MICROECONOMICS

Authors
NurNaddia Nordin
NurHaiza Nordin

For information contact: naddia.n@umk.edu.my

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INTRODUCTION

This book as guidance to students for course Microeonomics offered at Faculty of Entrepreneurship and Business, Universiti Malaysia Kelantan.

AIMS

The main purpose of this book is to gives practical and guidance to students with a basic understanding of microeconomics. Yhis module caters to first level undergraduate students.

LEARNING OUTCOME

At the end of this book, student able to:

1. Discuss various issues, concepts and theories of microeconomic (PLO1, C3)
2. Apply relevant concepts and tools to address microeconomic problems (PLO2, PLO5, P2, A2,CS3)
3. Discuss microeconomic current issues and challenges in the context of microeconomic problems.(PLO6, CTPS3, A2)

SYNOPSIS

This book is written in eleventh chapters and gives practical and guidance to students with a basic understanding of microeconomics. The first chapter offers readers an overall picture of economics while the subsequent chapters cover various concepts, theories and issues in the study of microeconomics.The questions are carefully selected from various sources available to provide students with a valuable insight into the examination need. It is hoped that this module will help students to master the needed knowledge and at the same time be prepared for their examinations.

CHAPTER

1

INTRODUCTION TO ECONOMICS

LEARNING OUTCOME

At the end of this chapter, students are able to:
i. Understand the concept of an economics.
ii. Explain the basic concept of economics
iii. Differentiate between microeconomics and macroeconomics

CHAPTER OUTLINE

1.1 Introduction
1.2 Definition of Economics
1.3 What Economics Is All About
1.4 Ten principles in economics
1.5 Thinking like an economist
1.6 Model In Economic:
1.7 Positive and Normative economics
1.8 Microeconomics and Macroeconomics

1.1 Introduction

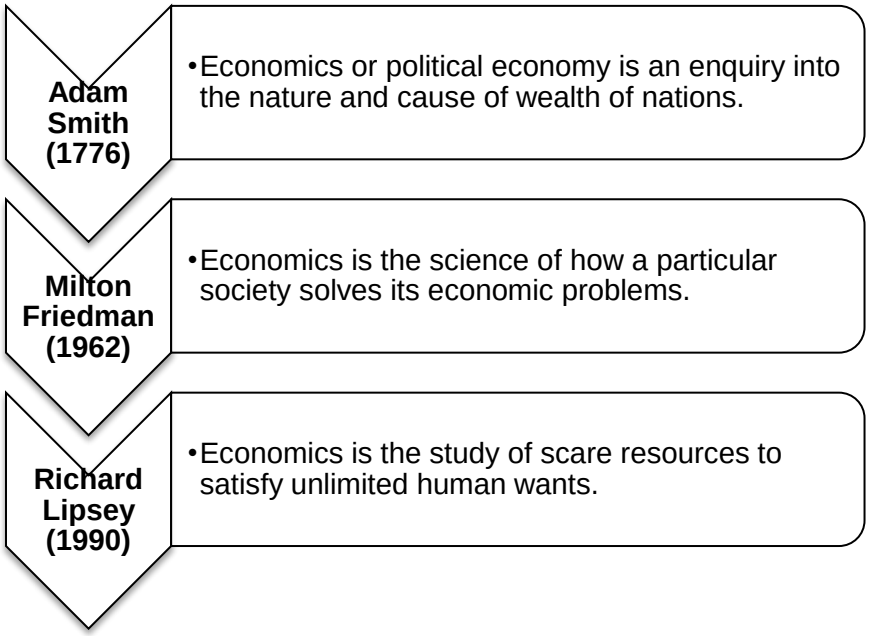
Economics is one of the most important aspects to be explored and understood by people. The nature of human beings is to have unlimited wants or desires, such as cloths, gadgets, cars, houses, properties, entertainments and so on. They will strive to fulfill their unlimited wants, in order to gain maximum satisfaction in life.

However, economics is an entity that faces the obstacle of limited resources or limited factors of production. Even though society is blessed with the different functions and benefits of resources, such as land, labour, capital, entrepreneur and natural resources, society will still encounter the problem of scare resources. Therefore, economics is a social science which is concerned with the efficient allocation of scare resources to achieve the maximum satisfaction of human's unlimited wants.

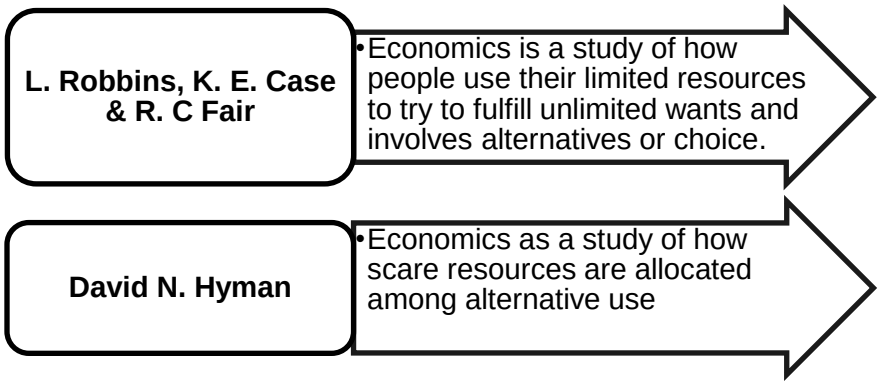
1.2 Definition of Economics

Basically, there are wide definitions of economics as a social science. The word 'economy' comes from a Greek word which means 'one who manages a household'. There are some quotations from famous economists:

1.2.1 Definition from Economist



1.2.2 Definition from text Books



Generally, economics is a study of how people and society organize scare and limited resources to produce goods and services to satisfy unlimited human wants. Society is divided into four main groups namely households, firms, governments and foreign sectors. Resources are also known as factor of productions. They are inputs that are used to produce goods and services in the economy. There are four factors of production used in the production process (land, labour, capital and entrepreneur).

1.3 What Economics Is All About

Economics:The study of how society manages its scarce resources,

Example

- How people decide what to buy.
- How much to work, save, and spend.
- How firms decide how much to produce.
- How many workers to hire.
- How society decides how to divide its resources between national defense, consumer goods, protecting the environment, and other needs.

Resources

- Inputs is a factors of production (Used to produce goods and services).
- Goods and services are scarce because resources are scarce
- Example resources
    - Labor
    - Capital
    - Natural resources
    - Entrepreneurial ability

1. **Labour** is a human effort. Can be divided by two

1. Physical effort
2. Mental effort

The Payment for labor is in terms of wage

2. **Capital** is a human creation. Can be divided by two

1. Physical capital
2. Human capital

The Payment in terms of Interest (ex: the interest get from the investment of capital)

3. **Natural resources** is a gifts of nature

- Renewable
- Exhaustible

Payment in term of Rent

4. **Entrepreneurial ability**

- Talent, idea
- Risk of operation

Payment in term of Profit

1.4 Ten principles in economics

Part 1: The Principles of How People Make Decisions

Decision-making is at the heart of economics.The individual must decide how much to save for retirement, how much to spend on different goods and services, how many hours a week to work. The firm must decide how much to produce, what kind of labor to hire. Society as a whole must decide how much to spend on national defense ("guns") versus how much to spend on consumer goods ("butter").

Principle 1: People Face Tradeoffs

All decisions involve tradeoffs. Examples:

- Going to a party the night before your midterm leaves less time for studying.
- Having more money to buy stuff requires working longer hours, which leaves less time for leisure.
- Protecting the environment requires resources that could otherwise be used to produce consumer goods.

Society faces an important tradeoff: (*efficiency vs. equality)*

- Efficiency: when society gets the most from its scarce resources
- Equality: when prosperity is distributed uniformly among society's members

Tradeoff: To achieve greater equality, could redistribute income from wealthy to poor. But this reduces incentive to work and produce, shrinks the size of the economic "pie."

"Redistribute income from wealthy to poor" is accomplished through the progressive tax system, as well as social programs like food stamps and unemployment insurance that try to provide a safety net for people at the low end of the income distribution.

"But this reduces the incentive to work" – the reward for working hard is a high income. Taxes reduce this reward, and therefore reduce the incentive to work hard.

Principle 2: The Cost of Something Is What You Give Up to Get It

Making decisions requires comparing the costs and benefits of alternative choices.

The **opportunity cost** of any item is whatever must be given up to obtain it. It is the relevant cost for decision making.

Examples:

The opportunity cost of…

1. going to college for a year is not just the tuition, books, and fees, but also the foregone wages.
2. seeing a movie is not just the price of the ticket, but the value of the time you spend in the theater.

Principle 3: Rational People Think at the Margin Rational people

Systematically and purposefully do the best they can to achieve their objectives.

Make decisions by evaluating costs and benefits of **marginal changes** incremental adjustments to an existing plan.

Examples:

- When a student considers whether to go to college for an additional year, he compares the fees & foregone wages to the extra income he could earn with the extra year of education.
- When a manager considers whether to increase output, she compares the cost of the needed labor and materials to the extra revenue.

Principle 4: People Respond to Incentives

Incentive: something that induces a person to act, *i.e.* the prospect of a reward or punishment.
Rational people respond to incentives.
Examples:

- When gas prices rise, consumers buy more hybrid cars and fewer gas guzzling SUVs.
- When cigarette taxes increase, the number of smoking will falls.

Part II : The Principles of How People Interact

Whether we're talking about the Malaysia economy, or the local economy, the term "economy" simply means a group of people interacting with each other. These interactions play a critical role in the allocation of society's scarce resources. For example, the interaction of buyers and sellers determines the prices of goods and the amounts produced and sold. These interactions are an important part in the economic.

Principle 5: Trade Can Make Everyone Better Off

Rather than being self-sufficient, people can specialize in producing one good or service and exchange it for other goods.
Countries also benefit from trade and specialization:

- Get a better price abroad for goods they produce
- Buy other goods more cheaply from abroad than could be produced at home

If each person had to grow his own food, make his own clothes, cut his own hair, we would have a world full of skinny, unfashionable poor people having bad hair days every day of the week.

It's far more efficient for each person to specialize in producing a good or service, and then exchanging it with other people for the things they produce.

The same principles apply at the national and international level: International trade allows countries to sell their exports abroad and get a higher price, and to buy things from abroad more cheaply than they could produce at home.

In addition, trade gives a country's consumers access to a greater variety of goods, including goods they might not be able to get at all.

Principle 6: Markets Are Usually A Good Way to Organize Economic Activity

Market is a group of buyers and sellers (need not be in a single location). "Organize economic activity" means determining

- What goods to produce
- How to produce them
- How much of each to produce
- Who gets them

A market economy is "decentralized," meaning that there is no government committee that makes the decisions about what goods to produce and so forth. Instead, many households and firms make their own decisions:

- Each of many households decides who to work for and what goods to buy.
- Each of many firms decides whom to hire and what goods to produce.

A market economy allocates resources through the decentralized decisions of many households and firms as they interact in markets.
Famous insight by Adam Smith in *The Wealth of Nations* (1776):

- Each of these households and firms acts as if "led by an invisible hand" to promote general economic well-being.

The invisible hand works through the price system:

- The interaction of buyers and sellers determines prices.
- Each price reflects the good's value to buyers and the cost of producing the good.
- Prices guide self-interested households and firms to make decisions that, in many cases, maximize society's economic well-being.

Principle 7: Governments Can Sometimes Improve Market Outcomes

Important role for government: enforce property rights (with police, courts). People are less inclined to work, produce, invest, or purchase if large risk of their property being stolen. Market failure happen when the market fails to allocate society's resources efficiently

Causes:
Externalities, when the production or consumption of a good affects by standers (*e.g.* pollution). Market power, a single buyer or seller has substantial influence on market price (*e.g.* monopoly). In such cases, public policy may promote efficiency**.** Government may alter market outcome to promote equity.

If the market's distribution of economic well-being is not desirable, tax or welfare policies can change how the economic "pie" is divided.

Part III: The Principles of How The Economy As A Whole Works

Principle 8: A country's standard of living depends on its ability to produce goods & services.

Huge variation in living standards across countries and over time: Average income in rich countries is more than ten times average income in poor countries. The U.S. standard of living today is about eight times larger than 100 years ago

- "Rich countries" refers to countries like the U.S., Japan, and Germany.
- "Poor countries" refers to countries like India, Indonesia, and Nigeria.

The most important determinant of standards of living is productivity (the amount of goods and services produced per unit of labor). Productivity depends on the equipment, skills, and technology available to workers. Other factors (*e.g,* labor unions, competition from abroad) have far less impact on standards of living.

Principle 9: Prices rise when the government prints too much money.

Inflation happens when there are increases in the general level of prices. In the long run, inflation is almost always caused by excessive growth in the quantity of money, which causes the value of money to fall. The faster the government creates money, the greater the inflation rate.

Principle 10: Society faces a short-run tradeoff between inflation and unemployment

In the short-run (1 – 2 years), many economic policies push inflation and unemployment in opposite directions. Other factors can make this tradeoff more or less favorable, but the tradeoff is always present.

While the long-run effect of increasing the quantity of money is inflation, the short-run effects are more complicated and controversial. However, most mainstream economists believe the following: An increase in the quantity of money causes spending to rise, which causes prices to rise, which induces firms to produce more goods and services, which requires that they hire more workers. Hence, in the short-run, increasing the quantity of money causes inflation to rise, but unemployment to fall. Of course, reducing the quantity of money would have the opposite effects (inflation would fall, while unemployment would rise) in the short run.

1.5 Thinking like an economist

The Economist as Scientist
Economists play two roles:
1. Scientists: try to explain the world
2. Policy advisors: try to improve it

In the first, economists employ the scientific method, the dispassionate development and testing of theories about how the world works.

Assumptions & Models
Assumptions simplify the complex world, make it easier to understand.

Example:
To study international trade, assume two countries and two goods. Unrealistic, but simple to learn and gives useful insights about the real world.

Model: a highly simplified representation of a more complicated reality. Economists use models to study economic issues.

1.6 Model In Economic:

1.6.1 The Circular-Flow Diagram

The **Circular-Flow Diagram**: A visual model of the economy, shows how money (Ringgit Malaysia (MYR)) flow through markets among households and firms.
Assumptions:

- Two types of "actors":
  - Households
  - firms

- Two markets:
  - the market for goods and services
  - the market for "factors of production"
    - **Factors of production:** the resources the economy uses to produce goods & services, including labor, land and capital (buildings & machines used in production)

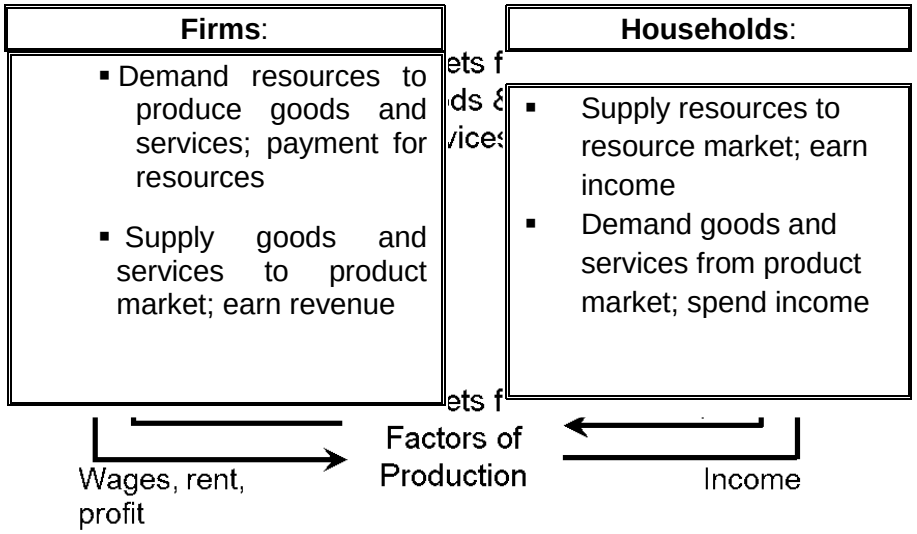


Figure 1: The Circular-Flow Diagram

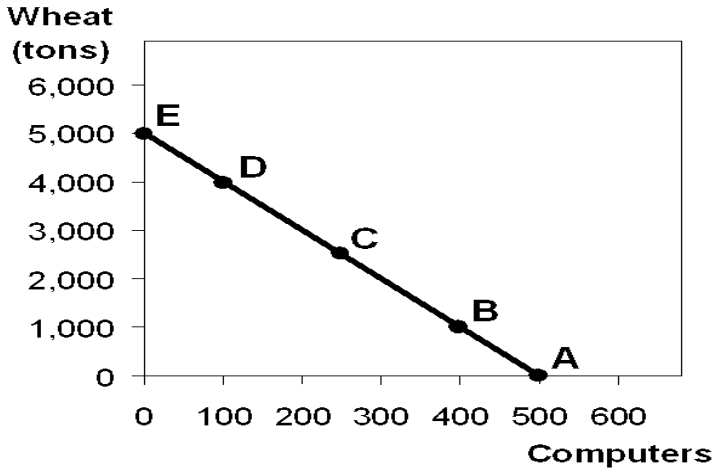
In this diagram, the green arrows (outer arrow) represent flows of income/payments. The red arrows (inner arrow) represent flows of goods & services (including services of the factors of production in the lower half of the diagram).

1.6.2 The Production Possibilities Frontier

The **Production Possibilities Frontier (PPF)** is a graph that shows the combinations of two goods the economy can possibly produce given the available resources and the available technology.

Example:

- Two goods: computers and wheat
- One resource: labor (measured in hours)
- Economy has 50,000 labor hours per month available for production.



Explanations:
This PPF curve shows the combination of two goods that is computer and wheat. At point E, show the 50, 000 labors produced 5000 wheat and no production of computers, means that with the one resource only produce one production, at point D, with the 50,000 labor can produce 4000 wheat and 100 computers.

1.6.3 Production Possibilities

A production possibility is used to explain the basic economic concepts of production efficiency, trade off and opportunity cost.

The Production Possibilities Frontier (PPF) or Production Possibilities Curve (PPC)

The **Production Possibilities**: a graph that shows the various combinations of two goods the economy can possibly produce given the available resources (labor, land and capital) and the available technology.
Assumptions under production possibility:

- The economy is operating in full employment and full production capacity (full efficiency).
- The amount of resources available is fixed.
- The state of technology does not change throughout the production.

1.6.4 The Shape of the PPF

The PPF could be a straight line or bow-shaped or convex.
Depends on what happens to opportunity cost as economy shifts resources from one industry to the other.

- If opportunity cost remains constant, PPF is a straight line. (In the example, opp. cost of a computer was always 10 tons of paddy)
- If opportunity cost of a good rises as the economy produces more of the good, PPF is bow-shaped.
- If opportunity cost of a good decrease as the economy produces more of the good, PPF is convex.

Example:

- Two goods: computers and paddy.
- One resource: labor (measured in hours).
- Economy has 50,000 labor hours per month available for production.
  - Producing one computer requires 100 hours labor.
  - Producing one ton of paddy requires 10 hours labor.

	Employment of labor hours	
	Computers	**Paddy**
A	50,000	0
B	40,000	10,000
C	25,000	25,000
D	10,000	40,000
E	0	50,000

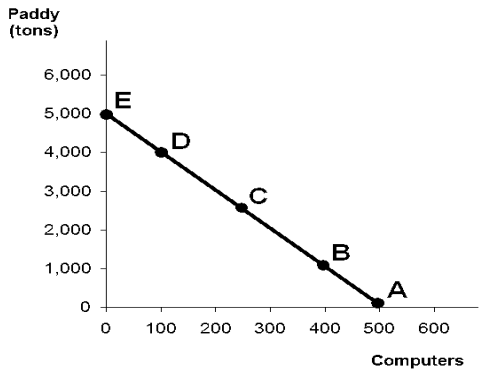
Explanations of tables:
The second and third column is the combination if distributed the total hours of labor for the two productions (computers and paddy).

- Combination A, if we use all the 50,000 hours labor to produce computer and no hours of labor to produce paddy.
- Combination B, if we use 40,000 hours labor to produce computer and 10,000 hours of labor to produce paddy.
- Combination C, if we use 25,000 hours labor to produce computer and 25,000 hours of labor to produce paddy.
- Combination D, if we use 10,000 hours labor to produce computer and 40,000 hours of labor to produce paddy.
- Combination E, if there is no allocation hours of labor to produce computer and 50,000 of labor to produce paddy.

Then based on the assumption that to produce one computer requires 100 hours labor and to produce one ton of paddy requires 10 hours labor. So, we can find the production of computer and paddy.

	Employment of labor hours				**Production**	
	Computers	**Paddy**	**Computers**	**Paddy**	**Computers**	**Paddy**
A	50,000	0	50,000/100 = 500 C	0/10 = 0 P	500	0
B	40,000	10,000	40,000/100 = 400 C	10,000/10 = 1000 P	400	1000
C	25,000	25,000	25,000/100 = 250 C	25,000/10 = 2500 P	250	2500
D	10,000	40,000	10,000/100 = 100 C	40,000/ 10 = 4000P	100	4000
E	0	50,000	0/100 = 0 C	50,000 /10 = 5000 P	0	5000

From the combination of the production, the curve of production possibilities can be draw as below: (The curve maybe straight line or bowed out depends opportunity cost)



From The PPF: We Can Know That

Points on the PPF (like A – E)

- Possible
- efficient: all resources are fully utilized

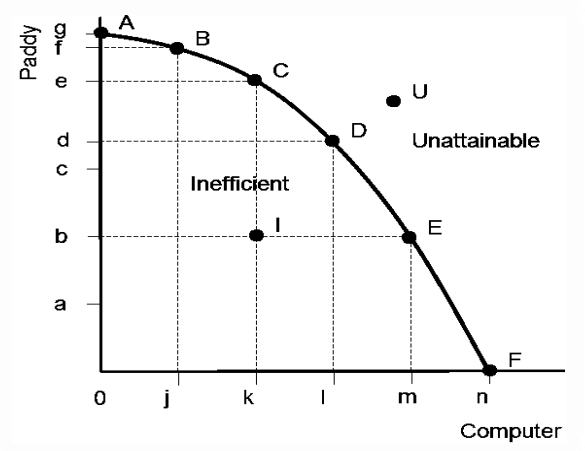
Points under the PPF

- possible
- not efficient: some resources underutilized (*e.g.,* workers unemployed, factories idle)

Points above the PPF (like G)

- not possible

Example for the production possibilities of convex (bowed out)

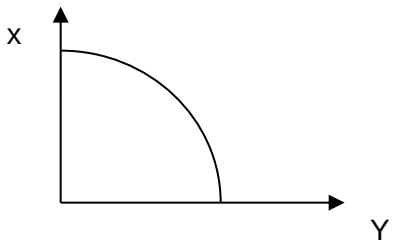


The production possibility (point A - F): Economy uses all resources and technology efficiently

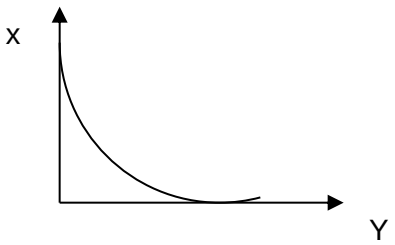
The shape of curve is bowed out based on the law of increasing opportunity cost. The Inefficient point: inside PPF (point I). The unattainable point (point U) outside of PPF.

TYPE OF PPC/PPF

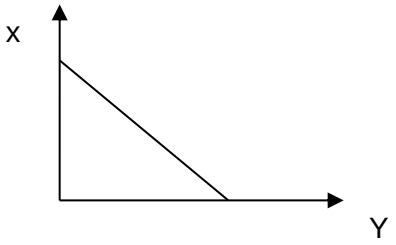
1. Increasing opportunity cost



2. Decreasing opportunity cost

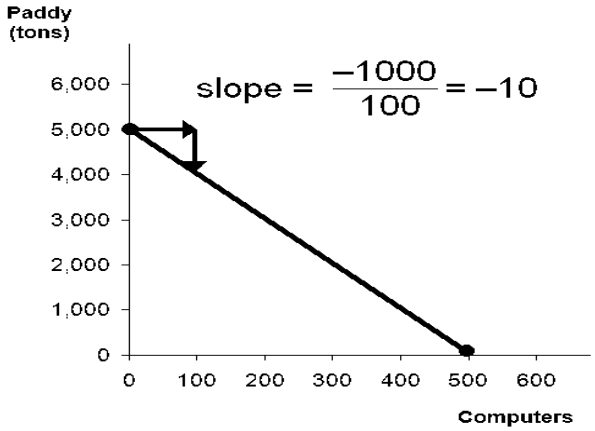


3. Constant opportunity cost



1.6.7 Opportunity Cost

The **opportunity cost** of an item is what must be given up to obtain that item. Moving along a PPF involves shifting resources (*e.g.*, labor) from the production of one good to the other. Society faces a tradeoff: Getting more of one good requires sacrificing some of the other. The slope of the PPF tells you the opportunity cost of one good in terms of the other.



The slope of a line equals the "rise over the run," the amount the line rises when you move to the right by one unit. Here, the opportunity cost of a computer is 10 tons of paddy.

Here, the "rise" is a negative number, because, as you move to the right, the line falls (meaning wheat output is reduced). Moving to the right involves shifting resources from the production of wheat (which causes paddy output to fall) to the production of computers (which causes computer production to rise). Producing an additional computer requires the resources that would otherwise produce 10 tons of paddy.

Example of Calculation opportunity cost

Production	**Combinations**				
	A	**B**	**C**	**D**	**E**
Computer (million)	0	50	100	150	200
Radio(million)	200	180	150	60	0

Calculate the opportunity cost of

1. Producing 50 millions Computer
   200 – 180 = 20 millions radio
2. Producing 150 millions Radio
   200 – 60 = 140 millions radio
3. When the production of computer increases from 100 million to 200 millions
   150 – 0 = 150 millions radio

1.6.8 Three main points from PPF:

- Production efficiency
- Tradeoff
- Opportunity Cost

1. **Production efficiency**
   - is when we cannot produce more of one good without producing less of some other good. When production is efficient, we are at a **point on the PPF.**
   - If the point is inside PPF- production is inefficient because there are some unused resources
   - If the point is outside the PPF – it is unattainable with the existing resources

2. **Tradeoff**
   - Happen when the point is on the PPF, every choice involve tradeoff, **we must give up something to get something** (e.g. on the PPF we must give up some computer to get more paddy.

3. Opportunity Cost

- All tradeoffs involve a opportunity cost. The opportunity cost of an action is the highest-value alternative forgone.
- The opportunity cost of producing additional capital goods is the number of consumer goods that we must forgo.
- Since the PPF is bowed outward the opportunity cost is increasing – implies that each additional increment of one good requires the economy to sacrifice successively larger and larger increments of other good (law of increasing opportunity cost).

1.6.9 What Can Shift the PPF?

1.6.9.1 Economic Growth

An economic growth means that an expansion in the economy's production possibilities and reflected by shift of the PPF. There are four conditions that will change the production possibilities.

1. Changes in resource availability
   - Outward shift of PPF – increase in:
     - Size, health of labor force
     - Skills of labor force
     - Availability of other resources

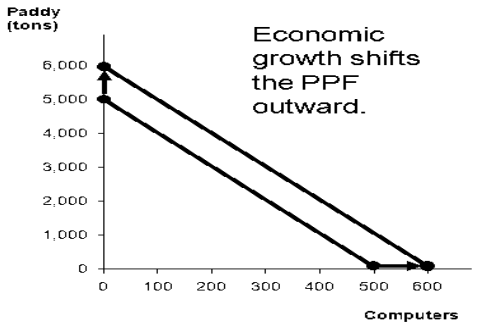
2. Increases in capital stock
   - More output; outward shift of PPF

3. Technological change
   - Employs resources more efficiently
   - Outward shift of PPF

4. Improvements in the rules of the game
   - Formal and informal institutions
     - Economic growth
     - Outward shift of PPF

Straight line PPF

With additional resources or an improvement in technology, the economy can produce more computers, more paddy or any combination in between.



Economic growth causes a parallel outward shift of the PPF. Since the new PPF is parallel to the old one, the tradeoff between the two goods is the same. However, this need not always be the case.

For example, if a new technology had more impact on the computer industry than on the paddy industry, then the horizontal (computer) intercept would increase more than the vertical (paddy) intercept, and the PPF would become flatter. The opportunity cost of computers would fall, because the technology has made them relatively cheaper (relative to paddy).

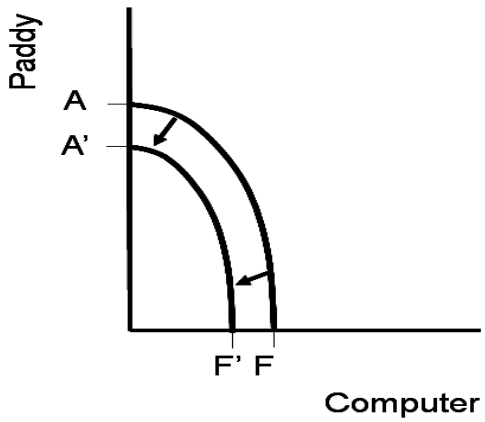
Bow shape PPF
Shifts of the economy's PPF

(a) Increase in available resources

Outward shift of PPF
- increase in available resources; better technology
- enhanced production of both capital and consumer goods

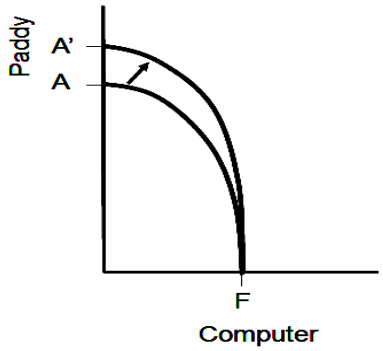
Computer

(b) Decrease in available resources



Inward shift of PPF
- decrease in available resources
- decreased production of both capital and consumer goods

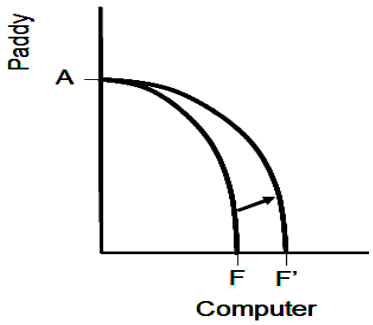
(c) Change in resources that benefit for paddy production



Upward shift of Paddy curve

- Because the increase of resources give benefit only to paddy production, so only paddy production will increase

(d) Change in resources, technology, or rules that benefits for computer production.



Upward shift of Computer curve

- Because the increase of resources give benefit only to computer production, so only computer production will increase.

1.7 Positive and Normative economics

Positive economic analysis: addresses factual questions, typically about economic choices or market outcomes. What is currently happening in the world or how the world is operating? Might be right or wrong and can be tested

- What did happen? What will happen? What would happen?
- Historical fact-finding
- Forecasting
- Cause-and-effect analysis of actions and their consequences
- Questions that deal with explanation and prediction
  - What will be the impact of an import quota on foreign cars?
  - What will be the impact of an increase in the gasoline excise tax?

  Example:
  - If the price of Pepsi increases, then the quantity demanded will decrease.
  - An increase in the minimum wage will cause a decrease in employment among the least-skilled.
  - Higher federal budget deficits will cause interest rates to increase.

Normative economic analysis: addresses questions that involve value judgments concerning the allocation of resources cannot be tested (someone's opinion)

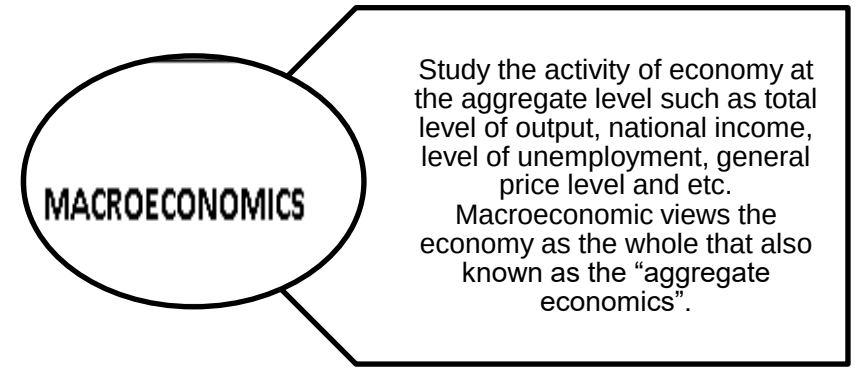
- What ought to happen?
- Should the government impose a larger gasoline tax?
- Should the government decrease the tariffs on imported cars?

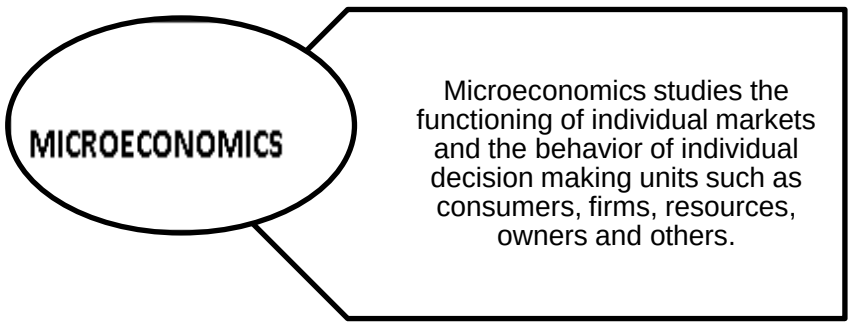
Example:

- The distribution of income in the Malaysia should be more equal
- The income gains from a higher minimum wage are worth more than any slight reductions in employment.
- State governments should be allowed to collect from tobacco companies the costs of treating smoking-related illnesses among the poor.

1.8 Microeconomics and Macroeconomics

The studies of economics can be divided into microeconomics and macroeconomics. The term micro means something small while micro indicates something that is comprehensive or large. In general microeconomics studies the functioning the individual markets and the behavior of individual decision making units such as consumers, firm, resources, owner and other. Macroeconomics studies the activity of economics at the aggregate level such as total level of output, national income, level of employment and unemployment, general price level and so on.





1.8.1 Comparison between Microeconomics and Macroeconomics

Microeconomics is the study of how households and firms make decisions and how they interact in markets.

- Concerns individual decision making and its collective effect on allocation of a society's resources.
- Individual economic choices.
- Markets coordinate the choices of economic decision makers.
- Individual pieces of the puzzle.

