EPT 3102
Notes

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Unit Introduction

The agricultural and food industry is one of the largest industries in terms of people employed and value of products. In Malaysia’s economy, agricultural sector means production of farm commodities such as oil palm, rubber, rice, fisheries and livestock and food processing industries are classified under manufacturing sector. Food commodities have become extremely important for its purpose in its food security objective. The study on agricultural economics will provide students with more understanding as to how food and marketing system works in terms producers’, consumers’ and government’s roles.

Learning Outcomes: Students are able to;

1. Explain the agribusiness food systems
2. Define economics and agricultural economics
3. Differentiate between normative and positive economics

1: The Agribusiness/Food Systems

1.1. The Food Systems
Agricultural sector remains one of the important sectors of the Malaysian economy despite the country’s vision of becoming an industrial and high income nation (Table 1.1). The Malaysian agricultural sector basically comprises industrial or primary commodities such as oil palm, rubber and cocoa; and food commodities such as rice, vegetables and fruits. The farming system is divided large estate or plantation and the smallholders. Off late, food commodities have been given more emphasis in agricultural policy due two reasons; namely the food security and high food import bills. Food is an important factor in our lives. Besides providing all necessity nutrients it is one the things that brings people together. The food sector which consists of producers, processors and marketers of foods is one of the largest industries in the world.
Table 1.1: Contribution of Agricultural Sector to the Gross National Product 2000-2010

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2005</th>
<th>2010*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RM (mill.)</td>
<td>%</td>
<td>RM (mill.)</td>
</tr>
<tr>
<td>Agriculture</td>
<td>30,647</td>
<td>8.6</td>
<td>35,835</td>
</tr>
<tr>
<td>Industrial Crop</td>
<td>18,759</td>
<td>5.3</td>
<td>22,031</td>
</tr>
<tr>
<td>Agro-food</td>
<td>11,888</td>
<td>3.3</td>
<td>13,804</td>
</tr>
<tr>
<td>Mining</td>
<td>37,617</td>
<td>10.6</td>
<td>42,472</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>109,998</td>
<td>30.9</td>
<td>137,940</td>
</tr>
<tr>
<td>Construction</td>
<td>13,971</td>
<td>3.9</td>
<td>14,685</td>
</tr>
<tr>
<td>Services</td>
<td>175,649</td>
<td>49.9</td>
<td>230,043</td>
</tr>
<tr>
<td>Minus: FISIM not distributed</td>
<td>17,308</td>
<td>4.9</td>
<td>17,742</td>
</tr>
<tr>
<td>Plus: Import Duty</td>
<td>5,826</td>
<td>1.6</td>
<td>6,017</td>
</tr>
<tr>
<td>Total Value Added</td>
<td>356,400</td>
<td>100.0</td>
<td>449,250</td>
</tr>
</tbody>
</table>

Source: National Agri-food Policy 2010-2020
Note: 2010: estimated
FISIM : Financial Intermediation Services Indirectly Measured

Since the Malaysian agri-food sector is mostly smallholdings, the government is promoting commercialization and modernization of the sector, so much so that, the Ministry of Agriculture and Agro-based Industries establishes a tagline of “Agriculture is a Business.” Thus, agribusiness approaches is adopted.

Agribusiness started in the United States in the 1950s. Davis and Goldberg in (1957) defined agribusiness as: “The sum of all operations involved in the manufacturing and distribution of the farm supplies; production operation on farm; and storage, processing, and distribution of the resulting farm commodities and items.”

The United States Department of Agriculture (USDA, 1996) defined as: “Any profit-motivated enterprise that involves providing of agriculture supplies and/or the processing, marketing, transporting, and distributing of agricultural materials and consumer products.”

From the above definitions, agribusiness comprises three major sectors: the input or agriculture supplies sector; the farm production sector; and the output or processing
and marketing sector. Drummond and Goodwin (2011) describe agribusiness in terms of food industry. They describe food industry in terms of four major sectors: the service sector; the producer sector; the processor sector; and the marketing sector. Figure 1.1 illustrates the food industry or the food system.

**Figure 1.1: The Food System**

### 1.1.1 Farm Service Sector

The farm service sector provides the producer with the inputs he/she purchases. Examples of inputs are fertilizer, fuel, farm equipment, agriculture chemicals and feed. Most of the firms which supply these inputs are large multi-national companies such as John Deere, Monsanto, Bayers, DOW, DuPont and Cargill. An example of a local fertilizer company is the Chemical Company of Malaysia Bhd. (CCM), while Sin Heng Chan is an animal feed company. The farm service sector is not limited to the sellers or suppliers of goods (farm supplies). It includes services such as banking, legal advice, agronomic consultancy, animal health services, etc. As farming becomes more complex, farmers are forced to rely heavily on farm service providers.
Table 1.2: Malaysia Fertilizer Consumption (tonnes)

<table>
<thead>
<tr>
<th>Fertilizer Type</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ammonium nitrate</td>
<td>0</td>
<td>77,368</td>
<td>102,090</td>
<td>112,035</td>
<td>102,279</td>
<td>105,323</td>
</tr>
<tr>
<td>Ammonium sulphate</td>
<td>763,152</td>
<td>917,573</td>
<td>763,132</td>
<td>741,979</td>
<td>690,872</td>
<td>990,495</td>
</tr>
<tr>
<td>Calcium ammonium nitrate</td>
<td>155,742</td>
<td>344</td>
<td>1,210</td>
<td>4,836</td>
<td>8,458</td>
<td>3,866</td>
</tr>
<tr>
<td>Diammonium phosphate (DAP)</td>
<td>30,776</td>
<td>35,561</td>
<td>36,840</td>
<td>21,511</td>
<td>30,519</td>
<td>52,053</td>
</tr>
<tr>
<td>Monoammonium phosphate (MAP)</td>
<td>0</td>
<td>10,418</td>
<td>22,336</td>
<td>12,233</td>
<td>19,421</td>
<td>42,237</td>
</tr>
<tr>
<td>NPK complex &lt;=10kg</td>
<td>16,351</td>
<td>8,085</td>
<td>7,042</td>
<td>18,633</td>
<td>4,503</td>
<td>923</td>
</tr>
<tr>
<td>NPK complex &gt;10kg</td>
<td>174,523</td>
<td>81,082</td>
<td>157,302</td>
<td>130,835</td>
<td>193,047</td>
<td>402,852</td>
</tr>
<tr>
<td>Other nitrogen &amp; phosphates compounds</td>
<td>43</td>
<td>13</td>
<td>5,688</td>
<td>11</td>
<td>74</td>
<td>0</td>
</tr>
<tr>
<td>Other nitrogen &amp; phosphorus compounds</td>
<td>0</td>
<td>0</td>
<td>5,041</td>
<td>806</td>
<td>12,893</td>
<td>303,265</td>
</tr>
<tr>
<td>PK compounds</td>
<td>2,064</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Potassium chloride (Muriate of potash)</td>
<td>1,088,010</td>
<td>1,436,080</td>
<td>1,524,931</td>
<td>1,443,561</td>
<td>540,220</td>
<td>1,361,224</td>
</tr>
<tr>
<td>Potassium sulphate</td>
<td>2,146</td>
<td>2,948</td>
<td>6,380</td>
<td>11,372</td>
<td>3,540</td>
<td>46,144</td>
</tr>
<tr>
<td>Superphosphate</td>
<td>407,522</td>
<td>82,130</td>
<td>63,326</td>
<td>62,702</td>
<td>21,668</td>
<td>46,403</td>
</tr>
<tr>
<td>Urea</td>
<td>672</td>
<td>750,355</td>
<td>1,000,201</td>
<td>1,480,675</td>
<td>1,613,536</td>
<td>0</td>
</tr>
<tr>
<td>Urea and ammonium nitrate solutions</td>
<td>3,375</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>117</td>
</tr>
</tbody>
</table>

Source: FAO

1.1.2 Producers

This sector includes all of those firms engaged in the biological process associated with the production of foods crops, industrial crops and livestock and aquaculture. Examples of producers are the farmers, orchard owners, ranches and feedlots farmers, nursery owners and aquaculture operators. As shown in Figure 1.1, producers buy (inputs and services) from farm service sector or known as input sector and sell (farm outputs) to the processing/manufacturing sector. Alternatively, producers sell to food retailers such as grocery stores, supermarkets and hypermarkets, or/and to food service sector such as restaurants and food caterers.

1.1.3 Processors

The processing sector adds values to the raw materials or agricultural commodities by converting them into consumer products. Processors change the form of agriculture commodities and create or add value in the process. There are two categories of processors: 1. The commodities processors, such as flour milling which turns wheat into flour, oil palm refinery turns fruit bunch into palm oil and rice millers turn paddy to rice. 2. The food product processors, such as bread baker who turns the flour into bread and edible oil firms turn crude palm oil into cooking oils. Often one firm will engage in both activities. For example Hershey processes cocoa beans
and manufactures chocolate bars. On the other hand, the Malaysia Cocoa Manufacturing Sdn. Bhd. processes cocoa beans into cocoa powder and cocoa butter which are intermediate products. Felda Holdings processes crude palm oil into oleochemicals and cooking oil. Another example of oleo chemical company is the IOI Oleochemicals. Food product processors can be expanded further into those that produce for retail food consumer and those which produce for food service distributors. An example of food product processor is the Coca-Cola Company. It procures high fructose corn sweetener from a commodity processor and combines it with its secret formula to produce Coke in cans and bottles for the retail market in a bulk for food service industry. Another example is Nestle which produces a wide range of food products, such as soya drink, sugarcane drink, chocolates and breakfast cereals and distributes them to both retail and service industry. There also processors in the small and medium industries category.

1.1.4 Marketers

The marketer sector creates value in the food industry through time and place functions. As an illustration, wheat is harvested in Australia in June. Burger buns are needed in Malaysia in December. The marketing system links the producer and consumer together through the distribution system. The marketing system provides consumers with a food product as to what, when and where he or she wants it. The consumer may be a retail shopper or somebody who eats at an away from home dining facility. Market players or actors are those individuals of companies who provide wholesale, retail, logistics and transport services. They are also referred to as the market intermediaries.

Activity 1

1. Identify the four sectors in the food industry. For each firms in each of the four sectors, identify what they buy and they sell. Who are their suppliers and who are their buyers.

2. Most food crop farmers prefer to operate in traditional way rather than commercial way. Discuss this proposition.
2: Definitions of economics and agricultural economics

2.1. Introduction
Agricultural economics a part of economics which studies agriculture and food sector in its many facets and forms. The studies are concerned with the entire agriculture and food value chain, from inputs procurement and utilization to farm production, processing, logistics and marketing until consumers end. Since agriculture and food systems are directly involved with natural resources and environment, some agricultural economists study natural resource, environment conservation and climate change issues. Others study on agribusiness sector as buyers, processors and distributors of food and fiber products.

2.2. Economics Studies
The study of economics rests on three foundations, i.e self-interest, scarcity, and choice.

- Basically every resource is scare. It means that resource available is insufficient to satisfy every user. Hence, there is a need for system to allocate the resources amongst users. If there is sufficient resource for user, then, there would be no need for an allocation system.
- Choice is another important foundation of economics study. Choice is about making decision and allocation of resource. Thus economics is about decision making and allocation on consumption and resources.
- Self-interest is what motivates the consumer to seek more goods at a lower price. It also drives the producer to produce as efficiently as possible, such as lowering production cost and increase profit margin.

Scarcity of resource problem forced society to make choices. In making decision to make an appropriate choice, three basic questions need to be answered.

a. What goods and services should be produced?
Society needs to determine what goods and services should be produced with the limited resources to maximize their satisfaction. Product combinations to be produced must be on the Production Possibility Curve (PPC) because it is the most efficient product combination. Once goods and services to be
produced are identified, the society needs to decide how much to produce each good and service. For example, capital goods and consumer goods; in the contexts of Indifference Curve, if the society choose to produce more of consumer goods, then the consumer goods give more satisfaction relative to capital goods.

b. How should the goods and services be produced?
In a free market economy, resources are distributed by demand and supply process or market mechanism. In this situation, resources are allocated to industries which offer higher wage.

c. For whom the goods and services are produced?
Goods and services produced need to be distributed. Capital goods are distributed to firms while consumer goods are distributed to consumers. In a free market economy, price mechanism plays important role in distribution of goods and services.

