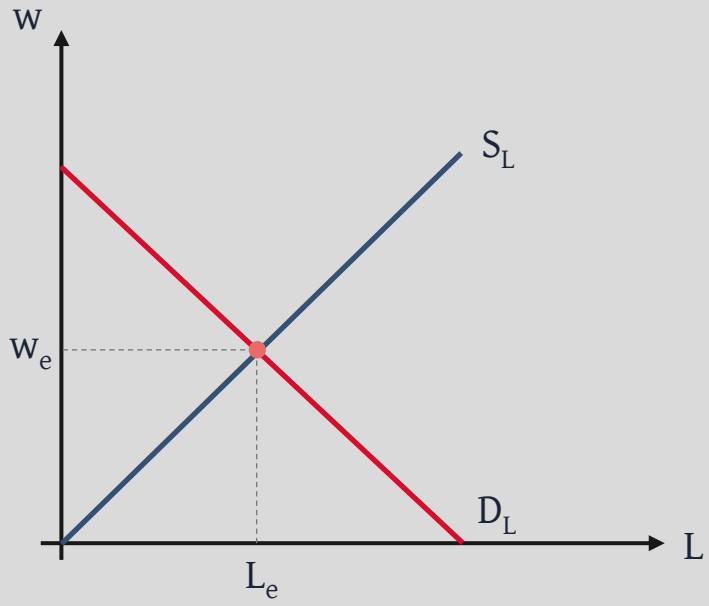
We simplify these assumption and come up with a supply line that **labor supply corresponding to wage**.

Class #28

Factor market and adjustment

Page 264-267

(1) Introduction



Demand and supply for labor are covered. Now let's take them both into the same graph, with an exception that we only consider before the supply curve bends.

The equilibrium in labor market is determined by demand and supply for labor. However, since the demand is derived from product market, when product price goes up or down, price change also affects equilibrium in labor market. On the other hand, if there is any external factor affecting labor supply, it also affects price in product market. So, we are studying two cases which are