Macroeconomics is the study of economy-wide phenomena.

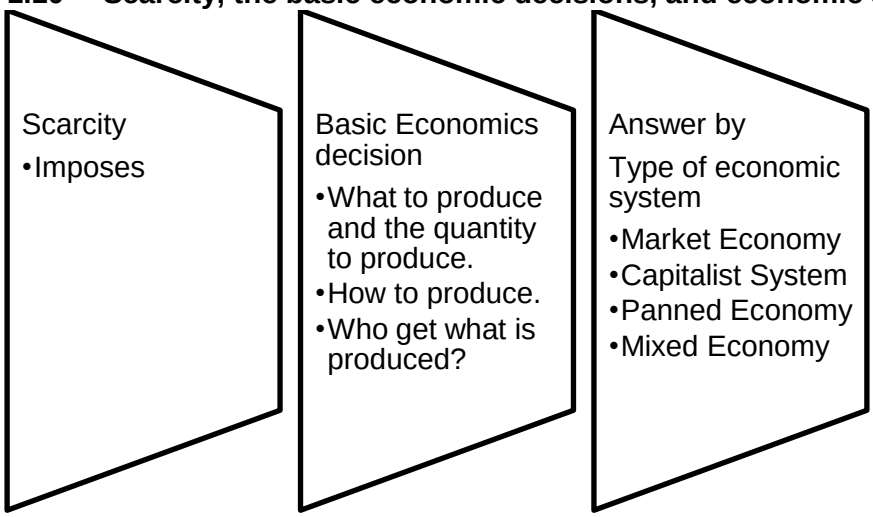
- Including inflation, unemployment, and economic growth.
- Performance of the economy as a whole
- Concerns aggregate phenomena
- Big picture

1.9 Basic Economic Decisions/ questions

Scarcity of resources and unlimited wants make a nation to answer 3 basic economic questions

i. What to produce and in what quantities?
ii. How to produce, or how to use the economy's resources?
iii. Who gets what is produced? – targeted buyers/ consumers

1.10 Scarcity, the basic economic decisions, and economic systems



Scarcity imposes three basic economic decisions on a society. A society's economic system determines how the decisions are made. Economic system = the way in which an economy is organized to make the basic economic decisions

1.9 The Economic System

An economic system is a way of organizing the relationship among individuals, firms and government agencies on how to make choices when confronted with basic economic questions (what to produce, how to produce and for whom to produce). There are three types of economic systems:

i. Capitalism or Market Economy
ii. Socialism or Command Economy
iii. Mixed Economy
iv. Islamic Economy

1. Capatalism

Known as free market economy, free enterprise or laissez-faire. Capatalism is economy in which no one is told what to do or how to do it. Every one is left on their own to decide what to produce, who to work for and how to get the things they need. Thus, the force of market demand and supply, without any government interventions, determines the allocation of resources and known as the working of price mechanism.

Example: When there is increase in demand for a product, the product price will rises and this situation will rise the firm profitibility of selling in the market. This situation gives a signal for the firm to expand production.

Characteristics of capitalism

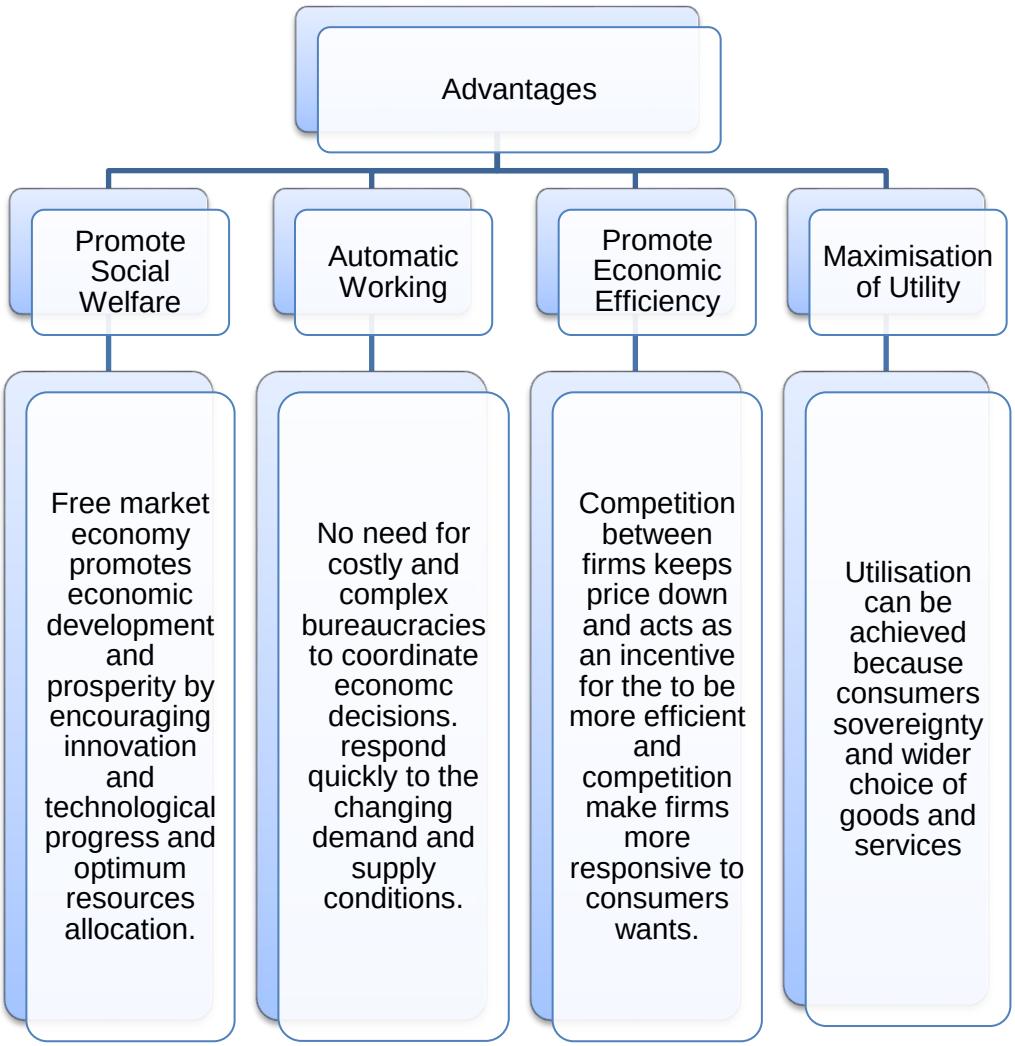
1. Private ownership of resources.
   Individuals in the economics system are free to own factors of production and use them in whatever manner they wish to.

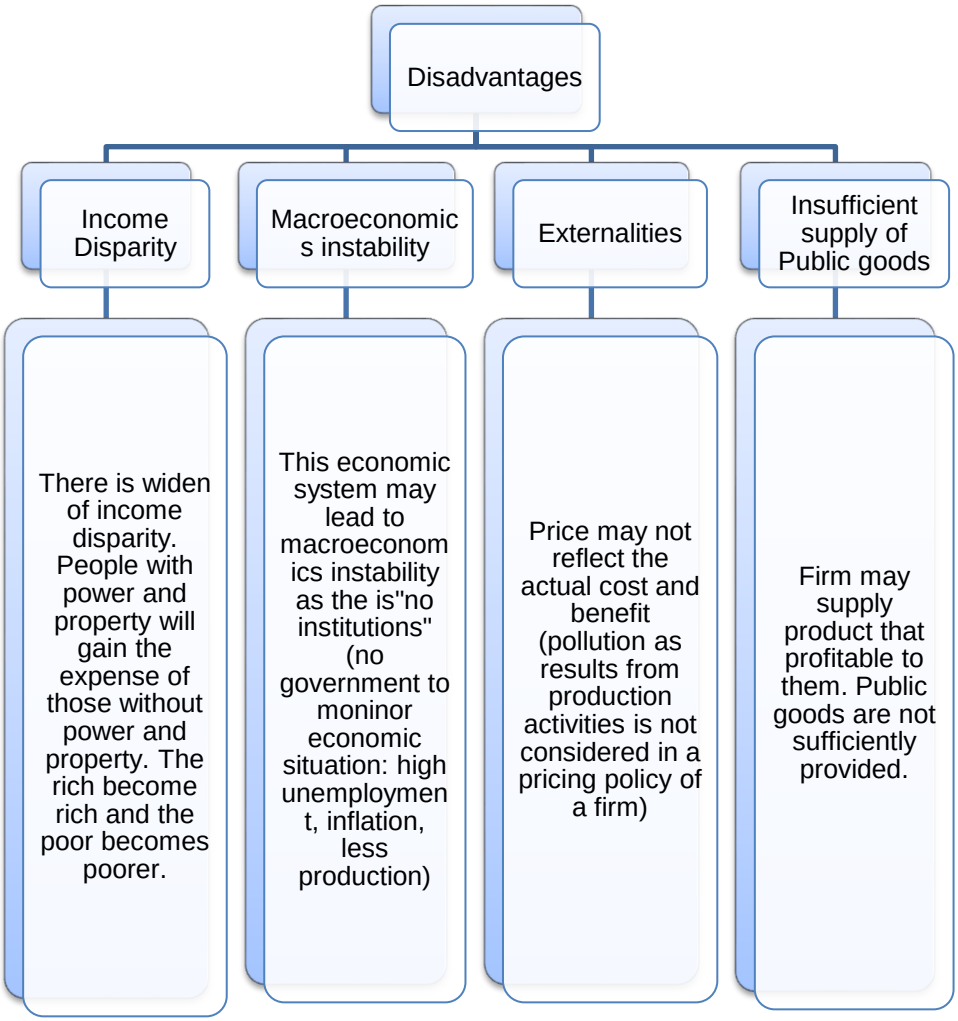
2. Freedom of Enterprise and Choice
   Household and firm are freely to take any decions based on their own self interest.Individual freely to choose what to buy with ther incomes and firms are freely to choose what to sell, what production method to use, and freely set up any type of business.
3. Profit Motive
   Main objective in economics are utility maximization and profit maximization. Consumer seek to get the best value for money from their expenditure, workers seek to maximizes their wages and producer seek to maximize profit.

4. Perfect Competition
   Producer compete with one another to sell their products. Healthy competitions brings about better quality products being offered at lowest possible prices.This also results in increased efficiency

amongst producers.

5. Limited Government Intervention
In economic decision, the is very limited involvement from government. Government only play a role in confined to the national defense, law and order.




Disadvantages
Income Disparity
Macroeconomics instability
Externalities
Insufficient supply of Public goods
There is widen of income disparity. People with power and property will gain the expense of those without power and property. The rich become rich and the poor becomes poorer.
This economic system may lead to macroeconomics instability as the is"no institutions" (no government to moninor economic situation: high unemployment, inflation, less production)
Price may not reflect the actual cost and benefit (pollution as results from production activities is not considered in a pricing policy of a firm)
Firm may supply product that profitable to them. Public goods are not sufficiently provided.

2. Socialist or Command Economy

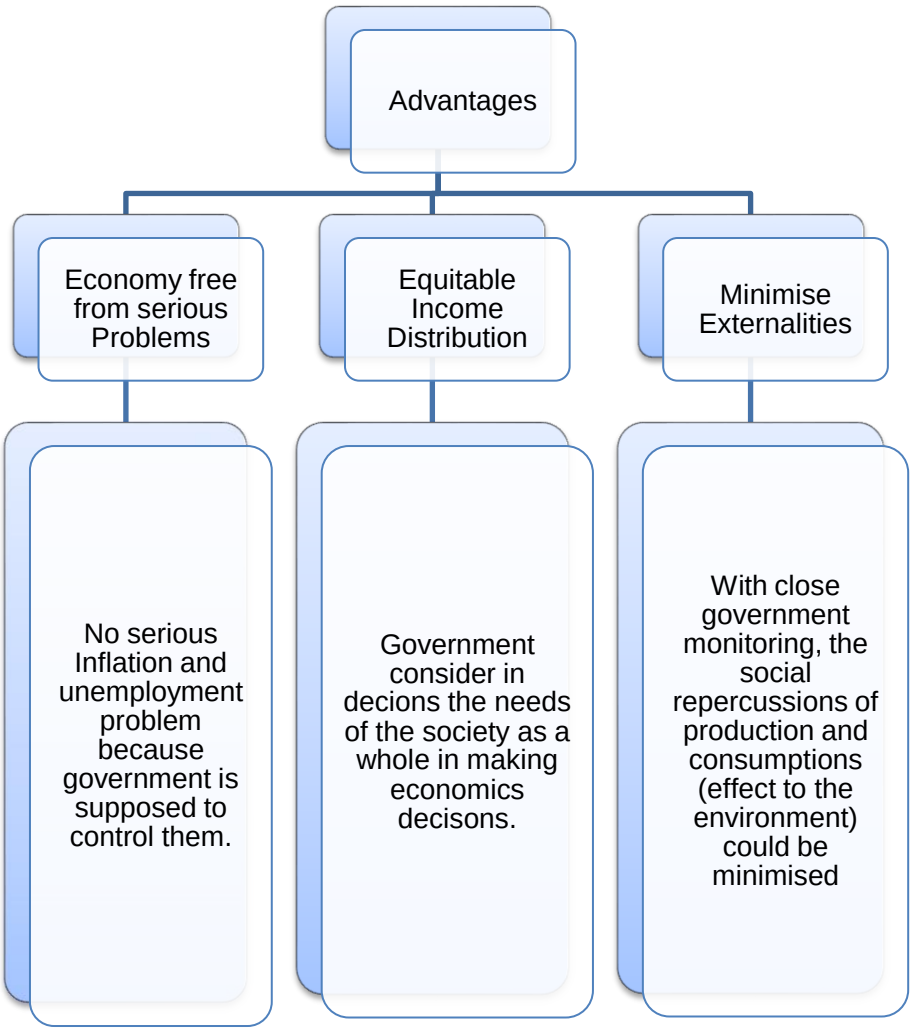
Economic system that government own and operates the factors of productions. Government also play a role to solve the fundamental of ecconomic problems. Government will decides what will be produced, how it will produced and for whom it will produced for. The price mechanism has no active role since the market price is rarely used. The objective of this economic system is to make sure that everything that people need is produced and that everyone gets what they need.

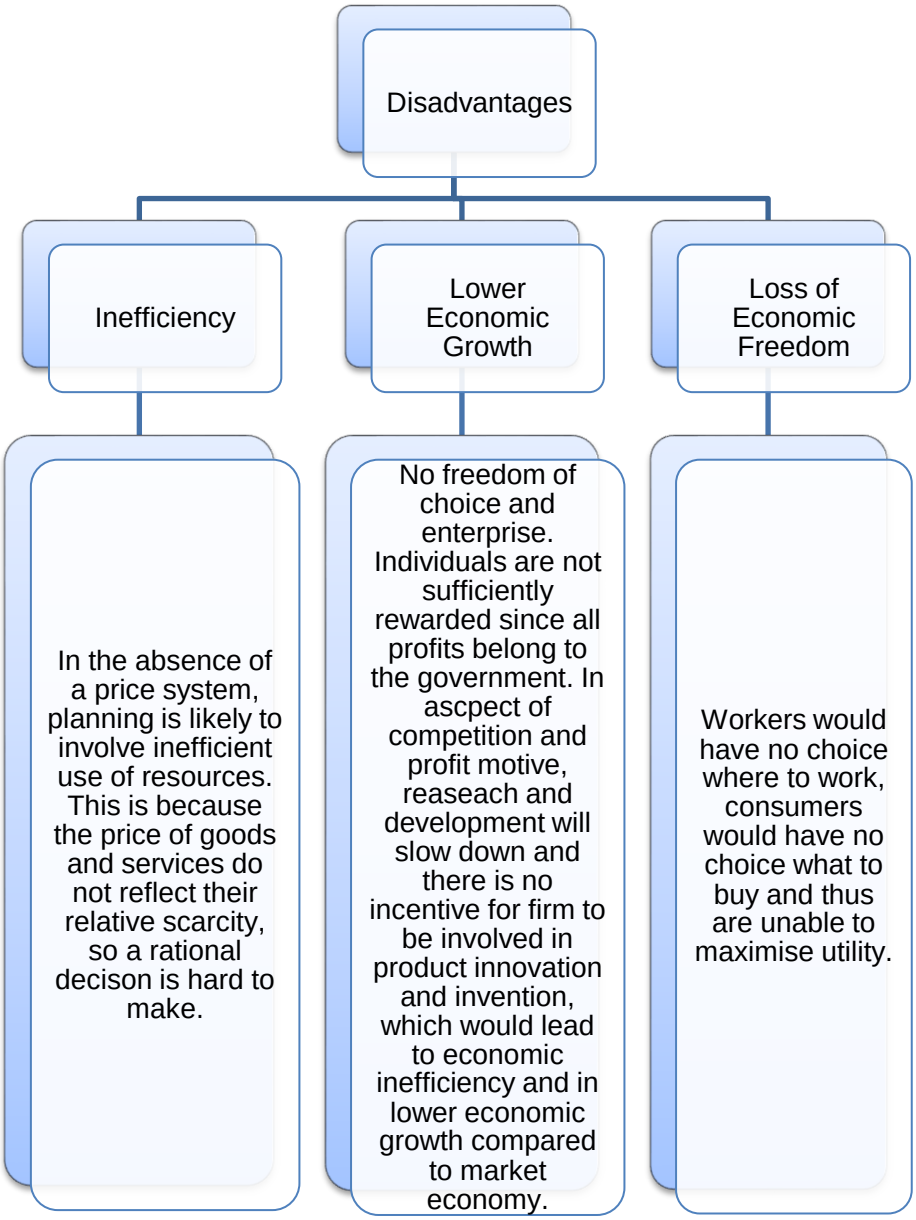
Characteristics of Socialism

i. Economic Planning
The government through its planning authority play its role to direct the nations resources in accordance with specific national goals rather than rely on decisions of millions of individuals.

ii. Public Ownership of resources.
Individuals are not allowed to own productive resources.The government controls resources by carefully planning their allocation in accordance with the production requirements and the needs of the society.

iii. No/Very Limited Economic Freedom
There is almost no economic freedom for individuals. Individuals do not have the choice of choosong what they want as decisions on what to produce is made by the authority.They also cannot set up their own business enterprises as all their profits belong to the government.


Advantages
Economy free from serious Problems
Equitable Income Distribution
Minimise Externalities
No serious Inflation and unemployment problem because government is supposed to control them.
Government consider in decions the needs of the society as a whole in making economics decisons.
With close government monitoring, the social repercussions of production and consumptions (effect to the environment) could be minimised


Disadvantages
Inefficiency
Lower Economic Growth
Loss of Economic Freedom
In the absence of a price system, planning is likely to involve inefficient use of resources. This is because the price of goods and services do not reflect their relative scarcity, so a rational decison is hard to make.
No freedom of choice and enterprise. Individuals are not sufficiently rewarded since all profits belong to the government. In ascpect of competition and profit motive, reaseach and development will slow down and there is no incentive for firm to be involved in product innovation and invention, which would lead to economic inefficiency and in lower economic growth compared to market economy.
Workers would have no choice where to work, consumers would have no choice what to buy and thus are unable to maximise utility.

3. The Mixed Economy/ The Regulated Market System

Mixed economy is an economy system that has features of both market and command economies. Most countries are mixed economiies.Usually they have a free market, but the government owns some businesses and provides some goods and services to the citizens. Example Malaysia, Singapore and UK.

Characteristics of mixed economies:

i. Both private and public ownership of economics resources.
The government and the private sectors interact in solving economic problems. Many goods and services are allocated through the markets at prices determined by demand and supply. Consumers are free to purchase what they want amd workers are free to work where they want.

ii. Government intervene in the market.
Government may provide a public goods to citizens and allows parts of the economy to run on their own so that inefficiency is minimised and people can have the jobs that they want. In other words, the government intervenes in the market to provide a sufficient supply of social goods, maintained law and order, reduce externalities, reduce income disparity, control monopolies and stabilise the economy.

4. Islamic Economy

An Islamic economy is another type of economic system in which the questions of what, how and for whom to produce are decided by the public and private sectors according to Islamic principles.

Characteristics of an Islamic Economy

i. Public and private ownership by God
In Islam, properties are owned by God and human being are considered the trusteed of the properties. Human have right to enjoy and use these properties, but not as absolute owners. Concept of public property is Islams means that God created all wealth for all humans to have equals rights.

ii. Price mechanism and limites government interventions.
In Islam, price fixing by buyers and sellers is strictly prohibited. The market is determined by the forces of demand and supply, whereby no individual (seller or buyer) has the power to control the market. Intervention of government are only under specific circumstances when the market fails. Produces provide consumers with information and knowledge about quality and quantity of goods.

iii. Distribution of wealth.
Unlike capatalism and socialism, the distribution of goods based on the needs of consumers, not wealth creation.

iv. Prohibition of interest
Interest or riba is prohibited in islam. Banking, finance and business in Muslim countries have reorganized and set up Islamic Institutions which apply principle of Syariah that prohibits riba.

vi. Freedom of economic enterprise.
Is Islam, man has freedom of work and enterprise. They are encouraged to choose any enterprise such as agriculture, business or trade, but need to meet the ends of economics activities. The ends of economic activities could be individual or society which includes basic necessity for survival such as food and shelter.

TUTORIAL 1
(Chapter 1: Introduction to Economics)

Question 1

Based on the table below

Possible Production	Food (million)	Cloth (million)
A	0	110
B	20	100
C	40	80
D	60	50
E	80	0

a. Draw the production possibility frontier (PPF)
   i. Indicate the shape of PPF.
   ii. State type of opportunity cost.

b. Calculate the opportunity cost of production additional 1 million of Foods.
   i. Point A to B
   ii. Point B to C
   iii. Point C to D
   iv. Point D to E

c. Calculate the opportunity cost of production additional 1 million of Cloths.
   i. Point A to B
   ii. Point B to C
   iii. Point C to D
   iv. Point D to E

d. State the points are efficient.

e. Indicate area of the production is not efficient but firm able to produce.

f. Indicate area of the production that impossible for firm to produce.

Question 2

The production possibility frontier is linear and opportunity cost is constant.

Choice	Motorcycle (million)	Car (million)
A	0	8
B	1	6
C	2	4
D	3	2
E	4	0

a. Draw the production possibility Curve (PPC)
   i. Indicate the shape of PPC.
   ii. State type of opportunity cost.

b. Calculate the opportunity cost of production additional 1 million of Motorcycle.
   i. Point A to B
   ii. Point D to E

c. Calculate the opportunity cost of production additional 1 million of Car.
   i. Point B to C
   ii. Point C to D

d. If the technology in production car increases, what happen to the PPC?

e. If the technology in production motorcycle increases, what happen to the PPC?

f. If the technology in both production increases, what happen to the PPC?

g. If country face an economic recession, what happen to the PPC?

h. If firm decided to cut off the number of workers in both production, what happen to the PPC?

i. If country face an economic growth, what happen to the PPC?

CHAPTER

2

DEMAND AND SUPPLY

LEARNING OUTCOMES

At the end of this chapter, student should able to:

1. Define the concept and law of demand and supply
2. Construct the demand and supply curve and derive the demand and supply function
3. Explain the different between change in quantity demand and change in demand.
4. Determine the equilibrium market
5. Explain the factors that shift the demand and supply curve

CHAPTER OUTLINE

2.1 Markets and Competitions
2.2 Demand
2.3 Supply
2.4 Market Equilibrium
2.5 Using the mathematical to find the equilibrium
2.6 Changes in market equilibrium

2.1 Markets and Competitions

Supply and demand are the two words that economists use most often. Supply and demand are the forces that make market economies work. Modern microeconomics is about supply, demand, and market equilibrium.

2.1.1 What Is a Market?

A *market* is a group of buyers and sellers of a particular good or service. The terms supply and demand refer to the behavior of people, as they interact with one another in markets. Buyers determine *demand* and sellers determine *supply.*

2.1.2 What Is Competition?

A *competitive market* is a market in which there are many buyers and sellers so that each has a negligible impact on the market price. The Competition market may be perfect and otherwise.

1. Perfectly competitive market:
    - Goods offered for sale - exactly the same
    - Buyers and sellers are numerous
    - No single buyer or seller has any influence over the market price
    - Must accept the price determined on the market
        - Price takers
    - At the market price
        - Buyers will buy all they want
        - Sellers will sell all they want
2. Monopoly:
    - One seller

    The seller controls price (price maker)

3. Oligopoly:
    - Few sellers
    - Not always aggressive competition

4. Monopolistic Competition:
    - Many sellers
    - Slightly differentiated products
    - Each seller may set price for its own product

In this chapter, we assume markets are **perfectly competitive.**

2.2 Demand

2.2.1 What is Demand?

The quantity consumers are willing and able to buy at each possible price during a given time period, other things constant.

- Amounts purchased per period at each possible price.
- Willing and able to buy or purchase
- At a specific period

2.2.2 Law of Demand

The law of demand claims that the quantity demanded of a good falls when the price of the good rises, other things equal.

2.2.3 The Demand Schedule

The demand schedule is a table that shows the relationship between the price of the good and the quantity demanded.
Example: Mawar demand for cup cake.
Notice that Mawar preferences obey the Law of Demand.

Price	Quantity
RM 0	16
RM 1	14
RM 2	12
RM 3	10
RM 4	8
RM 5	6
RM 6	4

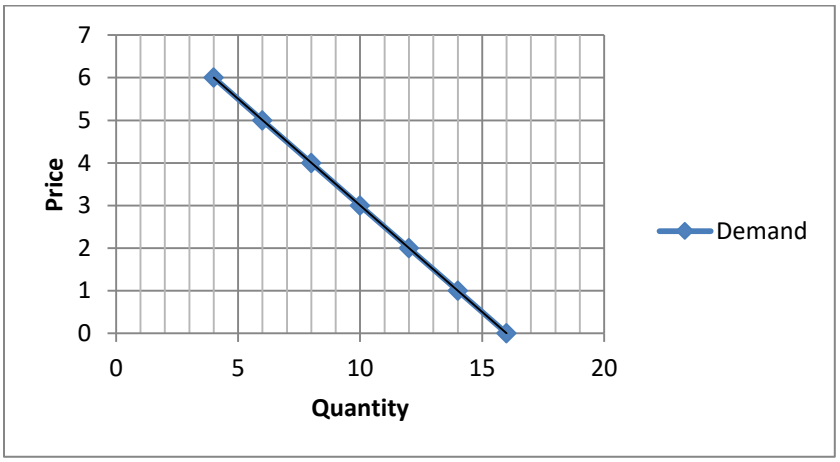
2.2.4 Demand Curve

The demand curve is a graph of the relationship between the price of a good and the quantity demanded.

The demand curve shows:

- How much buyers of the product want to buy at each possible price
- Holding fixed all other factors that affect demand.
- On a graph: vertical axis shows RM per unit of the good, horizontal axis shows quantity demanded per unit of time.
- Downward sloping (buying the product is less attractive when the price is high than when the price is low)

Based on the quantity and price, the demand curve will be



2.2.5 Market Demand versus Individual Demand

Market demand refers to the sum of all individual demands for a particular good or service. Graphically, individual demand curves are summed horizontally to obtain the market demand curve.

Suppose Fazal dan Faiz are the only two buyers in the Pizza market.(***Q^d*** = quantity demanded)

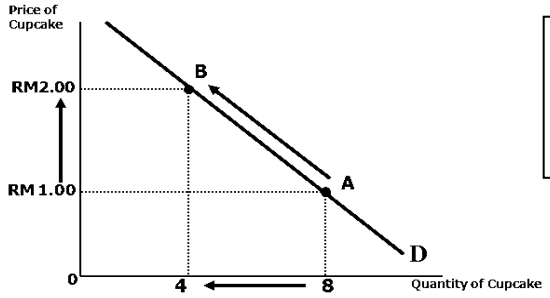
Price	**Faizal Q^d**	**Faiz Q^d**	**Market Q^d**
RM 0	40	30	70
RM 2	35	25	60
RM 4	30	20	50
RM 6	25	15	40
RM 8	20	10	30
RM 10	15	5	20
RM 12	10	0	10

Demand curve for individual and market

2.2.6 Change in Demand

2.2.6.1 Change in Quantity Demanded

A change in quantity demand shown by movement along a fixed demand curve that caused by a change in the price of the product itself.



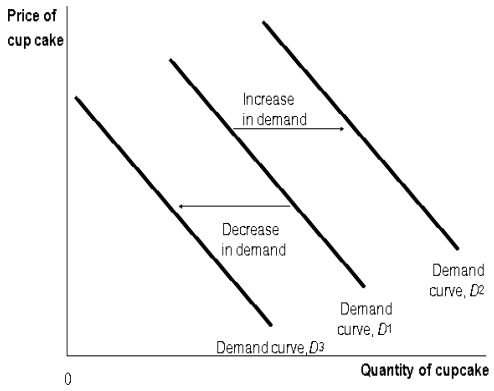
A raise in the price of cupcake, results in a movemesnt along the demand curve.

Expansion of demand is the increase in quantity demanded when the price increase or decrease. As a price of cupcake increase from RM 1 to RM 2, the quantity demanded fall from 8 units to 4 units and point A moves to point B.

2.2.6.2 Shift in the Demand Curve

A change in demand refers to a change in quantity demanded at each possible price and is caused by changes in factors other than the good's or product own price (Consumer income, Prices of related goods,Tastes, Expectations, Number of buyers). This can be shown by a shift in the demand curve, either to the left or right.An icrease in demand is shown by a rightward shift in the whole demand curve, for example from D1 to D2

Shifts in the Demand Curve



1. Consumer Income

- As income increases the demand for a *normal good* will increase.
- As income increases the demand for an *inferior good* will decrease.

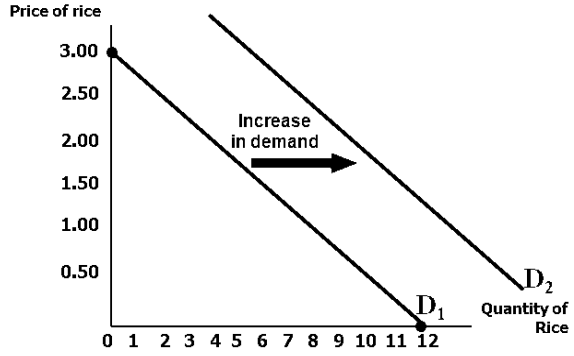
Demand for a **normal good** is positively related to income.

- Increase in income causes increase in quantity demanded at each price, shifts ***D*** curve to the right.

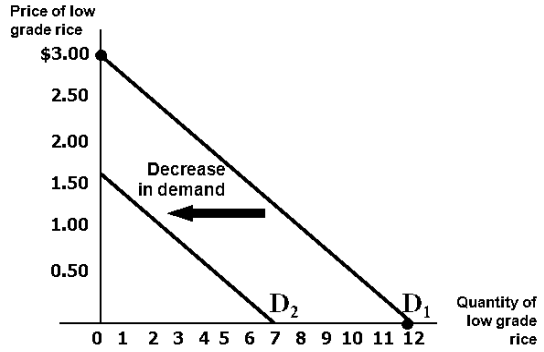
Demand for an **inferior good** is negatively related to income.

- An increase in income shifts ***D*** curves for inferior goods to the left.)

Consumer Income Normal Good



Consumer Income Inferior Good



2. Prices of Related Goods

When a fall in the price of one good reduces the demand for another good, the two goods are called *substitutes.*

- Two goods are **substitutes** if an increase in the price of one causes an increase in demand for the other.
- Example: pizza and hamburgers. An increase in the price of pizza increases demand for hamburgers, shifting hamburger demand curve to the right.
- Other examples: Coke and Pepsi, laptops and desktop computers, CDs and music downloads

Example:

Suppose the quantity of pizza and hamburger Q = 1000 when P = RM5. If pizza becomes more expensive, but price of hamburgers does not change, what would happen to the quantity of hamburgers demanded? Would it remain at 1000, would it increase, or would it decrease?

Solution:

People will want more hamburgers when the price of pizza rises. Note that the increase in the price of pizza caused an increase in the quantity demanded of hamburgers, because pizza and hamburger are "substitutes" goods.

When a fall in the price of one good increases the demand for another good, the two goods are called *complements.*

- Two goods are **complements** if an increase in the price of one causes a fall in demand for the other.
- Example: computers and software. If price of computers rises, people buy fewer computers, and therefore less software. Software demand curve shifts left.
- Other examples: college tuition and textbooks, bagels and cream cheese, eggs and bacon

3. Tastes

Anything that causes a shift in tastes *toward* a good will increase demand for that good and shift its ***D*** curve to the right.

Example:

- The LCD TV became popular, caused an increase in demand for LCD TV, shifted the LCD TV demand curve to the right.

4. Expectations

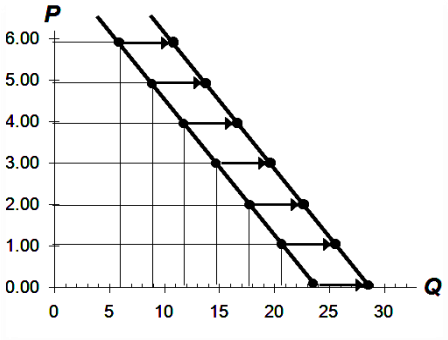
Expectations affect consumers' buying decisions.

Examples:

- If people expect their incomes to rise, their demand for meals at expensive restaurants may increase now.
- If the economy sours and people worry about their future job security, demand for new autos may fall now.

5. Number of Buyers

Suppose the number of buyers increases. Then, at each ***P***, Q^d will increase (by 5 in this example)



Summary: Variables That Influence Buyers

Variable	**A change in his variable**
Price	cause a movement along the ***DD*** curve
Number of buyer	shifts the ***DD*** curve
Income	shifts the ***DD*** curve
Price of related goods	shifts the ***DD*** curve
Tastes	shifts the ***DD*** curve
Expectation	shifts the ***DD*** curve

2.2.7 Demand Functions

Product's demand function is a mathematical representation of its demand. Describes the amount of the product buyers demand for each possible combination of price and other factors. Can be determined by applying statistical techniques to historical data

The basic demand function is

$$Q_d = a + bp$$

Where Q_d is the quantity demand, a is a intercept, b is the slope and p is the price. The sign Negative from this function show the negative relationship between the price and quantity that based on the law of demand where when the price increase the quantity demanded will
decrease.