2.3. Branches of Economics
Economics can be divided into three branches. They are microeconomics, market economics and macroeconomics. The difference between the three is the level of aggregation of the analysis.

2.3.1. Microeconomics
Studies economic behavior of individual or group of individuals decision making units such as,

I. Consumers: The microeconomics of consumption. The consumer faces the problem of what to buy with limited resources, eg budget. The individual consumer, on daily basis, must make a number of consumption decisions on a daily basis.
   a. Many not the products of conscious deliberation, but are habitual or impulsive.
   b. The consumer must decide what to buy & what not to buy
   c. The consumer must also decide when to consume.
II. Business Firms (producers): The microeconomics of production. Firm acquires resources and used them in production process so that it maximizes profit. Production management decisions that affect the profit of the firm include:

a. Which inputs to purchase.
b. What production technique to use.
c. Which product to produce.
d. How much of each product to produce.
e. When to produce them.

2.3.2. Market economics
To the economist, a market is established whenever potential buyers and potential sellers interact to establish prices and exchange goods. It is the primary price determination mechanism found in the institutional framework of most countries. A market is distinguished from a marketplace. A market refers to interaction of buyers & sellers, and marketplace refers to a physical location. Market economics involves the study of the dealings in a particular commodity by all potential buyers and potential sellers, taken as a group.

In the economics of markets, we study how value is created as a commodity moves from producer to consumer. In the marketing of a good, four changes happen: time, place, form and possession. The form of wheat must change to bread or buns. The place the bread moves from Kuala Lumpur to Malacca. The time of bread shifts from Monday (factory) to Wednesday (retail store). The possession of the bread transferred from retailer to consumer.

Most of the functional changes, particularly in traditional societies, are performed by middlemen. However, in the modern agricultural marketing systems, these functions are carried out by large business firms which specialize in undertaking certain functions. These specialized firms are known as agribusiness.

2.3.3. Macroeconomics
Macroeconomics studies the aggregate level of economic activity, usually at the national or international level. The main focus of study is how the total economic
system operates and how various policies and institutions affect the vitality of the economic system. It concerns issues which include:

I. Level of National Income
II. Total Level of Unemployment
III. General Price Level of the Economy: Inflation
IV. Balance of payment
V. Federal budget

Macroeconomics also deals with international issues. For example changes in world fuel price – how it affect cost structures of farmers, processors and marketers?

3. Scopes of Economics

3.1. **Normative Economics**: subjective, value laden, emotional. “What ought to be” economics

Rx and/or Policy oriented. We often hear a lot of normative economic statements during political elections.

3.2. **Positive Economics**: Objective, without emotion or value judgment. “What is, What was, What will be economics. It is based on probability and statistical methods.

4. **Definition of economics:**

A social science that deals with how consumers, producers and societies choose among the alternative uses of *scarce resources* in the process of producing, exchanging, and consuming goods and services.

A social science concerned with the way an individual or society CHOOSES to employ limited resources having alternative uses to produce economic goods and services for present and future consumption.
Let's analyze this definition: Consider Figure 2 below

Think of economics as being a core area, surrounded by outlying extensions into areas more usually associated with other disciplines. Core area is considered a social science. Economics deals with a limited range of human activity characterized by rational behavior, and the interaction of individuals upon one another through the mechanism known as a market.

Rational Behavior: An action suitable to achieve specific goals within the limitations and capacities of an individual. You learn from your mistakes, and do not repeat them.

Limited Resources: Resources are also called "factors of production" or "inputs." Limited implies the concept of scarcity. For all practical purposes, human wants may be regarded as limitless. Do we ever have enough goods and services?

Scarcity: Scarcity simply means that there is not enough factors of production in the world to create all of the goods and services that people desire at a $PRICE = 0$. The supply of resources available at any particular time, only allow for the production of a small fraction of the goods and services that people desire.
Resources: AKA “factors of production”, or "inputs"

Land
Capital
Labor
Entrepreneurship (management)

Land: All raw materials available in nature, i.e. land, coal, timber, rivers, air, fish, etc.
Nonrenewable resources: include oil, coal, natural gas, gold, silver, platinum, copper, etc. Renewable resources would include timber, water, grasslands, wildlife, etc.

Capital: Man made supports to the production process. Tools, machinery, and buildings used to produce other goods and services.

Labour: All the human physical and mental skills that can be used in the production of goods and services.

Entrepreneurship (management): The ability to organize production, innovate, and take risks. The ability to collect information, and analyze that information to solve problems or create opportunities.

Owners of resources receive payments in the following forms:

- LAND receives RENT
- CAPITAL receives INTEREST
- LABOR receives WAGES
- MANAGEMENT receives PROFIT

Limited resources have alternative uses and CHOICES must be made. How will these scarce resources be used?
1. Will we use oil to make gasoline, plastic, fertilizer etc.,
2. Use fertilizer to raise corn, soybeans, tobacco, cotton, turf, tulips etc.,
3. Use corn to feed people, feed beef cattle to produce beef, feed dairy cattle to produce milk.

How do we allocate these scarce resources? What should we produce? How much of each good or service should we produce?

Definition of Agricultural Economics

“…an applied social science that deals with how producers, consumers and societies use scarce resources in the production, processing, marketing and consumption of food and fiber products”.

The social science that deals with the allocation of scarce resources among those competing alternative uses found in the production, processing, distribution, and consumption of food and fiber (Drummond & Goodwin)

Activity 2.

1. Discuss the branches of economics.
2. Differentiate between positive and normative economics.
3. Give an example of economic question which would be answered by an analysis at microeconomic level, at market level and at the macroeconomic level.

Summary

Agricultural economics is a social science which deals with the allocation of scarce resources. Microeconomics deals with the decision making of the individual producer or consumer. Market economics deals with the collective economic behavior of all potential producers and consumers of a good. Macroeconomics on the other hand, deals with economy at aggregate level.
UNIT 2
Theory of Consumer Behavior

Unit Introduction

Consumers must make choices when faced with unlimited human wants and a scarcity of resources with which to satisfy wants. Consumption theory is based on the behavior of the individual consumer since that consumer seeks to maximize his/her self-interest. The theory deals with consumer’s behavior in maximizing benefits from consuming goods and services as well as how he/she evaluates those benefits.

Economists study consumer choice and demand in terms of utility theory. Even though most individuals have not studied utility theory, they nonetheless make choices about how to allocate their scarce resources by comparing the added satisfaction (marginal utility) per dollar spent on each good.

Learning Outcomes: Students are able to

1. Discuss the utility theory
2. List the assumptions about utility theory
3. Differentiate the cardinal and ordinal utility theory
4. Understand the budget constraints concept

1. Utility Theory

Consumers purchase things due to certain motivation. They buy because they want to (eg. Fried chicken); they have to (petrol); ought to (such as multi vitamins) or out of habit (cigarettes). A consumer receives satisfaction obtain from consuming the product he/she bought, for whatever motivation. Economists refer the satisfaction as utility. Utility is created by the consumption of goods and services. However, utility cannot be measured in objective way.
1.1 Assumptions about Utility

The utility model of consumer behavior is founded on several important assumptions:

a. **Opportunity Costs and Price** – A consumer will buy a product provided that the utility created by its consumption is greater than the opportunity cost of consuming it. Most of the opportunity cost of consuming a good or service is the price of the good itself.

b. **Rational Behavior** – there are three fundamental assumptions about rationality.
   i. Consumers consume a good only if the utility of consuming it is greater than the disutility (price) of acquiring it. For example, for a mutton eater, mutton will be bought as long as the utility (satisfaction) of eating is greater than the disutility (dissatisfaction) of having to pay for it.
   ii. More is better than less—more thing is a constant desire, regardless of how much things we have.
   iii. Wants are unlimited, and our wants exceed our means, so we must choose among our wants—what economics is all about.

c. **Preferences** - It is assumed the consumer is able to assess the utility gained from consumption of alternative goods, and able to establish a system of preferences between any two goods at any time. For example, a consumer is looking at the menu to decide what he/she wants.

d. **Budget Constraint** - A typical consumer is assumed to be constrained by a limited budget in making purchase decisions.

e. **Purchasing and Consuming** - Some people gain utility from the act of purchasing, separate from that of actually consuming what is purchased.
f. **Objective of the Consumer** — It is assumed that a consumer is a utility maximizer, given the limited budget available. The set of consumption choices of the individual will depend on the tastes and preferences of that individual.

g. **Total and Marginal Utility** - Given a budget constraint, the objective of the consumer is to consume that combination of goods that will provide the greatest amount of utility possible.

### 1.2 Utility

Let’s develop behavior rules that will portray how the consumer attains his/her objective from consuming goods and services. To simplify matters, economists assume **utils** be the measurement of utility or satisfaction. Consumers may not know how many utils of satisfaction are obtained from a given good. But they are able to identify which of two goods will offer the greater number of utils. Let’s examine the utility associated with individual consumption of a single good, say fried chicken, as shown in table 2.1 below. Ahmad consumes this fried chicken. Referring to the table, as Ahmad consumes more and more fried chickens, the total amount of utility he obtains from them increases at a decreasing rate, reaches a maximum and then declines after 4 fried chickens. The marginal utility column shows Ahmad’s marginal or additional utility obtained by consuming fried chickens. The marginal utility associated with the consumption of fried chicken is decreasing as additional fried chicken is consumed.

<table>
<thead>
<tr>
<th>Fried chicken/day</th>
<th>Total Utility/day</th>
<th>Marginal Utility/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>23</td>
<td>-2</td>
</tr>
<tr>
<td>5</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>
This situation leads us to a fundamental principle in the theory of consumer behavior; that is the **law of diminishing marginal utility**. As additional units are consumed, marginal or additional utility obtained from each additional unit decreases. This is shown in Diagram 2.1 below.

![Diagram 2.1: Relationship between total utility and marginal utility](image)

1.2.1 Cardinal Utility Theory

Cardinal approach assumes that utility can be measured and the unit is util. For example eating *nasi lemak* gives 2 utils and eating fried noodle gives 1 util. It shows that *nasi lemak* gives 2 times satisfaction than fried noodle.

### 1.2.1.1. Total Utility and Marginal Utility

**Total utility (TU)** is the aggregate level of satisfaction or fulfillment which a consumer receives from the consumption of a good or service. A utility function is an algebraic expression that allows us to rank consumption bundles or combinations of goods.

\[
\text{Total utility} = \sum MU
\]

**Marginal utility (MU)** is additional satisfaction that an individual derives from consuming an additional unit of a good or service, and presented as follow:
Total Utility (TU) generally increases with quantity (Q). From table 2.2 we see that at some point TU can start falling with Q, i.e when Q = 6. If TU is increasing, MU > 0. From Q = 1 onwards, MU is declining and this is known as principle of diminishing marginal utility. That is, as more and more of a good are consumed, the process of consumption, at some point, yield smaller and smaller additions to utility. If we chart the TU and MU, the result is shown in Figure 2.2. Observe that the MU is the slope of TU at every unit of consumption. TU is at peak when MU=0.

<table>
<thead>
<tr>
<th>Quantity (Q)</th>
<th>Total Utility (TU)</th>
<th>Marginal Utility (MU)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>30</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>29</td>
<td>-1</td>
</tr>
<tr>
<td>7</td>
<td>25</td>
<td>-4</td>
</tr>
</tbody>
</table>
1.2.1.2 Consumer Equilibrium

So far, we have assumed that any amount of goods and services are always available for consumption. In reality, consumers face constraints, i.e. income and prices. How a consumer allocates his income so that he maximizes his satisfaction? The concept of marginal utility is used to answer this question.

a. Consumer Equilibrium for One Good

For one good a consumer maximizes utility when marginal utility for consuming that good equals to the price of the good; i.e. MU=P. From the table 2.3 below, the consumer achieves the equilibrium condition at the third unit of good X. At the first
and second unit of good X consumed, MU>P and the consumer can increase his/her satisfaction by purchasing additional unit of good X.