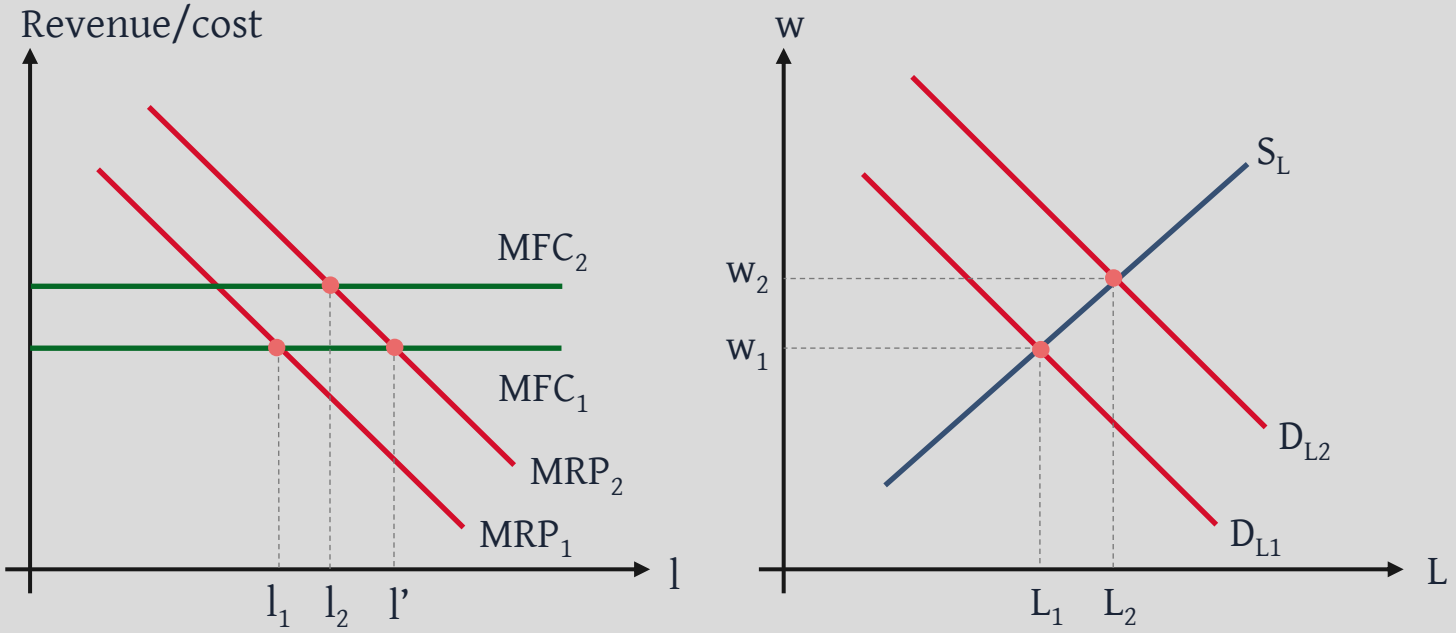
(2) Higher demand in product market

Let l be number of labor that a firm hires while L be total labor in an industry.

› Assumed price is driven upward by an external factor in product market, MRP shifts from MRP_1 to MRP_2.

› Every firm demands more labor from l_1 to l', driving total labor demand in this industry from D_{L1} to D_{L2}.

› Rising demand for labor causes wage increase from w_1 to w_2, leading to an increase in MFC (from MFC_1 to MFC_2)

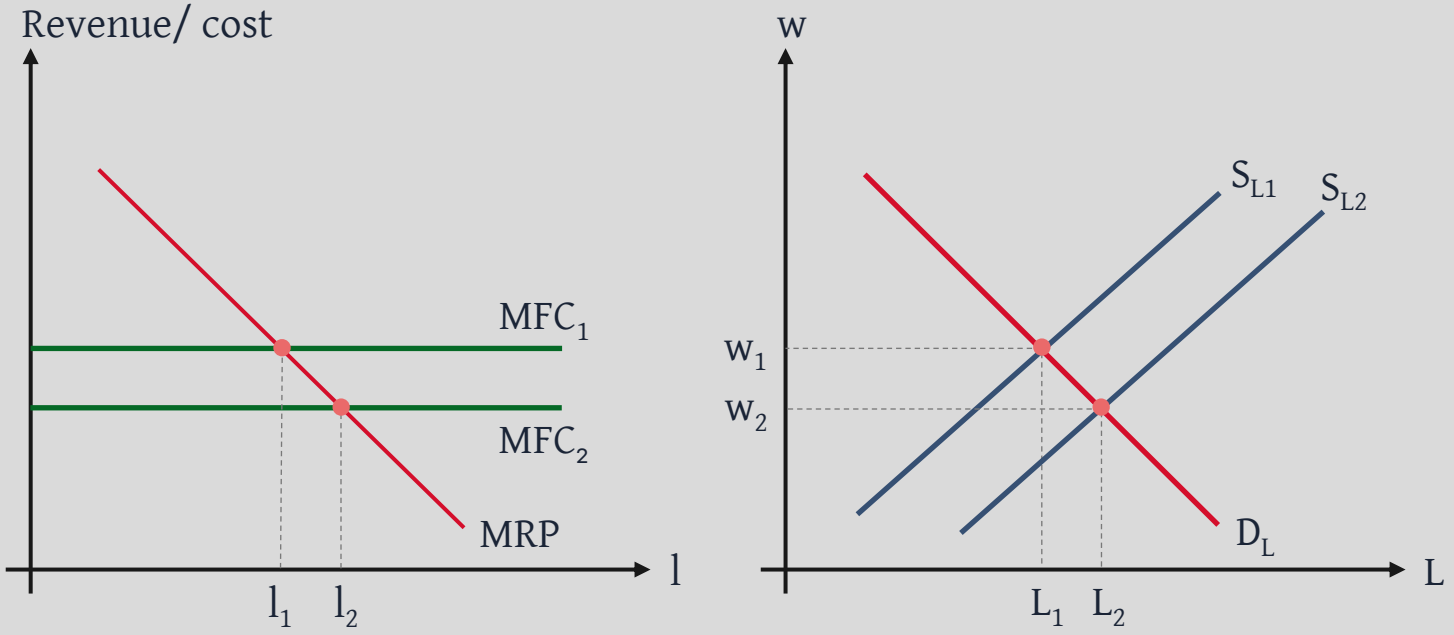


(3) Rising labor supply

› Assumed labor supply increases, i.e., more people join labor force, labor supply shifts from SL_1 to SL_2.