Given the data of price and quantity demand

Price	Quantity demanded
RM 2.00	**60**
RM 4.00	**50**
RM 6.00	**40**
RM 8.00	**30**
RM 10.00	**20**
RM 12.00	**10**

Method 1:

Step 1: Find the value of b
Take the two point and develop the equation based on the basic demand function

At P = RM 6.00 and Q_d = 40
At P = RM 8.00 and Q_d = 30

We know that $Q_d = a + bp$

Develop the equation
40 = a - 6b…… (1)
30 = a - 8b ……(2)

Step 2:
Now , you should eliminate the value of c to get the value of b by using the operation either add or subtract the both equation.
Subtract the equation 1 to equation 2

(-) 40 = a + 6b …… (1)
30 = a + 8b ……(2)

10 = 0a - 2b ……(3)

Step 3: Solve the equation 3
10 = - 2b
b = 10/-2 =- 5

Step 4 : Find the value of a

Take one point
At P = RM 6.00 and Qd = 40

Substitute the P and Q in the basic function of supply, then will get

40 = a - 5(6)
40 = a - 30
a = 40 + 30
a = 70

Step 5 : Develop the supply function based on the value of b and c

$Q_s = 70 - 5p$

Method 2:

Given

$Q_d = a + b\ p$

Step 1: Take the two point

At P = RM 6.00 and $Q_d = 40$
At P = RM 8.00 and $Q_d = 30$

Step 2: Calculate the value of b

$b = \frac{\Delta Q}{\Delta P} = \frac{30-40}{8-6} = -5$

Step 3: Find the value of a
Take one point

At P = RM 6.00 and $Q_d = 40$
40 = a - 5 (6)
40 = a - 30
a = 40 + 30
a = 70

Now, we already know the value of a and b, so the demand equation will be

$Q_d = 70 - 5p$

Method 3:

From the above schedule

Price	Quantity demanded
RM 2.00	**60**
RM 4.00	**50**

$$P - P_1 = \frac{P_2 - P_1}{Qd_2 - Qd_1} \ (Qd - \ Qd_1)$$

Where assume that:

P_1= RM 2.00
P_2= RM4.00
Qd_1 = 60 unit
Qd_2 = 50 unit

$$P - 2 = \frac{4 - 2}{50 - 60} \ (Qd - \ 60)$$

$$P - 2 = \frac{2}{-10} \ (Qd - \ 60)$$
$$P - 2 = \ -0.2 \ (Qd - \ 60)$$
$$P - 2 = \ -0.2 \ Qd + 12$$
$$0.2 \ Qd = \ -P + 2 + 12$$
$$0.2 \ Qd = \ -P + 14$$
$$Qd = \ \frac{-P + 14}{0.2}$$
$$Qd = \ -5P + 70$$

Thus, the demand function is

$$Qd = \ 70 \ - 5P$$

2.3 Supply

2.3.1 What is supply?

Supply show

- How much producers are willing and able to offer for sale per period at each possible price, other things constant
- Willing and able
- Specific period

2.3.2 Law of supply: Claim that the quantity supplied of a good rises when the price of the good rises, other things equal

- Higher price: higher quantity supplied
- Higher reward, profit (More willing to increase quantity supplied)
- Can afford to cover the marginal costs
- Increasing opportunity cost (More able to increase quantity supplies

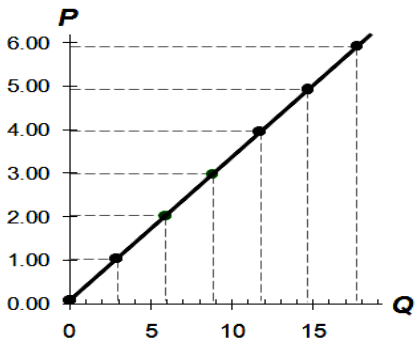
2.3.4 Supply Schedule

The *supply schedule* is a table that shows the relationship between the price of the good and the quantity supplied.

Price	Quantity supply
RM 0	0
RM 1.00	3
RM 2.00	6
RM 3.00	9
RM 4.00	12
RM 5.00	15
RM 6.00	18

2.3.5 Supply Curve

The *supply curve* is the graph of the relationship between the price of a good and the quantity supplied.



2.3.6 Market Supply versus Individual Supply

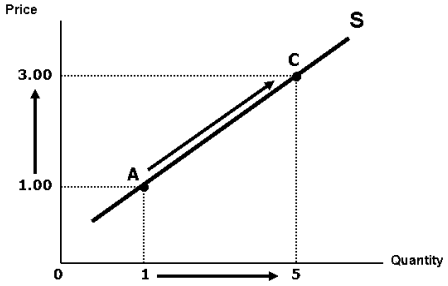
The quantity supplied in the market is the sum of the quantities supplied by all sellers at each price. Suppose Ali and Abu are the only two sellers in this market. (Q^s = quantity supplied)

Price	Ali Q^s	Abu Q^s	Market Q^s
RM 0	0	0	0
RM 2.00	10	0	0
RM 4.00	20	0	20
RM 6.00	30	10	40
RM 8.00	40	20	60
RM 10.00	50	30	80
RM 12.00	60	40	100

Supply curve for market

2.3.7 Change in Quantity Supplied

A change in quantity supply is a movement along a fixed supply curve.Caused by a change in the price of the product.A rise in the own price of good results in a movement along the supply curve.



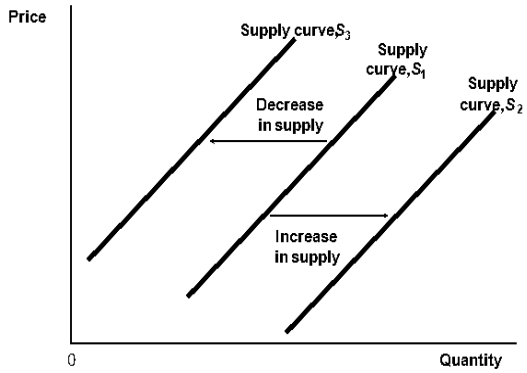
Expansion of supply is the increase in the quantity supplied when the price rises. As price rise from RM 1 to RM 3 the quantity supplied rises from 1 unit to 5 unit and point A moves to point B.

2.3.8 Shift in the Supply Curve

A shift in the supply curve, either to the left or right, caused by a change in a determinant other than price:

i. Input prices
ii. Technology
iii. Expectations
iv. Number of sellers

Shifts in The Supply Curve



Supply Curve Shifters:

1. Input Prices

Examples of input prices: wages, prices of raw materials.
A fall in input prices makes production more profitable at each output price, so firms supply a larger quantity at each price, and the *S* curve shifts to the right.

2. Technology

Technology determines how much inputs are required to produce a unit of output.
A cost-saving technological improvement has the same effect as a fall in input prices, shifts ***S*** curve to the right.

3. Number of Sellers

An increase in the number of sellers increases the quantity supplied at each price, shifts *S* curve to the right.

4. Expectations

Example:

- Events in the Middle East lead to expectations of higher oil prices.
- In response, owners of Texas oilfields reduce supply now, save some inventory to sell later at the higher price.
- ***SS*** curve shifts left.

In general, sellers may adjust supply* when their expectations of future prices change. (**If good not perishable*)

Summary

Variable	**A change in his variable**
Price	cause a movement along the ***SS*** curve
Input Price	shifts the ***SS*** curve
Technology	shifts the ***SS*** curve
Expectation	shifts the ***SS*** curve
Number of sellers	shifts the ***SS*** curve

2.3.9 Supply Function

The basic supply function is

$$Q_s = c + bp$$

Where Q_s is the supply function, c is the intercept, b is the slope and p is the price. The positive sign in this function show that the positively relationship between the price and quantity based on the law of supply which when the price increase the quantity supply also will increase at the same time.

Given the data of price and quantity supply.

Price	Quantity supply
RM 2.00	**0**
RM 4.00	**20**
RM 6.00	**40**
RM 8.00	**60**
RM 10.00	**80**
RM 12.00	**100**

Method 1:

Step 1: Find the value of b
Take the two point and develop the equation based on the basic supply function

At P = RM 6 and $Q_s = 40$
At P = RM 8.00 and $Q_s = 60$
We know that $Q_s = c + bp$

Develop the equation
40 = c + 6b…… (1)
60 = c + 8b ……(2)

Step 2:
Now , you should eliminate the value of c to get the value of b by using the operation either add or subtract the both equation.
Subtract the equation 1 to equation 2

(-) 40 = c + 6b…… (1)
60 = c + 8b ……(2)

-20 = 0C – 2b ……(3)

Step 3: Solve the equation 3

-20 = -2b

b = -20 / -2 = 10

Step 4 : Find the value of c

Take one point

At P = RM 6.00 and Q = 40

Substitute the P and Q in the basic function of supply, then will get

40 = c + 10 (6)

40 = c + 60

c = 40 – 60

c = -20

Step 5 : Develop the supply function based on the value of b and c

$Q_s = -20 + 10p$

Method 2:

Given

$Q_s = c + bp$

Step 1: Take the two point

At P = RM 6 and $Q_s = 40$

At P = RM 8.00 and $Q_s = 60$

Step 2: Calculate the value of b

$b = \frac{\Delta Q}{\Delta P} = \frac{60-40}{8-6} = 10$

Step 3: Find the value of a

Take one point

At P = RM 6.00 and $Q_s = 40$

40 = a + 10(6)

40 = a + 60

a = 40 - 60

a = -20

Now, we already know the value of a and b, so the demand equation will be

$Q_s = -20 + 10p$

Method 3

From the above schedule

Price	Quantity supply
RM 6.00	**40**
RM 8.00	**60**

$$P - P_1 = \frac{P_2 - P_1}{Qs_2 - Qs_1} \ (Qs - \ Qs_1)$$

Where assume that:

P_1= RM 6.00
P_2= RM 8.00
Qs_1 = 40 unit
Qs_2 = 60 unit

$$P - 6 = \frac{8 - 6}{60 - 40} \ (Qd - \ 40)$$

$$P - 6 = \frac{2}{20} \ (Qs - \ 40)$$
$$P - 6 = \ 0.1 \ (Qs - \ 40)$$
$$P - 6 = \ 0.1Qs - 4$$
$$0.1 \ Qs = \ P - 6 + 4$$
$$0.1 \ Qs = \ P - 2$$
$$Qs = \ \frac{P - 2}{0.1}$$
$$Qs = \ 10P - 20$$

Thus, the demand function is

$$Qs = \ -20 \ + 10P$$

2.4 Market Equilibrium

Equilibrium refers to a situation in which the price has reached the level where quantity supplied equals quantity demanded.

Equilibrium Price

- The price that balances quantity supplied and quantity demanded.
- On a graph, it is the price at which the supply and demand curves intersect.

Equilibrium Quantity

- The quantity supplied and the quantity demanded at the equilibrium price.

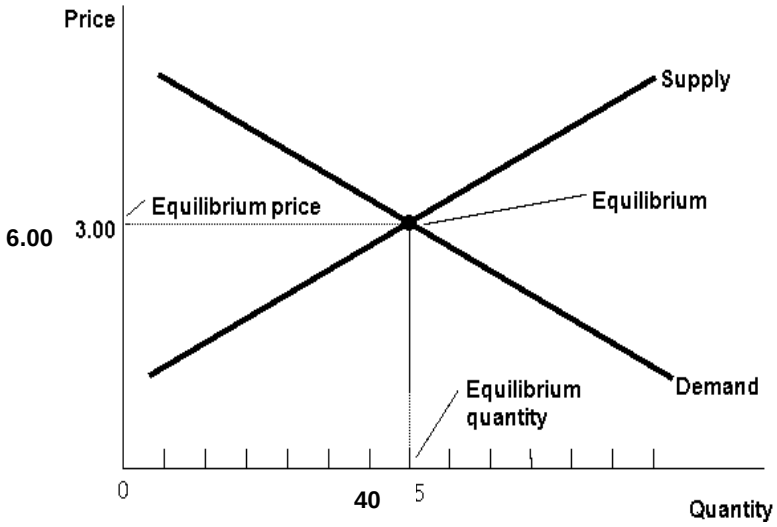
On a graph it is the quantity at which the supply and demand curves intersect.

	Quantity demand
RM 2.00	**60**
RM 4.00	**50**
RM 6.00	**40**
RM 8.00	**30**
RM 10.00	**20**
RM 12.00	**10**

Price	**Quantity supply**
RM 2.00	**0**
RM 4.00	**20**
RM 6.00	**40**
RM 8.00	**60**
RM 10.00	**80**
RM 12.00	**100**

At RM 6.00, the quantity demanded is equal to the quantity supplied (Q = 40)

The Equilibrium of Supply and Demand



2.4.1 Excess Supply, Excess Demand, Surplus

When price is higher equilibrium price, then quantity supplied more quantity demanded.
There is excess supply or a surplus. Surplus: excess quantity supplied

- Downward pressure on price.
- Decrease quantity supplied.
- Increase quantity demanded

2.5 Using the mathematical to find the equilibrium

Based on the demand and the supply function that we calculated before, we can find the equilibrium

The demand function:

$$Q_d = 70 - 5P$$

The supply function

$$Q_s = -20 + 10\,P$$

The equilibrium condition when the **demand equal to supply** (**DD = SS**)

So, **DD = SS**

$70 - 5P = -20 + 10P$

$70 + 20 = 5P + 10P$

$90 = 15P$

$P = 6$

To find the value of Q, substitute P = 6 in either demand and supply function.

$Q_s = -20 + 10(6)$

$Q_s = -20 + 60$

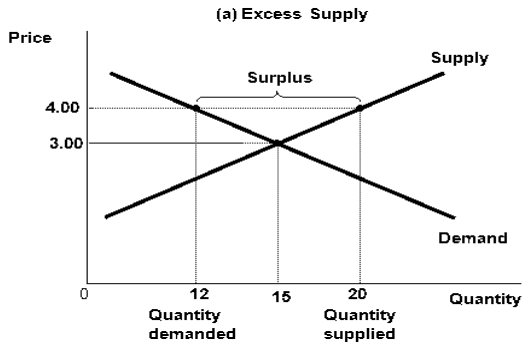
$Q_s = 40$

So the equilibrium is Q = 40 and P = 6.

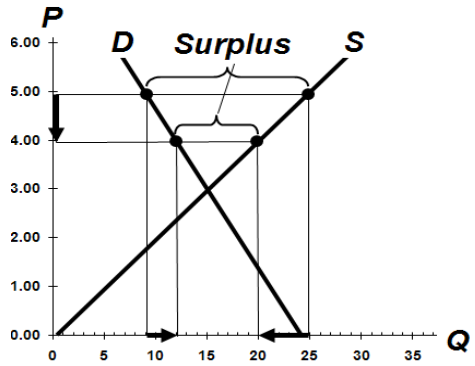
This also can be see in the table

Price	Quantity supply	Quantity Demand
RM 2.00	**0**	**60**
RM 4.00	**20**	**50**
RM 6.00	**40**	**40**
RM 8.00	**60**	**30**
RM 10.00	**80**	**20**
RM 12.00	**100**	**10**

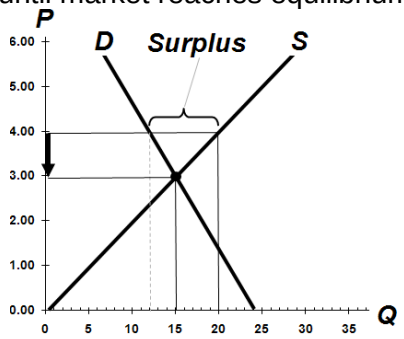
Markets Not in Equilibrium



Suppliers will lower the price to increase sales, this causes Q^D to rise and Q^s to fall, thereby moving toward equilibrium which reduces the surplus.



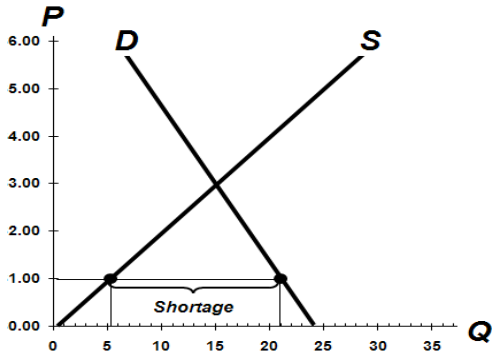
Prices continue to fall until market reaches equilibrium.



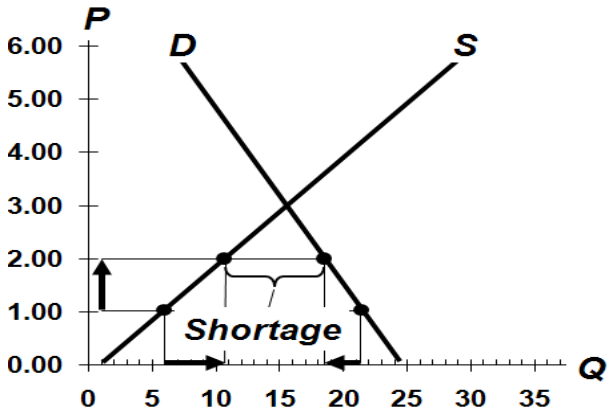
Shortage: excess quantity demanded when quantity demanded is greater than quantity supplied
Upward pressure on price

- Increase quantity supplied
- Decrease quantity demanded

Example:
At price equal to RM 1.00, the quantity demand is 21 and quantity supply is 5, resulting the shortage 16.



Facing a shortage, sellers raise the price causing Q^D to fall which reduces the shortage and Q^S to rise



Prices continue to rise until market reaches equilibrium.

2.6 Changes in market equilibrium

The market equilibrium takes place when demand intersects with supply curves. If the demand or supply change, or both change simultaneously, the market equilibrium will change as well.

2.6.1 Law of supply and demand

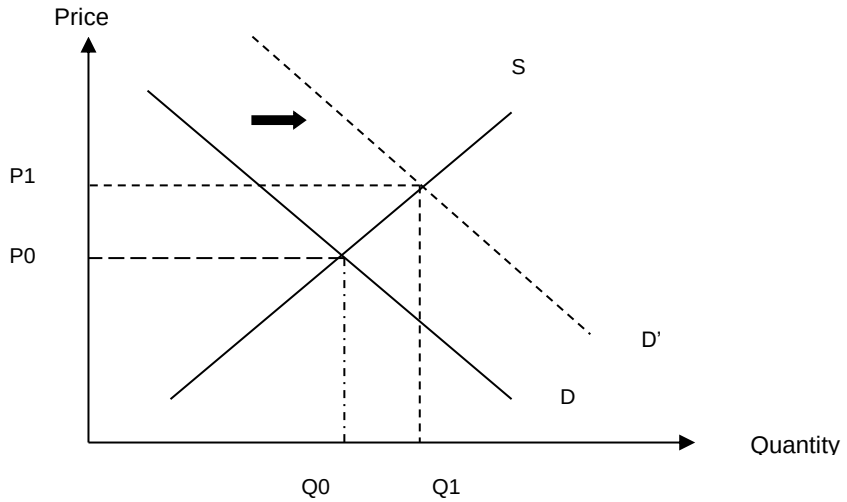
The claim that the price of any good adjusts to bring the quantity supplied and the quantity demanded for that good into balance.
Three steps to analyzing changes in equilibrium

1. Decide: the event shifts the supply curve, the demand curve, or both curves
2. Decide: curve shifts to right or to left
3. Use supply-and-demand diagram
    - Compare initial and new equilibrium
    - How the shift affects equilibrium price and quantity

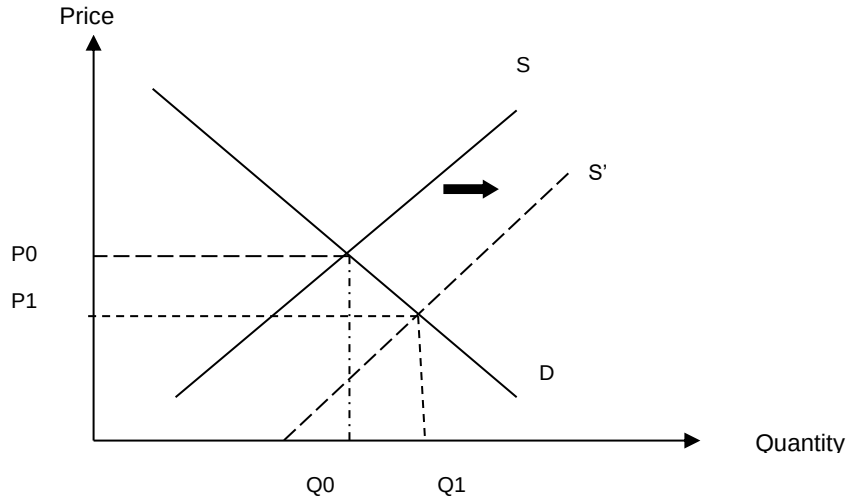
2.6.2 Changes in supply or demand.

Factors affecting the changes of supply and demand were discussed previously. The changes of supply, holding the demand costant or changes of demand holding the supply constant will change the equilibrium.

i. Increase in demand, as shown in the shift of demand curve to the right from D to D', cause the equilibrium price to increase from P0 to P1. At the new equilibrium point, the quantity also increase from Q0 to Q1. Thus, higher demand leads to a higher equilibrium price and higher equilibrium quantity.



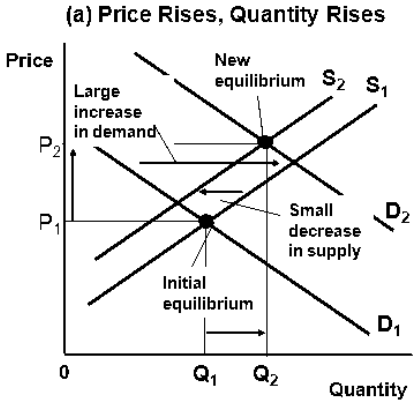
ii. Increase in supply is shown by shift of supply curve to rights from S to S'. cause the equilibrium price to deccrease from P0 to P1. At the new equilibrium point, the quantity also increase from Q0 to Q1. Thus, hiher supply leads to a lower equilibrium price and higher equilibrium quantity.

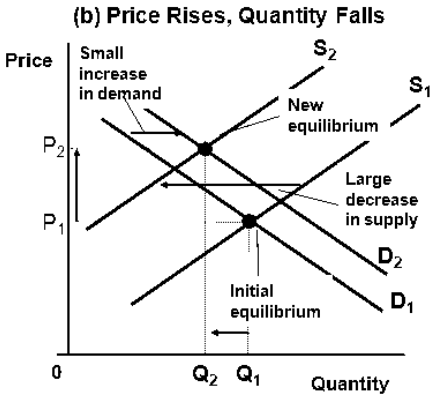


2.6.3 Changes in both supply and demand

If both supply and demand change simultaneosly, either in the same direction or in different directions, the new equilibrium will be more difficult to determine. Here we observe a simultaneous increase in demand and decrease in supply. Two outcomes are possible.

i. In panel (a), the equilibrium price rises from P_1 to P_2, and the equilibrium quantity rises from Q_1 to Q_2.
ii. In panel (b), the equilibrium price again rises from P_1 to P_2, but the equilibrium quantity falls from Q_1 to Q_2.





What happens to price and quantity when supply or demand shifts?

	No change In Supply	An increase In Supply	A decrease In supply
No change In demand	P same Q same	P down Q up	P up Q down
An increase In demand	P up Q up	P ambiguous Q up	P up Q ambiguous
A decrease In demand	P down Q down	P Down Q ambiguous	P ambiguous Q down

TUTORIAL 2
CHAPTER: DEMAND AND SUPPLY

1. The following table shows the demand and supply schedule for shoes.

Price (RM)	Quantity demanded (thousand)	Quantity supply (thousand)
100	10	70
80	20	60
60	30	50
40	40	40
20	50	30
10	60	20
0	70	10

(a) i. Sketch demand and supply curve for this product
ii. Determine the equilibrium price and quantity for this product.

(b) If the price increases to RM80:
i. What will happen?
ii. Briefly describe how the prices move to eliminate this economic situation.

2. The following function for demand and supply in the Malaysia oil industry*:*

$$Q_D = 525{,}000 - 7{,}500P$$
$$Q_S = -150{,}000 + 15{,}000P$$

Whereas Q_D is quantity demanded, Q_s is quantity supply (quantity measured in millions of barrels) and P is price.

(a) Complete the following table*:*

Price (RM)	Quantity demanded	Quantity supply
35	(i)	(ii)
30	(iii)	(iv)
25	(v)	(vi)
20	(vii)	(x)
15	(xi)	(xii)

(b) i. Sketch demand and supply curve for this product.
ii. Determine the equilibrium price and quantity for this product.

3. Illustrate each of the following events using a demand and supply diagram for chicken. Explain the effect on equilibrium price and quantity.

(a) Consumers' real income decreases (assuming chicken is a normal good).
(b) The price beef falls (assuming beef and chicken are substitutes).
(c) A medical report published suggests that fish provides more nutrient than chicken.
(d) Kentucky's promotion for rice and chicken meal has been very successful.
(e) Consumers prefer to eat seafood instead of chicken.
(f) News reported that the chickens are infected by bird flu.

4. The following table show the demand and supply of rice.

Price (RM)	Quantity Demanded (million Kg)	Quantity Supplied (million Kg)
1	125	90
2	105	105
3	85	120
4	65	135
5	45	150

(a) Draw demand and suppy curve.
(b) State the equilibrium price and quantity.
(c) Derived demand and supply function
(d) Using algebraic solution, find the equalibrium price and quantity.
(e) If price increase above that equilibrium price:
i. What will happen?
ii. Briefly describe how the prices move to eliminate this economic situation.
(f) If price deccrease below that equilibrium price:
i. What will happen?
ii. Briefly describe how the prices move to eliminate this economic situation.
(g) If consumer income increase, assume that this rice from normal brand, what will happen to demand and supply curve.

CHAPTER

3

GOVERNMENT INTERVENTION IN THE MARKET

Learning Outcomes

At the end of this topic, you should be able to:

1. Explain and use demand and supply curve to analyze the economic impact of price celings and price floor.
2. Use demand and supply curve to analyze the economic impact of taxes and subsidies.

CHAPTER OUTLINE

3.1 Introduction

3.2 Maximum Price and Minimum Price

3.3 Tax and Subsidies

3.4 Consumer Surplus and Producer Surplus

3.1 Introduction

There are several types of government interventions on market equilibrium. Government may intervene by legally limiting or controlling how high or how low price may be set. The forms of interventions are fixing higher limit or lower limit on prices in certain markets and imposing taxes and subsidies on certain items. These types of government interventions in the market can be explained using demand and supply analysis.

i. Price Ceiling or Maximum Price
ii. Price Floor or Minimum Price
iii. Impact of Tax
iv. Impact of Subsidy
v. Consumer Surplus and Producer Surplus

3.2 Maximum Price and Minimum Price

3.2.1 Price Ceiling/Maximum legal price.

A price ceiling sets the maximum legal price that a seller may charge for a product or service. It is also known as maximum price legislation and it is set below the equilibrium price. The rational of having price ceilings on specific productd is that they enable consumer to obtain some essential goods and services that they could not afford at the equilibrium price. A government can also impose price ceilings either on all products or on a very wide range of products to try to restrain inflation.

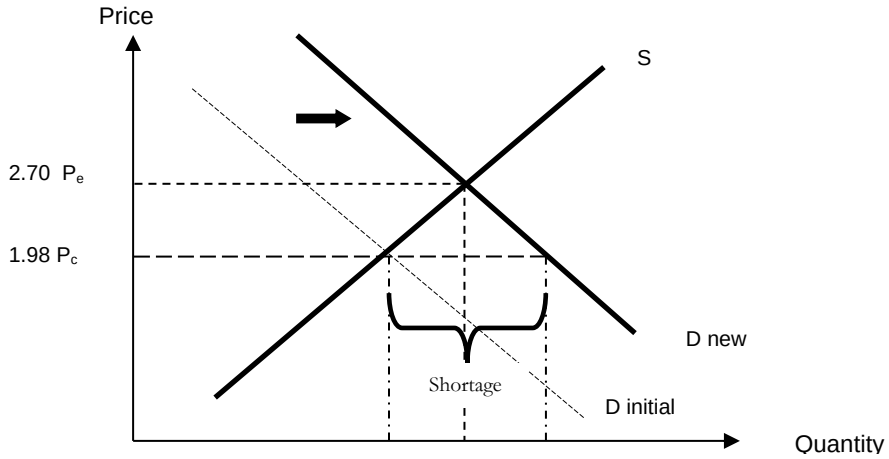
Example:

In Malaysia, The government has set the price ceiling of low income houses at RM42,000 in Peninsular Malaysia and RM50,400 in Sabah and Sarawak. Government also imposes ceiling price on food items such as cooking oil, wheat flour, condensed milk, and for construction materials such as cement and steel bar.

Rationale:

i. To enable consumers to obtain some essential goods or services that they could not afford at the equilibrium price.
ii. To restrain inflation if the government can impose price ceiling on a very wide range of products.

Example of Government imposed Price ceilings



Based on figure, assum Q_0 t Q_e Q_3 d increase in income that has lead to an increase in the purching power parity that shifts the demand curve to rights. Initial market equilibrium is at RM 1.98 and new market equlibrium is RM 2.70. The rapid increase in the price will burden the consumers, especially to B40 group. Therefore, to keep this goods is affordable to these households, the government imposed a price ceiling (P_c) of RM 1.98 per unit.

The question is what are the effects of this RM 1.98 ceiling price?.

The price ceiling was intended to keep the goods affordable but it also resulted in excess demand. At the restricted price, the quantity demanded remained greater than the quantity supplied and a state of excess demand existed. The quantity demand at price celing is Q_3 and quantity supplied is only at Q_0, a persistent excess demand or shortage of amount $Q_3 - Q_0$ occurs.

Adjustment

The price ceiling prevents the usual market adjustment in which competition amongst buyers bids up the price, including more production and rationing more buyers out of the market. The process will continue until shortage disappears at the equlibrium price and the quantity P_e and Q_e.

3.2.1.1 Disadvantages of Price Ceilings or Maximum Price

i. The rise of illegal or black markets
   An illegal or black market often arises to supply the commodity at a price higher than the ceiling price.
ii. Unfair to sellers who would have to receive a lower price
   Unfair because the lower price is the lower profit for sellers. Investment in industry will greatly reduced due to less return that investors earn.
iii. Sellers may used other mechanism to replace the price system.
   The goal is to protect low income families. However this regulation become a problem on the supply side that will impact the sellers.
iv. Reducing the selling price create a shortage of the product.

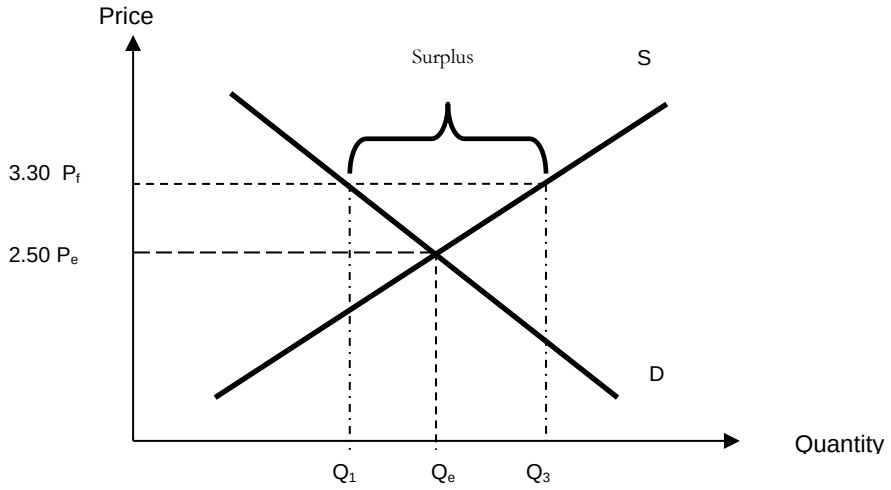
3.2.2 Price floor/ minimum price)

Price floor are minimum price fixed by the government. Price floor set above the equilibrium price are usually imposed when society feels that the market system has not provided sufficient income for certain groups of resources suppliers or producers. A price floor is also implemented to create surpluses as a buffer stock and to stabilise prices.

Example
The government practices price floor in the agriculture sector (paddy) to protect the farmers' income if the prices of commodities are too low under the free market. Government imposes minimum wage rate in order to help the low skilled labors to protect them from employers' exploitation.

Rationale:
i. To provide sufficient income for certain groups of resources suppliers or producers.
ii. To create surpluses as a buffer stock.
iii. To stabilizes prices.

Example of Government imposed Price floor



Based on figure, suppose the equilibrium price of Tomato is RM 2.50 per kilogram and because of that low price, many farmers have extremely low incomes. The governments decides to help out by establishing a legal price floor of RM 3.30 per kilogram. At any price above the equilibrium price, the quantity supplied will be greater than quantity demanded. Therefore, there will be a persistent excess of supply or a suplus of a product. Farmers will be willing to produced and offer for sale more than buyers are willing to buy. Based on graph, the existence of surplus is $Q_3 - Q_1$.

Disadvantages of Price floor or Minimum Prices.

i. Unfair for consumer
Consumer have to pay more and it may result in waste of resources.

ii. Surplus of products
The storage and maintenace cost of the surplus could be huge. To finance these costs, the government might increase the tax rate. This would be unfair to taxpayers whose money is used to purchase and store surplus.

iii. A waste of resources
A price floor represent a waste of resources because government has to finance the surplus. Government must buy the surplus and release

it if there is a shortage or dump in overseas market. If surplus is too much, government may have to destroy it.

iv. Overinvestment in the industry

Regulation that keep price high encourage overinvestment in an industry. Even inefficient business whose high operating costs would cause them to fail in an unrestricted can survive due to the shelter of price floor.

Summary

Price Floors	Price Ceilings
- Set above equilibrium P	– Set below the equilibrium P
- Minimum selling P	– Maximum selling P
- Surplus	– Shortage
- Distort markets	– Distort markets
-Reduce economic welfare	– Reduce economic welfare

The difference between price ceiling and price floor

	Price Ceiling/ max price	**Price Floor/ min price**
Price	Price is set below the equilibrium price and is not allowed to rise	Price is set above the equilibrium price and is not allowed to drop
Market Condition	Shortage	Surplus
Advantages	• Consumer could purchase goods and services at lower prices • Try to restrain inflation	• Higher wage rate help the unskilled labor to get higher and stable income • Protects producers' income especially the farmers
Disadvantages	• Emergence of black market. • Producers produce lower quantity • Producers tend to receive illegal payments from consumers	• Consumers pay more than the equilibrium price. • Surplus of productions lead to waste of resources for government. • Minimum wage rate leads to unemployment.