Table 2.3 : Total Utility, Marginal Utility and Price

<table>
<thead>
<tr>
<th>Q_X</th>
<th>TU_X</th>
<th>MU_X</th>
<th>P_X</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>46</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>44</td>
<td>-2</td>
<td>10</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>-4</td>
<td>10</td>
</tr>
</tbody>
</table>

b. Consumer Equilibrium for two or more goods

Now we are going to discuss how a consumer should allocate his/her income to spend 2 or more goods.

Take 2 goods, X and Y; Price of X (P_x) and price of Y (P_y) are fixed; and consumer’s income is given. A rational consumer will use all his/her income by purchasing combination goods where the marginal utility per ringgit for goods is equal.

Marginal utility per ringgit is additional utility derived from spending the next ringgit on the good, i.e

\[
MU \text{ per ringgit} = \frac{MU}{P}
\]

Optimizing condition:

\[
\frac{MU_x}{P_x} = \frac{MU_y}{P_y}
\]
Let us look at numerical illustrations as shown in table 2.4:

Suppose X = coffee, Y = pancake; \( P_X = RM2 \), \( P_Y = RM5 \)

Table 2.4: TU, MU dan MU/P for two Goods

<table>
<thead>
<tr>
<th>( Q_X )</th>
<th>( TU_X )</th>
<th>( MU_X )</th>
<th>( MU_X/P_X )</th>
<th>( Q_Y )</th>
<th>( TU_Y )</th>
<th>( MU_Y )</th>
<th>( MU_Y/P_Y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>30</td>
<td>15</td>
<td>1</td>
<td>25</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>9</td>
<td>4.5</td>
<td>2</td>
<td>52.5</td>
<td>27.5</td>
<td>5.5</td>
</tr>
<tr>
<td>3</td>
<td>45</td>
<td>6</td>
<td>3</td>
<td>3</td>
<td>74</td>
<td>21.5</td>
<td>4.3</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>5</td>
<td>2.5</td>
<td>4</td>
<td>89</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>54</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>99</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>56</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>107</td>
<td>8</td>
<td>1.6</td>
</tr>
</tbody>
</table>

From the table: 2 possible optimal combinations

Combination 1: \( X = 3 \) (3 cups of coffee) and \( Y = 4 \) (4 pieces of pancakes)

\[ TU = 45 + 89 = 138 \]

Combination 2: \( X = 5 \) (5 cups of coffee) and \( Y = 5 \) (5 pieces of pancakes)

\[ TU = 54 + 99 = 153 \]

Second combination gives a higher TU. The Presence of 2 potential equilibrium positions suggests that we need to consider income. To do so let us examine how much each consumer spends for each combination.

Total expenditure = \( P_X X + P_Y Y \)

Hence, expenditure per combination:

Combination 1: \( 2(3) + 5(4) = RM26 \)

Combination 2: \( 2(5) + 5(5) = RM35 \)
If consumer's income = 26, then the optimum is given by combination 1 as combination 2 is not affordable. If the consumer's income = 35, then the optimum is given by Combination 2. Combination 1 is affordable but it yields a lower level of utility.

1.2.2. Ordinal Utility Theory

The ordinal approach assumes that satisfaction cannot be measured. Consumer’s behavior that maximizes satisfaction is illustrated by indifference curve. For example eating nasi lemak gives more satisfaction than eating fried noodle or in other words, nasi lemak is preferred over fried noodle.

1.3 Indifference Curves

Modern consumption theory is based upon the notion of isutility curves, where “iso” is the Greek for equal”. The consumer is assumed to be indifferent among different combinations of goods along an isutility curve. This is shown by points M, N and O (different combinations of nasi lemak and noodle) where the consumers obtained same level of satisfaction i.e 100 utils. Points P and Q which are on a higher level of indifference curve indicate the two combinations/bundles of nasi lemak and noodle give higher level of satisfaction, i.e 500 utils.
The slope of an indifference curve is known as the marginal rate of substitution (MRS). The marginal rate of substitution of noodle for nasi lemak is given by:

\[ \text{MRS} = \frac{\Delta \text{nasi lemak}}{\Delta \text{noodle}} \]

The MRS reflects the number of nasi lemak a consumer is willing to give up for an additional noodle.

From the above graph, the MRS between points M and N is equal to -2.0, \((-2 \div 1.0)\). This means the consumer is willing to give up 2 nasi lemak in exchange for one additional noodle.

This will make us to ask: Which bundle would a consumer prefers more - bundle M or bundle N?
The answer is that the consumer would be indifferent because they give him/her the same utility. The definitive choice will depend on the prices of these two products.

What about the choice between bundle M and bundle P?
A consumer would prefer bundle P over bundle M because it gives him/her more utility or satisfaction. The question is whether the consumer can afford to buy 5 nasi lemak and 5 noodles.
2. Concept of Budget Constraint

The concept of budget constraints will help us to answer the above question.

Let a weekly budget for foods be:

\[
(P_{\text{noodle}} \times Q_{\text{noodle}}) + (P_{\text{nasilemak}} \times Q_{\text{nasilemak}}) \leq \text{Budget}
\]

Where:
- \(P_{\text{noodle}}\) = price of noodles
- \(P_{\text{nasilemak}}\) = price of \text{nasi lemak}
- \(Q_{\text{noodles}}\) = quantity of noodles
- \(Q_{\text{nasilemak}}\) = quantity of \text{nasi lemak}

The budget constraint limits the amount that a consumer can spend on these items. A graph portraying this constraint is referred to as the budget line. The slope of this line is given by:

\[
\text{Slope of budget line} = - \left( \frac{P_{\text{noodle}}}{P_{\text{nasilemak}}} \right)
\]

If the price of nasi lemak =RM2.50 and price of noodle =RM2.50; the slope of the budget line is -1. If the budget per week is RM20; the consumer is unable to buy 5 nasi lemak and 5 noodles as it exceeds the budget (RM2.5x5+RM2.5x5=RM25).

3. Summary

Consumption creates utility. Consumers attempts to maximize utility given a limited budget. The law of marginal utility states that as additional units of a good are consumed, ceteris paribus, the marginal or additional utility associated with each additional unit is decreased. In order to maximize utility from consumption, the consumer should consume each good to a point which the MU/Ringgit for all goods are equal.
Activity
1. Table below shows the total utility a consumer gets from consuming 2 goods good X and good Y. Assume the price of good X is RM5/unit and the price of good Y is RM10/unit.
   a. For a budget of RM55, how many units of each good would the consumer consume?
   b. If the budget were to increase by RM10, how many units of each good would the consumer consume?
2. Is the law of diminishing marginal utility valid for a true chocolate fanatic?
UNIT 3
DEMAND AND SUPPLY

Unit Introduction

The concepts of demand and supply are the fundamental concept in market economies. The price system will determine how resources, goods and services are distributed. Distribution is made based on wants and the ability to pay for goods and services.

Learning Outcomes: Students are able to:

1. explain the law of demand
2. explain the law of supply
3. demonstrate how prices are determined

1. DEMAND

Demand can be defined as the willingness and ability of buyers to purchase a given amount of goods or services, over a range of prices, over a given period of time in a given market, *ceteris paribus*.

Demand is a relationship between quantity and price, i.e different quantities will be demanded at different prices. It is a series of possible price-quantity combinations, and refers to the desires or intentions of buyers, rather than their actual purchases. Demand shows the willingness of buyers to purchase at various prices, *ceteris paribus*; regardless those prices are actually observed in the market.

The demand relationship can be explained in words, with a schedule, as a graph, or an equation. The relationship is the same in whatever methods used to illustrate. It is important to understand the relationship between *quantity demanded* and price, and other variables are constant (*ceteris paribus*). Other variables means, variables
which influence the demand for the product. Those variables are income, taste and preferences, price of other related goods and consumer’s future expectation.

*quantity demanded is how much of a good or service a consumer is willing to buy at a specific price, in a given market and at a given time, ceteris paribus.*

1.2 The Law of Demand

The law of demand states that, as the price of a good or a service increase, the quantity of the good or service consumers are willing to buy will decrease, *ceteris paribus*. This does not mean that every consumer in every market will react according to the law of demand, but generally, there is an inverse relation between prices and the quantity demanded. Thus a demand curve will have a negative slope.

Two explanations for the law of demand:
1. Substitution effect
2. Diminishing marginal utility (discussed in unit 2)

1.3 Substitution Effect

To illustrate the substitution effect, let us take an example. Ahmad has a budget of RM150 per week. If Ahmad buys 25 units of beefburger per week at RM2.00/unit, the total spending on beefburger per week is RM50. The other RM100 is spent on 100 unit of thing with a price of RM1.00/unit.

If the price of beefburger doubles to RM4/unit, *ceteris paribus*, how Ahmad reacts to the price increase?

1. He increases purchases of the relatively cheap thing (including chicken) & decreases beefburger purchases.
2. He may reduce his consumption of beefburger to 10 units, and increase his purchases of thing to RM130.

He has substituted thing for beefburger as the price of hamburger went up.
The increase in the price of beef has reduced the amount of goods that Ahmad is able to buy.

- His purchasing power or real income has fallen, and to compensate he must buy less of both beefburger and thing.

Table 3.1 and Figure 3.1 below show a demand schedule and a demand curve, showing the relationships between various prices and quantity demanded. The demand curve has a negative slope.

Table 3.1: Demand Schedule

<table>
<thead>
<tr>
<th>Price/unit</th>
<th>Quantity Demanded (unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>20</td>
</tr>
</tbody>
</table>

Figure 3.1: Demand Curve
1.3. Demand and Quantity Demanded

It is important to understand and differentiate the concept of demand and quantity demanded. The demand curve shows the relationship between prices and quantity demanded at a point in time. In a longer time period, the variables (ceteris paribus) will change. The changes of this variable will shift the demand curve; to the right or to the left. These variables are known as demand shifters. A shift of the demand curve to the right means an increase in demand at a given price level. Conversely, a shift to the left means a decrease in demand at a given price level.

A change in quantity demanded is illustrated by a movement along the demand curve caused by changes in price of that commodity or good and service. This movement is related to the law of demand.

Figure 3.2 illustrates the changes in quantity demanded and changes in demand.

The quantity demanded a good or service is influenced by its own price. Thus changes in price will cause changes in the quantity demanded. It is the movement along the demand curve. Change in demand is caused by the changes in the ceteris paribus (will discuss in next section) at a given price level and they are known as the demand shifters. Change in demand is represented by the shift in the demand curve.
1.4. Demand shifters

i. **Prices of substitute goods.** Substitute goods are other goods which fulfill a want of a consumer. For example, butter and margarine or coffee and tea, or beef and chicken. A change in the price of butter caused a shift in the demand curve of margarine.

ii. **Prices of complementary goods.** Complementary goods are products which are used or consumed jointly or together. For example bread and butter are normally consumed together. An increase in the price of butter, ceteris paribus, will shift the demand curve of bread to the left.

iii. **Consumers’ income.** Income has positive relationship with demand. An increase in consumer’s income demand for a given good is also increase. Income is sensitive to non-essential goods, such as new fridge.

iv. **Taste and preferences.** Consumers have different taste and preference and they are changing over time. When taste and preference towards a commodity increases, more consumers will buy that commodity, hence demand curve shifts to the right, vise-versa.

v. **Expectation.** When consumers expect prices for a good to increase in near future, they will purchase more of that good prior to the effective date. This will increase demand for the good and caused the demand curve shift to the right.

vi. **Demography.** The growing segment of the Malaysian population is age group over 65 years. The increase of this segment will increase demand for medicine or health products.