› Wage drops from w_1 to w_2.

› MFC drops from MFC_1 to MFC_2, labors are absorbed into an industry.



Chapter 7

Market Failures

Class #29

Externalities

Page 269-275

Flow of study in this chapter

› Definition of market failures

Imagine that if we human only rely on market as a resource allocation tool, market alone cannot sort out some specific types of good or service.

› Externalities

Many economic activities generate external effects. If they are not accounted for both cost and benefit, market price cannot signal the true cost and benefit which leads to inefficient price and quantity.

› Public goods

Some products or services cannot be allocated through pure market because they will not generate any profit due to their attributes.

› Asymmetric information

Information in the real world are limited for all agents. This may lead to inefficiency price set up and negotiation.

Further reading can be found in Pindyck and Rubinfeld (2018) Part 3, Chapter 10-11, and Part 4, Chapter 17-18.

Introduction

Oftentimes, price cannot act as a signal that represents true cost or benefit in our societies. Or if it can, it might not be an efficient tool to do so.

In this chapter, we should get to know the basic concept market failures, understand how it affects parties in the market system, and learn what and how our current policies have handled with the problems and what problems still persist in our economy today.

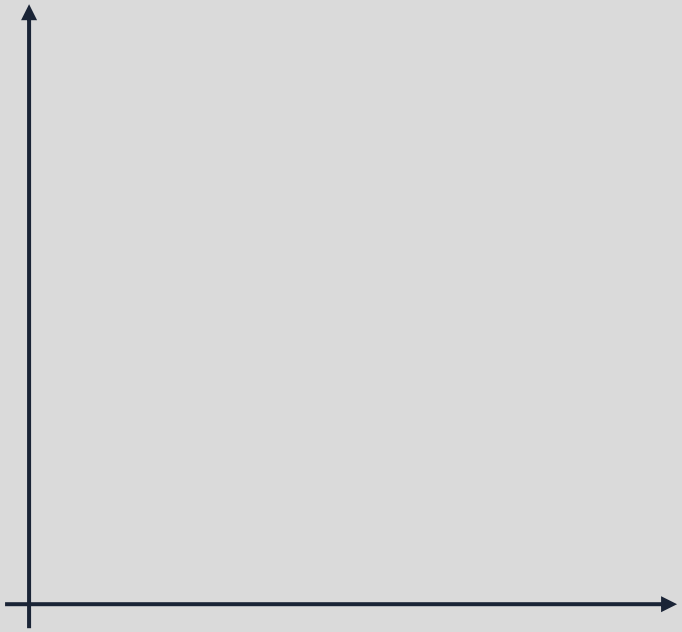
Moreover, is there any problem that market failures do not cover? In other words, what kind of failures exist in our society, stemmed for the market system.

Since we already discussed the market power and how to measure it in Chapter 5, we are going to start with externalities.

(1) Definition

Definition 7.1

Externalities *is the cost or benefit that affects a party who did not choose to incur that cost or benefit. Externalities often occur when a product or service's price equilibrium cannot reflect the true costs and benefits of that product or service.*