3.3 Tax and Subsidies

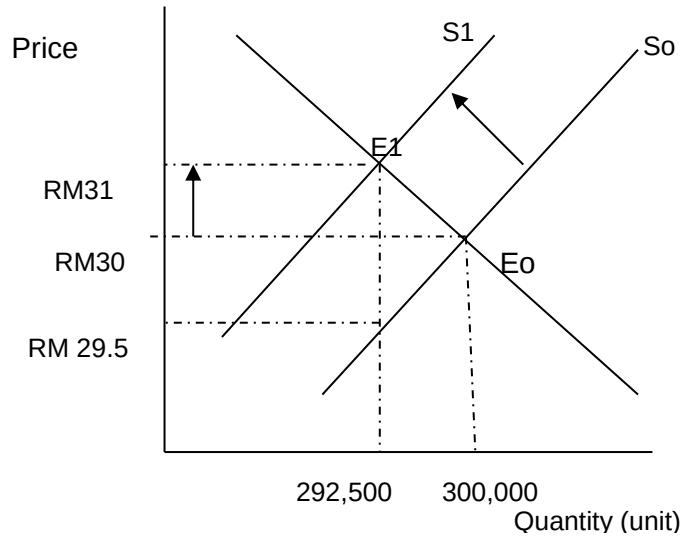
3.3.1 Impact of tax

Indirect tax

Indirect tax is a tax that is imposed by the government on producers or sellers but paid by or passed to the end-users (consumers). Indirect taxes consist of import duties, excise duties, sales tax, service tax and export duties = revenue for the government.

3.3.1.1 Tax and changes in equilibrium

Indirect Taxes



The initial equilibrium price and quantity is RM30 per pack and 300,000 packs. The imposition of exicise tax of RM1.5per pack has decreased the supply since it would increase cost of production.Supply curve shift to left from S0 to S1 and equilibrium price rises to RM 31 per pack while quantity falls to 292,500 packs. The price the buyer pay is RM31and the price the seller receives is RM 29.50. The difference in the price is the burden of tax of RM 1, is paid by consumer and producer only pay RM0.50 burden of tax.

3.2.1.2 Application of tax in demand and supply analysis.

Given the following data concerning supply and demand of boxes of chocolates.

Price (RM)	Quantity Demanded	Quantity Supplied
1.00	200	80
1.25	180	100
1.50	160	120
1.75	**140**	**140**
2.00	120	160
2.25	100	180

Given the demand and supply schedule. The demand and supply function that derived from the above schedule is as follow.

$$Q_d = 280 - 80P$$
$$Q_s = 80P$$

This functions are derived using
Qd = a-bp
Qs = c + bp

From the schedule and function the equilibrium price and quantity is RM 1.75 and 140 unit.

Note: Equilibrium demand and supply can be identify based on DD=SS from sechedule and functons.

If government imposed tax RM0.25. This imposition of tax will effect supply curve and also supply function.

Thus, the new supply function is calculated as follow:

$Q_s = 80P$ Initial supply function

$Q_s = 80(P - tax\ value)$ Incorporated the taxes value

Thus new supply function

$$Q_s = 80(P - 0.25)$$
$$Q_s = 80P - 20$$ New supply function

The new equilibrium after tax are calculated as follows:

Demand = Supply (new supply function after tax)

$$Q_d = 280 - 80P$$

$$Q_s = 80P - 20$$

280 – 80P = 80P - 20

280+ 20 = 80P + 80P

300 = 160P

P = 300/160

P = 1.875

To calculate value of quantity, substitute P=1.875 in demand function or new supply function.

$$Q_d = 280 - 80(1.875)$$

$$Q_d = 280 - 150$$

$$Q_d = 130$$

or

$$Q_s = 80(1.875) - 20$$

$$Q_s = 150 - 20$$

$$Q_s = 130$$

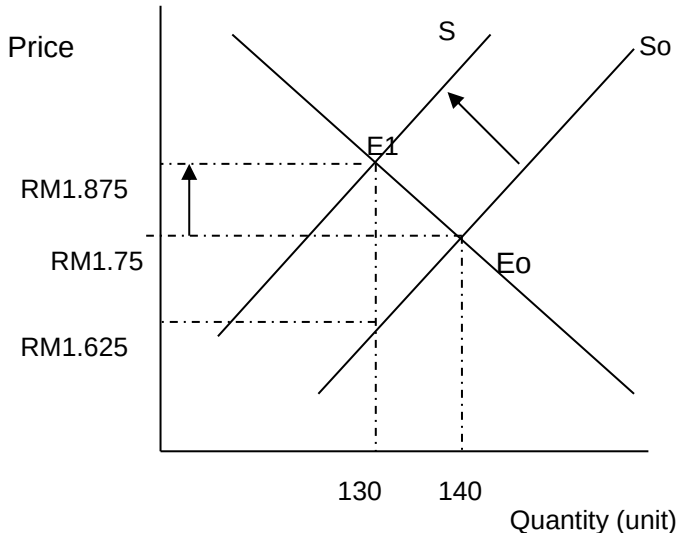
The new equilibrium after tax of price is RM 1.875 and quantity is 130.

The impact of tax can be illustrated using graph.

Based on new supply function the has been derived above, the new supply schedule are as follow.

Price (RM)	**Quantity Demanded**	**Quantity Supplied**	**New quantity supplied Qs = 80P -20**
1.00	200	80	80(1) - 20 = 60
1.25	180	100	80(1.25) - 20 = 80
1.50	160	120	80(1.50) - 20 = 100
1.75	**140**	**140**	80(1.75) - 20 = 120
2.00	120	160	80(2.00) - 20 = 140
2.25	100	180	80(2.25) - 20 = 160

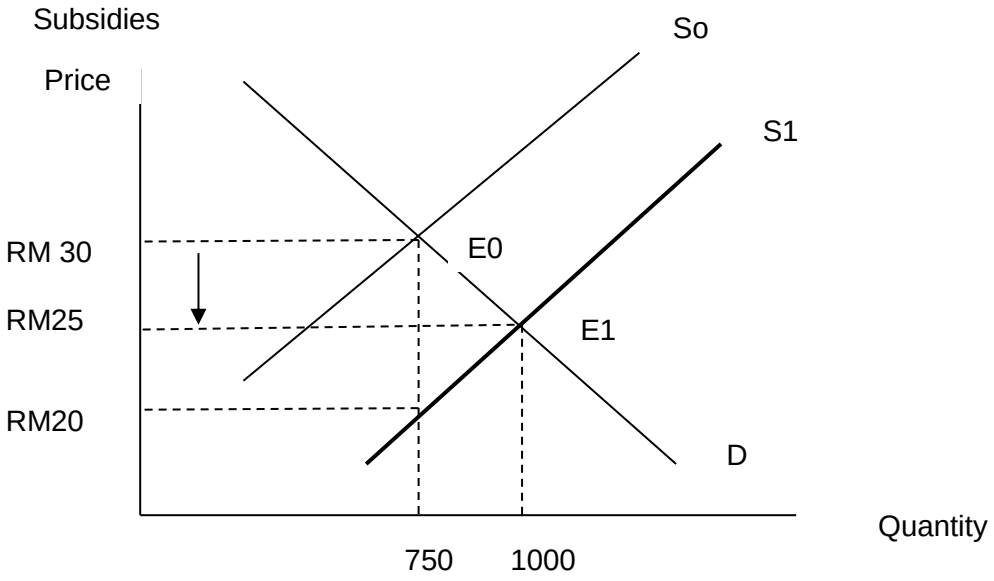
Indirect Taxes



The initial equilibrium price and quantity is RM1.75 per boxes and 140 boxes. The imposition of exicise tax of RM 0.25 per boxes has decreased the supply since it would increase cost of production. Supply curve shift to left from S0 to S1 and equilibrium price rises to RM1.875 per boxes while quantity falls to 130 boxes. The price the buyer pay is RM1.875 and the price the seller receives is RM1.625. The difference in the price is the burden of tax of RM 0.25, which is share equally by buyer and seller (RM 0.125 by both sides)

3.3.2 Impact of Subsidy

Subsidy is an incentive from government to encourage producers or sellers to produce more. The impact of subsidy on equilbrium price and quantity is opposite with the tax effect. Subsidy will lower the cost of production and at the same time encourage producer to increase the quantity production.



Based on the above figure, the initial equilibrium price and quantity for fertilizers is at RM 30 per bag and 1000 bags pf fertilizers. A subsidy of RM10 per bag would shift the suuply curve from So to S1 and the equilibrium price decrease to RM 25 per bag while quantity at 750 bag of fertilizers. The buyer and seller share RM5.00 each from the total subsidy of RM10.00 per bag fertilizer.

3.3.2.1 Application of subsidy in demand and supply analysis. (Using the same example in 3.2.1.2 Application of tax in demand and supply analysis)

$$Q_d = 280 - 80P$$
$$Q_s = 80P$$

From the schedule and function the equilibrium price and quantity is RM 1.75 and 140 unit.

Suppose that government provide subsidy of RM0.25. Thus, the new supply function is calculated as follow:

$Q_s = 80P$ Initial supply function

$Q_s = 80(P + subsidy\ value)$ Incorporated the subsidy value

Thus new supply function

$$Q_s = 80(P + 0.25)$$
$$Q_s = 80P + 20$$ New supply function

The new equilibrium after tax are calculated as follows:

Demand = Supply (new supply function after tax)

$$Q_d = 280 - 80P$$
$$Q_s = 80P + 20$$
$$280 - 80P = 80P + 20$$
$$280 - 20 = 80P + 80P$$
$$260 = 160P$$
$$P = 260/160$$
$$P = 1.625$$

To calculate value of quantity, substitute P=1.625 in demand function or new supply function.

$$Q_d = 280 - 80(1.625)$$
$$Q_d = 280 - 130$$
$$Q_d = 150$$

or

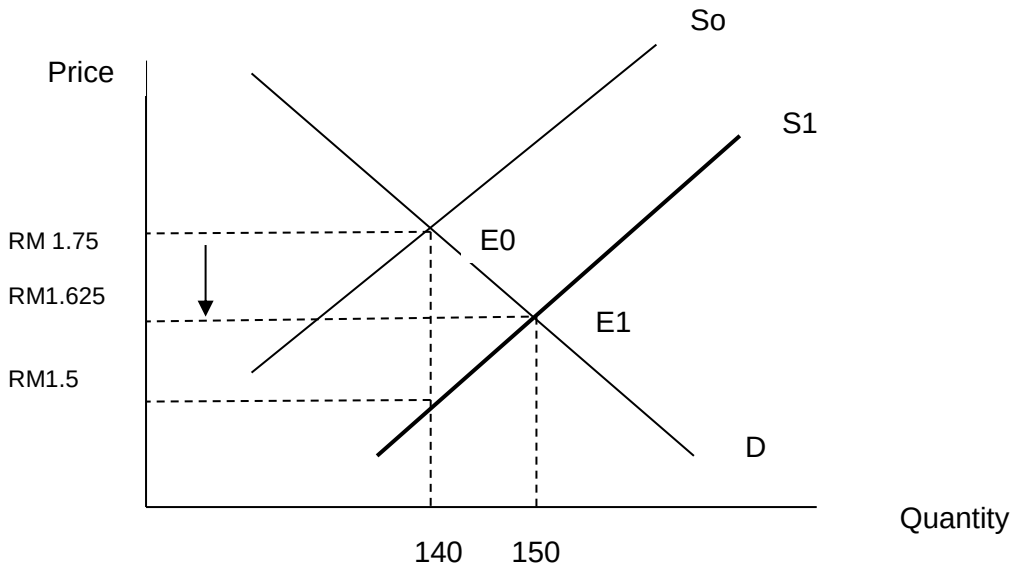
$$Q_s = 80(1.625) - 20$$
$$Q_s = 130 + 20$$
$$Q_s = 150$$

The new equilibrium after tax of price is RM 1.625 and quantity is 150.

The impact of subsidycan be illustrated using graph. Based on new supply function the has been derived above, the new supply schedule are as follow.

Price (RM)	Quantity Demanded	Quantity Supplied	New quantity supplied Qs = 80P + 20
1.00	200	80	80(1) + 20 = 100
1.25	180	100	80(1.25) + 20 = 120
1.50	160	120	80(1.50) + 20 = 140
1.75	**140**	**140**	80(1.75) + 20 = 160
2.00	120	160	80(2.00) + 20 = 180
2.25	100	180	80(2.25) + 20 = 200

Subsidies

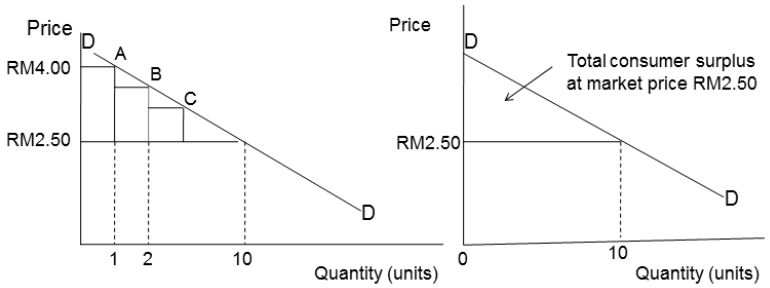


Based on the above figure, the initial equilibrium price and quantity for chocolate is at RM1.75 per boxes and 140 boxes. A subsidy of RM0.25 would shift the suuply curve from So to S1 and the equilibrium price dectrease to RM 1.625 per boxes while quantity at 150 boxes of chocolate. The buyer and seller share RM0.125 each from the total subsidy of RM0.25 per boxes of chocolates.

3.4 Consumer Surplus and Producer Surplus

3.4.1 Consumer Surplus

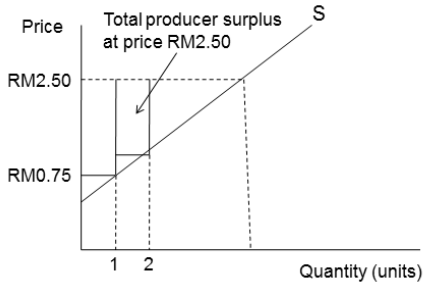
Consumer surplus is the difference between the highest price that buyers are willing to pay for each unit and its current market price. CS is equal to the area below DD curve and above market price.



Suppose the good whose demand curve is DD were available at price of RM2.50. The buyer of the first unit would have been willing to pay as much as RM4.00 for it. Since the market price is just RM2.50, she receives a consumer surplus of RM1.50. The buyer of the second unit is willing to pay something less than RM4.00 and receive a slightly smaller surplus. Total consumer surplus received by buyers is thus the area of triangle between the demand curve and the market price.

3.4.2 Producer surplus

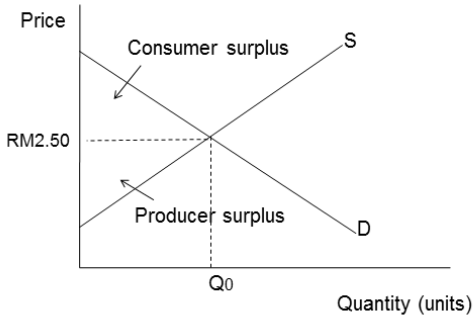
Producer surplus is the difference between the current market price for a product and the full cost of production for a firm. (hint: SS curve = MC curve for a firm)



Some producers are willing to produce the product for a price of RM0.75 each. Since they are paid RM2.50, they earn a producer surplus equal to RM1.75. Other producers are willing to supply the product at a price of RM1.00; they receive a producer surplus equal to RM1.50.

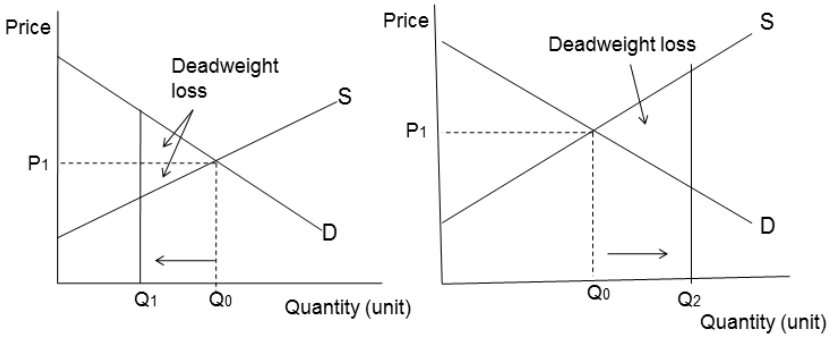
Since the market price is RM2.50, the total producer surplus is the area of triangle between the market price and the supply curve, or the area above the SS curve and below the market price.

3.4.3 Total Producer and Consumer Surplus



3.4.3.1 Deadweight loss (or efficiency loss)

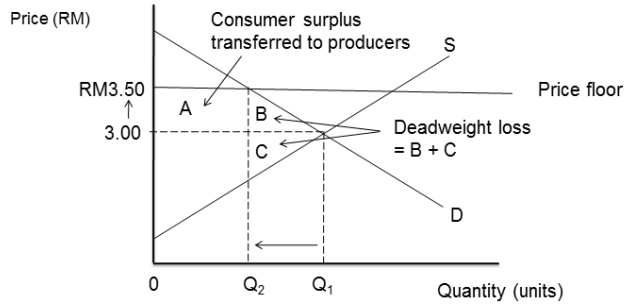
Deadweight loss = lost economic surplus: The total loss of producer and consumer surplus from underproduction or overproduction.



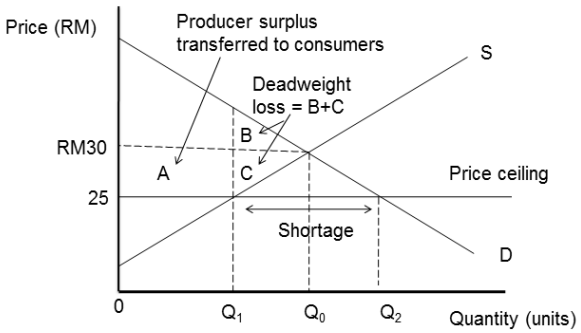
(a) Deadweight loss from underproduction

(b) Deadweight Loss from overproduction.

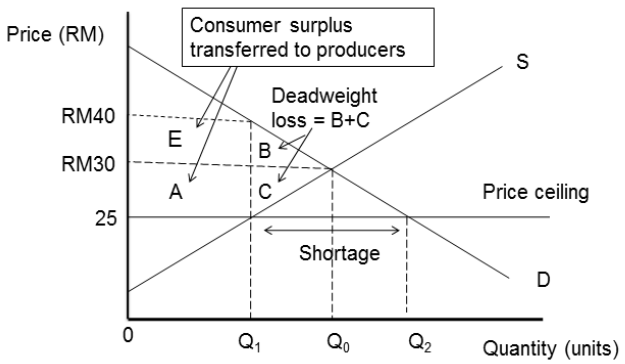
3.4.3.2 Price Floors & Economic surplus



3.4.3.4 Price Ceilings & Economic surplus (without black market)



3.4.3.5 Price Ceilings & Economic surplus (there is a black market)



TUTORIAL 3
(Chapter 3: Government Intervention in The Market)

1. Consider the given for Pizza Hut.

Price	Quantity demanded	Quantity Supplied
5	200	0
7	160	40
9	120	80
11	80	120
13	40	160
15	0	200

a. On a graph paper, plot demand and supply curve

b. State the equilibrium price and quantity of pizza.

c. An increase in price of flour cause the supply of pizza to decline by 2 unit of pizza at every price level.
   i. On the same graph in (a), draw a new supply curve.
   ii. Determine the new equilibrium price and quantity.

d. If the price of pizza is sold at RM 9.00.
   i. Describe whether there would be surplus or shortage and how much it would be.
   ii. What is this price control known as?
   iii. Suggest two problems that would results from such government action.

e. What will happen if the government established a price ceiling of RM 7.00.

f. Government decides to impose tax RM 0.75 of SST from the price of Pizza.
   i. Calculate equilibrium price and quantity after tax.
   ii. Determine price paid by consumer after tax.
   iii. Determine price received by seller after tax.
   iv. Calculate total tax burden of the consumer.
   iv. Calculate total tax burden of the sellers.
   v. Total tax revenue received by the government.

vi. Indicate clearly on the graph drawn in (a) above, the amount of tax paid by the consumers and the amount of the tax paid by the sellers/producers.

g. Suppose that government provide a subsidy RM0.50.
   i. Calculate equilibrium price and quantity after subsidy.
   ii. Determine the total amount of subsidy enjoy by buyers.
   iii. Determine the total amount of subsidy enjoy by seller.

2. The market burger for Fizo Hot Burger has the following demand and supply schedules.

Price	Quantity Demanded	Quantity Supplied
1.00	200	80
1.25	180	100
1.50	160	120
1.75	140	140
2.00	120	160
2.25	100	180

(a) i. Sketch demand and supply curve for this product.
ii. Determine the equilibrium price and quantity.

(b) Derive demand and supply function for Fizo Hot Burger.

(c) Based on above schedule, assume that the government has imposed a price floor at RM2.00.
i. Calculate excess in quantity supplied.
ii. Show answer with a diagram.

(d) Based on above schedule, if government-imposed tax RM0.25 to producer, calculate:
i. Calculate new equilibrium price and quantity.
ii. Show answer with a diagram.

(e) Based on above schedule, assume that the government has imposed a price ceiling at RM1.25.
i. Calculate total excess in quantity demanded.
ii. Show answer with a diagram.

(f) Based on above schedule, if government provide subsidy RM 0.25 to producer
i. Calculate new equilibrium price and quantity.
ii. Show answer with a diagram.

CHAPTER

4

ELASTICITY

LEARNING OUTCOME:

At the end of this chapter, student should able to:

1. Calculate the elasticity of demand, supply, income and cross price.
2. Explain the types of elasticity and type of goods.

CHAPTER OUTLINE

4.1 Introduction
4.2 Price Elasticity of Demand
4.3 Price Elasticity of supply
4.4 Other Elasticity

4.1 Introduction

Elasticity measures how much one variable responds to changes in another variable. **Elasticity** is a numerical measure of the responsiveness of Q^d or Q^s to one of its determinants.

4.2 Price Elasticity of Demand

Price elasticity of demand measures how much Q^d responds to a change in P.

Measure of how much quantity demanded of a good responds

- To a change in the price of that good

Percentage change in quantity demanded

- Divided by the percentage change in price

Measures how willing consumers are to buy less of the good as its price rises. It measures the price-sensitivity of buyers' demand.

Price elasticity of demand = $\frac{Percentage\ Change\ in\ Q^d}{Percentage\ Change\ in\ P}$

i. Mid Point formula : $\frac{(Q_2 - Q_1)/\ [(Q_2+Q_1)/2\ ]}{(P_2 - P_1)/\ [(P_2+P_1)/2\ ]}$

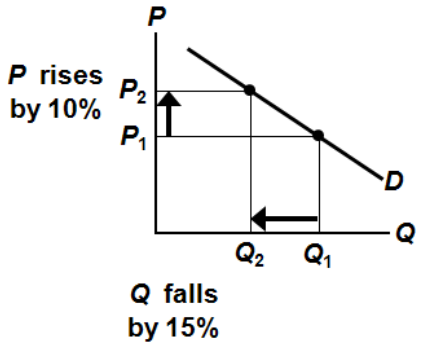
ii. Point formula: $\frac{\frac{Q_2 - Q_1}{Q_1}}{\frac{P_2 - P_1}{P_1}}$

or : $\frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{Q_0 - Q}{Q} \times \frac{P}{P_0 - P}$

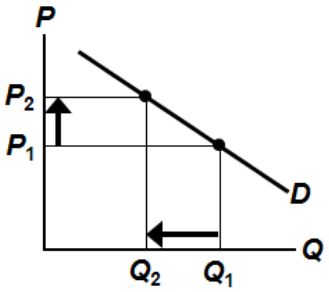
Example 1:

Given the percentage change in quantity demand is 15% and percentage change in the price is 10%, so Price elasticity of demand equals

$$\frac{15\%}{10\%} = 1.5$$



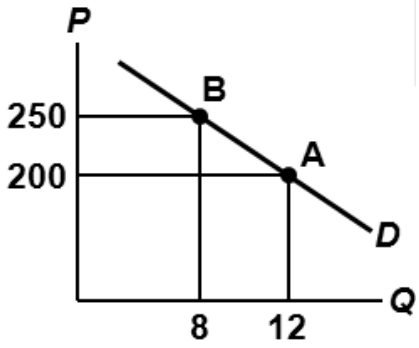
Along a ***D*** curve, ***P*** and ***Q*** move in opposite directions, which would make price elasticity negative. We will drop the minus sign and report all price elasticities as positive numbers.



Calculating Percentage Changes

A scenario

You design websites for local businesses. You charge RM200 per website, and currently sell 12 websites per month. Your costs are rising (including the opportunity cost of your time), so you consider raising the price to RM250.



Demand for your websites
Standard method of computing the percentage (%) change:

$$\frac{End\ value - start\ value}{Start\ value} \text{ x } 100\%$$

Going from A to B, the % change in ***P*** equals
(RM 250–RM200)/$200 = 25%

Problem:
The standard method gives different answers depending on where you start

From A to B,

P rises 25%, **Q** falls 33%,

elasticity = 33/25 = 1.33

From B to A,

P falls 20%, **Q** rises 50%, elasticity = 50/20 = 2.50

So, we instead use the **midpoint method**:

$$\frac{End\ value - start\ value}{mid\ point} \text{ x } 100\%$$

The midpoint is the number halfway between the start and end values, the average of those values.
It doesn't matter which value you use as the "start" and which as the "end" – you get the same answer either way!

Calculating Percentage Changes

Using the midpoint method, the % change in ***P*** equals

$$\frac{250-200}{225} \text{ x } 100\% = 22.2\%$$

The % change in ***Q*** equals

$$\frac{12-8}{10} \text{ x } 100\% = 40.0\%$$

The **price elasticity** of demand equals

40 / 22.2 = 1.8

Example 2:

Price (RM)	Quantity Demanded (kg)
6.00	100
6.50	90
7.00	70
7.50	40
8.00	10

Calculate the price elasticity of demand for A if the price of A increase from RM7.00 to RM 8.00 per kg.

P1 = 7.00

P2 = 8.00

Q1= 70

Q2 = 10

By using mid point formula:

$$= \frac{\frac{10-70}{[\frac{10+70}{2}]}}{\frac{8-7}{[\frac{8+7}{2}]}}$$

$$= \frac{\frac{-60}{40}}{\frac{1}{7.5}}$$

$$= \frac{-1.5}{0.133}$$

= -11.27

4.2.1 The Variety of Demand Curves

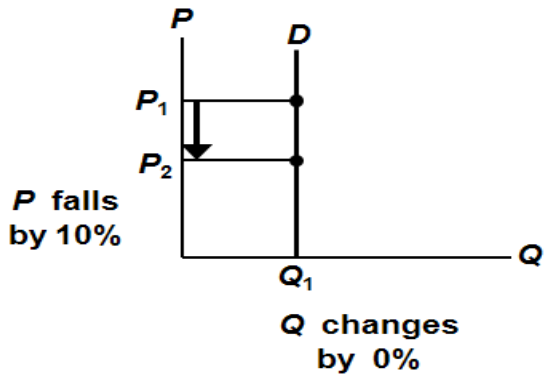
The price elasticity of demand is closely related to the slope of the demand curve.

Rule of thumb:
The flatter the curve the bigger the elasticity, the steeper the curve, the smaller the elasticity.

There are five different classifications of ***D*** curves.

1. "Perfectly inelastic demand"

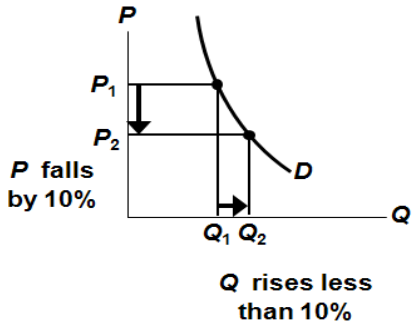
Price elasticity of demand = $\frac{\%\,\Delta\, Q^d}{\%\,\Delta\, P} = \frac{0\,\%}{10\,\%} = 0$



D curve: is vertical
Consumers' price sensitivity: None
Elasticity: 0

2. "Inelastic demand"

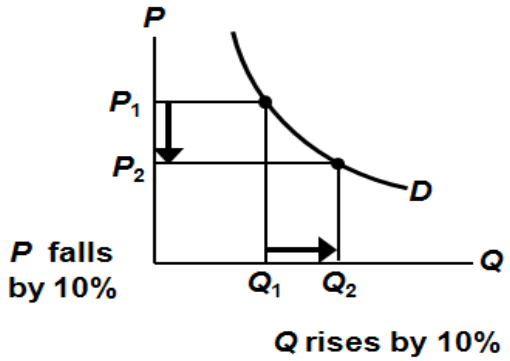
Price elasticity of demand = $\frac{\%\,\Delta\, Q^d}{\%\,\Delta\, P} = \frac{<10\,\%}{10\,\%} = < 1$



D curve: is relatively steep
Consumers' price sensitivity: relatively low
Elasticity: < 1

3. **"Unit elastic demand"**

Price elasticity of demand = $\frac{\%\,\Delta\, Q^d}{\%\,\Delta\, P} = \frac{10\,\%}{10\,\%} = 1$

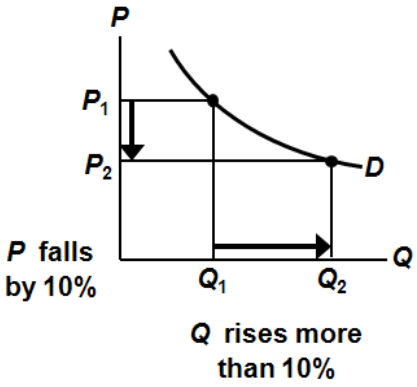


D curve: is intermediate slope
Consumers' price sensitivity: Intermediate
Elasticity: 1

This is the intermediate case: The demand curve is neither relatively steep nor relatively flat. Buyers are neither relatively price-sensitive nor relatively insensitive to price.

4. **"Elastic demand"**

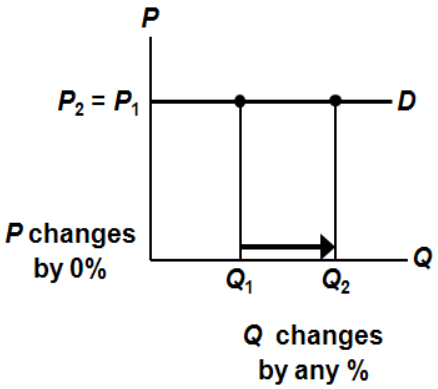
Price elasticity of demand = $\frac{\%\,\Delta\, Q^d}{\%\,\Delta\, P} = \frac{>10\%}{10\,\%} = > 1$



D curve: is relatively flay
Consumers' price sensitivity: relatively high
Elasticity: > 1

5. **"Perfectly elastic demand"**

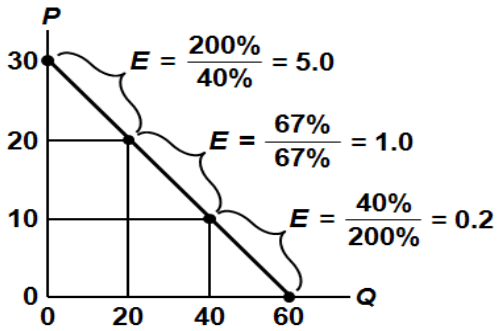
Price elasticity of demand = $\frac{\%\,\Delta\, Q^d}{\%\,\Delta\ P}$ = $\frac{any\,\%}{0\,\%}$ = infinity



D curve: is horizontal
Consumers' price sensitivity: extreme
Elasticity: infinity

"Extreme price sensitivity" means the tiniest price increase causes demand to fall to zero.

Elasticity of a Linear Demand Curve



The slope of a linear demand curve is constant, but its elasticity is not.

4.2.2 Determinants of Price Elasticity of Demand

i. The greater the availability of substitutes, and the more similar the substitutes.
Goods with close substitute tend to have more elastic demand because it is easier for customers to change the goods.

ii. Proportion of consumer expenditure.
Demand tend to be more price elastic when a consumer expenditure on the product is large.

iii. The longer the period of adjustment (time).
Goods tend to have more elastic demand over a longer period of time horizon.

4.3 Price Elasticity of supply

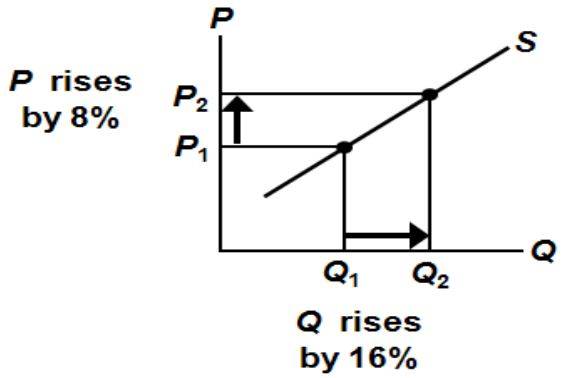
Price elasticity of supply measures how much Q^s responds to a change in P. it measures sellers' price-sensitivity.
Again, use the midpoint method to compute the percentage changes.

Price elasticity of supply = $\frac{Percentage\ Change\ in\ Q^S}{Percentage\ Change\ in\ P}$

Price elasticity of supply = $\frac{End\ value - start\ value}{mid\ point}$

Example:
Given the percentage change in quantity supply is 16% and percentage change in the price is 8%, so Price elasticity of supply equals

$\frac{16\%}{8\%} = 2$



4.3.1 The Variety of Supply Curves

The slope of the supply curve is closely related to price elasticity of supply.

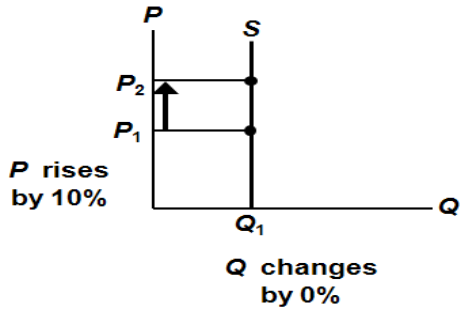
Rule of thumb:

- The flatter the curve, the bigger the elasticity.
- The steeper the curve, the smaller the elasticity.