1.5. Market Demand and Individual Demand

A market comprises many individual consumers. The market demand is an aggregation of individual consumers in the market for a given good or service. Market demand schedule of curve is derived from summing the individual quantity demanded at every price level. The derivation of market demand schedule and curve is illustrated in table 3.2 and figure 3.3. Assume there two consumers in the market.
Table 3.2: Derivation of Market Demand Schedule

<table>
<thead>
<tr>
<th>Price RM/unit</th>
<th>Individual Quantity Demanded</th>
<th>Market Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumer 1</td>
<td>Consumer 2</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>35</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>7</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 3.3: Derivation of Market Demand Curve

2. SUPPLY

As we have discussed above, demand theory dealt with the consumer’s behavior in the market. However, a market also comprises sellers or producers. The concept of supply depicts seller’s behavior in a market.

Supply is defined as a relationship showing the various amounts of a commodity that producers would be willing and able to sell at possible alternative prices during a given time period, ceteris paribus.

As of demand, supply relationship can be explained in words, with a schedule, as a graph, or an equation.
2.1. The Law of Supply

The law of demand states that, as the price of a good or a service increases, the quantity of the good or service sellers are willing to sell will increase, ceteris paribus. Thus a supply curves will have a positive slope.

Table 3 and Figure 4 below show a supply schedule and a supply curve, showing the relationships between various prices and quantity supplied. The supply curve has a positive slope.

<table>
<thead>
<tr>
<th>Price/unit</th>
<th>Quantity Supplied (unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>70</td>
</tr>
</tbody>
</table>

The positive slope of a supply curve explains that: a. an increase in price of the good increases producer’s profit hence motivate firm to increase production, b. if the
price stays at a higher level for a long time, it will attract new producers into the market and hence increase quantity supplied.

2.2. Supply and Quantity Supplied

As demand, the changes in quantity supplied occur with the changes of the product’s price. The changes in supply refer to the shift of the supply curve caused by a supply shifter or any one of the ceteris paribus.

2.3 Supply Shifters

i. **Price of inputs.** As input prices increase, the quantity producers are willing to produce at each price level will reduce. For example feedlot farmers use a lot of feed to feed cattle. If the feed price increases, the supply curve of beef shifts to the left.

ii. **Technology.** Adoption of new technology by producers increase the production efficiency and possible reduce unit cost. This shifts supply curve to the right (or outward).

iii. **Taxes and subsidies.** The cost of production increases if taxes are increase or subsidies decrease. Hence producers or firms are willing produce fewer units at each alternative price of the good. The supply curve shifts to the left of inward.

iv. **Expectation.** Similar to demand, expectations about future event will affect current supply. If rubber farmers expect rubber prices to be higher in the future, they will hold their rubber (cup lump) off the market causing today’s supply curve shift inward or to the left.

v. **Number of firms.** An increase in the number of firms in the industry will shift the supply curve to the right or outward.

2.3. Market Supply

As in the case of market demand market supply is derived by summing quantity supplied from all sellers of a given good or service at various price levels, *ceterus paribus.*
As an illustration, assume there are only 2 sellers in a market, derivation of market supply schedule and market supply curve are shown in table 3.4 and figure 3.5.

Table 3.4: Derivation of Market Supply Schedule

<table>
<thead>
<tr>
<th>Price RM/unit</th>
<th>Quantity Supplied</th>
<th>Market Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seller 1</td>
<td>Seller 2</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>30</td>
</tr>
</tbody>
</table>

Figure 3.5: Derivation of Market Supply Curve

3. Price Determination

The interaction between supply and demand is the basic to the process of market price determination. In a perfectly competitive market, the price will adjust to clear the market of goods by equating quantity demanded and the quantity supplied. The point of intersection of demand and supply curves is called the equilibrium point. At this point, the price is the equilibrium price. Table 3.5 and Figure 3.6 illustrates the price determination process in a perfectly competitive market.
Table 3.5: Market Schedule

<table>
<thead>
<tr>
<th>Price (RM/unit)</th>
<th>Quantity Demanded</th>
<th>Quantity supplied</th>
<th>Market Condition</th>
<th>Pressure on Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>4</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>6</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>8</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
<tr>
<td>4</td>
<td>14</td>
<td>10</td>
<td>Shortage</td>
<td>Upward</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>12</td>
<td>Equilibrium</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>14</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
<td>16</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>18</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>20</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>22</td>
<td>Surplus</td>
<td>Downward</td>
</tr>
</tbody>
</table>

At prices lower than RM5/unit, quantity demanded is more than quantity supplied, causing shortage in the market for a given product. Shortage will push price to go up. In contrast, at prices above RM6/unit, quantity supplied is more than quantity demanded causing market surplus for the given product. This will drive the prices down to the equilibrium price. Once the equilibrium price is achieved, the price
stabilized until the changes in ceteris paribus (demand/supply shifters) occurs, forcing to a new equilibrium price.

Summary
Demand is a relationship between quantity and price. It is a series of possible price-quantity combinations, and refers to the desires or intentions of buyers, rather than their actual purchases. Demand shows the willingness of buyers to purchase at various prices, *ceteris paribus*; regardless those prices are actually observed in the market. Supply is defined as a relationship showing the various amounts of a commodity that producers would be *willing and able* to sell at possible alternative prices during a given time period, ceteris paribus.

Activity
1. What changes would cause the market demand curve to shift but not shift individual demand curves?
2. What changes would cause the market supply curve to shift but not shift individual supply curves?
3. Using a graph, demonstrate how a price of a commodity is determined in a perfectly competitive market.
UNIT 4
CONCEPT OF ELASTICITY

Unit Introduction
An understanding of the concept of elasticity is important for managers in making adjustments in response to changes that affect their business. Elasticity is a measurement of sensitivity of consumers or producers to prices and income. Hence, elasticity can be defined as a measure of how responsive the quantity demanded by consumers or the quantity supplied by producers is to a change in the equilibrium price or some other economic factors.

Learning Outcomes: students are able to:

1. understand the concept of elasticity
2. compute and interpret various elasticity coefficients

4.1. Elasticity of Demand

Elasticity of demand is defined as the responsiveness of the quantity demanded to a change in the price of the good or service.

\[ \varepsilon = \frac{\% \text{ change of quantity demanded}}{\% \text{ change of price}} \]

\[ \varepsilon = \frac{\Delta Q/Q}{\Delta P/P} \]

Where: \( \varepsilon \) = demand elasticity
Q = quantity purchase
P = price of the product
A demand for a good is elastic when the rate of change of quantity demanded is greater than the rate of change of price. On the other hand, a demand relationship where the rate of change of quantity demanded is less than the rate of change of price is inelastic.

The following example illustrates the computation of elasticity of demand.

![Figure 4.1: Example](image)

The calculation of the elasticity of demand with respect to price move from point A to point B

\[
\varepsilon = \frac{Q_1 - Q_2}{P_1 - P_2} \left( \frac{Q_1}{P_1} \right) = \frac{(20 - 25)/20}{(8 - 7.50)/8} = \frac{-5/20}{0.50/8} = -4.0
\]

However, the computation of the elasticity of demand with respect to price move from point B to point A would be:

\[
\varepsilon = \frac{Q_2 - Q_1}{P_2 - P_1} \left( \frac{Q_2}{P_2} \right) = \frac{(25 - 20)/25}{(7.50 - 8)/7.50} = \frac{5/25}{-0.50/7.50} = -3.0
\]
The above elasticity calculation is called point elasticity. The weakness of this computation is that we get two different estimates of elasticity coefficients over the same arc. The greater the size of the arc between point A and point B, the greater the difference between the two estimates.

To eliminate the discrepancy, we can modify the basic elasticity formula. We call this the arc elasticity. This calculation of elasticity uses the mid-points of \( Q_1 \) and \( Q_2 \) and of \( P_1 \) and \( P_2 \). The formula for arc elasticity is:

\[
\varepsilon = \frac{(Q_1 - Q_2)}{(Q_1 + Q_2)/2} = \frac{Q_1 - Q_2}{Q_1 + Q_2} \cdot \frac{P_1 - P_2}{P_1 + P_2}/2
\]

Hence the computation for our example would be:

\[
\varepsilon = \frac{(20 - 25)}{(20 + 25)/2} = \frac{20 - 25}{20 + 25} = \frac{20 - 25}{45} = \frac{-5}{45} \cdot \frac{15.50}{15.50} = \frac{-77.50}{22.50} = -3.44
\]

The arc elasticity above eliminates the problem of discrepancy which arises from using end points.

If the value of demand elasticity is between 0 and -1, then the demand is inelastic and the demand is elastic when the value of demand elasticity is less than -1 (more than 1 in terms of absolute value).

In our example the value of demand elasticity = -3.44. Thus the demand is elastic; 1% change in price will lead to 3.44 % change in quantity demanded. Since the demand slope is negative, the relationships in an inverse relationship. If the price drops by 1% the quantity demanded increases by 3.44%, vise-versa.

Often, demand curves show three ranges of elasticity, i.e: elastic, inelastic and unitary, in a single curve. It can be illustrated in figure 4.2 below.
Cross elasticity is a measure of the sensitivity of quantity demanded to changes in the price of another good, normally a substitute or a complementary good. In another way, it measures the extent to which the demands for various commodities are related. An example of a cross-price elasticity is shown in figure 3.9. Figure 3.9 shows the demand curve for beef, ceteris paribus. Let one of the ceteris paribus is the price of chicken. The demand curve for beef is shown in solid line for a chicken price of RM6.00/kg. and labeled as C=6.

Now, let us see what happen to the market for beef if the price of chicken increased to RM8/kg., ceteris paribus? Consumers would substitute beef for chicken, thus
increase demand for beef causing a shift in beef demand curve to the right. The new demand curve for beef is represented by dotted line labeled as \( C = 8 \). For any given price of beef, the quantity demanded for beef has increased from \( Q_1 \) to \( Q_2 \).

The cross price elasticity is calculated as follows:

Basic elasticity formula:

\[
\varepsilon = \frac{\Delta Q_B/Q_B}{\Delta P_C/P_C}
\]

Where

- \( \varepsilon \) = cross price elasticity
- \( Q_B \) = quantity of beef
- \( P_C \) = price of chicken

The may be modified by using midpoints as follows:

\[
\varepsilon = \frac{Q_1B - Q_2B}{Q_1B + Q_2B} \cdot \frac{P_1c - P_2c}{P_1c + P_2c}
\]

The interpretation of the cross price elasticity coefficient is in terms of the degree of substitutability or complementarity between the two goods.

If \( \varepsilon = \) positive, the two goods are substitute goods. That is if a price of one increases, the quantity of other good purchased will also increase.

If \( \varepsilon = \) negative, the two goods are complementary goods. That is, an increase of price of one good, the quantity of other good demanded will be reduced.

**4.3. Income Elasticity**

As we know that income is a demand shifter. Now we have an elasticity measure which indicate the sensitivity that consumers response to changes in income. The basic elasticity formula is:
Where: \( \varepsilon_I = \text{income elasticity} \)
\( Q = \text{quantity purchase} \)
\( I = \text{Income} \)

Which may be modified into the standard mid-point formula:

\[
\varepsilon_I = \frac{\frac{Q_1 - Q_2}{Q_1 + Q_2}}{\frac{I_1 - I_2}{I_1 + I_2}}
\]

This formula simply shows the relationship between the rate of change in the quantity of a good or service purchased with the rate of change in consumer income. A positive income elasticity coefficient indicates the good is a normal good. For a normal good, the consumption increases as income increases. On the other hand, a negative income elasticity coefficient indicates the good is an inferior good. It means that as consumers’ income increases the consumption of the good will be reduced. If income elasticity of demand is 0, the demand for that particular good is not affected by the changes in consumer income.

The summary of income elasticity coefficient and types of goods is shown in table 4.1 below.