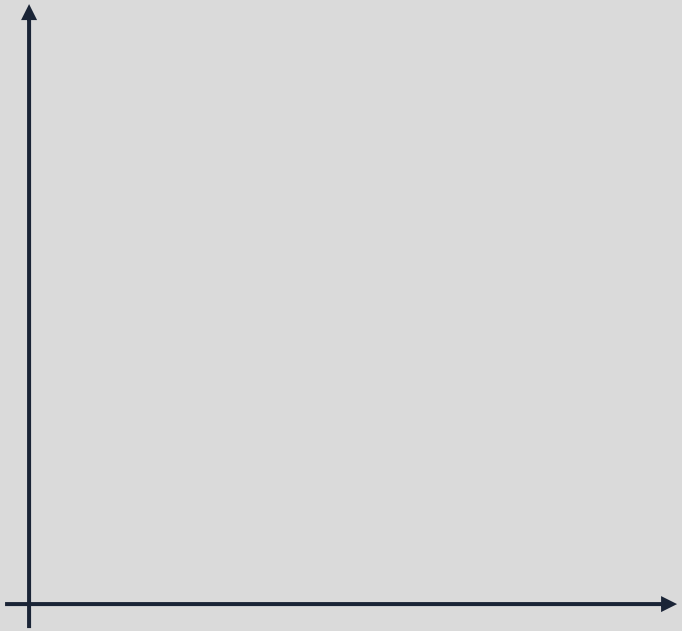


First of all, if a market is perfectly competitive, and there is no external effect, demand and supply can represent marginal social benefit (MSB) and marginal social cost (MSC) respectively.

When private benefit (cost) is not equivalent to social benefit (cost), there exist an externality.

(2) Negative externalities

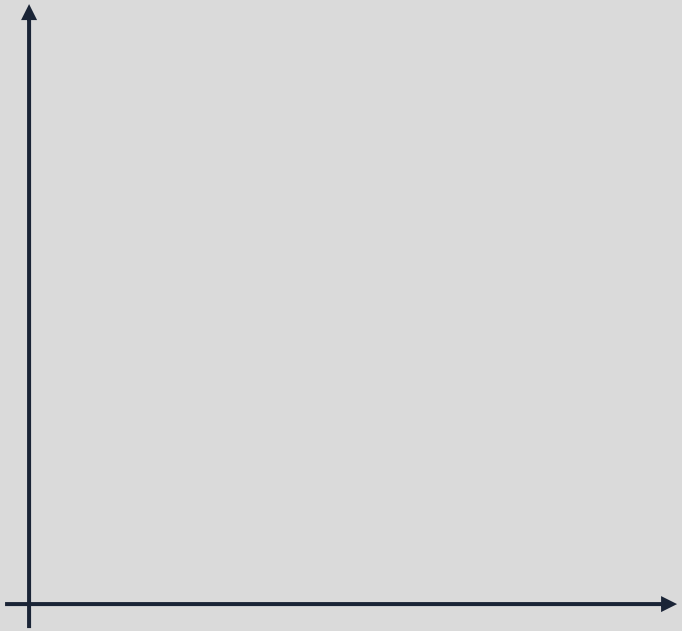
Negative externalities: a negative effect or cost incurred to a third-party irrelevant to a trade. The cost can be generated through either production or consumption process.



Draw some examples and illustrate deadweight loss in the graph.

(3) Positive externalities

Positive externalities: a “fringe” benefit incurred to a third-party, again irrelevant to a trade. The benefit can be generated through either production or consumption process.



Draw some examples and illustrate deadweight loss in the graph.

(4) Remedial measures

How can we tackle these externalities, both negative and positive?

Class #30

Public goods and asymmetric infor.

Page 276-284

(1) Definition

Definition 7.2

Public goods *is a product that is both non-excludable and non-rivalrous, that individuals cannot be excluded from use or could be enjoyed without paying for it, and where use by one individual does not reduce availability to others or the goods can be consumed simultaneously by more than one person.*

To depict a clearer picture, excludability and rivalry in consumption must ne defined.

Excludability is a characteristic of a product or service whether it can be excluded for those who pay for it.

Rivalry in consumption is also another characteristic that defines if a product or service can be simultaneously consumed by more than one person, or strictly speaking consumption does not induce marginal cost.

(2) Examples

If we divide types of goods by these characteristics, it can be sorted into 2 x 2 table on the below.

		Rivalrous ✓	Rivalrous ✗
Excludable	✓	**Private goods** › Ice-cream › Clothes › Congested toll	**Club goods** › Local facilities › Netflix › Non-congested toll
	✗	**Common resources** › Fishing › Lumbering › Congested road	**Public Goods** › Lighthouse › Public defense › Non-congested road

(3) Problems and remedial measures

› No private firm would invest in any public good since they cannot return any profit.

› Consumers can enjoy utilizing public goods without paying a price, which we call them as **'Free Rider'**.