There are five different classifications of supply curves.

1. **"Perfectly inelastic"**

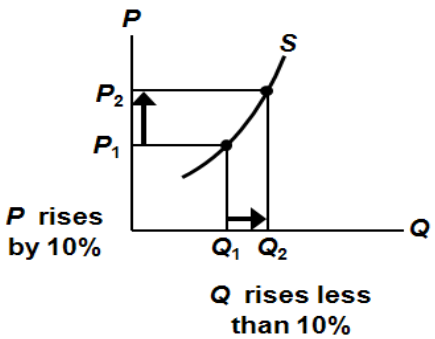
Price elasticity of supply = $\frac{\%\,\Delta\, Q^S}{\%\,\Delta\, P} = \frac{0\,\%}{10\,\%} = 0$



S curve: vertical
Sellers' price sensitivity: None
Elasticity: 0

2. **"Inelastic"**

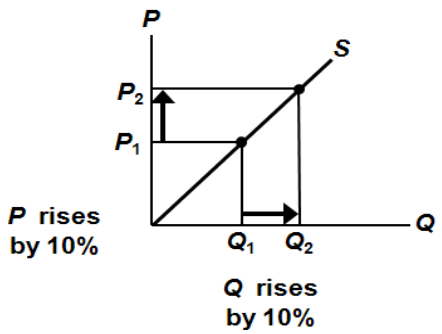
Price elasticity of supply = $\frac{\%\,\Delta\, Q^S}{\%\,\Delta\, P} = \frac{<10\,\%}{10\,\%} = <1$



S curve: relatively steep
Sellers' price sensitivity: Relatively low
Elasticity: < 1

3. **"Unit elastic"**

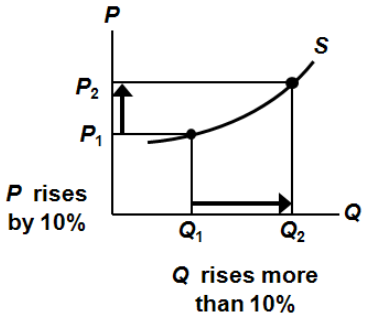
Price elasticity of supply = $\frac{\%\,\Delta\, Q^S}{\%\,\Delta\, P} = \frac{10\,\%}{10\,\%} = 1$



S curve: intermediate slope
Sellers' price sensitivity: intermediate
Elasticity: 1

4. **"Elastic"**

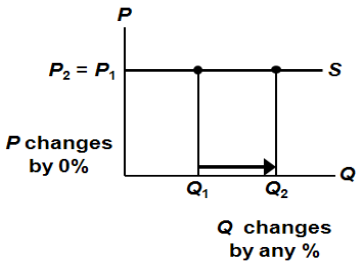
Price elasticity of supply = $\frac{\%\,\Delta\, Q^S}{\%\,\Delta\, P} = \frac{>10\,\%}{10\,\%} = >1$



S curve: relatively flat
Sellers' price sensitivity: relatively high
Elasticity: > 1

5. **"Perfectly elastic"**

Price elasticity of supply = $\frac{\%\,\Delta\, Q^S}{\%\,\Delta\, P} = \frac{any\,\%}{0\,\%}$ = infinity



S curve: horizontal
Sellers' price sensitivity: extreme
Elasticity: infinity

4.3.3 The Determinants of Supply Elasticity

Ability of sellers to change the amount of the good they produce.

1. The more easily sellers can change the quantity they produce, the greater the price elasticity of supply.
    - Example: Supply of beachfront property is harder to vary and thus less elastic than supply of new cars.
2. Time period
    - For many goods, price elasticity of supply is greater in the long run than in the short run, because firms can build new factories, or new firms may be able to enter the market.

4.4 Other Elasticity

4.4.1. Income elasticity of demand

Measures the response of $\boldsymbol{Q^d}$ to a change in consumer income

$$\text{Income elasticity of demand} = \frac{\%\,\Delta\, Q^d}{\%\,\Delta\ income}$$

An increase in income causes an increase in demand for a *normal* good.

- but lowers the quantity demanded for *inferior* goods

Hence, for *normal* goods, income elasticity > 0. For *inferior* goods, income elasticity < 0

Type of Income Elasticity

1. Goods consumers regard as necessities tend to be income inelastic
    - Examples include food, fuel, clothing, utilities, and medical services.
2. Goods consumers regard as luxuries tend to be income *elastic*.
    - Examples include sports cars, furs, and expensive foods.

Example:

Quantity Demanded for A (kg)	Quantity Demanded for B (kg)	Consumer Income (RM)
100	20	2000
90	30	1800
70	50	1600
40	70	1400
10	85	1200

When the income of consumers increase from RM1400 to RM1800, calculate the income elasticity demand for A and B. What types of products are A and B?

Goods A

$$E_Y = \frac{\frac{90-40}{[\frac{90+40}{2}]}}{\frac{1800-1400}{[\frac{1800+1400}{2}]}}$$

$$E_Y = \frac{\frac{50}{65}}{\frac{400}{1600}} = \frac{0.769}{0.25} = 3.076$$

E_Y = > 1: Luxury Goods

Goods B

$$E_Y = \frac{\frac{30-70}{[\frac{30+70}{2}]}}{\frac{1800-1400}{[\frac{1800+1400}{2}]}}$$

$$E_Y = \frac{\frac{-40}{50}}{\frac{400}{1600}} = \frac{-0.8}{0.25} = -3.2$$

E_Y = < 0: Inferiors Goods

4.4.2. Cross-price elasticity of demand:

Measures the response of demand for one good to changes in the price of another good

Cross price elasticity of demand = $\frac{\%\ change\ Q^d of\ good\ 1}{\%\ \ change\ in\ price\ of\ good\ 2}$

1. For substitutes, cross-price elasticity > 0 (e.*g*., an increase in price of beef causes an increase in demand for chicken)

2. For complements, cross-price elasticity < 0 (*e.g*., an increase in price of computers causes decrease in demand for software)

Example:

Price of A (RM)	Quantity Demanded for A (kg)	Quantity Demanded for B (kg)
6.00	100	20
6.50	90	30
7.00	70	50
7.50	40	70
8.00	10	85

Calculate the cross elasticity of demand for B when the price of A decrease from RM7.50 to RM6.50. Are A and B complements or substitutes goods?

$$E_{AB} = \frac{\frac{30-70}{[\frac{30+70}{2}]}}{\frac{6.5-7.5}{[\frac{6.5+7.5}{2}]}}$$

$$E_{AB} = \frac{\frac{-40}{50}}{\frac{-1}{7}}$$

$$E_{AB} = \frac{-0.8}{-0.1428}$$

$$E_{AB} = 5.6$$

$E_{AB} = > 0$: Substitute Goods

TUTORIAL 4
CHAPTER: ELASTICITY

1. Use the table below to answer the questions.

Price of A (RM)	Quantity of A (unit)	Quantity of B (unit)	Income (RM)
10	100	140	2000
20	80	110	1800
30	60	80	1600
40	40	50	1400

(a) Calculate price elasticity of demand for goods A, when price increases from RM20 to RM30 and indicate whether the demand is elastic or inelastic?

(b) Calculate the cross-price elasticity of demand for goods B when the price of goods A increases from RM10 to RM20. Are goods A and goods B substitutes or complement?

(c) Calculate the income elasticity of demand for goods A and goods B when the income increases from RM1,600 to RM2,000. What type of goods A and goods B?

2. Use the table below to answer the questions.

Price of A (RM)	Quantity demanded (Income = RM5000)		Quantity demanded (Income = RM7500)		Quantity demanded (Income = RM10000)	
	Goods A	Goods B	Goods A	Goods B	Goods A	Goods B
24	4	2	6	3	8	4
20	8	4	9	6	12	8
16	12	6	12	9	16	12
12	16	8	15	11	20	16
8	18	9	18	15	24	18
4	20	12	21	18	28	20

(a) Calculate price elasticity of demand for goods A, when price increases from RM12 to RM20 at income RM7,500 and indicate whether the demand is elastic or inelastic?

(b) Calculate cross price elasticity of demand when price of goods A decreases from RM24 to RM8 at income RM10,000 and indicate type of goods A?

(c) i. Calculate income elasticity for goods A at price RM16 if income increase from RM5,000 to RM10,000 and indicate type of goods A?

ii. Calculate income elasticity for goods B at price RM8 if income decrease from RM7,500 to RM5,000 and indicate type of goods B?

(d) Explain briefly factors would affect the elasticity of demand and elasticity of supply.

3. Use the table below to answer the questions.

Price of A (RM)	Quantity Demanded for A (kg)	Quantity Demanded for B (kg)	Consumer Income (RM)
6.00	100	20	2000
6.50	90	30	1800
7.00	70	50	1600
7.50	40	70	1400
8.00	10	85	1200

(a) Calculate price elasticity of demand for goods A, when price increases from RM7 to RM8 and indicate whether the demand is elastic or inelastic?

(b) Calculate the cross-price elasticity of demand for goods B when the price of goods A decreases from RM7.5 to RM6.5. Indicate type of product.

(c) Calculate the income elasticity of demand for goods A and goods B when the income increases from RM1,400 to RM1,800. What type of goods A and goods B?

CHAPTER

5

PRODUCTION AND COST THEORY

LEARNING OUTCOME:

At the end of this chapter, students are able to:

1. Describe the concepts of cost.
2. Explain the relationship of cost and production
3. Explain the short run and long run cost.
4. Explain the concept economies of scale and diseconomies of scale.
5. Calculate the cost, revenue and profit.

CHAPTER OUTLINE:

5.1 Production
5.2 Classification of factors of production
5.3 Type of Cost
5.4 Economic profit and Accounting profit
5.5 Total Revenue, Total Cost, Profit
5.6 Short Run versus Long Run
5.7 Short Run Production
5.8 Law of Diminishing Marginal Returns
5.9 Short Run Costs
5.10 Short Run versus Long Run

5.1 Production

Production means the process of using the factors of production to produce goods and services. Productions can be meaning as transformation of inputs and outputs. The term inputs refers to those things that a firm buys for use in production such as land, labor, capital and entrepreneur. Output refers to what we get at the end of the production or refers to finished products.

5.2 Classification of factors of production

Inputs for the production of a given product have been classified into the four factors of production, namely, land, labor, capital and entrepreneur.

i. Land

Land refers to all those natural resources or gifts of nature which are available for free such as land surface, air, lakes, water, minerals, forests, seas, mountain, etc. Land is the means of supporting human beings, plants and animals. Therefore, land is the source of all matter and the starting point of all production.

ii. Labor

Labor refers to all activities, physical or mental, which are undertaken by man in exchange for monetary reward. Labor consists of all human efforts of body or of mind which are undertaken in the expectation of a reward. Labor plays a very important roe in production. The natural resources of a country cannot be utilized in the absence of labor. The works of lecturers, doctors, contractors, farmers, lawyers, prime minister are all examples of labors.

iii. Capital

Capital refers to that part of man-made wealth, which is used in further producing wealth. A country capital is producing its stocks of produced or man-made means of production, consisting of such items as buildings, factories, machinery, tools, equipment and inventories of goods in stock. Factories, machinery, tools, building, trucks and railroads are example of capitals. Money that is employed in business and production is considered to be capital. Therefore all money is not capital. Capital is basically all wealth other than land, which is used to produce more wealth. For example, a sewing machine does not give the profit if we use for our own, but if we used this machine to make a business(production of shirts) this machine known as capital goods.

iv. Entrepreneurship

Entrepreneurship refers to the combining of the three factors of production; land, labor and capital together, organizing and bearing the risk and uncertainties in production and coordinating work. An entrepreneur is a persons who combines the different factors of productions and initiates the process of production and also and bear the risk.

5.3 Type of Cost

Costs as opportunity costs: The cost of something is what you give up to get it

Firm's cost of production includes all the opportunity costs to making its output of goods and services

i. Explicit costs

Input costs that require an outlay of money by the firm

ii. Implicit costs

Input costs that do not require an outlay of money by the firm Interest income not earned

- On financial capital
  - Owned as saving
  - Invested in business
- Not shown as cost by an accountant

Example

You need RM100,000 to start your business. The interest rate is 5%.

Case 1: borrow RM 100,000

- explicit cost = RM 5000 interest on loan

Case 2: use RM 40,000 of your savings, borrow the other RM 60,000

- explicit cost = RM 3000 (5%) interest on the loan
- implicit cost = RM 2000 (5%) *foregone* interest you could have earned on your $40,000.

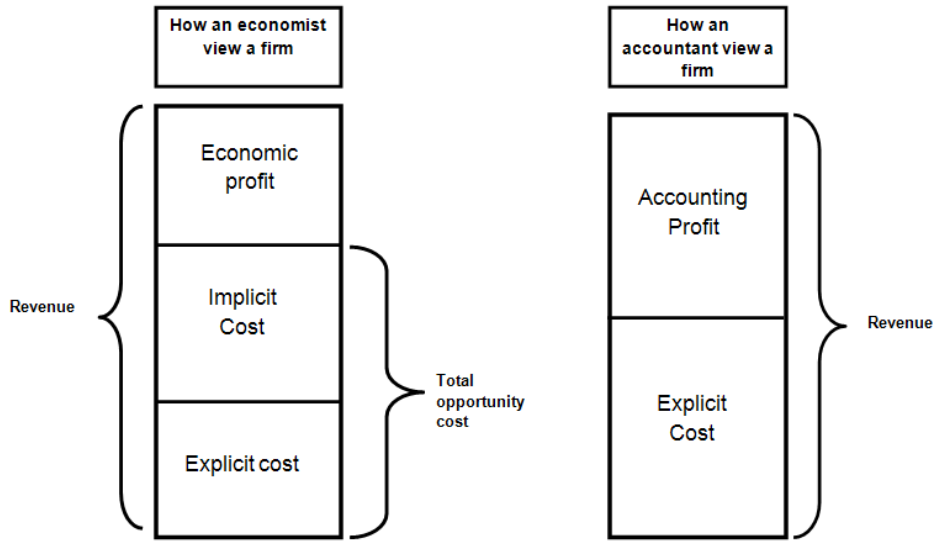
In both cases, total (exp + imp) costs are $5000

5.4 Economic profit and Accounting profit

1. Economic profit :Total revenue minus total cost
   Including both explicit and implicit costs

2. Accounting profit : Total revenue minus total explicit cost

Economists include all opportunity costs when analyzing a firm, whereas accountants measure only explicit costs. Therefore, economic profit is smaller than accounting profit



Example 1:

The equilibrium rent on office space has just increased by RM500/month. Compare the effects on accounting profit and economic profit if

a. you rent your office space
b. you own your office space

Solution:

a. You rent your office space.
Explicit costs increase RM500/month. Accounting profit & economic profit each fall RM500/month.

b. You own your office space.
Explicit costs do not change, so accounting profit does not change.Implicit costs increase RM500/mont(opportunity Cost of using your space instead of renting it), so economic profit falls by RM500/month

Example:

Suppose Pak Mat is the owner of a farm that produces paddy. At the end of the year, he wants to calculate his profit. Below are the two ways of calculating his profit: from the accounting view and the economist view.

(a) Accounting Profit:

ITEMS	RM	RM
Total revenue received		100,000
Cost of seeds and fertilizer	20,000	
Wages and salaries	10,000	
Interest on loan	10,000	
Utilities	15,000	
Total Explicit Cost		55,000
Accounting Profit		45,000

(b) Economic Profit:

ITEMS	RM	RM
Total revenue received		100,000
Cost of seeds and fertilizer	20,000	
Wages and salaries	10,000	
Interest on loan	10,000	
Utilities	15,000	
Total Explicit Cost	55,000	
Pak Mat's forgone wages	15,000	
Pak Mat's forgone rent	10,000	
Wages for Pak Mat's son	5,000	
Total Implicit Cost	30,000	
Total Cost		85,000
Economic Profit		15,000

From (a) and (b) we can conclude that the accounting profit is greater than the economic profit.

5.5 Total Revenue, Total Cost, Profit

i. Total revenue
Amount a firm receives for the sale of its output

ii. Total cost
Market value of the inputs a firm uses in production

iii. Profit
Total revenue minus total cost

We assume that the firm's goal is to maximize profit, so profit can be calculated

Profit = Total revenue – Total cost

5.6 Short Run versus Long Run

It takes time for a firm to adjust production from one set of inputs to another. Firms must consider not only what inputs can be varied but over what period of time that can occur. We must distinguish between long run and short run. Short Run where the period of time in which quantities of one or more production factors cannot be changed, these inputs are called fixed inputs. Long-run is an amount of time needed to make all production inputs variable.

i. Variable Inputs
Variable inputs are inputs that can be varied in the period under consideration, for example labour and raw materials. They vary with output levels: as output increase, variable inputs also increase.

ii. Variable Costs
Variable costs are cost paid for the use of variable inputs, for example labour costs (wages and salaries) and cost of raw materials. They change as output level changes. As more and more output is produced, variable cost will be higher and higher as well.

iii. Fixed Inputs
Fixed inputs are inputs that cannot be varied in the period under consideration, as the time is too short for the producers to change them. This are called fixed inputs such as land size and the quantity of machines.

iv. Fixed Costs
Fixed costs are cost paid for the use of fixed inputs. For example the rental of a business space or a building (land) and the costs of buying machines and equipment (capital). In the short run the quantities of these inputs do not change as the output changes and the total fixed cost does not change as the output change. In other words, it remains constant in the short run.

5.7 Short Run Production

In order to earn profit, a firm must have something to sell. It must produced a goods or services using factors of production. The relationship between various quantities of inputs and the maximum level of output that a firm can produce, assuming that the state of technology is fixed, is called a production function. The variable inputs is the number of workers per day and all workers are assume to be homogenous. All other factors are assumed to be fixed. Therefore , to increase output, a firm must increase the quantity of labour that it employs.

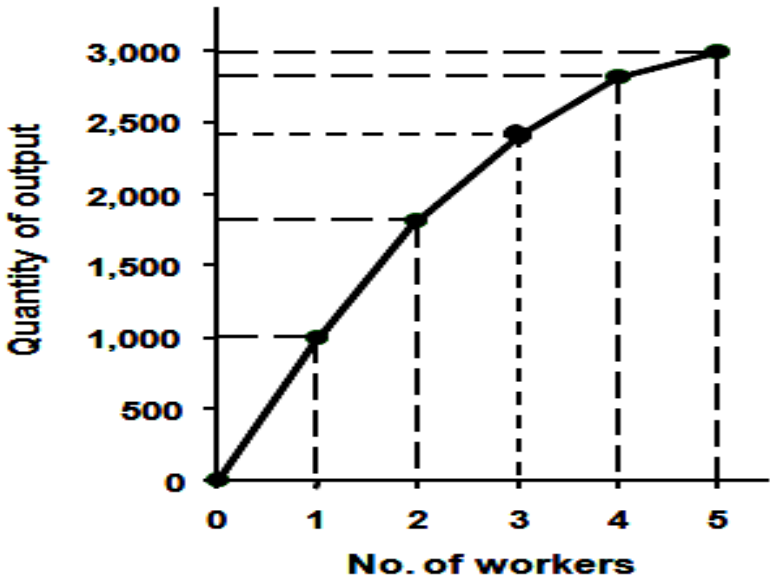
5.7.1 Total Product (TP)

The amount of output depends on the amount of variable inputs. Example number of labour used in short run by assuming that all other factors are fixed (land and capital). Thus the output produced is said to be the product of labour since no output can be produced without labour. The total quantity of output produced is called total product or total output. The total product increases as the quantity of labour employed increased.

Example 1:
Farmer Jamil grows paddy. He has 5 acres of land. He can hire as many workers as he wants.

Farmer Jamil Production Schedule

L **(no. of workers)**	***Q*** **(bushels of paddy)**
0	**0**
1	**1000**
2	**1800**
3	**2400**
4	**2800**
5	**3000**



5.7.2 Marginal Product

If Jamil hires one more worker, his output rises by the *marginal product of labor*. The **marginal product** of any input is the increase in output arising from an additional unit of that input, holding all other inputs constant.
Notation: Δ (delta) = "change in…"

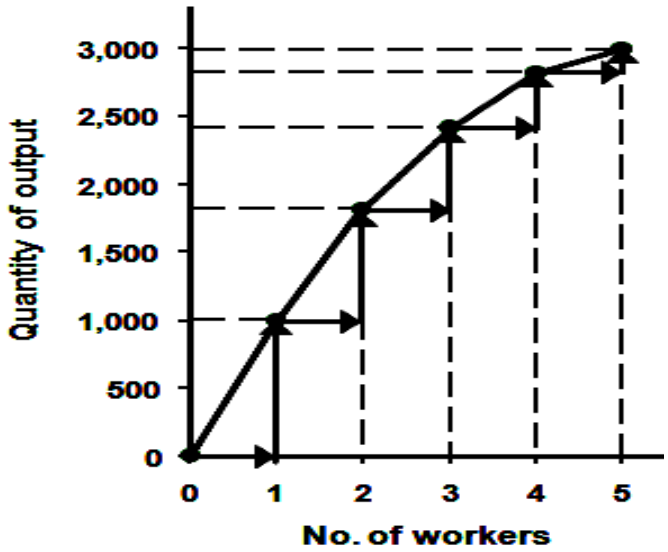
Examples:

$\Delta \boldsymbol{Q}$ = change in output, $\Delta \boldsymbol{L}$ = change in labor
Marginal product of labor (*MPL*) = $\frac{\Delta Q}{\Delta L}$

EXAMPLE: Total & Marginal Product

	L (no. of workers)	*Q* (bushels of paddy)		MP_L
	0	0		
$\Delta L = 1$	1	1000	$\Delta Q = 1000$	1000
$\Delta L = 1$	2	1800	$\Delta Q = 800$	800
$\Delta L = 1$	3	2400	$\Delta Q = 600$	600
$\Delta L = 1$	4	2800	$\Delta Q = 400$	400
$\Delta L = 1$	5	3000	$\Delta Q = 200$	200

MP_L = Slope of Prod Function



Example:

The short-run relationship between units of labor and tons of furniture moved

Units of the variable resource (worker days)	Total Product (tons moved per day)	Marginal Product (tons moved per day)
0	0	-
1	2	2
2	5	3
3	9	4
4	12	3
5	14	2
6	15	1
7	15	0
8	14	-1

Marginal product increases as the firm hires each of the first three workers, reflecting increasing marginal returns. Then marginal product declines, reflecting diminishing marginal returns. Adding more workers may, at some point, actually reduce total product (as occurs here with an eighth worker) because workers start getting in each other's way.

5.7.3 Average Product (AP)

Average Products refers to the quantity of output per worker. It is calculated by dividing total product with the quantity of labour.

$$AP = \frac{TP}{Q}$$

Units of the variable resource (worker days)	Total Product (tons moved per day)	Average Product (tons moved per day)
0	**0**	**-**
1	**2**	**2**
2	**5**	**2.5**
3	**9**	**3**
4	**12**	**3**
5	**14**	**2.8**
6	**15**	**3**
7	**15**	**2.14**
8	**14**	**1.75**

5.8 Law of Diminishing Marginal Returns

Marginal product is subject to the law of diminishing returns, which states that in the short run as the firm employs more and more variable inputs to given fixed inputs, its marginal product (MP) initially rises until it reaches a certain maximum level after which the marginal product will fall or diminish.

Why MP_L Is Important

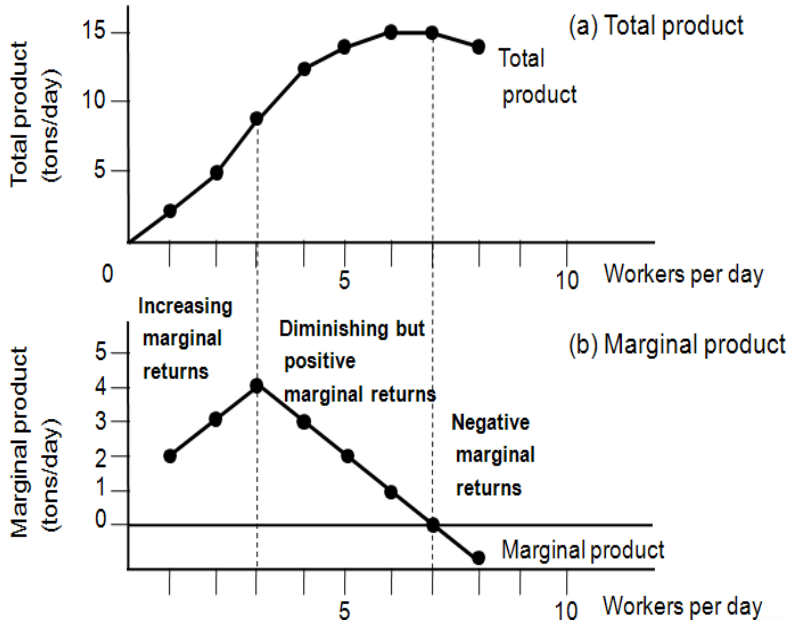
Recall one of the Ten Principles: ***Rational people think at the margin.*** When Farmer Jamil hires an extra worker, his costs rise by the wage he pays the worker**,** his output rises by *MPL***.** Comparing those helps Jamil decide whether he would benefit from hiring the worker

Why MPL Diminishes

Farmer Jamil output rises by a smaller and smaller amount for each additional worker. Why?. As Jamil adds workers, the average worker has less land to

work with and will be less productive. In general, *MPL* diminishes as ***L*** rises whether the fixed input is land or capital (equipment, machines, etc.).

Diminishing marginal product: the marginal product of an input declines as the quantity of the input increases (other things equal).



Explanation of figure

1. As the variable input (labor) increases, the total product (TP) curve rises, reaches its maximum and then declines.
2. The average product (AP) is at maximum when the marginal product (MP) curve intersects the AP curve.
3. TP reaches the maximum point when the MP is at zero.
4. Law of diminishing marginal returns = law states that if the quantities of certain factors are increased while the quantities of one or more factors are held constant, beyond a certain level of production, the rate of increases in output will decrease.
5. Diminishing marginal returns begins with MP reaches maximum and begins to diminish until MP becomes zero.
   i. TP will increase at a decreasing rate
   ii. MP declines, but MP = +ve.

5.9 Short Run Costs

5.9.1 Fixed and Variable Costs

i. **Fixed costs (*FC*)** do not vary with the quantity of output produced.

- For Farmer Jamil, *FC* = RM 1000 for his land
- Other examples: cost of equipment, loan payments, rent

ii. **Variable costs (*VC*)** vary with the quantity produced.

- For Farmer Jamil, *VC* = wages he pays workers
- Other example: cost of materials

iii. **Total cost (*TC*)** = *FC* + *VC*

EXAMPLE : Farmer Jamil Costs

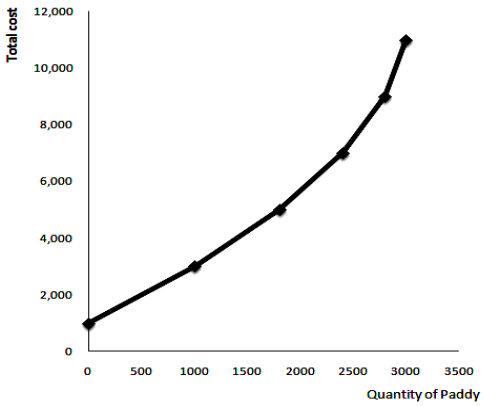
Farmer Jack must pay RM1000 per month for the land, regardless of how much paddy he grows. The market wage for a farm worker is RM 2000 per month. So Farmer Jamil costs are related to how much paddy he produces.

Farmer Jamil Costs

L (no. of workers)	*Q* (bushels of paddy)	Cost of land	Cost of labor	Total Cost
0	0	RM 1000	RM 0	RM 1000
1	1000	RM 1000	RM 2000	RM 3000
2	1800	RM 1000	RM 4000	RM 5000
3	2400	RM 1000	RM 6000	RM 7000
4	2800	RM 1000	RM 8000	RM 9000
5	3000	RM 1000	RM 10000	RM 11000

So, the total cost curve as drawn below

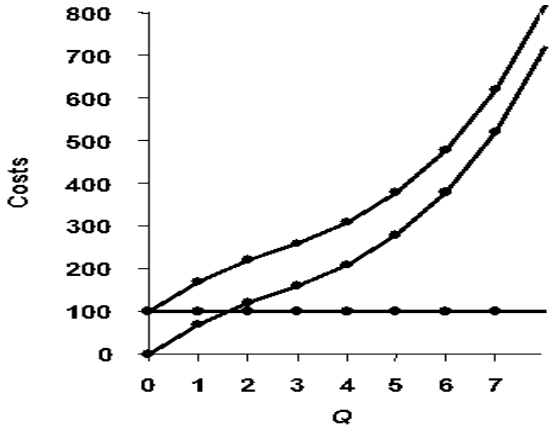
Q (bushels of paddy)	Total Cost
0	RM 1000
1000	RM 3000
1800	RM 5000
2400	RM 7000
2800	RM 9000
3000	RM 11,000



EXAMPLE

Our second example is more general, applies to any type of firm producing any good with any types of inputs.

Q	FC	VC	TC
0	RM 100	RM 0	RM 100
1	RM 100	RM 70	RM 120
2	RM 100	RM 120	RM 220
3	RM 100	RM 160	RM 260
4	RM 100	RM 210	RM 310
5	RM 100	RM 280	RM 380
6	RM 100	RM 380	RM 480
7	RM 100	RM 520	RM 520



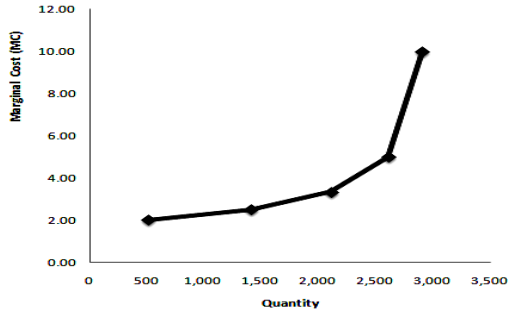
5.9.2 Marginal Cost

Marginal Cost (*MC*) is the increase in Total Cost from producing one more unit:

$$\text{MC} = \frac{\Delta TC}{\Delta Q}$$

Q (bushel of paddy)	Total cost (TC)	Marginal cost (MC)
0	**1000**	
1000	3000	RM 2
1800	5000	RM 2.50
2400	7000	RM 3.30
2800	9000	RM 5.00
3000	11000	RM 10.00

The Marginal Cost Curve



Why MC Is Important

Farmer Jamil is rational and wants to maximize his profit. To increase profit, should he produce more or less wheat?

To find the answer, Farmer Jamil needs to “think at the margin.”
If the cost of additional paddy (*MC*) is less than the revenue he would get from selling it, then Jamil profits rise if he produces more.

5.10 Short Run versus Long Run

It takes time for a firm to adjust production from one set of inputs to another. Firms must consider not only what inputs can be varied but over what period of time that can occur. We must distinguish between long run and short run. Short Run where the period of time in which quantities of one or more production factors cannot be changed, these inputs are called fixed inputs. Long-run is an amount of time needed to make all production inputs variable.

5.10.1 Production in the Short Run

In the short run the variable resources can be varied quickly and the fixed resources cannot be altered easily. In the short run at least one resource is fixed

5.10.2 Costs in the Short Run

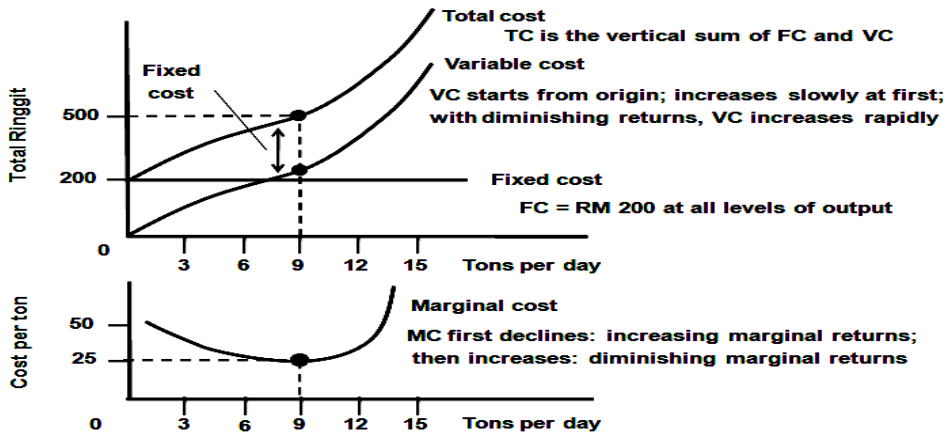
Fixed cost (FC) noted for fixed resources. Variable cost (VC) noted for variable resources. The total cost TC = FC + VC. The Marginal cost MC = $\Delta TC/\Delta q$ which is the change in TC to produce one more unit of output.Changes in MC reflect the changes in marginal productivity. Increasing marginal returns happen when the MC falls and diminishing marginal returns happen when MC increases.

Short-run TC and MC

(1) Tons moved per day	(2) Fixed cost (FC)	(3) Workers per day	(4) Variable cost (VC)	(5) Total cost (TC=FC+VC)	(6) Marginal cost MC=ΔTC/Δq
0	200	0	0	200	-
2	200	1	100	300	50.00
5	200	2	200	400	33.33
9	200	3	300	500	25.00
12	200	4	400	600	33.33
14	200	5	500	700	50.55
15	200	6	600	800	100.00

First 3 workers: increasing marginal returns: MC declines. With the 4th worker: diminishing marginal returns: MC increases.

TC and MC curves



5.10.3 Average Cost in the Short Run

Average variable cost (AVC) can be calculated by variable cost divided by quantity.

$$AVC = VC / q$$

Average total cost (ATC) can be calculated by total cost divided by the quantity.