<table>
<thead>
<tr>
<th>Elasticity coefficient</th>
<th>Degree of elasticity</th>
<th>Good Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \varepsilon_I = 0 )</td>
<td>Perfectly inelastic</td>
<td>Necessity goods</td>
</tr>
<tr>
<td>( \varepsilon_I &gt; 1 )</td>
<td>elastic</td>
<td>Luxury goods</td>
</tr>
<tr>
<td>( 0 &lt; \varepsilon_I &lt; 1 )</td>
<td>inelastic</td>
<td>Normal goods</td>
</tr>
<tr>
<td>( \varepsilon_I &lt; 0 )</td>
<td>Negative elastic</td>
<td>Inferior goods</td>
</tr>
</tbody>
</table>
Summary
Elasticity is a measurement of sensitivity of consumers or producers to prices and income. Hence, elasticity can be defined as a measure of how responsive the quantity demanded by consumers or the quantity supplied by producers is to a change in the equilibrium price or some other economic factors. An elasticity of demand measures the ratio of the rate of change of the price of the product. A cross price elasticity measures the rate of change of the quantity demanded of one good with respect to the rate of change of another good. Income elasticity measures the rate of change of quantity demanded with respect to the rate of change of income.

Activity

1. Calculate the elasticity of demand between point A and point B for the demand relationship as shown below. Over this range, is demand elastic or inelastic?

![Demand Curve](image)

2. What is the value of the cross price elasticity coefficient of the demand for chicken with respect to the price of the price of fish? Explain why?

3. The income elasticity of rice is -0.7. If the consumers’ income were to increase by 10%, what would be the % decrease in the quantity of rice consumed?
UNIT 5
THEORY OF FIRM - PRODUCTION

Unit Introduction

Production is one of important economic activities in a nation. Economists use production as an indicator of economic performance. Producers, each of which is known as a firm, are engaged in production. Production is a process in which factors of production (or inputs) are combined to produce an output (or a product). A typical Malaysian farmer may involve in numerous production activities. A paddy farmer may involve in oil palm production and/or fresh water fish production simultaneously. However, plantations are normally practice mono cropping and might involve in downstream activities.

Learning Outcomes: students are able to:
1. identify fixed and variable inputs
2. explain the firm’s production function
3. discuss the stages of production

1. Production defined

Production refers to the transformation of resources into outputs of goods and services. Output can be a final commodity such as orange juice, cooking oil etc, or an intermediate product like orange paste for making orange juice. Output can also be a service rather than a good. Examples of services are education, transportation and banking.

2. Classification of inputs

Inputs or resources or factors of production are the means of producing the goods and services demanded by society. Inputs can be classified into labor, capital and land. It can be further classified into fixed and variable inputs.
Fixed inputs are those for which the use rate does not change as the level of output changes. In most cases, land is a fixed input in agriculture.

Variable inputs are those inputs that affect the level of output and change with it. The farmer must determine how to combine fertilizer and other variable inputs with a fixed or predetermined quantity of land. The amount of the variable input used per unit of the fixed factor is the only variable the manager can control.

3. Length of Run
Production processes are also classified according to the “length of run” or time period considered.

The short run is a time period short enough such that some factors of production are considered by the manager to be fixed. For a paddy farmer, one crop cycle or year, the land is fixed. For oil palm farmers, 3 years is the time for a newly established farm ready for harvest. The manager’s task is to determine which variable and fixed resources should be combined, in order to maximize profits.

In the long run, when all resources are variable, management must evaluate investment alternatives such as whether the firm should purchase more land or more equipment. However, if the manager can’t make good short-run decisions, there is little need to be concerned about managerial ability in the long run.

4. Returns to Scale
In the long run, all factors of production are variable. Suppose the manager of a particular production process increased the quantity of each input used by 20%. What would happen to output? If output also increased by 20%, the firm exhibits constant returns to scale (or size). If output increased more or less than 20%, the firm has increasing returns or decreasing returns to scale.

In economics, ratio of output per unit of input is called efficiency. Industries with processes with increasing returns to scale would likely have a few large, efficient firms, rather than many smaller, less efficient ones. If returns to scale are constant, large and small firms are equally efficient and could be expected to happily coexist.
5. The Production Function

A production function is a relationship between variable inputs and output. It is a technical or physical relationship which is determined by the particular technology being used in the production process.

The general production function:

\[ \text{Quantity} = f(\text{Land}, \text{Labor}, \text{Capital}) \]

Let us begin the production function analysis with the simplest function. This simple production function comprise a single variable input use in combination with one or more fixed inputs to produce a single product, and is normally known as the “factor-product” model.

Example: Assume we have a production function in which fertilizer is the variable input, land is fixed input and rice is the product. The production function will describe the relationship between the quantity of fertilizer per hectare used and the amount of rice per hectare produce.

Table 5.1 shows a hypothetical production function – schedule and Figure 5.1 the graft for the same production function.

<table>
<thead>
<tr>
<th>Fertilizer (kg/ha)</th>
<th>Rice (kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>800</td>
</tr>
<tr>
<td>40</td>
<td>2000</td>
</tr>
<tr>
<td>60</td>
<td>3000</td>
</tr>
<tr>
<td>80</td>
<td>3500</td>
</tr>
<tr>
<td>100</td>
<td>3550</td>
</tr>
<tr>
<td>120</td>
<td>3300</td>
</tr>
<tr>
<td>140</td>
<td>3000</td>
</tr>
</tbody>
</table>
Table 5.1 and Figure 5.1 show the relationship as the quantity of fertilizer used increases, output or total product (TP) per hectare initially increases at an increasing rate, then it increases at a decreasing rate, and finally reaches a maximum value and it decreases after that. Average product (AP) is calculated to measure output for every unit of variable input used (Table 5.2).

### Table 5.2: TP and AP.

<table>
<thead>
<tr>
<th>Fertilizer (kg/ha)</th>
<th>Rice (kg/ha) -TP</th>
<th>AP</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>800</td>
<td>40</td>
</tr>
<tr>
<td>40</td>
<td>2000</td>
<td>50</td>
</tr>
<tr>
<td>60</td>
<td>3000</td>
<td>50</td>
</tr>
<tr>
<td>80</td>
<td>3500</td>
<td>43.7</td>
</tr>
<tr>
<td>100</td>
<td>3550</td>
<td>35.5</td>
</tr>
<tr>
<td>120</td>
<td>3300</td>
<td>27.5</td>
</tr>
<tr>
<td>140</td>
<td>3000</td>
<td>21.4</td>
</tr>
</tbody>
</table>

6. **Diminishing Marginal Product**

Before we discuss the concept and uses of diminishing marginal product, let us first define marginal product (MP). MP is the additional production (or output) associated with a unit increase in the variable input. MP answers the question of “how much output will increase if I increase one unit of variable input?” It is the rate of change of the total product (TP). Table 5.3 is an extension of table 1 with MP computed.
The MP column shows that at low levels of variable input (fertilizer) use, output increases at an increasing rate. This is referred to as increasing marginal returns. Beyond that additional input use increases output at a decreasing rate. This is known as decreasing marginal returns. Then, output reaches a maximum and begins to decrease. This is called negative marginal returns.

The law of diminishing marginal product says that as equal increments of the variable input are added to the fixed inputs, there will inevitably occur a decrease in the rate of increase of the total product. The relationship between TP and MP is illustrated in Figure 5.2.
7. Stages of Production

Production stages are determined by the relationship between AP and MP. There are three production stages in economy. Figure 5.3 illustrates the stages of production.

Stage 1: Stage 1 begins with the unit of input (such as labor or fertilizer) used until the maximum point of AP. At this stage both AP and MP are having positive values, but MP > AP. This stage is an irrational production stage as AP can be increased as input is increased. Return on fixed input (land) is increasing with additional input. Thus a rational producer will not operate in this stage.
Stage 2: Stage 2 begins from maximum point of AP and ends where MP is zero. Both MP and AP are still positive but declining as additional input is used, but MP<AP. This is a rational stage of production because MP for both variable and fixed inputs are positive.

Stage 3: Stage 3 starts where value of MP is negative and TP is declining. At this stage additional input will reduce or lower total output or total product. A rational producer will not operate in this stage.

Figure 5.3: Production Stages

Summary
Production refers to the transformation of resources into outputs of goods and services. Inputs or resources or factors of production are the means of producing the goods and services demanded by society. The relationship between variable inputs and output is a production function. It is a technical or physical relationship which is determined by the particular technology being used in the production process. There
are three stages of production. Stage 1 is when both AP and MP are having positive values, but MP > AP. This stage is an irrational production stage as AP can be increased as input is increased. Stage two begins from maximum point of AP and ends where MP is zero. This is a rational stage of production because MP for both variable and fixed inputs are positive. Stage three starts where value of MP is negative and TP is declining. A rational producer will not operate in this stage.

**Activity**

1. **Given the following production function.**
   
   a. Show the areas of increasing marginal returns, decreasing marginal returns and negative marginal returns.
   
   b. Show the three stages of production.

<table>
<thead>
<tr>
<th>Input Fertilizer (kg/ha.)</th>
<th>Output maize (10kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>150</td>
<td>60</td>
</tr>
<tr>
<td>200</td>
<td>85</td>
</tr>
<tr>
<td>250</td>
<td>100</td>
</tr>
<tr>
<td>300</td>
<td>110</td>
</tr>
<tr>
<td>350</td>
<td>117</td>
</tr>
<tr>
<td>400</td>
<td>121</td>
</tr>
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<td>123</td>
</tr>
<tr>
<td>500</td>
<td>124</td>
</tr>
<tr>
<td>550</td>
<td>122</td>
</tr>
<tr>
<td>600</td>
<td>115</td>
</tr>
</tbody>
</table>
UNIT 5
COSTS AND PROFIT MAXIMIZATION

Unit Introduction

This unit introduces the concepts of cost and optimal output levels. Let us think that a firm is having two sides: a cost side and a revenue side. The interplay between the two determines profit of a firm. First, we are going to discuss the cost side and later we will discuss the revenue side of the firm.

Learning Outcomes: students are able to

1. explain the concept of cost
2. explain the concept of revenue
3. determine the profit maximization production point

1. Cost Concept

Cost is the value of money that has been used up to produce something. In order to a product, a firm needs to use resources which have values. Thus, production cost is affected by the amount of resources used and by the value of those resources used. Production costs can be divided into 2 groups. First, the explicit cost is an easy accounted cost. For example: wage, rent and materials. Transactions are in the form of money payment. Two types of costs fall into this category, namely the operating cost (labor, rental, inputs etc.) and overhead cost (taxes, insurance, etc.).

Second, the implicit cost occurs when one foregoes an alternative action but does not make an actual payment. For example 1: a firm uses its own buildings. This is considered as an implicit cost because the capital could have been rented to another firm. Example 2: A firm uses its owner’s time and/or labor.
1.1. Opportunity Cost

Opportunity Cost is the value of a product foregone to produce or obtain another product. Alternatively, it can also be defined as the cost of an alternative that must be forgone in order to pursue a certain action. Put another way, the benefits you could have received by taking an alternative action. Opportunity cost is a key concept in economics because it implies the choice between desirable, yet mutually exclusive results. It has been described as expressing "the basic relationship between scarcity and choice". The next best thing that a person can engage in is referred to as the opportunity cost of doing the best thing and ignoring the next best thing to be done.

Example: if a farmer decides to grow melons, his or her opportunity cost is the alternative crop that might have been grown instead (sweat potatoes, or pumpkins).

Example: A person who invests $10,000 in a stock denies himself the interest he could have earned by leaving the $10,000 dollars in a bank account instead. The opportunity cost of the decision to invest in stock is the value of the interest.

1.2. Fixed and Variable Cost

Fixed costs (FC) are business expenses that are not dependent on the level of production or sales. They tend to be time-related, such as salaries or rents being paid per month.

Variable costs (VC) are expenses that change in proportion to the activity of a business or production.

The short run is a period of time in which the quantity of at least one input is fixed and the quantities of the other inputs can be varied. The long run is a period of time in which the quantities of all inputs can be varied. There is no fixed time that can be
marked on the calendar to separate the short run from the long run. The short run and long run distinction varies from one industry to another.