So how can we tackle this problem?

(1) Definition

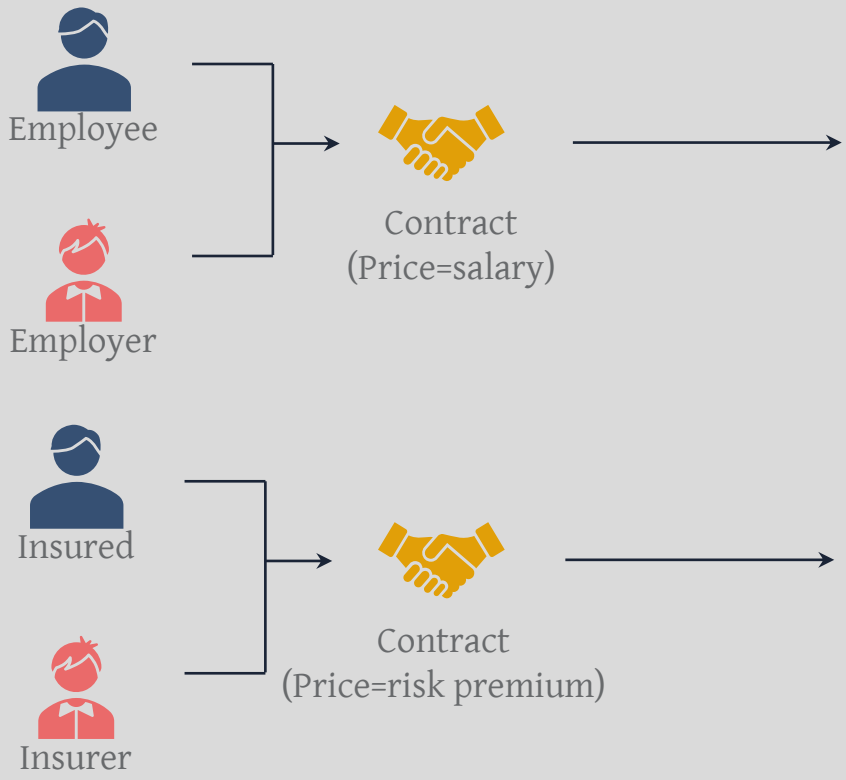
Definition 7.3

Asymmetric information *deals with a situation when making decisions in transactions where one party has more or better information than the other. This asymmetry creates an imbalance of power in a transaction.*

Two basic problems arise with asymmetric information which are **moral hazard** and **adverse selection.**

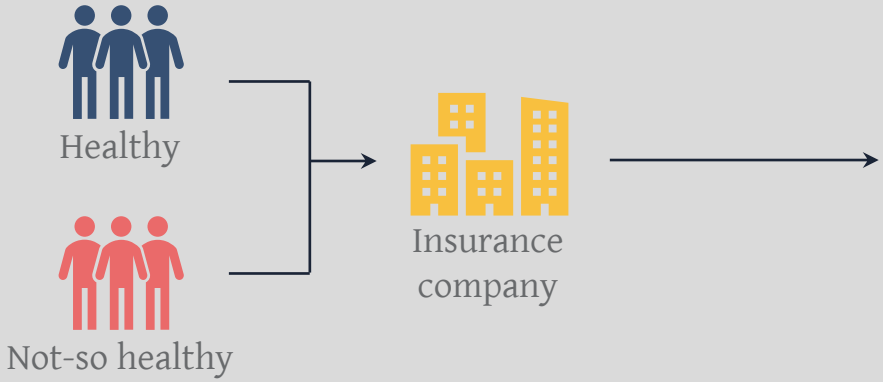
(2) Moral Hazard

Moral Hazard occurs when someone increases their exposure to risk when insured, especially when a person takes more risks because someone else bears the cost of those risks. Furthermore, it can be a situation when behavior changes after a contract is signed since another party cannot keeps monitoring.



(3) Adverse Selection

Adverse Selection is when traders with better private information about the quality of a product selectively participate in trades which benefit them the most, at the expense of the other trader.



(4) Remedial measures

What kind of measures can remedy the asymmetric information?

Concluding remarks