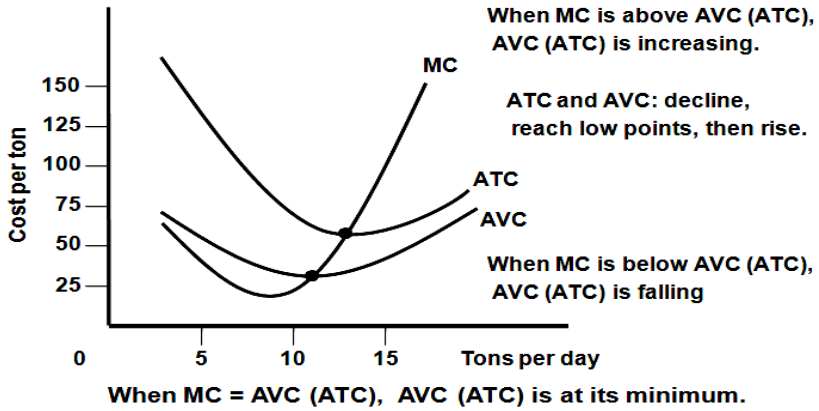
$$ATC = TC / q$$

When marginal cost (MC) is less than average cost (AC)**,** the marginal cost will pulls down the average cost**.** When marginal cost (MC) is greater than average cost (AC)**,** the marginal cost will pulls up the average cost**.** U-shape of average cost curves exist because of the law of diminishing marginal returns.

(1) Tons moved per day (q)	(2) Variable cost (VC)	(3) Total cost (TC=FC+VC)	(4) Marginal cost MC=∆TC/∆q	(5) Average variable cost (AVC=VC/q)	(6) Average total cost (ATC=TC/q)
0	0	200	-	-	∞
2	100	300	50.00	50.00	150.00
5	200	400	33.33	40.00	80.00
9	300	500	25.00	33.33	55.55
12	400	600	33.33	33.33	50.00
14	500	700	50.55	35.71	50.00
15	600	800	100.00	40.00	53.33

From the table we can see that marginal cost (MC) first falls then increases (increasing then diminishing marginal returns). As long as marginal cost (MC) is less than average cost (AC), average cost declines. Once marginal cost (MC) is greater that average cost (AC), average cost increases.

Average and marginal cost curves

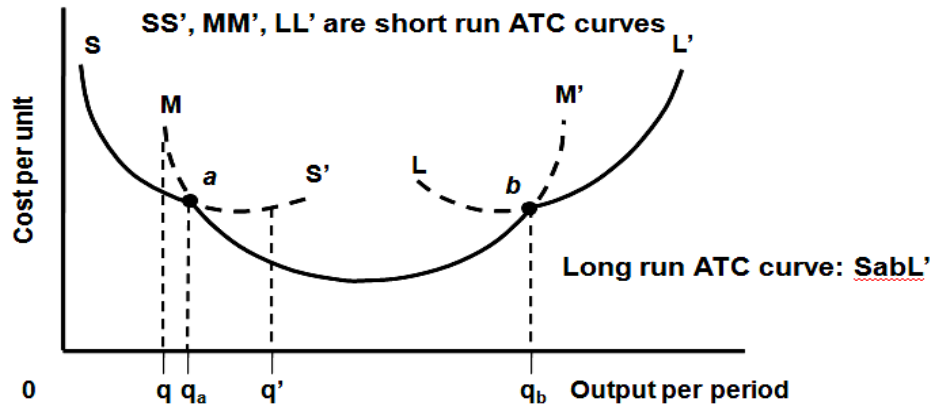


5.11 Costs in the Long Run

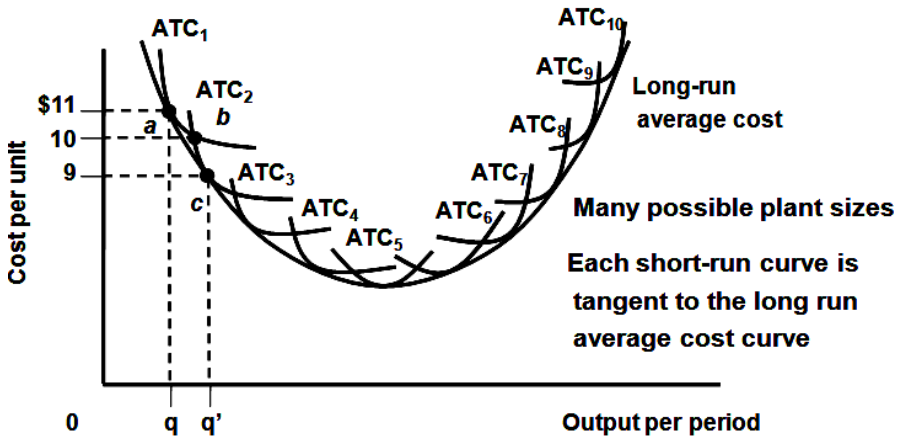
In the long run a firm can change all of its inputs**.** In making cost minimizing choices, must look at the cost of using capital and labor in production decisions.

In the long run the curve will be U-shaped long-run average cost curve because of the economies of scale, which show that the long run average cost **(**LRAC) falls as output expands**.** Diseconomies of scale happen when the long run average cost (LRAC) will increases as output expands**.**

Short-run ATC curves form the LRAC curve

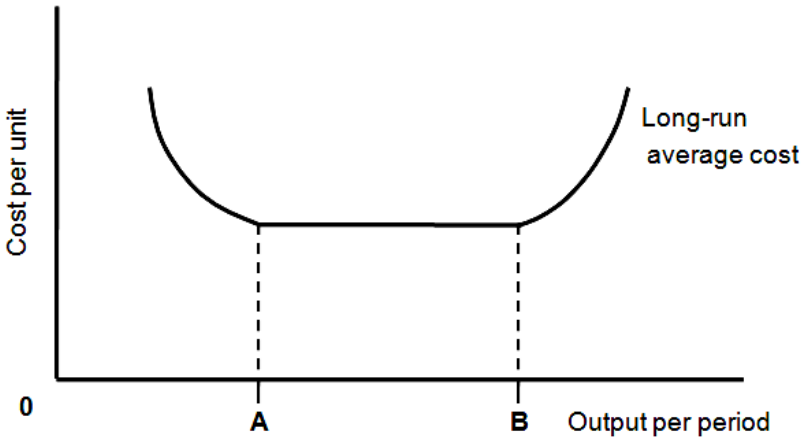


Many short-run ATC curves form firm's LRAC curve



Each point of tangency represents the least cost way of producing that level of output

A firm's long-run average cost curve



5.12 Costs in Short Run and in Long Run

i. Economies of scale

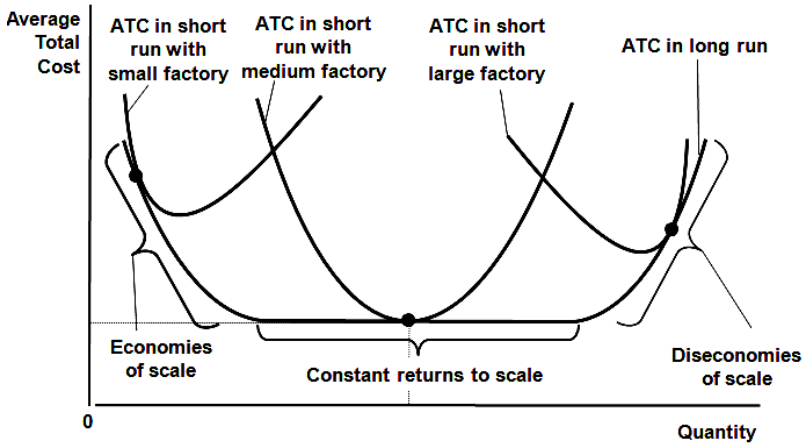
- Long-run average total cost falls as the quantity of output increases
- Increasing specialization

ii. Constant returns to scale

- Long-run average total cost stays the same as the quantity of output changes

iii. Diseconomies of scale

- Long-run average total cost rises as the quantity of output increases
- Increasing coordination problems



TUTORIAL 5

(CHAPTER 5 : PRODUCTION AND COST THEORY)

1. Complete the below table.

Output	TFC	TVC	TC	MC	AFC	AVC	ATC
0	60		60				
1	60		160				
2	60		240				
3	60		300				
4	60		400				
5	60		560				
6	60		600				

2. Complete the below table.

Price (RM)	Quantity per week	Total Revenue (TR)	Marginal Revenue (MR)	Total Costs (TC)	Average Total Costs (ATC)	Marginal Cost (MC)
20	1500			33000		
19	2000			36500		
18	2500			40500		
17	3000			45000		
16	3500			50000		
15	4000			55500		

3. The following table shows the production data for a firm.

Labour (L)	Machine (K)	Total Production (Q)	Marginal Product (MP_L)	Average Product (AP_L)
0	10	0		
1	10	6		
2	10	22		
3	10	34		
4	10	43		
5	10	50		
6	10	54		
7	10	56		
8	10	57		
9	10	55		

(a) Calculate the marginal product (MP_L) and average product (AP_L) of labor.
(b) Based on the data, sketch a diagram to show the stages of production.
(c) For a rational producer, at what stage will he/ she operate? Determine the range of labor used in this stage.
(d) Define law of diminishing return? Determine the range of labors used when this law occurs.

4. The following table shows the cost data for a firm.

OUTPUT	TOTAL COST
0	200
1	400
2	600
3	900
4	1200
5	1800
6	2800

(a) Calculate the total fixed costs, total variable costs, average fixed costs (AFC), average variable costs (AVC), average total costs (ATC) and marginal costs (MC) at each output level.
(b) Sketch a diagram to show the relationship between AVC, AFC, ATC, and MC.

5. Maryam works in a cybercafé and earns a salary of RM2,000 per month. She plans to open her own cybercafe. To start with her business, she needs to withdraw RM120,000 from her fixed deposit account, which yield 10% interest per annum. She estimates revenue to be RM300,000 per year and cost to operate her own cybercafé is RM20,000 per month including employees' salary, utilities, rental and supplies.

Based on the above information:

(a) Calculate explicit and implicit costs.
(b) Determine Maryam's accounting profit and economic profit.
(c) Based on the answer in (b), advise Maryam whether she should start with her own cybercafé or continue her job.

CHAPTER

6

PRODUCTION FUNCTION WITH TWO VARIABLE INPUTS

LEARNING OUTCOME:

At the end of this topic, you should be able to:
1. Explain the possible combination of inputs
2. Understand and classify the scale of production

CHAPTER OUTLINE

6.1 Isoquant Analysis and Isoquant Curves
6.2 Scale of production
6.3 Marginal Rate of technical Substitution (MRTS).
6.4 Substitution & output effects of a change in factor price.

6.1 Isoquant Analysis and Isoquant Curves

An isoquant represent all the possible combinations of variable input that are used to generate the same level of output (total product). An isoquant analysis illustrate that there are various way to generate a given quantity of output in one period of time.

Capital (K)	**Labor (L)**				
	1	**2**	**3**	**4**	**5**
1	25	45	**60**	70	**80**
2	45	65	**80**	90	**95**
3	**60**	**80**	**95**	105	110
4	70	90	105	115	120
5	**80**	**95**	110	120	125

Combination K and L to produce a certain amount of output:

i. Q = 60 unit: 1L + 3K , 3L + 1K
ii. Q = 80 unit: 1L+5K , 2L+3K , 3L+2K, 5L+1K
iii. Q = 95 unit: 2L + 5K, 3L + 3K, 5L + 2K

An isoquant represents all the possible combinations of K and L that can be used to produce the same level of output. Isoquant curves to produce 60, 80 and 95 units of output.

6.2 Scale of production

i. Increasing returns to scale:

1L + 1K, Q = 25; 2L + 2K, Q = 65

ii. Decreasing returns to scale

2L + 2K, Q = 65; 4L + 4K, Q = 115

iii. Constant returns to scale.

1L + 1K, Q = 25; 2L + 2K, Q = 50

6.3 Marginal Rate of technical Substitution (MRTS)

Marginal Rate of technical Substitution (MRTS): the rate at which a firm can substitute capital for labor and hold output constant.

$MRTS_{LK} = - \Delta K/\Delta L$

$- \Delta K \times MPK$ = the total output lost by using less capital.

$\Delta L \times MP_L$ = the total output gained by using more labor.

$- \Delta K \times MPk = \Delta L \times MP_L$

$MRTS_{LK} = - \Delta K/\Delta L = MP_L/MP_K$

Isocost line: a line that shows all combinations of K and L available for a given total cost.

$C = wL + rK$

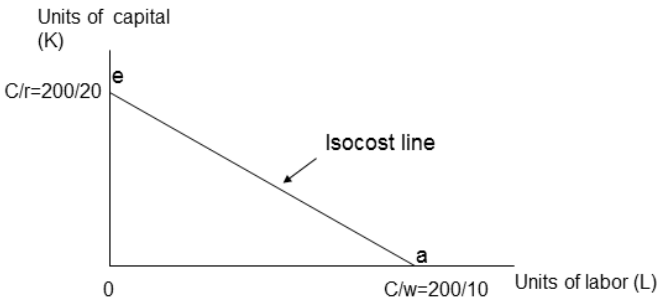
	Labor L	**Capital K**	**Cost on labor *w*L = RM10L**	**Cost on capital *r*K = RM20K**	**Total cost *w*L + *r*K**
a	20	0	RM200	RM0	RM200
b	14	3	RM140	RM60	RM200
c	10	5	RM100	RM100	RM200
d	6	7	RM60	RM140	RM200
e	0	10	RM0	RM200	RM200

Isocost line.

Slope of isocost line:

= C/r ÷ C/w

= w/r



6.4 Substitution & output effects of a change in factor price:

Lets a firm employs variable capital (K) and labor (L) inputs with factor prices P_K and P_L.

Factor substitution effect: the tendency of firms to substitute away from a factor whose price has risen and toward a factor whose price has fallen.

Technology	**Input requirements per output** **K** **L**	**Unit cost if P_L= RM1, P_K=RM1**	**Unit cost if P_L= RM2, P_K=RM1**
A (capital intensive)	10 5	RM15	RM20 √
B (labor intensive)	3 10	RM13 √	RM23

When P_L increases & P_K remains unchanged, Labor becomes more expensive, firms tend to buy less of it.

When P_L falls & P_K remains unchanged, Labor becomes less expensive, firms tend to buy more of it.

Output effect of a factor price increase:

When P_L increases, means an increase in costs of production. The firm is likely to produce less in the short run. Hence, the demand for all factors declines – including labor.

When P_L falls, means lower costs of production. The firm will increase output in the short run. Hence, the demand for all factors increases – including labor.

The substitution and output effects help explain why input demand curves slope downward. Consider the wage rate falls. Lower wage mean a firm will substitute capital for labor. The factor substitution effect leads to an increase in the quantity of labor demanded.

Lower wages mean lower costs, and lower costs lead to more output. The firm will hire more of all factors of production, including labor. This is the output effect of a factor price decrease.

Both effects lead to an increase in the quantity demanded for labor when the wage rate falls.

TUTORIAL 6
(Production Function with Two Variables Input)

1. The table below shows the amount of output produced by a firm using two types of inputs, labor and capital.

OUTPUT	INPUTS	
	LABOR	**CAPITAL**
50	6	2
120	12	4
260	24	8
520	48	16
1000	96	32

a. Is the firm operating in the short-run or long-run? Why?

b. Identify the range of output, when the firm experience:
   i. Increasing returns to scale;
   ii. Decreasing returns to scale;
   iii. Constant returns to scale.

2. The following table gives the quantities of output that can be produced with different amounts of capital (K) and labor (L) used by a firm.

Units of K	Units of Output					
6	122	174	213	244	274	300
5	112	158	194	224	250	274
4	100	142	173	200	224	244
3	87	122	150	173	194	213
2	71	100	122	142	158	174
1	50	71	87	100	112	122
0	1	2	3	4	5	6
	Units of L					

a. Compute the marginal product and average product of capital for L = 3 units as K varies from 1 unit to 6 units.

b. Compute the marginal product and average product of labor for K = 1 units as L varies from 1 unit to 6 units.

c. Suppose the firm is producing 87 units of output using 1 unit of capital and 3 units of labor. The cost of a unit of labor is RM10, and the cost of a unit of capital is RM20. Is the firm using a least cost combination of inputs? Why or why not

3. Suppose that the marginal product of the last worker employed by a firm is 40 units of output per day and the daily wage that the firm must pay is RM20, while the marginal product of the last machine rented by the firm is 120 units of output per day and the daily rented price of the machine is RM30.

a. What is the condition for the optimal inputs combination in the long run?

b. Is this firm maximizing output or minimizing costs in the long run? Explain.

c. How can the firm maximize output or minimize costs?

4. The following table gives the quantities of output that can be produced with different amounts of capital (K) and labour (L) used by a firm.

Units of K	Units of Output					
6	10	24	31	36	40	39
5	12	28	36	40	42	40
4	12	28	36	40	40	36
3	10	23	33	36	36	33
2	7	18	28	30	30	28
1	3	8	12	14	14	12
0	1	2	3	4	5	6
	Units of L					

a. Does the above production function show increasing or decreasing returns to scale if the firm increases the quantity of labour and capital used from:

i. 2L and 2K to 4L and 4K?

ii. 2L and 4K to 3L and 6K?

b. i. Compute the marginal product of labor for K = 1 unit as L varies from 1 unit to 6 units.

ii. What is decreasing marginal returns?

iii. Identify the range of labor when the firm experience decreasing marginal returns.

CHAPTER

7

MARKET STRUCTURE 1: PERFECT COMPETITION

LEARNING OUTCOME:

At the end of this chapter, student able to:

1. Explain the type of market structure.
2. Explain the characteristic of every market structure

CHAPTER OUTLINE

7.1 Market structure
7.2 Characteristics of Perfect Competition
7.3 Market equilibrium & Firm's Demand Curve in Perfect Competition
7.4: The Revenue of a Competitive Firm
7.6 Shutdown and Exit the market
7.7 The Irrelevance of Sunk Costs
7.8 A Firm's Long-Run Decision to Exit
7.9 A New Firm's Decision to Enter Market
7.10 The Competitive Firm's Supply Curve
7.11 Identifying a firm's profit
7.12 Identifying a firm's loss
7.13 Long Run Equlibrium
7.14 Long Run Equilibrium and Economic Efficiency

7.1 Market structure

Many of firm's decisions depend on the structure of the market in which it operates.

Market structure describes the important features of a market such as:

i. number of suppliers/producers

ii. product degree of uniformity

- do firms in the market produce identical products or differentiated products?

iii. Ease of entry into market

- can new firms enter easily or are they blocked by barriers?

iv. forms of competition among firms

- do firms compete only through prices or use advertising & product differences?

7.2 Characteristics of Perfect Competition

1. Many buyers & sellers

   The exact number of firms cannot be stated, but there are a large number of small firms that each firm has no significant share of output and therefore unable to influence the product's price in the market. For example, thousands of rice farmer in Malaysia. If one farmer raises the price, the market rice is unaffected.

2. Homogenous product (close substitute)

   The products produced by firms are identical or standardised. The products are so similar that nobody can identify who actually produces a particular product. The rice produced by Farmer Zaini, for instance is identical to that Farmer Johan. Thus there is no differenve in the quality and hence, rules out the need for advertising. Other examples of products produced in perfect competition are eggs, sugar, wheat and etc.

3. Firm are price takers

   Firm have no control over the price of products that they sell. This is because each firm isrelatively too small and is unable to control prices. As such, there is too much competition from other firms, which sell

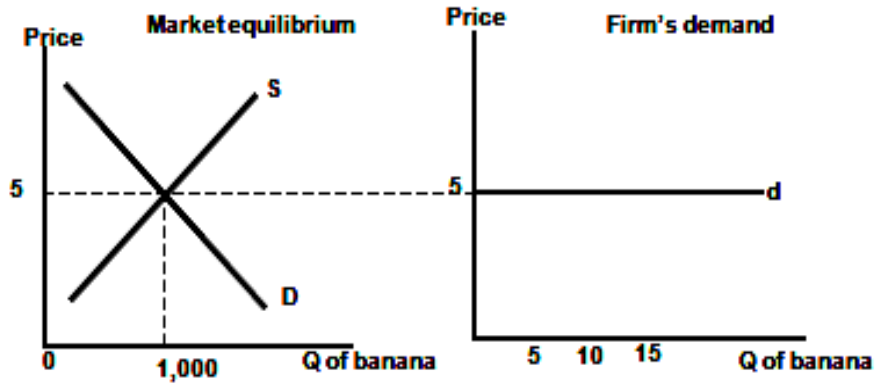
homogenous products. Thus, it cannot affect the market price, instead it has to just take the market price.

Each buys and sells only a small fraction of the total amount exchanged in the market. Individual firm of producers do not have influence on price. Price is determined by market demand (DD) and supply (SS). The perfectly competitive firm is a price taker. Price taker means that must accept the market price but free to produce whatever quantity.

4. Firms can freely enter or exit the industry
There is no barriers to entry into the market, such as license, permits and etc.There is no restraint such as law restricting the right to close a plant. So, there is free of entry and exit.

7.3 Market equilibrium & Firm's Demand Curve in Perfect Competition

For example market price of banana is RM 5 is determined by intersection of the market demand (DD) and supply (SS) curve. Once market price (P) is established, producers can sell all they want at the market price (P). Perfectly competitive firm so small and how much the firm produce has no effect on the market price



7.4: The Revenue of a Competitive Firm

The profit for the firm can be calculated by total revenue minus total cost.

Profit = Total revenue (TR) – Total cost (TC)

Total revenue for a firm is the selling price times the quantity sold.

$$TR = (P \times Q)$$

TR is proportional to the amount of output.

Average revenue (AR) tells how much revenue a firm receives for the typical unit sold.

$$AR = TR / Q$$
$$AR = P \times Q / Q$$
$$AR = P$$

Marginal revenue is the change in total revenue from an additional unit sold.

$$MR = \Delta TR / \Delta Q$$

For competitive firms, MR=Price

Thus in perfect competition,

$$P = AR = MR$$

Example:

Given the table below, fill the table.

Q	P	TR	AR	MR
0	**RM 10**		**n.a**	
1	**RM 10**			
2	**RM 10**			
3	**RM 10**			
4	**RM 10**			
5	**RM 10**			

For A Competitive Firm marginal revenue (MR) is equal to price (P).

A competitive firm can keep increasing its output without affecting the market price. So, each one-unit increase in ***Q*** causes revenue to rise by ***P***, *i.e.*,MR = **P**.

MR = ***P*** is only true for firms in competitive markets

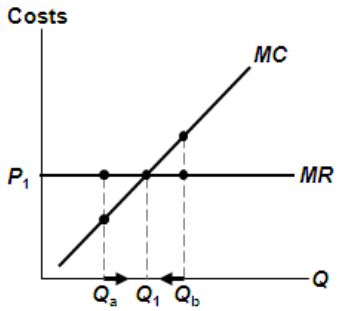
7.5 Profit Maximization

At what quantity output maximizes the firm's profit? To finds the answer, "think at the margin." If increase quantity (Q) by one unit, revenue rises by marginal revenue (MR), cost rises by MC. If marginal revenue (MR) is greater than MC, then increase in quantity (Q) to raise profit. If marginal revenue (MR) is less than marginal cost (MC), then reduce quantity (Q) to raise profit. At any quantity (Q) with marginal revenue (MR) is greater than marginal cost (MC) this will show that increasing quantity (Q) will raises profit.

At any quantity (Q) with marginal revenue (MR) is less than marginal cost (MC), this will show that reducing quantity (Q) will raises profit.

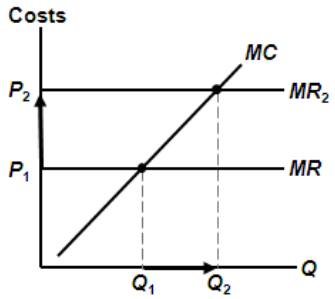
Marginal cost (MC) and the Firm's Supply Decision

Rule: *MR* = *MC* at the profit-maximizing *Q*



At Q a, MC < MR.
So, increase Q to raise profit.
At Q b, MC > MR.
So, reduce Q to raise profit.
At Q1, MC = MR.
Changing Q would lower profit.

MC and the Firm's Supply Decision



If price rises to P2, then the profit maximizing quantity rises to Q2. The MC curve determines the firm's Q at any price. Hence, the MC curve is the firm's supply curve

7.6 Shutdown and Exit the market

i. Shutdown:

Firm will shut down the market at the short-run when the firm does not produce anything because of market conditions.

ii. Exit:

Firm will exit the market at long run that is leaving the market. A key difference:

- If firm shut down in short run (SR), the firm must still pay fixed cost (FC).
- If exit in LR, zero costs.

7.6.1 A Firm's Short-run Decision to Shut Down

When the firm makes the decision to shutting down, firm will face the cost of shutting down, that is revenue loss (TR). But firm will get the benefit of shutting down that is cost savings. The cost saving in terms of variable cost (*VC)* but firm must still pay fixed cost (*FC*).

So, shut down if total revenue (*TR)* is less than variable cost (*VC)*

If divide both sides by ***Q***:

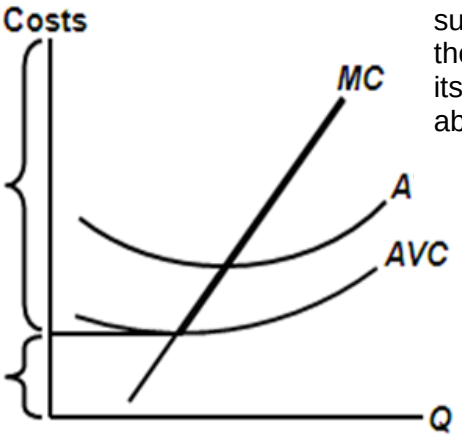
$$\frac{TR}{Q} < \frac{VC}{Q} = P < AVC$$

So, firm's decision rule is: Shut down if $P < AVC$

A Competitive Firm's SR Supply Curve

If P > AVC , then firms produces Q where P = MC

If P < AVC , then firm shut down (produce Q = 0)



The firm's SR supply curve is the portion of its MC curve above AVC.

7.7 The Irrelevance of Sunk Costs

Sunk cost is a cost that has already been committed and cannot be recovered Sunk costs should be irrelevant to decision; you must pay them regardless of your choice. Fixed cost *FC* is a sunk cost: The firm must pay its fixed costs whether it produces or shuts down. So, *FC* should not matter in the decision to shut down.

7.8 A Firm's Long-Run Decision to Exit

Cost of exiting the market refer to the revenue loss will equal to *TR*. Benefit of exiting the market is cost savings will equal *TC* (zero *FC* in the long run). So, firm exits if total revenue (TR) is less than total cost (TC). Divide both sides by ***Q*** to write the firm's decision rule as: Exit if ***P*** is less than average total cost (*ATC).*

7.9 A New Firm's Decision to Enter Market

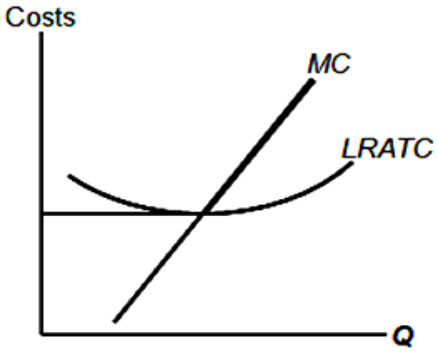
In the long run, a new firm will enter the market if it is profitable to do so: if total revenue (*TR)* is grater than total cost (*TC)*. Divide both sides by ***Q*** to express the firm's entry decision as:

Enter the market if

$$P > ATC$$

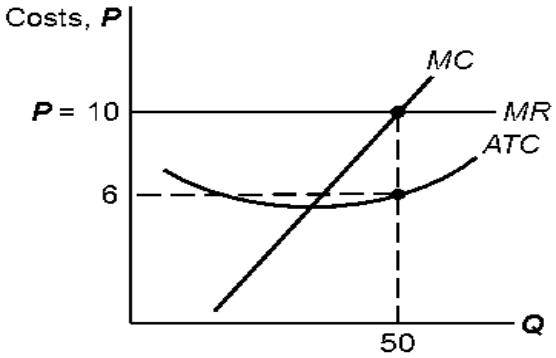
7.10 The Competitive Firm's Supply Curve

The long run supply curve is the portion of its MC above LRATC



7.11 Identifying a firm's profit

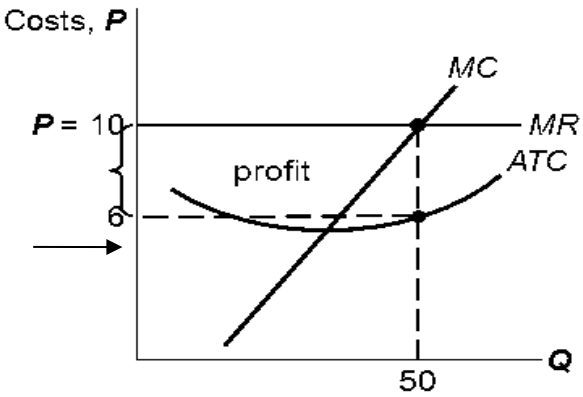
Determine this firm's total profit.
Identify the area on the graph that represents the firm's profit.



Answer

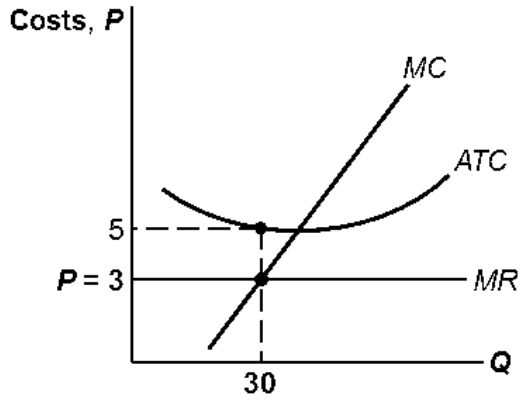
Profit per unit
= P – ATC
= 10 – 6
= 4

Total profit
= (P – ATC) x Q
= 4 x 50
= 200



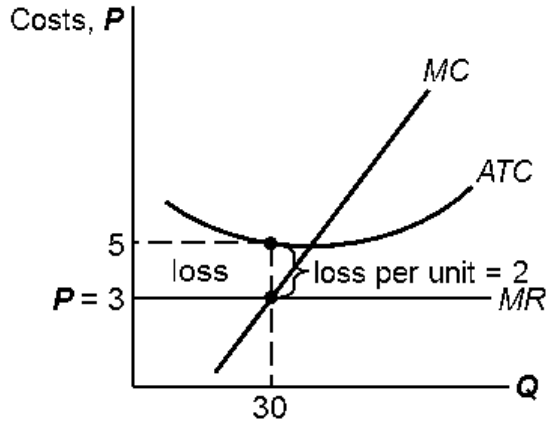
7.12 Identifying a firm's loss

Determine this firm's total loss, assuming AVC < 3.
Identify the area on the graph that represents the firm's loss.



Determine this firm's total loss, assuming *AVC* < 3. Identify the area on the graph that represents the firm's loss.

Total loss
= (ATC – P) x Q
= 2 x 30
= 60



7.13 Long Run Equilibrium

In the long run, competitive firms only earn normal profits. This is explained by the easy entry and exit. If there are supernormal profit in the short run, new firm enter the industry and this increase the supply of product. As a result, the price falls and reduces the profits. New firms will continue to venture into this business until the profits reach zero.

If firms suffer economic losses, some of the existing firms will leave the businedd, causing the supply to decrease and price to rise. As the price increase, losses will be reduced. Firms will continue to leave the business untill there are no more losses. Hence, in long run firm only make a normal profit.

In long run, the firm operates at a point where the price (marginal revenue) equals the minimum point on its long run average cost curve (LRAC) and erans a normal profit. At this point, the short run marginal cost curve (SRMC) intersect both short run average cost (SRAC) and its long run average cost curve.

7.14 Long Run Equilibrium and Economic Efficiency

Economic efficiency means that the product is produced with a minimum cost and the price that society pays for the products is just equal to the cost of producing it. Minimum cost relates to technical efficiency and prices, which equal to marginal cost and relates to social efficiency. When both technical and social efficiency prevails, there is economic efficiency.

Under perfect competition, there is economic efficientcy because in the long run every firm operated at the level of output where average cost is minimised and where pric eequals marginal costs. Firms also operate at maximum capacity and the high degree of competition helps allocate resources to its most efficient use.

Example 1

The table below shows the cost of production for a firm that sells its product at RM10 each

Output	Fixed Cost	Variable Cost	Total Cost	Total Revenue	Marginal Cost	Marginal Revenue
0			10		-	
1					23	
2					8	
3					6	
4					5	
5					7	
6					10	
7					14	

a. Based on the data given, complete the table.

Answer:

Output	Fixed Cost	Variable Cost	Total Cost	Total Revenue	Marginal Cost	Marginal Revenue
0	10	-	10	0	-	-
1	10	23	33	10	23	10
2	10	31	41	20	8	10
3	10	37	47	30	6	10
4	10	42	52	40	5	10
5	10	49	59	50	7	10
6	10	59	69	60	10	10
7	10	73	83	70	14	10

b. What type of profit is the firm experiencing at equilibrium?

Answer:

Profit = TR – TC

Profit = 60 -69

Profit = -9 (Subnormal profit)

c. Based on your answer in (b), should the firm continue its operation? Justify your answer.

Answer:

Continue its operation because loss is less than fixed cost. (9.00 < 10.00)

Example 2

Given total cost function

TC= 1000 + 200Q – 9Q2 + 0.025Q3

Determine:

a. The average fix cost function

Answer:

AFC = TFC/Q

AFC = 1000/Q

b. The average total cost function

Answer:

ATC = TC/Q

ATC = (1000 + 200Q – 9Q2 + 0.025Q3) / Q

ATC = 100/Q + 200 -9Q + 0.25Q2

c. The average variable cost function

Answer:

AVC = TVC / Q

AVC = (200Q-9Q2 + 0.025Q3) / Q

AVC = 200 - 9Q2 + 0.25Q2

d. The output level that minimizes average variable cost

Answer:

dAVC / dQ = -9 + 0.5Q =0

0.5Q = 9

Q = 18

e. The marginal cost function

Answer:

MC = dTC/dQ

MC= 200 - 18Q + 0.75Q2

f. The output that minimizes marginal cost

Answer:

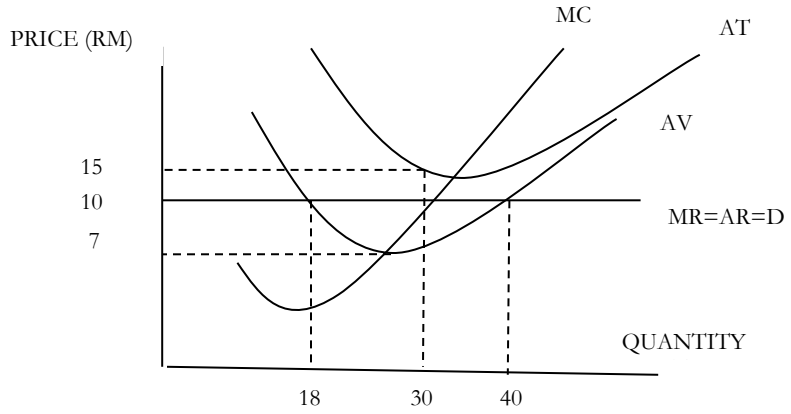
dMC/dQ = -18 +1.5Q

1.5Q= 18

Q = 12

TUTORIAL 7
(Market Structure 1: Perfect Competitive Market)

1.