1.3. **Total Cost (TC):** all costs of producing a given level of output.

\[
\text{Total Cost (TC)} = \text{Total Fixed Cost (FC)} + \text{Total Variable Cost (VC)}
\]

Where TVC = all costs associated with the variable input at a given level of output and TFC = all costs associated with the bundle of fixed factors. Fixed costs do not change as the level of output changes.

The TC, TFC and TVC schedule and curve is shown in Table 6.1 and Figure 6.1. Assume the fixed input is 1 ha. of land. Variable input (fertilizer) price is RM12.

Table 6.1 : Cost of Production

<table>
<thead>
<tr>
<th>Input (kg/ha)</th>
<th>Output (kg/ha)</th>
<th>TVC</th>
<th>TFC</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>1000</td>
<td>600</td>
<td>100</td>
<td>700</td>
</tr>
<tr>
<td>100</td>
<td>3000</td>
<td>1200</td>
<td>100</td>
<td>1300</td>
</tr>
<tr>
<td>150</td>
<td>6000</td>
<td>1800</td>
<td>100</td>
<td>1900</td>
</tr>
<tr>
<td>200</td>
<td>8500</td>
<td>2400</td>
<td>100</td>
<td>2500</td>
</tr>
<tr>
<td>250</td>
<td>10000</td>
<td>3000</td>
<td>100</td>
<td>3100</td>
</tr>
<tr>
<td>300</td>
<td>11000</td>
<td>3600</td>
<td>100</td>
<td>3700</td>
</tr>
<tr>
<td>350</td>
<td>11700</td>
<td>4200</td>
<td>100</td>
<td>4300</td>
</tr>
<tr>
<td>400</td>
<td>12100</td>
<td>4800</td>
<td>100</td>
<td>4900</td>
</tr>
<tr>
<td>450</td>
<td>12300</td>
<td>5400</td>
<td>100</td>
<td>5500</td>
</tr>
<tr>
<td>500</td>
<td>12400</td>
<td>6000</td>
<td>100</td>
<td>6100</td>
</tr>
</tbody>
</table>
Observe that the TFC cost curve is a horizontal line as it does not change with the change in output. The TC curve increases with an increasing rate due to the law of diminishing returns in short term. The TC curve is obtained from vertical addition of TFC and TVC. Hence the distance between the TVC and TC is the TFC.

Average cost or per unit cost

As in the case of TC, there are three types of average cost.

\[
\text{Average Variable Cost (AVC)} = \frac{\text{Total Variable Cost (TVC)}}{\text{Total Product (TP)}}
\]

\[
\text{Average Fixed Cost (AFC)} = \frac{\text{Total Fixed Cost (TFC)}}{\text{Total Product (TP)}}
\]

\[
\text{Average Total Cost (ATC)} = \frac{\text{Total Cost (TC)}}{\text{Total Product (TP)}}
\]

\[
ATC = AFC + AVC
\]
Table 5.2: Average Costs of Production

<table>
<thead>
<tr>
<th>Input (kg/ha)</th>
<th>Output (kg/ha)</th>
<th>AVC</th>
<th>AFC</th>
<th>ATC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>1000</td>
<td>0.60</td>
<td>0.10</td>
<td>0.70</td>
</tr>
<tr>
<td>100</td>
<td>3000</td>
<td>0.40</td>
<td>0.03</td>
<td>0.43</td>
</tr>
<tr>
<td>150</td>
<td>6000</td>
<td>0.30</td>
<td>0.02</td>
<td>0.32</td>
</tr>
<tr>
<td>200</td>
<td>8500</td>
<td>0.28</td>
<td>0.01</td>
<td>0.29</td>
</tr>
<tr>
<td>250</td>
<td>10000</td>
<td>0.30</td>
<td>0.01</td>
<td>0.31</td>
</tr>
<tr>
<td>300</td>
<td>11000</td>
<td>0.33</td>
<td>0.01</td>
<td>0.34</td>
</tr>
<tr>
<td>350</td>
<td>11700</td>
<td>0.36</td>
<td>0.01</td>
<td>0.37</td>
</tr>
<tr>
<td>400</td>
<td>12100</td>
<td>0.40</td>
<td>0.01</td>
<td>0.40</td>
</tr>
<tr>
<td>450</td>
<td>12300</td>
<td>0.44</td>
<td>0.01</td>
<td>0.45</td>
</tr>
<tr>
<td>500</td>
<td>12400</td>
<td>0.48</td>
<td>0.01</td>
<td>0.49</td>
</tr>
</tbody>
</table>

1.4. Marginal Cost

Marginal cost (MC) is the changes in TC associated with producing one additional unit of output.

\[
MC = \frac{\Delta TC}{\Delta Q}
\]

*TP and output (Q) is used interchangeably.

TC comprises TVC and TFC and since TVC and TP is changing, the MC can be obtained by:

\[
MC = \frac{\Delta TVC}{\Delta Q}
\]
### Table 6.3: Total Cost, Average Costs and Marginal Cost

<table>
<thead>
<tr>
<th>Input (kg/ha)</th>
<th>Output (kg/ha)</th>
<th>TVC</th>
<th>TFC</th>
<th>TC</th>
<th>AVC</th>
<th>AFC</th>
<th>ATC</th>
<th>MC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>50</td>
<td>1000</td>
<td>600</td>
<td>100</td>
<td>700</td>
<td>0.60</td>
<td>0.10</td>
<td>0.70</td>
<td>0.60</td>
</tr>
<tr>
<td>100</td>
<td>3000</td>
<td>1200</td>
<td>100</td>
<td>1300</td>
<td>0.40</td>
<td>0.03</td>
<td>0.43</td>
<td>0.30</td>
</tr>
<tr>
<td>150</td>
<td>6000</td>
<td>1800</td>
<td>100</td>
<td>1900</td>
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<td>0.02</td>
<td>0.32</td>
<td>0.20</td>
</tr>
<tr>
<td>200</td>
<td>8500</td>
<td>2400</td>
<td>100</td>
<td>2500</td>
<td>0.28</td>
<td>0.01</td>
<td>0.29</td>
<td>0.24</td>
</tr>
<tr>
<td>250</td>
<td>10000</td>
<td>3000</td>
<td>100</td>
<td>3100</td>
<td>0.30</td>
<td>0.01</td>
<td>0.31</td>
<td>0.40</td>
</tr>
<tr>
<td>300</td>
<td>11000</td>
<td>3600</td>
<td>100</td>
<td>3700</td>
<td>0.33</td>
<td>0.01</td>
<td>0.34</td>
<td>0.60</td>
</tr>
<tr>
<td>350</td>
<td>11700</td>
<td>4200</td>
<td>100</td>
<td>4300</td>
<td>0.36</td>
<td>0.01</td>
<td>0.37</td>
<td>0.86</td>
</tr>
<tr>
<td>400</td>
<td>12100</td>
<td>4800</td>
<td>100</td>
<td>4900</td>
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<td>0.40</td>
<td>1.50</td>
</tr>
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<td>5400</td>
<td>100</td>
<td>5500</td>
<td>0.44</td>
<td>0.01</td>
<td>0.45</td>
<td>3.00</td>
</tr>
<tr>
<td>500</td>
<td>12400</td>
<td>6000</td>
<td>100</td>
<td>6100</td>
<td>0.48</td>
<td>0.01</td>
<td>0.49</td>
<td>6.00</td>
</tr>
</tbody>
</table>

The typical AVC, AFC, ATC and MC curves are shown in Figure 2.

![Figure 6.2: Average and Marginal Costs](image)
From the figure:

1. AFC is declining but never will be zero as TFC is divided by an increasing output.
2. AVC declines at lower output level but later increases as stated by the law of diminishing returns.
3. ATC is the vertical summation of AFC and AVC. Since AFC is declining, the distant between ATC and AVC is getting closer.
4. Both ATC and AVC are having a U shape.
5. Marginal cost declines at lower output level and later increases. MC crosses the AVC and ATC curves at their minimum points. At these points: MC = AVC and MC = ATC
6. The relationship between AC and MC is that: AC increases when MC > AC and AC declines when MC < AC.

2. Revenue of the Firm

2.1. Total Revenue

Total revenue is simply the value of sales. It is equal to the quantity of product sold multiply by the unit price of the product. As being mentioned earlier, the total revenue refers to revenue per unit of fixed factor, in our case is the land (1 ha.).

\[ Total \ Revenue \ (TR) = \text{Quantity} \times \text{price per unit} \]

Figure 6.3: Total Revenue
2.2. Average Revenue

Average revenue (AR) is revenue per unit of output. It can be calculated as follow:

\[ AR = \frac{TR}{Q} = \frac{Q \times P}{Q} = P \]

Basically, the AR is the unit price of the product.

2.3. Marginal Revenue

Additional revenue associated with an additional unit of output. It is equal to price of the product in perfect competition market.

\[ MR = \frac{\Delta TR}{\Delta Q} \]

![Figure 5.4 : Average and Marginal revenue](image)
3. Profit Maximization

If the firm’s objective is to maximize profit, how does the firm’s manager adjust production level to obtain maximum profit? Since the price of a perfectly competitive firm is determined by the market, the manager has no control over it. However the manager has the control over production.

To find the profit maximizing output level:

1. Total cost per total revenue information
2. Marginal cost per marginal revenue information.

1. **Graft using TR and TC**: Profit is the difference between revenues and costs. As shown in Figure 5.5, the vertical difference between TR and TC curves is the amount of profit. The point of maximum profit is the tangency between TC and the line is parallel to TR curve. The output level at this point is the profit maximizing output level.

![Figure 5.5: Profit Maximizing](image)

2. **Schedule Using TR and TC**: Profit maximizing behavior is easily seen from Table 6.4. The highest profit is RM5100 from utilizing 300kg of fertilizer. To use more or less fertilizer will reduce some profit. The profit maximizing output is 11700 kg.
### Table 6.4: Profit Maximizing Schedule

<table>
<thead>
<tr>
<th>Input (kg/ha)</th>
<th>Output (kg/ha)</th>
<th>TVC</th>
<th>TFC</th>
<th>TC</th>
<th>TR</th>
<th>Profit</th>
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<td>4300</td>
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<td>6000</td>
<td>100</td>
<td>6100</td>
<td>9920</td>
<td>3820</td>
</tr>
</tbody>
</table>

Note: Price of fertilizer is RM12/kg
Price of output is RM0.80/kg

3. Graph Using MR and MC. As illustrated in Figure 5.6, the maximum is achieved at the point where MR=MC. Production should be expanded as long as MR>MC. This operation is in the rational production region. On the contrary, production should be reduced when MR<MC.

![Figure 6.6: Profit Maximizing using MR and MC](image-url)
4. **Schedule using MR and MC:** Table 6.5 illustrates the profit maximizing behavior of a firm. The firm gets maximum profit by producing a little less than 11700 kg. where MR=MC.

<table>
<thead>
<tr>
<th>Input (kg/ha)</th>
<th>Output (kg/ha)</th>
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<td>6100</td>
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</tr>
</tbody>
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4. **Break-Even Point**

Break-even point is the product price for which the economic profits of the firm are zero. Let us look at the illustration given in Figure 6.7.

![Figure 6.7: Profit Maximization and Loss Minimization](image)
From Figure 6.7, if the price is P1, the firm would produce at Q1 to maximize profit. The vertical line aQ1 is the AR (AR=MR=MC=P). Vertical distance bQ1 is the average total cost of producing Q1. Therefore ab is the average profit of producing Q1. The total profit is Q1*ab.

If the price increases higher than P1, MC increases faster than ATC, hence higher profit per unit. If the price decreases to P2, Q2 would be the profit maximizing output level. The average profit is therefore zero. At point d, the economic profit falls to zero and this point is the break-even point. Any price above P2, the firm will earn profit while price below P2, the firm will experience economic losses.

At P3, the firm will experience losses and thus, in the short run the firm will shift its objective from profit maximizing to loss minimization and produce at Q3. At this production level, the average revenue is the distance of fQ3, while the ATC is eQ3. The average variable cost is the vertical distance gQ3. The vertical distance ef is the average loss. The average revenue earned covers the AVC and some AFC. At P4 the firm is unable to cover both AFC and AVC. At point h and output level of Q4 is known as the shutdown point.