(a) Determine the profit maximizing price and output.
(b) Is the firm earning profit or incurring losses at the equilibrium output?
(c) Briefly explain whether the firm will continue to produce in the short-run.
(d) What is the shut down price of this firm?

2. The daily market demand and supply function for beef meat in Kedah is given by:

$$Q_D = 16{,}000 - 1{,}000P$$
$$Q_S = 2{,}000 + 1{,}000P$$

Whereas:

Q_D is quantity demanded, Q_S is quantity supply (quantity measured in kilogram) and P is price.

(a) Determine the equilibrium quantity and price in the above market.
(b) The total cost faced by a firm in a perfectly competitive is given as:

$$TC = 600\text{-}100Q+0.5Q^2$$

i. Find the profit maximizing level of output of the firm.
ii. Calculate the profit earned at this level.

iii. Is this short-run equilibrium for the firm? Justify your answer.

iv. Should the firm continue to operate in the short-run?

3. The table below lists the short-run costs for Kelantan Hot Pizza. Price pizza is RM30 per unit and fixed cost is RM100.

Keluaran/Output	Jumlah kos/Total cost
50	720
52	780
54	850
56	985
58	1,060
60	1,200
62	1,090
64	1,000

Use the above table to answers the questions.

(a) For every level of output, calculate total variable cost, average variable cost and marginal cost.

(b) For every level of output, calculate total revenue, average revenue and marginal revenue.

(c) Determine profit maximizing output for Kelantan Hot Pizza.

CHAPTER

8

MARKET STRUCTURE 2: MONOPOLY

CHAPTER OUTLINE:

8.1 Characteristics of Monopoly
8.2 Why Monopolies Arise
8.3 The demand curve for monopoly and perfect competition.
8.4 Demand, Marginal revenue and Marginal cost for monopoly
8.5 The Monopolist's Profit
8.7 The Welfare Cost of Monopoly
8.6 A Monopoly Does Not Have an S Curve
8.8 Demand Curve and Elasticity of Demand.
8.9 Monopoly demand, marginal and total revenue
8.10 Short-Run Losses; Shutdown Decision
8.11 Price Discrimination
8.12 Price Discrimination in the Real World
8.13 The Monopolist's Profit
8.14 The social costs of monopoly: Inefficiency and Consumer Loss

A monopoly firm has **market power**, the ability to influence the market price of the product it sells. A competitive firm has no market power. Monopoly is a sole supplier of a product with no close substitutes.

8.1 Characteristics of Monopoly

1. Single seller

   There is only one single firm which makes up the industry. Therefore the firm is the industry. This one firm provides the supply of the product. Example, Tenaga Nasional Berhad, Astro, Jabatan Bekalan Air. In the real life, however a firm is said to be a monopoly if it has a market share of at least 25 per cent.

2. Unique product

   The monopolist product has no close substitute and therefore a monopolist faces little or no competition.

3. High barriers to entry.

   It is very difficult to enter a monopoly market.. There are three major barrers to entry, which are:

   i. Ownership of resources. For example, Petronas has the exclusive right on crude petroleum, so only this firm can extract this resource.
   ii. Legal barriers such as pattents, licence and permits.
   iii. Economies of scale, which means low per unit costs associated with large scale production. This prevents newer and smaller firms from entering as they cannot match the lower cost incurred by the existing firm. The firm remain dominant in the business.

4. Firms are price makers

   Monopolies are price makers as they face no competition. A price maker refers to a firm which faces a downward sloping demand curve. This means that the firm can determine the price of its products. In order to sell more, they will reduced the price or vice versa.

8.2 Why Monopolies Arise

The main cause of monopolies is **barriers to entry** that is other firms cannot enter the market.

Three sources of barriers to entry:

1. Legal restrictions
2. Control of essential resources
3. Natural monopoly

Legal restrictions

The government gives a single firm the exclusive right to produce the good. For example, patents and invention incentives, patent is an exclusive rights for 20 years. Licenses and other entry restrictions like Federal license and State license.

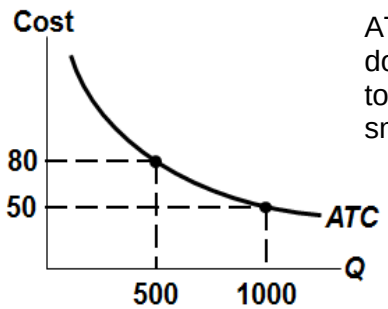
Control of essential resources

A single firm owns a key resource. For example DeBeers owns most of the world's diamond mines

Natural Monopoly

A single firm can produce the entire market ***Q*** at lower cost than could several firms.

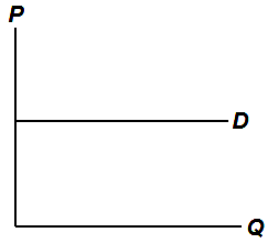
Example: 1000 homes need electricity .ATC is lower if one firm services all 1000 homes than if two firms each service 500 homes. This can be seeing in the curve. The horizontal axis of the graph measures number of homes provided electricity. The vertical axis measures the average total cost of providing electricity per home.



ATC slopes downward due to huge FC and small MC

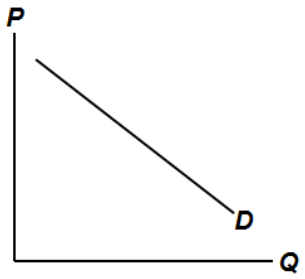
8.3 The demand curve for monopoly and perfect competition.

In a competitive market, the market demand curve slopes downward. But the demand curve for any individual firm's product is horizontal at the market price.
The firm can increase quantity (***Q)*** without lowering price (***P)***, so MR = **P** for the competitive firm.



A competitive firm is a price-taker, means that the firm can sell as much as it wants at the market price. In effect, the competitive firm sells a product for which there are many perfect substitutes, so demand for its product is perfectly elastic; if it raises its price above the market price, demand for its product falls to zero. The relationship between P and MR is what distinguishes a competitive firm from a monopoly firm, in terms of both firm behavior and welfare implications.

A monopolist is the only seller, so it faces the market demand curve that downward sloping. To sell a larger quantity (**Q)**, the firm must reduce price (**P)**. Thus, marginal revenue is not equal to price (MR ≠ P).



Example:

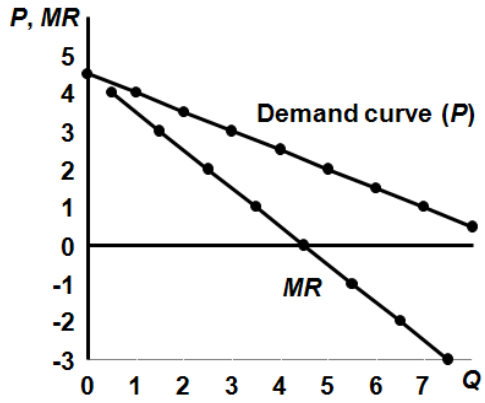
Tenaga National Berhad (TNB) is the only supplier of electricity in town. The table shows the market demand for cappuccinos. Fill in the missing spaces of the table.

What is the relation between ***P*** and ***AR***? Between ***P*** and ***MR***?

Q	P	TR	AR	MR
0	RM 4.50	RM 0	n.a	
1	RM 4.00	RM 4.00	RM 4.00	RM 4.00
2	RM 3.50	RM 7.00	RM 3.50	RM 3.00
3	RM 3.00	RM 9.00	RM 3.00	RM 2.00
4	RM 2.50	RM 10.00	RM 2.50	RM 1.00
5	RM 2.00	RM 10.00	RM 2.00	RM 0.00
6	RM 1.50	RM 9.00	RM 1.50	RM -1.00

From the table we can see that, ***P*** is equal to ***AR***, same as for a competitive firm and but for marginal revenue in monopoly market the ***MR*** is less than ***P***, whereas ***MR*** is equal to ***P*** for a competitive firm.

8.4 Demand, Marginal revenue and Marginal cost for monopoly



From the above curve we can see that the curve for the price (P) is always above the marginal revenue curve (MR).

Understanding the Monopolist's MR

Increasing in quantity (Q) has two effects on revenue:

- Output effect: higher output raises revenue
- Price effect: lower price reduces revenue

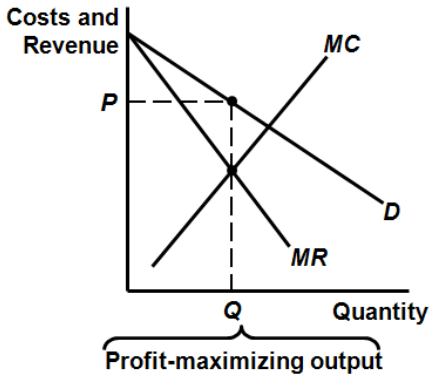
To sell a larger quantity (Q), the monopolist must reduce the price on all the units it sells. Hence, marginal revenue (MR) will be less than price (P). MR could even be negative if the price effect exceeds the output effect.

Profit-Maximization

Like a competitive firm, a monopolist maximizes profit by producing the quantity where ***MR*** = ***MC***. Once the monopolist identifies this quantity, it sets the highest price consumers are willing to pay for that quantity. It finds this price from the ***D*** curve.

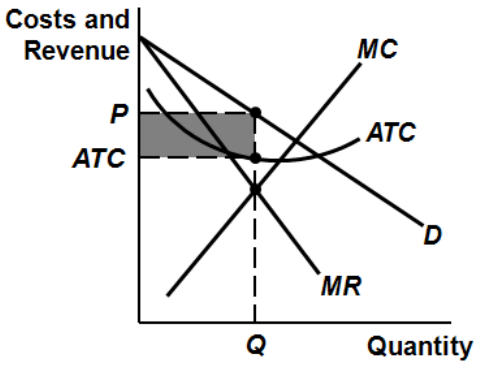
The profit-maximizing Q is where MR = MC.

Find P from the demand curve at this Q.



8.5 The Monopolist's Profit

As with a competitive firm, the monopolist's profit equals (P – ATC) x Q



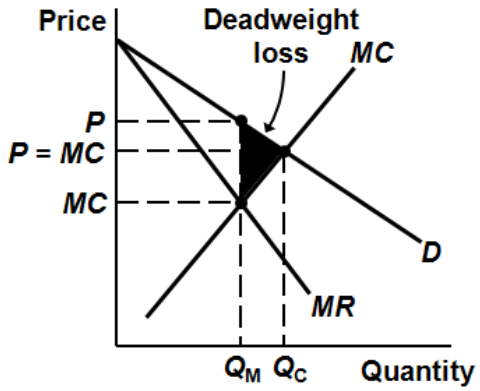
8.6 A Monopoly Does Not Have an S Curve

A competitive firm takes price (P) as given, therefore in competitive firm has a supply curve that shows how its quantity (*Q)* depends on price (P).

A monopoly firm is a "price-maker," not a "price-taker", therefore quantity (Q) does not depend on price (P); rather, quantity (Q) and price (P) are jointly determined by marginal cost (MC), marginal revenue (MR), and the demand curve. So there is no supply curve for monopoly.

8.7 The Welfare Cost of Monopoly

In competitive market equilibrium, price (***P)*** is equal marginal cost ***(MC)*** and total surplus is maximized. In the monopoly equilibrium, price (***P)*** is greater than marginal revenue (MR) when marginal revenue (MR) equal to marginal cost (MC). The value to buyers of an additional unit (***P***) exceeds the cost of the resources needed to produce that unit (*MC*). At this point, the monopoly quantity (***Q)*** is too low .Thus, monopoly results in a deadweight loss.



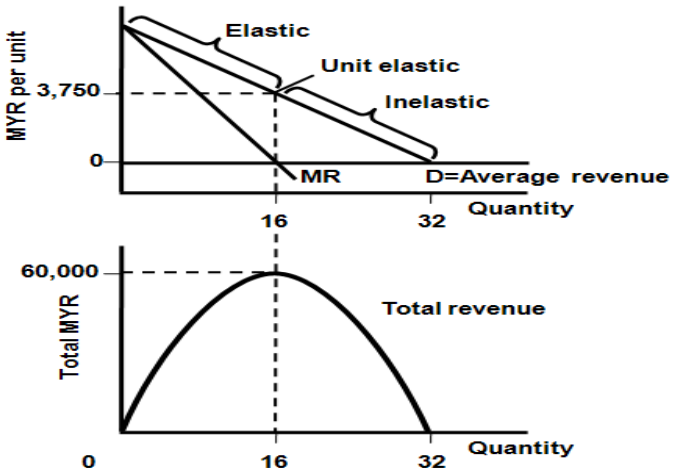
Competitive equilibrium:
Quantity = QC at P = MC
Total surplus is maximized

Monopoly equilibrium:
Quantity = QM at P > MC, Exist deadweight loss

From the above figure, in the perfect competition, the output is equilibrium at Q_c and the price is P = MC. As the monopoly, the equilibrium is when MR = MC, and the quantity equilibrium is at Q_M and price at P. The black area is the dead weight loss.
As we know that monopoly will charge higher prices, than a perfect competition the monopoly gets more surplus and consumers get fewer surpluses.

The figure shows that the monopoly by producing less than the socially efficient quantity and causing a deadweight loss.

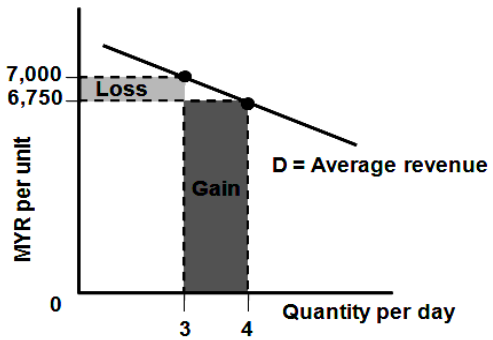
8.8 Demand Curve and Elasticity of Demand.



As shown in figure, the total revenue for a monopolist is related to the marginal revenue. When the marginal revenue is positive (MR > 0), the demand is elastic where the price decrease and the total revenue will increase. If the marginal revenue is negative (MR < 0), demand is inelastic because the decline in price will cause the total revenue fall. When the marginal revenue is zero (MR=0), the demand is unit elastic. The change in price does not change the total revenue and the total revenue is at its maximum.

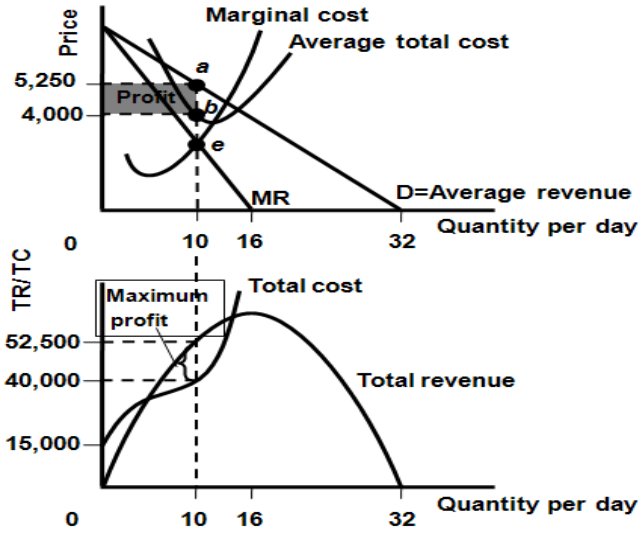
Example :

A monopolist's gain and loss in total revenue from selling one more unit



From the figure, if there is increase quantity supplied from 3 to 4, the gain in revenue is 6,750 and the loss in revenue is 750. The selling the first three units for 6,750 each instead of 7,000 each. Then the marginal revenue (MR) is total gain minus total loss = 6,750 - 750 = 6,000. So, marginal revenue (MR) (6,000) less than the price (P) 6,750).

8.9 Monopoly demand, marginal and total revenue

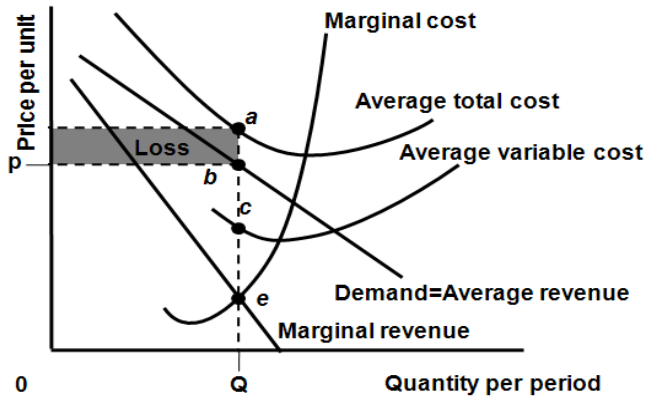


The first figure shows the per-unit cost and revenue. The monopoly equilibrium can be achieve when the MR = MC, The quantity at 10 and price at 5250. The profit is 12,500 [(5250 – 4000) (10)]. Then the second figure shows the total cost and revenue. The monopoly market will maximize profit where TR exceeds TC by the greatest amount: Q=10. So the maximum profit equal to TR-TC = 52500 - 40000= 12,500

Monopoly situations

1. If price is greater than total average cost (p>ATC) at equilibrium (MR = MC), the monopoly firm will get the profit.
2. If price is lest than average total cost and greater than average variable cost (ATC>p>AVC), the monopoly firm faces the economic loss. In this situation the firm still can produce the output in short run
3. If price is less than average variable cost (p<AVC) and average variable cost curve (AVC) above D curve. In this situation monopoly form faces the economic loss and must shut down in short run

8.10 Short-Run Losses; Shutdown Decision



From the figure, the equilibrium for the monopoly is when the MR = MC. From this condition the quantity equilibrium is at Q and price equilibrium at p. From the figure we know that the monopoly will get losses and must shut down the firm, because p*rice is less than average variable cost (P<ATC),* monopolist suffers a loss by the shaded area.

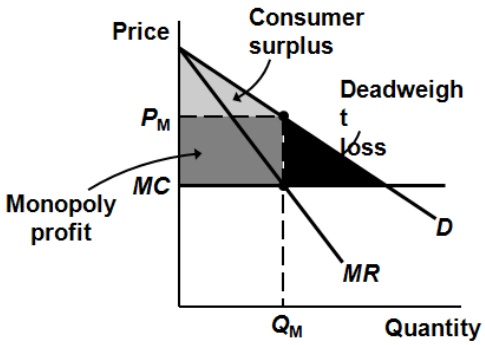
8.11 Price Discrimination

Discrimination means that treating people differently based on some characteristic, example based on the. race or gender. Price discrimination is selling the same good at different prices to different buyers.

The characteristic used in price discrimination is willingness to pay (WTP): A firm can increase profit by charging a higher price to buyers with higher WTP.

Perfect Price Discrimination versus Single Price Monopoly

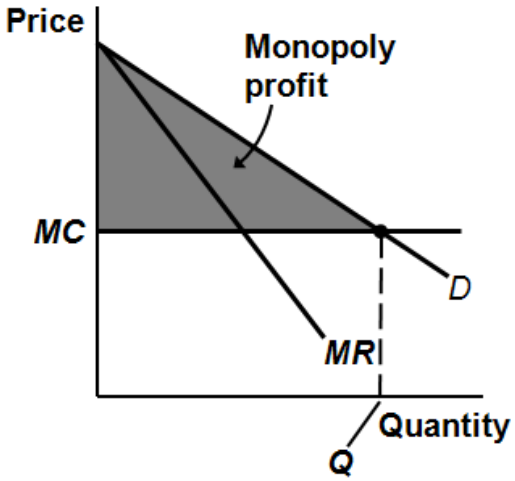
Example 1



Here, the monopolist charges the same price (P_M) to all buyers. There are deadweight loss results. This example assumes constant marginal cost.

Example 2

Here, the monopolist produces the competitive quantity, but charges each buyer his or her willingness to pay (WTP). This is called **perfect price discrimination**. The monopolist captures all CS as profit. But there's no DWL. Here, there is no horizontal price line. The "price line", is the demand curve. At each Q, the height of the demand curve shows the marginal buyer's willingness to pay, which is the price the monopolist charges that buyer under perfect price discrimination.



By setting the price of each unit equal to the maximum amount consumers are willing to pay for that unit (shown by the height of the demand curve), the monopolist can earn a profit equal to the area of the shaded triangle. Consumer surplus is zero. Ironically, this outcome is efficient because the monopolist has no incentive to restrict output, so there is no deadweight loss

8.12 Price Discrimination in the Real World

In the real world, perfect price discrimination is not possible because no firm knows every buyer's willingness to pay (WTP) and the buyers do not announce it to sellers. So, firms divide customers into groups based on some observable trait that is likely related to WTP, such as age.

Examples of Price Discrimination

1. Movie tickets

Discounts for seniors, students, and people who can attend during weekday afternoons. They are all more likely to have lower WTP than people who pay full price on Friday night.

2. Airline prices

Discounts for Saturday-night stay over help distinguish business travellers, who usually have higher WTP, from more price-sensitive leisure travellers.

3. Discount coupons

People who have time to clip and organize coupons are more likely to have lower income and lower WTP than others.

4. Need-based financial aid

Low income families have lower WTP for their children's college education. For example schools price-discriminate by offering need-based aid to low income families.

5. Quantity discounts

A buyer's WTP often declines with additional units, so firms charge less per unit for large quantities than small ones. Example: A movie theater charges RM4 for a small popcorn and RM5 for a large one that's twice as big.

8.13 The Monopolist's Profit

Profits-maximizing rule MC = MR, when MC is upward- sloping.
Short-run equilibrium:

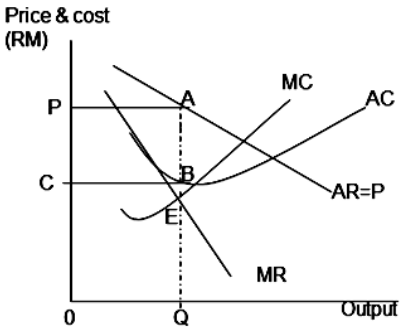
i. AR > AC earns positive economic profits

ii. AR = AC zero economic profits

iii. AR < AC, but AR > AVC loss by operating. This loss is less than FC.

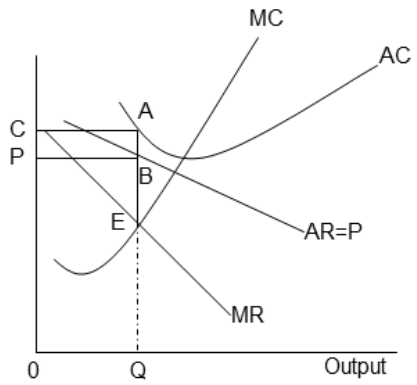
i) Monopoly Firm Earns Economic Profit

TR = 0PAB
TC = 0CBQ
Profit = PABC



As with a competitive firm, the monopolist's profit equals
(***P*** – ***ATC***) x ***Q***

ii) Monopoly firm Incurs Losses

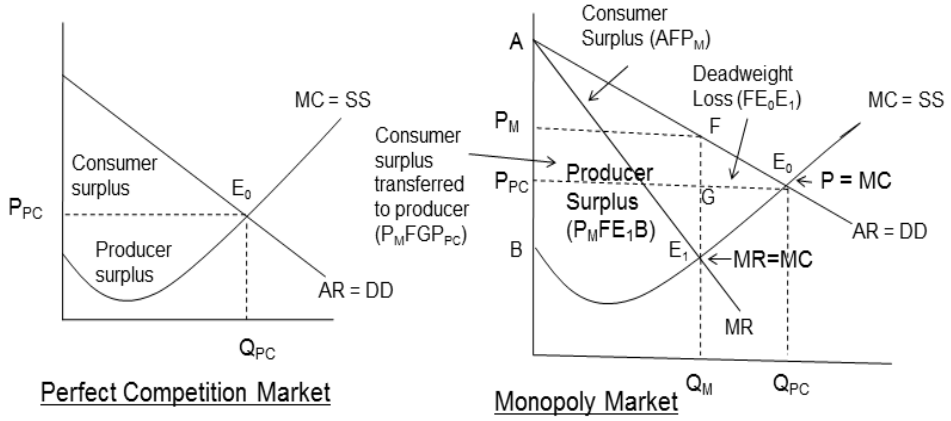


TR = 0PBQ TC = 0CAQ
Losses = CABP

8.14 The social costs of monopoly: Inefficiency and Consumer Loss

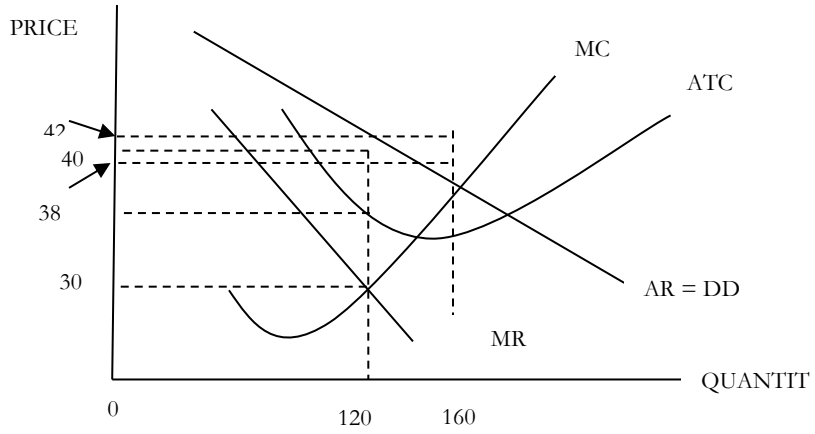
The key efficiency condition: P = MC (Perfectly competitive market)
Monopoly equilibrium: MC = MR .

i. Monopoly produces less output and higher price (P > MC)
ii. The firm is underproduction from society's point of view
iii. Monopoly leads to an inefficient mix of input.



TUTORIAL 8
(Market Structure 2: Monopoly)

1.

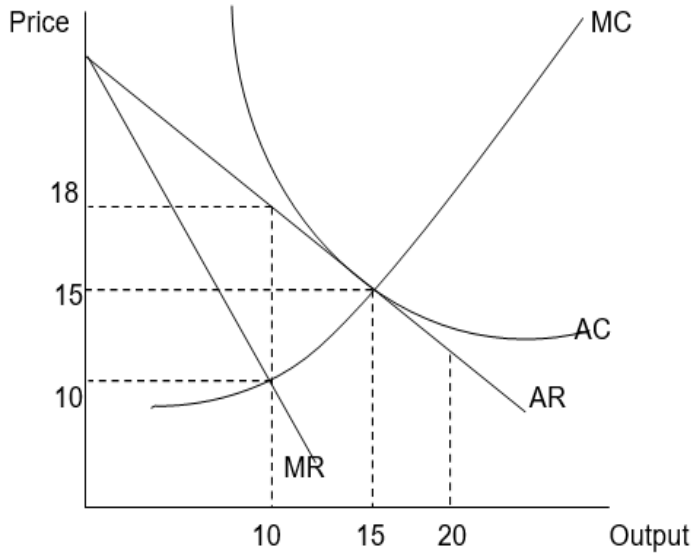


(a) Determine the profit maximizing price and output of the monopolist.

(b) Is the firm earning profit or incurring losses at equilibrium output? Shade the area of profit or loss.

(c) Suppose the government decides to regulate this monopoly. If the government wants to achieve economic efficiency:
   (i) What price should it require the monopoly to charge?
   (ii) How much output will the monopoly produce at this price?
   (iii) Will the monopoly make a profit if it charges this price? Briefly explain.

2. The following graph shows the demand and cost curve for a monopolistic firm. Use the graph below to answer the following questions.



(a) If the firm wants to maximize profit, determine the quantity would be produced, and the price would be charge. Explain.

(b) How much economic profit (or loss) is the firm making? Briefly explain.

CHAPTER

9

MARKET STRUCTURE 3: OLIGOPOLY

CHAPTER OUTLINE

9.1 Introduction
9.2 Definition
9.3 Characteristics
9.4 Price Rigidity and Kinked Demand Curve

9.1 Introduction

We had discussed on two different market structures in the earlier chapter: perfect competition and monopoly. In this we will look into oligopolistic market. Monopoly is the market structure that has only one seller; if two sellers exist in the market, we called it duopoly. So, what is an oligopolistic market? More than two firms existing in the market is called oligopoly. We will explore more into oligopoly in this chapter. We will also analyze why an oligopolistic firm faces a kinked demand curve and what is meant by game theory, prisoner's dilemma and Nash equilibrium.

9.2 Definition

Similar to other market structures, we will discuss the definition and characteristic of an oligopolistic market. An oligopoly market has some unique characteristics that can differentiate it from other markets. Oligopoly is a market structure in which there are only a few firms selling either standardized or differentiated products and it restricts the entry into and exit from the market. Under this market structure, some or all the firms industry can earn abnormal profits in the long run. This is because the entry of new firms is difficult or impossible. The oligopolistic firms can impose barriers to entry in terms of patents or access to a certain technology in the market. The purpose is to control excess production of output, which is unprofitable for the oligopolistic firms. Examples for this market are cigarettes, automobiles, electrical equipment and cement.

9.3 Characteristics

1. Few numbers of firms

Under oligopoly, the number of firms is small but size of the firms is large. The market share of each firm is large enough to dominate the market. Few firms control the overall industry under oligopoly. Here, few firms refer to the number of firms (two or more than two) that dominate the market. There is no specific number of firms that must control before becoming oligopolistic. The main criterion to become oligopolistic is the mutual interdependence between these firm. Under this, market, firm will consider the reactions of its rivals in decision making to create interdependence.

There will be strong interdependence among the firms in the oligopolistic market as the number of the firms becomes smaller. However, if the number of the firms becomes larger, then the interdependence among these firms will diminish. As a result, the description for this market does not hold as oligopoly can be described as monopolistic competition.

2. Homogeneous or differentiated product

A product sold under oligopoly can be either a homogeneous or a differentiated product. For example, cement or electrical appliances produced by one firm are identical to another firm. Similarly, oil sold by Malaysia is identical to the oil sold by Middle East countries such as Iran, Saudi Arabia and Kuwait. On the other hand, automobiles produced by major automakers are different in terms of design, technology, performance and prices.

3. Mutual interdependence

Firms in an oligopolistic market always consider the reaction of their rivals when choosing price, sales target, advertising budgets and other business policies. This is one of the most important characteristics of an oligopoly firm, which differs from other market structures. Since the number of firms is small, changes in price or output by one firm can have direct effect on another firm. Let us say, Honda changed its design and increased the price; its rivals Toyota and Nissan will also respond by changing their design and prices.

4. Barriers to entry

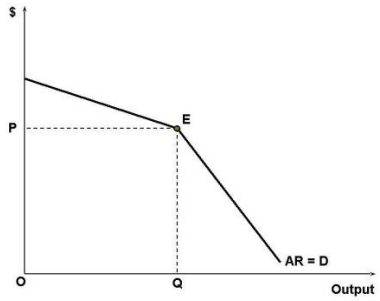
Under oligopolistic market, there are various barriers to entry. Similar to monopoly market, the oligopoly firms will restrict new entrants into the market. The types of barriers to entry are control of certain resources, ownership of patent and copyright, exclusive financial requirements and other legal barriers. In addition, large firms may take drastic actions to prevent the entry of new firms by flooding the market. These large firms will produce the output at excess production capacity, which would drive the price down. As a result, new firms would be unable to survive because sometimes the price set by these large firms is below the cost price. Once the new firms are out of the market, these large firms reduce the production capacity and increase the price.

9.4 Price Rigidity and Kinked Demand Curve

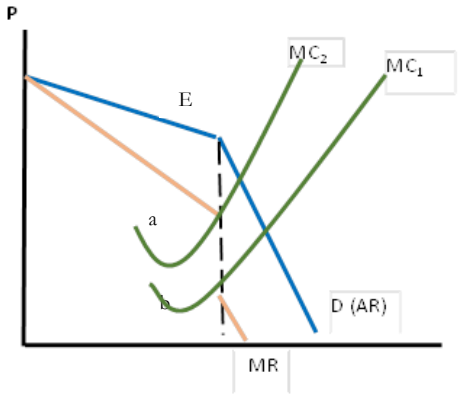
Since the characteristic of oligopoly market is mutual independence between oligopoly firms, the price in the market are more stable. This is called by price rigidity in oligopolist market, which can be explained by the inked demand curve. The price rigidity explained the behaviour of an oligopoly firm that has incentive to increase and decrease the price. The theory of kinked demand curve is based on the two assumptions.

Assumption:

1. If an oligopolist reduce its price, its rivals will follow and cut their price to prevent losing customers.
2. If an oligopolist increase it price, its rivals do not increase the price and keep their price same, thereby they gain customers from the firm that increase the price.



Based on figure, if competitors do not follow a price increase, the demand curve faced by an oligopolist firm is above the kink at P which is elastic. But if competitors follow a price decrease, then the demand curve faced by the firm is less elastic that is below the kink. Due to this assumption, an oligopoly firm faces a kinked demand curve.



The kinked demand curve below the point E creates agap in the marginal revenue, which indacated by the dotted line ab. At this range of marginal revenue, any change in the marginal cost does not reflect changes in the profit maximizing price and output. This show the price rigidity in the oligopolist market.

Example using Mathematical analysis

Kinked Demand. VoIP Telephone, Inc., provides local and long distance telephone service in the Toledo, Ohio market. The company faces the following segmented demand and marginal revenue curves for its service:

Over the range of 0 to 25(000) customers per month:

P1 = $6 - $0.04Q
MR1 = dTR1/dQ = $6 - $0.08Q

When output exceeds 25(000) customers per month:

P2 = $8 - $0.12Q
MR2 = dTR2/dQ = $8 - $0.24Q

The company's total and marginal cost functions are as follows:

TC = $2.50 + $1.50Q + $0.02Q2
MC = $1.50 + $0.04Q

where P is price (in dollars), Q is output (in thousands), and TC is total cost (in thousands of dollars).

a. Graph the demand, marginal revenue, and marginal cost curves.