5. Cost in the Short Run and in the Long Run

The division of fixed and variable costs depends on time horizon. In the short run, input like land is fixed. However in several years, land become a variable input and for example, a rice farmer can expand his farm size and hence the cost of rice production is a variable cost in the long run. Since many decisions are fixed in the short run but variable in the long run, the farmers long run cost curve is different from the short run cost curve. Figure 6.8 illustrates an example.

Each SATC curve represents the plant to be used to produce a certain level of output at minimum cost. They are tangent to LATC. First, the lowest LAC at RM30 to produce 2 units of outputs when firm operates plant 1. Second, the lowest LAC at RM15 results when the firm operates plant 2 to produce 10 units of outputs. This plant size represents the lowest per unit cost. The firm expand its plant size from 1 to
2, it is known as economies of scale, at point B, optimal plant size or constant return to scale and B to C and beyond, the plant is experiencing diseconomies of scale.

![Figure 6.8: Relationship between Short Run and Long Run Average Total Cost Curves](image)

**Summary**

Cost is the value of money that has been used up to produce something. Thus, production cost is affected by the amount of resources used and by the value of those resources used. Opportunity Cost is the value of a product foregone to produce or obtain another product. Alternatively, it can also be defined as the cost of an alternative that must be forgone in order to pursue a certain action. Total revenue is simply the value of sales. It is equal to the quantity of product sold multiply by the unit price of the product. To find the profit maximizing output level, information on total cost per total revenue and marginal cost per marginal revenue are needed. The maximum profit is achieved at the point where MR=MC.

**Activity**

The table below shows the production function of a single input. Use the information in the table to determine the profit maximization output and the break even production. The assumptions are: 1. Input price is RM12/kg; 2. FC = Rm100; 3. Output price is RM0.80/kg.
<table>
<thead>
<tr>
<th>Input (kg/ha)</th>
<th>Output (kg/ha)</th>
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UNIT 7
MARKET STRUCTURE

Unit Introduction

The market structure refers to the number of firms in an industry or a market and the linkage or relationship among them. Market structure also refers to the relative ease with which additional firm may enter the industry of market. Four types of market structure will be discussed in this section.

Learning Outcomes: Students are able to:
1. explain the differences between different market structures
2. explain the conducts of different market structures

1. Perfect Competition

Perfect competition market is defined as a market which has many firms selling homogenous products, having perfect market information and no limitations or barriers on entry and exit from the market.

1.1 Characteristics of Perfect Competition Market (Structure)

i. Number of Sellers and Buyers

The market has many buyers and sellers. Thus, actions of individual seller or buyer cannot influence the market price of the product. This is due the quantity produced (purchased) by a seller (a buyer) is relatively small compared to the quantity produced (bought) in the market. Hence, seller and buyer are the price takers, which prices are determined by the market forces.
ii. Homogenous Products
All firms in the perfectly competitive market produce or sell homogenous products. It means that buyers cannot differentiate the product (in terms of source or destination) once the products enter the market.

iii. Ease of entry to and exit from the market
There are no barriers or limitations for new firms to enter the market or any firms to exit the market. If the existing firms are earning profit, they cannot stop new firms to enter the industry. Any firms on the other hand are free to exit the market if they are not making profit. This characteristic is only true for long term. In a short term firms are not free to enter to or exit from the market.

iv. Perfect Information
All firms are assumed to have perfect market information. For instance, with price information that a firm has, it will not sell the product lower than the market price. By the same token buyer will not buy the product higher than the market price when they have the information.

1.2. Conduct of Perfect Competition Firm

To understand the conduct of a firm in perfect competition market let us look at the relationship between a perfectly competitive firm and the market. The conduct of firm management can be illustrated by figure 7.1. Notice that the quantity axis for the market is measured in larger units than the quantity axis for the firm. It shows that individual firm provides very small part of the market supply. A firm maximizes profit by adjusting output such that MC=MR. As it being mentioned, resources are free to move to industries with the highest returns. At price P1, the average revenue is higher than ATC, the firm is making good profits. At P1, the Q1 (millions of units) is the quantity supplied in the market with corresponding S supply curve. As the industry is highly profitable, new firms will enter the market causing supply of the product increases, shifting the supply curve to the right, S'. The quantity supply in the market increases to Q2 million units. The price drops to P2, causing the economic profits zero (AR=AVC). At P2, there are few firms leaving the market due to no economic profits.
Figure 7.1: Relationship between a perfectly competition firm with the market

2. Pure Monopoly

The structure of a monopoly market is the opposite of perfect competition market. It is defined as a market with only one seller or one firm of a given product. It is a form of imperfect competition.

2.1 Characteristics of Monopoly

i. Number of Sellers

There is one seller of firm of a given product in a given market.

ii. Close Substitute goods

There are no substitute goods for the product. A good example of a monopoly firm in Malaysia is TNB. The electrical power supplied by TNB cannot be substituted with other power.

iii. Barrier of entry

In contract with perfect competition, monopoly firm has the power to block the entry of other firms into the market. The most common barrier to entry is patent. Patents are right granted to investors to the exclusive use on their innovation for a period of time; 20 years. Second form of barrier to entry is a company secret. Coca Cola Company has never disclosed its
soft drink recipe. Third is the size of market to be served. If the market is small, the entry of other firms might drive the price down making all firms for the given product loss.

iv. Price determination

Since there is only one firm in the market, the monopoly determines the prices for the service it provides.

2.2. Conduct of the Monopoly Firm

To analyse the conduct of monopoly firm, let us compare with perfect competition market. Assume monopolist buys his resources from perfect competition market. Because the monopoly firm is the only seller of the product, the firm’s demand curve is in fact the market demand curve. The monopoly firm can only expand sales by lowering the price of the product. Actually, the market demand curve is firm’s average revenue (AR) curve. On the other hand, MR is computed from TR and both of them have negative slopes. However MR curve is steeper than the AR curve. This is shown in Figure 7.2.

<table>
<thead>
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<td>8</td>
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</table>

Figure 7.2: AR and MR of Monopoly
Similar to perfect competition, profit maximizing condition for a monopoly firm is MR=MC. From figure 7.3, the profit maximizing level of output is Qo where MR=MC. Once the profit maximizing output is determined, the manager of a monopoly firm must determine the price. In contrast with perfect competition, firms are the price taker but monopoly firm is the price maker. At price Po, the firm would forego some of profit. At prices higher than Po, consumers will not buy the product. Hence, Po is profit maximizing price.

3. Monopolistic Competition

The market structures discussed above have opposite characteristics. Next we are going to discuss a market structure of imperfect competition that has a combination of characteristics of both perfect competition and monopoly. Monopolistic competition is characterized by many firms selling differentiated products. Differentiated products mean products with unique characteristics which separate them from close substitutes.

3.1. Characteristics of Monopolistic Competition

i. Many sellers
   There are many firms selling differentiated products.

ii. Ease of entry to or exit from market
As in perfect competition, firms are free to enter into and exit from the market.

iii. Differentiated products

Differentiation is the effort to produce a unique product to avoid from being homogenous in the market. Firms differentiate their product to earn some monopoly profits. There are several ways monopolistically competitive firms differentiate their products.

a. Brand name. Putting “nice sounding” name to the product packaging.

b. Product ingredients. Example: added calcium milk; vitamin fortified cereals, etc.

c. Packaging. Eg: soft margarine, soft drinks cans, etc.

d. Market segment. Sugar coated cereals for kids, High fiber products for elderly, etc.

3.2 Conduct of Monopolistically Competitive Firm

The conduct of a firm in monopolistic competition is illustrated in Figure 7.4 to Figure 7.5. Initially, the firm introduces a differentiated product as shown in Figure 7.4. The curves, in the short run, are similar to that of monopoly.

![Figure 7.4: Monopolistic competition in the short run](image)
In the short run, the firm is making monopoly profit of P2-P1. Knowing it is the price
maker, the firm sells the product at P2 and produces Q’ where MR=MC. At Q’ the
ATC is P1.

Since there are many sellers, competitors with differentiated products enter the
market and the firm cannot block the entry of new firms. As competitors enter the
market, the share of market from the initial firm shrinks. There will be shifts in AR
and MR curves to the left causing a reduced in profit maximizing quantity to produce,
resulting in lower AR. This process continues until long run equilibrium reach as
shown in Figure 5. In the long run, the profit maximizing quantity fallen to Q’’ and the
price is P3 where MR=MC, which equals to ATC. The economic profit at this point is
zero.

Figure 7.5: Monopolistic competition in the long run

4. Oligopoly

Another form of imperfect competition is the oligopoly type of market structure.
Oligopoly market structure is a structure with few firms which are highly
interdependent.

4.1 Characteristics of Oligopoly

i. Few firms

Different from perfect competition and monopoly, oligopoly market has few
firms. Hence, oligopoly firms seemed to be price setter but will need to
consider the actions of competitors. Competitor’s actions might have
impacts on firm’s decision pertaining to price, production and advertisement. Therefore oligopoly firms are highly interdependent.

ii. Homogenous products but minor product differentiation

Oligopoly firms might produce homogenous of differentiated products. Examples of homogenous products are cement and petroleum. But still they are differentiated by brand names, additive added and advertisement.

iii. Block to entry

Since the number of firms is small, each firm can achieve economies of scale in production. New firms will only have a small market share and do not have the economies of scale. These new firms will incur higher average cost of production and thus will not be able to sustain in the market.

4.2 The conduct of Oligopolistic firm

Pricing and output decision by each firm in oligopoly market will have impacts on sale and profit of other firms in the market. Any action (output or price change) by one firm will be retaliated by other firms. Managers in an oligopolistic market are very cautious of their action such as reducing price as they have to consider the impact onto their competitors as well as retaliation measures adopted by their rivals. Therefore, oligopolistic firms often depend on advertising as the marketing strategy rather than facing price reduction.

There are several models to illustrate the conduct of oligopolistic firms and the Sweezy Model or kinked demand model is one of them.

**Sweezy or Kinked Demand Model**

The model assumes that the sections of demand curve showing the action from reduced price is different from the section of demand curve showing the action from increased price. Thus, the model can describe the pricing strategy of an oligopoly firm.

Let us discuss an oligopoly model which a firm reduces price. The firm believed that its action will be followed by its competitor. However if the firm increases the price,
its competitor will not increase the price of the given product. This model is called the Sweezy or Kinked Demand Model.

The figure 7.6 below shows how the kinked demand curve for a firm derived. Kinked demand curve tries to explain price rigidity.

![Kinked Demand Curve for Oligopoly Firm](image)

**Figure 7.6: Kinked Demand Curve**

DD curve shows the demand curve for oligopoly firms when a firm changes its price and the action is not followed by its competitors. DD’ is the demand curve for oligopoly firms when an oligopoly firm changes its price and the action is followed by its competitors.

Let’s begin with p is the prevailing market price and its intersection, e with DD. q is the prevailing market quantity supply. To the left of q, demand is elastic and to the right, demand is inelastic. When a firm increases its price, its competitors do not follow, thus not making any sales and no revenue. When a firm reduces its price, competitors will also reduce prices but quantity demanded in the market does not increase much, hence affect firms’ revenue due to inelastic demand. Thus, it better for an oligopoly firm not to chance they price.

**Summary**

Market structure refers to the number of firms in an industry and relationship among them. Monopoly is a structure where there is only one firm in the industry. The cost structure of a monopoly firm is similar to perfectly competitive firm. Monopolistic competition is the structure that has some characteristics of monopoly and some
characteristics of perfect competition. The key characteristic of monopolistic competition is product differentiation through branding, packaging and product design. Another imperfect competition is oligopoly. There are few firms in the market but they are able to control the market.

Activity

1. Assume that a monopolist correctly adjust output to that level where $MC=MR$. What will happen if the firm priced the product: a. below the average revenue?, b. above the average revenue?