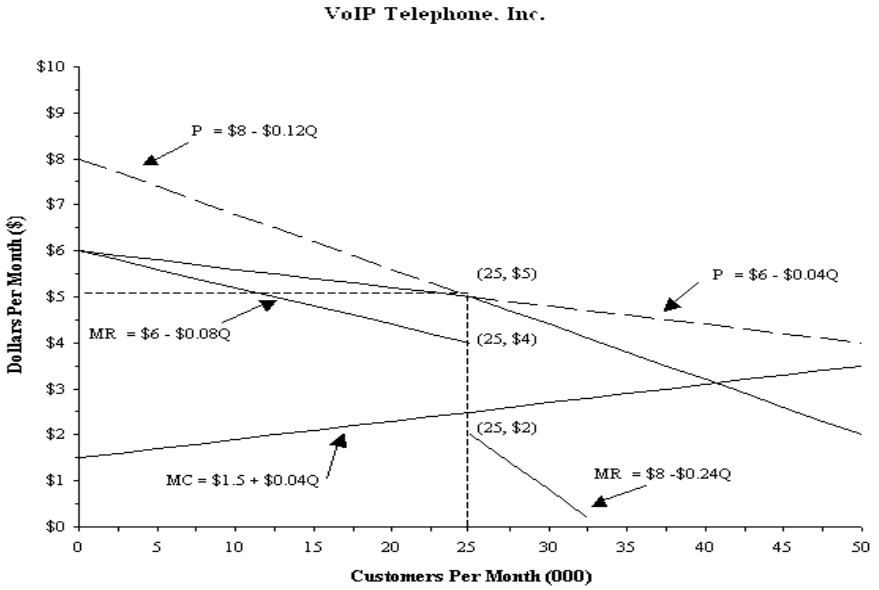
b. How would you describe the market structure of this industry? Explain why the demand curve takes the shape indicated above.

c. Calculate price, output, and profits at the profit-maximizing activity level.

d. How much could marginal costs rise before the optimal price would increase? How much could they fall before the optimal price would decrease?

Solution:

a. Graph the demand, marginal revenue, and marginal cost curves.



b. The firm is in an oligopolistic industry. It faces a kinked demand curve, indicating that competitors will react to price reductions by cutting their own prices and causing the segment of the demand curve below the kink to be highly inelastic. Price increases are not followed, causing the portion of the demand curve above the kink to be very elastic.

c. An examination of the graph indicates that the marginal cost curve passes through the gap in the marginal revenue curve. Graphically, this indicates that optimal P = 5 and Q = 25(000). Analytically,

MR1 = 6 - 0.08 (for Q < 25,000)
MR2 = 8 - 0.24Q (for Q > 25,000)
MC = 1.50 + 0.04Q

If one solves for the output levels where MR = MC, it is clear that MR1 > MC over the range Q < 25(000) and MR2 < MC for the range Q > 25(000). Therefore, CPI will produce 25(000) units of output and market them at a price P1 = 6 - 0.04Q = 6 - 0.04(25) = 5. Alternatively, P2 = 8 - 0.12Q = 4 - 0.12(25) = 5.
At P = 5 and Q = 25:

Profit = TR - TC
Profit = 5(25) - 2.50 - 1.50(25) - 0.02(252)
Profit = 72.5(000) or 72,500 per month

d. At Q = 25(000),

MR1 = 6 - 0.08Q	MR 2 = 8 - 0.24Q
= 6 - 0.08(25)	= 8 - 0.24(25)
= 4 = 2	

This implies that if marginal costs at Q = 25(000) exceed 4, the optimal price would increase. Conversely, if marginal costs at Q = 25(000) fall below $2, the optimal price would decrease. So long as marginal cost at Q = 25(000) is in the range of 2 to 4, the firm will have no incentive to change its price.

TUTORIAL 9
(MARKET STRUCTURE 3: OLIGOPOLY MARKET)

1. With the aid of diagrams, briefly describe why oligopoly firms have a kinked demand curve.

2. Suppose an oligopoly firm faces two demand curves for price increase and price decrease, respectively, as follows:

$Q_1 = 280 - 40P_1$ for price increase
$Q_2 = 100 - 10P_2$ for price decrease

The firm's total cost function is TC = 2Q + 0.025Q2.

(a) Derive marginal revenue functions.
(b) Calculate the price and quantity at the kinked point.
(c) Determine the upper limit and the lower limit of marginal revenue in the market.
(d) Derive marginal cost function. Calculate the value of MC when quantity is at the kinked point.
(e) If the firm's marginal cost is as the answer in (d), calculate the profit maximizing price and quantity.
(f) Sketch a relevant diagram to support your answer.

3. Discuss the differentiate of the following market

(a) Perfect competitive market
(b) Monopoly Market
(c) Oligopoly market
(d) Monopolistics Market

CHAPTER

10

MARKET STRUCTURE 4: MONOPOLISTIC COMPETITION

CHAPTER OUTLINE

10.1 Introduction
10.2 Features of Monopolistic competition
10.3 Derivation of demand curve
10.4 Long Run Equilibrium of a Monopolistically Competitive Firms

10.1 Introduction

Monopolistic competition is characterized by a large number of firms, no barriers to entry and product differentiation. Firm cannot influence market price by virtue of their size. Instead, firm gain control over price by differentiating their products. Monopolistic competitions have some features of competition and some features of monopoly.

10.2 Features of Monopolistic competition

1. Many Sellers

There are many firms competing for the same group of customers. Product examples include books, CDs, movies, computer games, restaurants, cookies, furniture's etc.

2. Product Differentiation

Each firm produced a product that is at least slightly different from those other firms in term of packaging, brand, quality and service. There is a high degree of substitute among products, hence each firm face an elastic downward sloping demand curve.

3. Easy entry or exit

Firm can enter or exit the market without restriction. Firm is monopolistically competitive industry are small relative to the total market. New firms can enter the industry in pursuit of profit and relatively good substitutes for the firm product are available. The number of the firms in the market adjust until economic profits are zero.

4. Non-price competition

Firms create demand from consumer by providing more advertising, product differentiation, sales promotion and product advancement, rather than decreasing the price

5. Price Maker

The firm have relative power to determine the price. Monopolistically competitive firms are price makers, not price takers. The main reason is product differentiation. Each firm is a small monopolist over the brand of the product it produces. But sib=nce there are close substitutes, the demand curve of each firm is more elastic compared

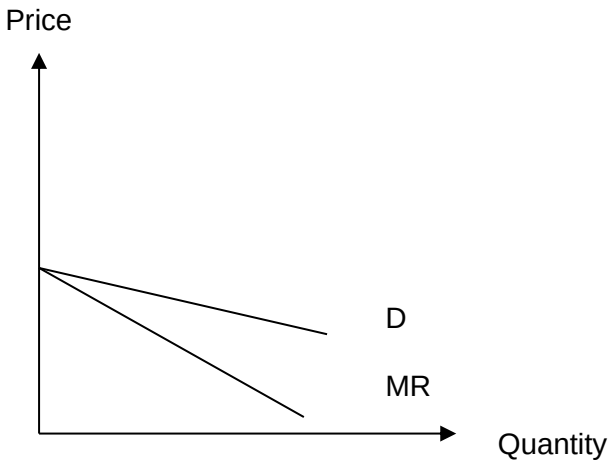
to that of a monopolist. But the demand curve is less elastic than a perfect competition.

10.3 Derivation of demand curve

The demand curve for monopolistic competitive firm is downward sloping and more elastic.

i. Downward Sloping: Each firm in this industry has considerable control over its products.

ii. Elastic: The availability of many close substitutes for the products



Although the demand curve faced by monopolistic competitors is likely to be less elastic than the demand curve faced by a perfectly competitive firm, it is likely to be more elastic than the demand curve faced by monopoly.

10.4 Long Run Equilibrium of a Monopolistically Competitive Firms

The firms only earns normal profit in the long run. The reason is that short run profits and easy entry attract new firms into the business. This will increase the market supply and if the demand is constant, the price will fall and the profit also falls.As more firms enter the market, the market supply become higher and higher and the price and profit becomes lower and lower. At the same time, the demand for the firms product becomes smaller due to competition from the new firm that just enter the market. As a results, firm only generate rnormal profit.

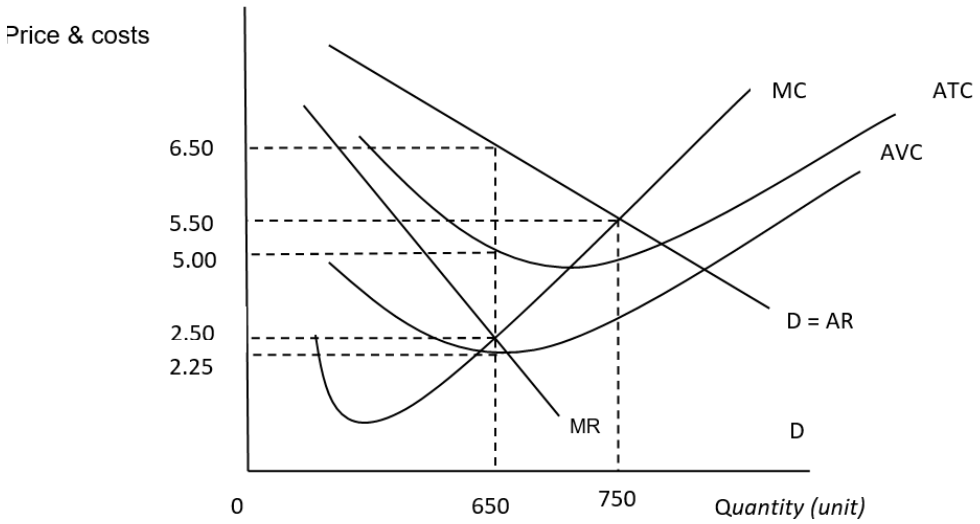
TUTORIAL 10
(MARKET STRUCTURE 4: MONOPOLISTIC COMPETITION)

1. Explain the difference between monopoly and monopolistic competition in terms of characteristic.

2. There are some differences between monopolistic competition and perfect competition. However, some features in both the markets are similar. What are the similarities between both the markets?

3. What are the differences between the long-run equilibrium of a perfectly competitive firm and the long-run equilibrium of a monopolistically competitive firm?

4. The following graph shows the demand and cost curve for a monopolistic firm. Use the graph below to answer the following questions.



(a) If the firm wants to maximize profit, determine the quantity would be produced, and the price would be charged. Explain.

(b) How much economic profit (or loss) is the firm making? Briefly explain.

(c) Suppose the firm decides to sell its product in perfectly competitive market in order to achieve economic efficiency, determine the price should be charged. How much outputs will the firm produce at this price? Explain.

(d) Based on your answer in (a) and (c), will you conclude that by selling products in perfectly competitive market the firm can increase economic efficiency? Explain.

(e) Briefly explain the two factors which can allow a monopolistic firm to continue to earn economic profits in the long run.

CHAPTER

11

ECONOMIC EFFICIENCY, MARKET FAILURES AND GOVERNMENT INTERVENTION

CHAPTER OUTLINE

11.1 Perfect Competition Vs. Real Markets?
11.2 Market Failure and Efficiency
11.3 A Perfectly Free Market is a rarity
11.4 Externalities
11.5 Negative Externalities
11.6 Solving the Negative Externalities
11.8 Positive Externalities
11.9 Public Goods
11.10 Private Goods
11.12 Overuse of A Common Resources
11.12 Tragedy of The Commons
11.13 Property Rights
11.14 Imperfect Information

11.1 Perfect Competition Vs. Real Markets?

Perfectly competitive market is a system that produces an efficient allocation of resources. Assumption: Households are price takers (P=MR = AR). Perfect information: All firms maximize profit (MC = MR). Equilibrium at the point where P = MC

Does this assumption hold in real market?
No, why? P > MC

11.2 Market Failure and Efficiency

Figure1: A case of Market Failure

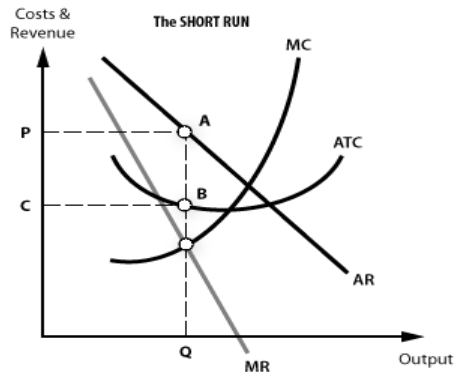
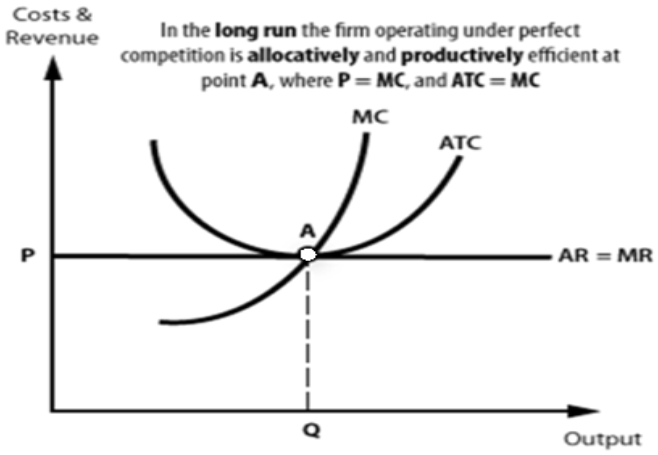


Figure 2 Freely competitive Market. No failure



11.3 A Perfectly Free Market is a rarity

Many small businesses operate under conditions of monopolistic competition, including independently owned and operated stores and restaurants. Allocative inefficiency is therefore the norms and a freely competitive market is the exception. Market as in Figure 1 is the norm

Dead Weight Loss

The cost to society of inefficiency is called Dead Weight Loss (DWL). It is the loss of total welfare. Possible causes: taxes, externalities, monopoly pricing.

Living with Market Failures

Market failure occurs when resources are misallocated or allocated inefficiently. Various sources of market failure and three major ones:

i. Externalities
ii. Public Goods
iii. Imperfect Information

11.4 Externalities

Externalities are costs or benefits of market transaction not reflected in prices. When an externality prevails, a third party the buyers or sellers of an item) is affected by its production or consumption OR externalities are unintentional side effects of an economic activity. The benefits or costs of the third party (either a household or a business) are not considered by either buyers or sellers of an item whose production or use externality. Market prices do not accurately reflect either all the marginal social benefit or all the marginal social cost of traded items when an externality is involved.

11.4.1 Positive and negative externalities

Externalities are costs or benefits of market transactions not reflected in prices.

i. Negative externalities are costs to third parties.
ii. Positive externalities are benefits to third parties

11.4.2 The Basic Concept

i. Private Cost

The cost borne by the producer of the goods and services.

ii. Private Benefit

The benefit received by the consumer from a consumption of goods and services.

iii. Social Cost

The total cost of producing goods and services, including private cost and other external cost (cost to pollute).

iv. Social Benefit

The total benefit from consuming goods and services including private benefit plus any external benefit.

11.4.3 Marginal Costs and Benefits

Marginal Social Cost (MSC) = Marginal Private cost (MPC) + Marginal External Cost (MEC).

$$\mathbf{MSC = MPC + MEC}$$

Marginal Social Benefit = Marginal Private Benefit (MPB) + Marginal External Benefit (MEB)

$$\mathbf{MSB = MPB + MEB}$$

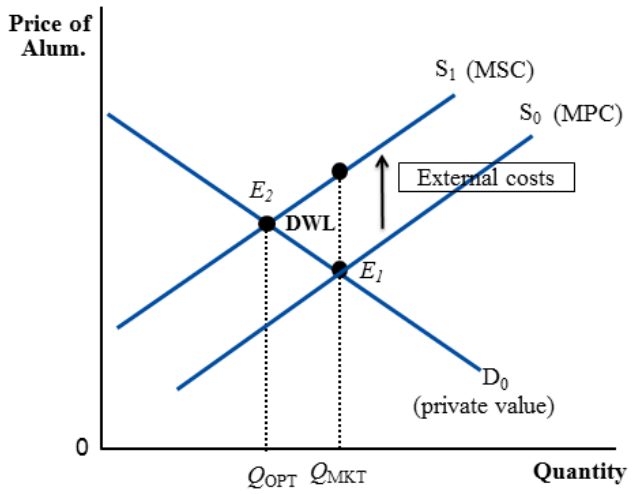
In the sum we have now taken accounts of all the factors into the market place.

11.5 Negative Externalities

A negative externality is a side effect that can be harmful to society or the environment: haze; plastic waste; toxic dump

i. Pollution may pose health risk or degrade air quality or water.
ii. The owner of factories does not directly pay the additional cost of cleaning up.

Figure: Pollution and Negative Externalities



1. Before Externalities

The equilibrium: E_1 (Q_{MKT}) MPC = MPB

S_0= MPC ; D= MPB' at Q_{MKT} there is DWL

2. After Externalities

The new equilibrium: E_2 (Q_{OPT}) MSC = MSB

S_0= MSC = MPC + MEC ; shift in social cost curve ; Q_{MKT} > Q_{OPT}

3. Externalities leads to a social welfare loss.
4. Over production/allocation of resources and output.

11.6 Solving the Negative Externalities

To achieve the socially optimal output

- The government can reduce the externality effects by *imposing tax* on the producer to reduce the equilibrium quantity to the socially desirable quantity
- This is also known as, " making the polluter pay"
- A tax increases the private cost on production causing a fall in output

11.7 Positive Externalities

Good side effect which affected a third party who indirectly involved in the transaction. The result of the social benefit of production/consumption is greater than the private benefit

- ❖ Lower cost for other parties
- ❖ Increased revenues/profits for other parties
- ❖ Increased satisfaction for other parties

11.7.1 Examples of Positive Externality

i. Education:

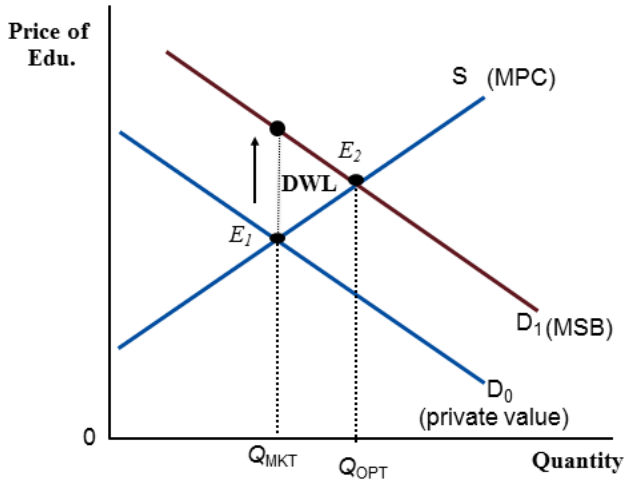
a. The development of new knowledge (the research function)
b. The training qualified personnel (the teaching function)
c. The provision of services to society
d. The supply of literate society

(MPB: You too benefitted personally from education)

ii. Cycling to work:

a. MPB: Health benefits of cycling
b. MEB: Help to reduce traffic congestion.

Figure: Education and the Social Optimum



1. Before Externalities

The equilibrium: E_1 (Q_{MKT}) MPC = MPB

S= MPC ; D_0= MPB' at Q_{MKT} there is DWL

2. After Externalities

The new equilibrium: E_2 (Q_{OPT}) MSC = MSB

D_1= MSB = MPB + MEB ; shift in social benefit curve ; $Q_{MKT} < Q_{OPT}$

Externalities leads to an increase in social benefit.
Under production/allocation of resources and output.

11.7.2 Solving the Positive Externalities

To achieve the socially optimal output. The government may increase the consumption on education by *giving subsidies* to the producer/consumer. When there is subsidy, it reduces the private cost on production/consumption causing the expansion of demand towards the optimal point

i. Demand Effect: D_0 shifts to D_1 :an incentive to buyers.

ii. Supply Effect: If subsidy reduces costs, SS curve shifts rightwards (Supply Effect): an incentive to suppliers.

11.8 Example of analysis positive and negtive externalities

Assume that scientific studies provide you with the following information concerning the benefits and costs of protecting environment programme. Given the marginal social benefit (MSB) and marginal social cost (MSC) function are:

$$MSB = 650 - 20A$$

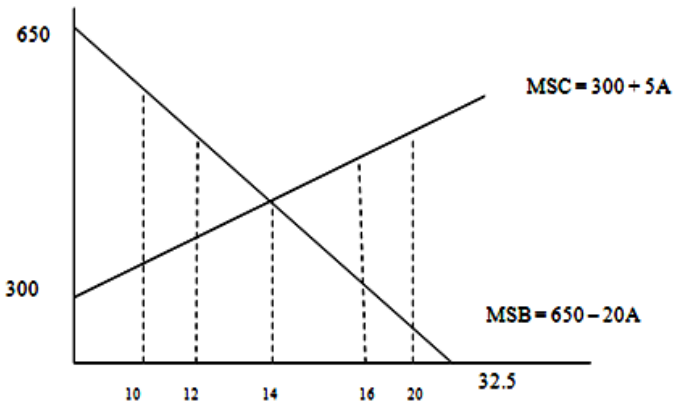
$$MSC = 300 + 5A$$

where A is the quantity in millions of tons and the benefits and costs are given in dollars per ton.

a. Draw graph of marginal benefit and marginal cost curve.
b. Calculate the socially efficient level of protecting environment programme.
c. Calculate the net social loss and gain if new programme provide by government where the quantity of saving environment is 20 but the original programme give only 16 of quantity of saving environment.
d. Calculate the net social loss and gain if new programme provide by government where the quantity of saving environment is 12 but the original programme give only 10 of quantity of saving environment.

Solution:

a. Draw graph of marginal benefit and marginal cost



ii. Calculate the socially efficient level of protecting environment programme.

Answer:

MSB = MSC

650 – 20A = 300 + 5A

650 -300 = 25 A

350/25 = A

A = 14

ii. Calculate the marginal benefit and marginal cost of protecting environment programme at the socially efficient level of protecting environment programme.

Answer:

MSB = 650 – 20 A

MSC = 300 + 5A

MSB = 650 – 20 (14)

MSB = 650 -280

MSB = 370

MSC = 300 + 5(14)

MSC = 300 + 70

MSC = 370

iii. Calculate the net social loss and gain if new programme provide by government where the quantity of saving environment is 12 but the original programme give only 10 of quantity of saving environment.

Answer:

A = ½ [450 -410] [2] = 40

B = 1/2 [360 – 350][2] = 10

C = 2 X [410-360] = 100

TOTAL = 40 + 10 + 100 = 150

iv. Calculate the net social loss and gain if new programme provide by government where the quantity of saving environment is 20 but the original programme give only 16 of quantity of saving environment.

Answer:
A = ½ [400 - 380] [20 - 16] = 40
B = 1/2 [330 – 250][4] = 10
C = 4 X [380-330] = 200
TOTAL = 40 + 160 + 200 = 400

11.9 Public Goods

There is a category of goods where the free market may not produce at all**.** These are goods where we have no choice but to share and to allow others to enjoy them too.

11.9.1 Characteristics Of Public Goods

A public good has two characteristics:

1. Non-Rival

Public goods are non-rival in consumption, meaning that a given quantity of a public good can be enjoyed by more than one consumer without decreasing the amounts enjoyed by rival consumers. For example, television and radio transmissions are non-rival in consumption. A given amount of programming per day can be enjoyed buy a large number of consumers. When an additional viewer switches on a television set, the quantity of programming enjoyed by other viewers is not reduced. Similarly, the benefits of national defense services are non-rival. When the population of a nation increases, no citizen suffers a reduction in the quantity of national defense because more people are being defended at any time.

Goods that are rival in consumption are called private goods. A given quantity of fish available on a dock is said to be rival in consumption. As the number of fish made available to any one consumer increases, the quantity available for rival consumers who desire the fish decreases. Except when externalities are present, prices can efficiently allocate goods that are rival in consumption. The price serves the purpose of making any one person who desires a unit of

the good consider the decrease in benefits to rivals who wish to consume that unit.

Pricing a good that is non-rival in consumption serves no useful purpose. After all, an additional consumer of a non-rival good does not reduce the benefit to others who wish to consume it. In other words, the marginal cost of allowing additional people to consume a given amount of a good with non-rival benefits is zero. It is therefore inefficient to price goods that are non-rival in consumption.

2. Non Exclusion

In most cases, it is also unfeasible to price units of a public good. This characteristic of public goods, called non-exclusion,' implies that it is too costly to develop a means of excluding those who refuse to pay from enjoying the benefits of a given quantity of a public good. For example, it is unfeasible to exclude those who refuse to pay for cleaner air from enjoying the benefits of a given amount of air quality improvement, once it has been supplied for the benefit of other people. Air quality improvement has the property of non-exclusion.

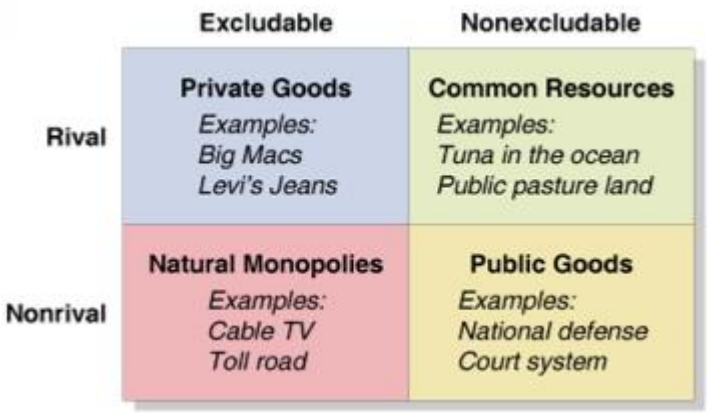
From a practical point of view, goods that are non-rival in consumption need not necessarily be subject to non-exclusion. Television broadcasting services, as was pointed out above, are non-rival. However, it is feasible to exclude those who refuse to pay from the benefits of transmissions through cable provision of the broadcasts or use of signal coding for satellite transmission. Similarly, the benefits of roads are often non-rival. However, it is feasible to use tolls to exclude those who refuse to pay. The characteristics of non-rival consumption and non-exclusion vary in degree from good to good. Much, however, can be learned from further investigation of the problems involved in making available efficient amounts of a good that is both non-rival in consumption and the benefits of which are nonexclusive.

Nonexclusion: The inability of a seller to prevent people from consuming a good if they do not pay for it.
Nonrivalry: The characteristic that if one person “consumes” a good, another person’s pleasure is not diminished, nor is another person prevented from consuming it.

For example: If efforts to clean-up polluted rivers is successful you can't prevent others from enjoying the clean waterways; can you?. Public goods can be enjoyed by more than one person and those enjoying cannot prevent others from receiving the benefits:

i. TV and radio signals; open source software
ii. Disease control
iii. Clean air and Pollution abatements
iv. Pollution: Bad news is the "free-riders"

11.9.2 Types of Goods



11.9.3 Problem of Public Goods

People who try to benefit from the clean up without pitching in. It is the non-exclusivity element that leads to free-riding. The problem with PG is free riding: individuals know they can benefit without paying for it

- Under-provisioning results when public goods are supplied by a free market;
- And in common resources: overuse
- How are these relevant to environmental economics?
- Climate change
- Clean air
- The forests
- Ocean fish
- Floods

11.10 Private Goods

A product that must be purchased in order to be consumed, and whose consumption by one individual prevents another individual from consuming it. The characteristics is "(Rival & Excludable)"**.** For example, a burger is excludable because it is possible to prevent someone from eating the burger.

11.10 Natural Monopolies

Exists as a result of the high fixed or start-up costs of operating a business in a particular industry. Example: Power generations supply

Why power generations been classified as natural monopoly goods?

"Nonrival & Excludable"

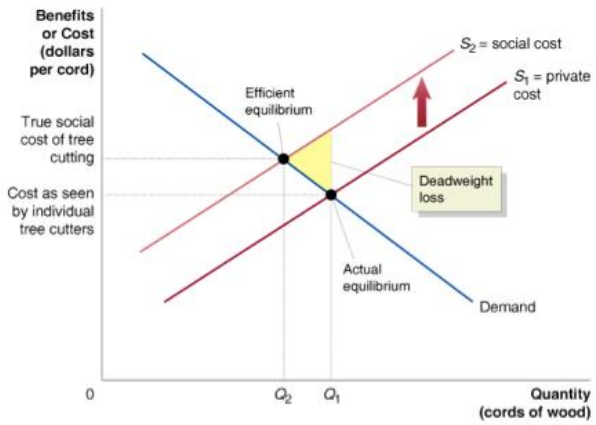
11.11 Quasi-public goods

Quasi-public goods are often referred to as Common Resource goods. They are rival goods but not excludable. One person's use of a common resource diminishes the amount available for others:

i. Severe depletion of fish stocks
ii. Deforestations

In each case, a resource that is freely available is overused

11.12 Overuse of A Common Resources



If each logger cuts to his private needs and ignoring all others, the total volume taken would be Q_1. Efficient equilibrium Q_2 is the socially acceptable quantity if the social costs and preference are accounted for. The loss to society is shaded area.

11.12 Tragedy of The Commons

i. Common: a land/ resources shared with everyone.

ii. Open access: Everybody can use the resources without any charges.

Example:

- Pasture for cows to graze
- Clear cutting tress in rain forest
- Fishing in the ocean

iii. What can be done?

- ❖ case for government intervention with public goods
- ❖ Overcoming the Free-Rider problem
- ❖ Overcoming under-provisioning and under-consumption of public goods

Example 1 government case

- ❖ If the government provides public goods they may be able to do so more efficiently because of economies of scale
- ❖ "The truth is that markets cannot exist without governments, and vice versa. Governments are essential to the establishment of security, justice, property rights, and contract enforcement, all of which are essential to a market economy."

Example 2: Case study: Over fishing in South China Sea?

Problems:

- ❖ South China Sea is over-fished by many countries
- ❖ Vast improvements in fishing technology means more fish will be caught
- ❖ Human Population factor
- ❖ 50-mile exclusion zones to respective countries are porous

Many contributing factors to overfishing

- ❖ Destructive practices:
- ❖ Destructive seabed trawling
- ❖ Use of fine meshed nets

- Indiscriminate catches
- Poaching: At current catch rate wild fish stocks will not last (estimated 74% depletion bet. 1972 and 1999). Ban is made by Malaysia on trawler fishing

An effective solution can be complicated unless made on multinational scales:

- Multilateral tradable annual quotas?
- Licensing?
- Breeders?
- Regulations?
- Policing?

Challenges: can it be applied in S.E. Asia waters?

Example 3: Case Study: Fishing For The Future

- Over fishing in the South China Sea: Accessible to all ASEAN countries (Vietnam, Thailand, Malaysia, Cambodia etc.)
- The causes: The depletion of the fish stocks will affect other fishermen and loss of benefits.

If no measures are taken to address the decline, fish stock is likely to be depleted by the year 2048.

What should the authorities do?

- *Quota (Australia, Namibia had done this approach)*
- *Permit*
- *Closed-Accessed*

11.13 Property Rights

Foundation to the economics: The market fails to allocate resources efficiently when property rights are not well-established (ownership to property).

Forest?	Common Land?
Ocean?	Air?

11.14 Imperfect Information

Market fails when information received about a product is asymmetrical:(i.e different parties to a transaction have different levels of information)

- Used car salesman and customer
- Doctor and patient
- Harm done by pollution
- Sales of defective products

If no one realizes an activity is bad (e.g. Mercury poisoning in Onondaga Lake:1950s), imperfect information is not the problem. And If all sides have the same knowledge, even if uncertainty exists, imperfect information is not a problem

Why is it important?
Because society may have no clear information of the dangers:

- Health hazards from toxic wastes
- Harmful effects of pollution
- Resource depletions
- Global warming
- Etc.

What can be done?

Government can supply the information or regulate:

- If product seal is broken don't sell/buy
- Product labeling
- Copyrights
- Fair ads regulation
- Insurance
- Publishing of financial returns
- Criminalizing substance abuse

TUTORIAL 11
(Economic Efficiency, Market Failures and Government Intervention)

1. The market for paper in a particular state in the Malaysia is characterized by the following demand and supply function:

$$Q_D = 160{,}000 - 2000P$$
$$Q_S = 40{,}000 + 2000P$$

where Q_D is the quantity demanded of paper in 100 lb. lots, Q_S is the quantity demanded of paper in 100 lb. lots, and P is the price per 100 lb. lot of paper. Currently there is no attempt to regulate the dumping of effluent into streams and rivers by the paper mills. As a result, dumping is widespread. The marginal external cost (MEC) associated with the production of paper is given by the function $MEC = 0.0006Q_s$.

(a) Discuss the concept of efficiency.
(b) With an aid of diagram, explain briefly two (2) types of externalities.
(c) Calculate the output and price of paper if it is produced under competitive conditions and no attempt is made to monitor or regulate the dumping of effluent.
(d) Determine the socially efficient price and output of paper.
(e) Explain why the answers you calculated in parts (a) and (b) differ.

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ABOUT THE AUTHORS

Nur Naddia Nordin is Senior Lecturer in Economics at . She receives her Bachelor Degree, Master Degree and Doctor of Philosophy (PhD) in Economics from Universiti Putra Malaysia. She specializes in the field of finance. Her research interest includes labour market, innovation, research and development (R&D) and foreign direct investment. She taught Microeconomics, Macroeconomics, Business Statistics, Financial Management. She supervised more than 36 undergraduates' students and 2 PhD students. She received 12 research grants.

Nur Haiza Nordin is Senior Lecturer in Economics at Universiti Malaysia Kelantan. She receives her Bachelor degree in Banking from Universiti Utara Malaysia, Master Degree and Doctor of Philosophy (PhD) in Economics from Universiti Putra Malaysia. She specializes in the field of finance. Her current research interest includes health care expenditure, education, population and aging. She taught Microeconomics, Macroeconomics, Business Statistics, Research Methodology and Principle of Management. She supervised more than 70 undergraduates' students and 3 PhD students. She received 14 research grants..