2. What will a monopolistic competition do to gain a short run monopoly position?

3. Compare and contrast between oligopoly and monopoly market structures.

4. Give same examples of firms in Malaysia that fall into monopoly and oligopoly market structures.
UNIT 8
UNDERSTANDING AGRICULTURAL PRICES

Unit Introduction

The fluctuation of agricultural commodities has been widely debated among agricultural economists, especially in the developing countries. Most developing countries populaces are depending on agriculture production for their living. This price instability will influence producers’ income as low farm prices will lower farm income and vise-versa. In developed economies, farmers have adopted price risk mitigation management such as hedging and future contracts. In developing and least developed economy, price risk mitigations are mostly in the form of government policy interventions.

Most agricultural markets are close to perfect competition. Hence, the supply and demand framework is the fundamental to describe the general behavior of agricultural prices. The understanding of agricultural price trends and fluctuations is important towards the development of appropriate policy. This unit discusses the changes in agricultural prices and factors influencing the changes in prices.

Learning Outcomes: students are able to:

1. identify determinants of price fluctuation.
2. explain market adjustment by producers with cobweb model.

3. Main Commodity Prices in Malaysia

3.1. Crude palm Oil monthly average prices are shown in figure 8.1. Although the prices do not show seasonal trend the prices show fluctuations of prices from 2008 to 2012. From the figure, the CPO prices were at its lowest in November 2008 and at its peak in January 2011, for the period between 2008 to 2012.
3.2. Monthly average latex prices from 2008 to 2012 are illustrated in figure 8.2. The lowest price is in November 2008 and the highest is in January 2011. It is interesting to note that the price trend is similar to that of CPO price trend.

The brief description of CPO price trend and latex price trend illustrate the fluctuation of the two commodities' prices. If the prices were transmitted to farm level, those prices will influence the price received by farmers and their revenue. The issue related to these prices instability is that farmers' income will also be instable if farmers did not hedge for possible commodity price fall. Agriculture prices fluctuation or changes are influenced by various factors which affect the supply and demand of a given commodity in the market.
4. Determinants of Agriculture Price Change

a. **Change in long run demand and supply.** In the long run there is no fixed factor of production and thus some firms expand output and others exit the market. Long-run supply curve tells us how much firms will produce at each price level. In the long run, firms adjust its scale either increase or decrease plant size or adopt new technology. This adjustment will shift the supply curve to the right (increase) or to the left (decrease) and hence influence the price levels. For example, technological improvements have made producing corn less expensive. The long run supply curve of corn shifts to the right, causing downward trend in prices and upward trend in production.

Long-run demand curve tells us how much consumers will purchase at each price level, given long enough time to adjust their consumption level. In the long run changes in demand are caused by factors other than price. These factors include changes in consumers’ income level, changes in taste and preferences and availability of substitute goods.

b. **Seasonality.** Agricultural production depends on sunlight, and the sun shines brighter during some seasons than other. The impact of seasonality is most obviously seen in crop production. In temperate countries grains such as corn, wheat, and soybeans produce seeds only once in a year. These crops are harvest once in a year and store the grain for continual consumption until the next harvest. In our country, although we have sun light year round, vegetable production is reduced during rainy seasons. Rubber cannot be tapped during rainy season as it lowers the quality of the latex. Supply curve will shift to the left during heavy downfall which causing floods. Seasonal tropical fruits such as durian, rambutan, mangosteen are produced one a year. Prices tends to be high at the beginning of the season and price slowly drops and its lowest at the peak of production and increases towards the end of the season. For example durian season is between May to September.

Another typical situation in Malaysia is that prices for chicken, beef and eggs tend to increase during festivities times. During the month of Ramadan and Eidul Fitr, demand for meats and eggs increase which lead to price spike.
c. **Market (Supply-Demand) Shock.** Some aspects of agricultural prices are not predictable and appear somewhat random. For example U.S. corn experienced an extraordinary period of high prices during 1974-76 which was caused by a large wheat failure in the USSR (drought). One-sixth of the U.S. wheat crop was exported to the USSR causing an increase the domestic demand for corn. This a form of supply shock. Food crisis in 2008 where world rice supply dropped cause Malaysia to import rice at high price and increase the rice prices in domestic market.

5. **Market Adjustment –The Cobweb Model**

The cobweb model is based on a time lag between supply and demand decisions. Agricultural markets are a context where the cobweb model might apply, since there is a lag between planting and harvesting. Suppose for example that as a result of unexpectedly bad weather, farmers go to market with an unusually small crop of strawberries. This shortage, equivalent to a leftward shift in the market's supply curve, results in high prices. If farmers expect these high price conditions to continue, then in the following year, they will raise their production of strawberries relative to other crops. Therefore when they go to market the supply will be high, resulting in low prices. If they then expect low prices to continue, they will decrease their production of strawberries for the next year, resulting in high prices again.

Figure 8.3 illustrates this process. The equilibrium price is at the intersection of the supply and demand curves. A poor harvest in period 1 means supply falls to Q₁, thus prices rise to P₁. If producers plan their period 2 production under the expectation that this high price will continue, then the period 2 supply will be higher under expansion phase, at Q₂. Prices therefore fall to P₂ when they try to sell all their output. Under the expectation of price will remain low, producers will reduce their production, at Q₃. This is called contraction phase. As this process repeats itself, oscillating between periods of low supply with high prices and then high supply with low prices, the price and quantity trace out a spiral. They may spiral inwards, as shown in figure 8.3.
Summary
Agriculture prices fluctuate due several reasons, which are changes in long run demand and supply, seasonality and market shock. Farmers adjust future production based on lag price. Cobweb model explains the market adjustment made by producers.

Activity
1. Plot a time series monthly average price data of an agricultural produce analyze whether there are any seasonal and trend pattern exist.
2. Using cobweb model, illustrate the spiral effect of an agricultural commodity.

Additional reference

http://en.wikipedia.org/wiki/Cobweb_model
UNIT 9
UNDERSTANDING CONSUMER SURPLUS AND PRODUCER SURPLUS

Unit Introduction

In previous units we only discussed how the market forces, supply and demand, determine product or service prices and quantity sold. Hence, we, thus far discussed how the market allocates scarce resource without addressing the question whether the market allocation of resources are desirable. Therefore, our analysis has been positive (what is) rather than normative (what ought to be). Welfare economic studies try to address this question. Welfare economics approach has been used to evaluate policy implications, especially the impact of government interventions in production, marketing and trade. This unit attempts to explain and hence enhances to understanding the concepts of consumer surplus and producer surplus. These two concepts will be used to analyse policy impacts in the subsequent units.

Learning Outcomes: Students are able to:

1. explain the concepts of consumer surplus and producer surplus
2. understand the welfare economic approach in analyzing economic problem.

1. Welfare economics is the study of how the allocation of resources affects economic well-being. Buyers and sellers receive benefits from participating in the market. The equilibrium in a market maximizes the total welfare of buyers and sellers. Equilibrium in the market results in maximum benefits, and therefore maximum total welfare for both the consumers and the producers of the product. Two concepts we need to understand before we proceed with analysis:
1.1. **Consumer surplus** is the amount a buyer is willing pay for a good minus the amount the buyer actually pays for it. It measures how much the buyer values the good or service. Buyers’ willingness to pay is used to derive the demand curve and the demand curve is used to measure consumer surplus. Willingness to pay is the maximum amount that a buyer will pay for a good.

Let us derive the demand curve through willingness to pay of a group of consumers. The market demand curve represents the various quantities that buyers would be willing and able to purchase at different prices. Table 9.1 below shows willingness to pay for a product, say beef, per kilogram. From the table we derive the demand schedule and demand curve.

<table>
<thead>
<tr>
<th>Buyer</th>
<th>Willingness to Pay (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mansor</td>
<td>20</td>
</tr>
<tr>
<td>Ismail</td>
<td>18</td>
</tr>
<tr>
<td>Nolila</td>
<td>14</td>
</tr>
<tr>
<td>Kong</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 9.2 Beef Demand Schedule

<table>
<thead>
<tr>
<th>Price</th>
<th>Buyers</th>
<th>Quantity Demanded</th>
</tr>
</thead>
<tbody>
<tr>
<td>RM20 or more</td>
<td>No Buyer</td>
<td>0</td>
</tr>
<tr>
<td>RM19-RM20</td>
<td>Mansor</td>
<td>1</td>
</tr>
<tr>
<td>RM18-RM19</td>
<td>Mansor &amp; Ismail</td>
<td>2</td>
</tr>
<tr>
<td>RM14-RM18</td>
<td>Mansor, Ismail &amp; Nolila</td>
<td>3</td>
</tr>
<tr>
<td>RM14 or less</td>
<td>Mansor, Ismail, Nolila and Kong</td>
<td>4</td>
</tr>
</tbody>
</table>
Figure 9.1 shows the demand curve corresponds to demand schedule (table 9.2). From figure 9.1 above, at price RM10/kg, the total consumer surplus is RM22. This situation can be represented by the demand curve in figure below. The area below the demand curve and above the price measures the consumer surplus in the market, indicated as a.

At any given quantity, the price given by the demand curve reflects the willingness to pay of the *marginal buyer*. Because the demand curve shows the buyers’ willingness to pay, we can use the demand curve to measure consumer surplus. Consumer surplus can be measured as the area below the demand curve and above the price. Thus consumer surplus is the amount that buyers are willing to pay for a good minus the amount they actually pay for it, measures the benefit that buyers receive from a good as the buyers themselves perceive it.
Let us look how a change in price affects the consumer surplus. As illustrated in figure below, as price decreases from $P_0$ to $P_1$, there is an increase in consumer surplus by the area $BCDF$. At $P_0$ the consumer surplus is the area $ABC$. When the price decreased to $P_1$, the new consumer surplus is the area $ADF$. Area $BCED$ is the additional consumer surplus to the existing consumers and area $CEF$ is the consumer surplus to new consumers.

![Figure 9.2 Consumer Surplus](image)

![Figure 9.3 The Effect of Change in Price to Consumer Surplus](image)
1.2. **Producer surplus** is the amount a seller is paid for a good minus the seller’s cost. It measures the benefit to sellers participating in a market. Similar to consumer surplus which is related to the demand curve, producer surplus is closely related to the supply curve. While consumer surplus is about price and consumer’s willingness to pay, producer surplus is about cost and producer willingness to sell. This is how a supply curve is derived.

Let us see how market supply curve is derived. Assume there are four sellers of a given good in the market. Their costs and quantity supplied are shown in tables 9.3 and 9.4 below.

### Table 9.3 Costs and Sellers

<table>
<thead>
<tr>
<th>Seller</th>
<th>Cost (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zol</td>
<td>3500</td>
</tr>
<tr>
<td>Sheen</td>
<td>3000</td>
</tr>
<tr>
<td>Nazmi</td>
<td>2500</td>
</tr>
<tr>
<td>Ann</td>
<td>2000</td>
</tr>
</tbody>
</table>

### Table 9.4 Supply Schedule

<table>
<thead>
<tr>
<th>Price (RM)</th>
<th>Sellers</th>
<th>Quantity Supplied</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500</td>
<td>Ann, Nazmi, Sheen &amp; Zol</td>
<td>4</td>
</tr>
<tr>
<td>3000-3500</td>
<td>Ann, Nazmi &amp; Sheen</td>
<td>3</td>
</tr>
<tr>
<td>2500-3000</td>
<td>Ann &amp; Nazmi</td>
<td>2</td>
</tr>
<tr>
<td>2000-2500</td>
<td>Ann</td>
<td>1</td>
</tr>
<tr>
<td>&lt;2000</td>
<td>No seller</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 9.4 illustrates the supply curve corresponds to the above supply schedule. Note that the height of supply curve is related to the producers’ costs. At any quantity, the price given by the supply curve represents the cost of marginal
sellers/producer, the seller/producer will leave the market if the price were any lower. At quantity 4, the supply curve has the height of RM3500, the cost that Zol (the marginal seller) to provide his service. At quantity 3, the marginal seller id Sheen as RM3000 is Sheen’s cost. In terms of producer surplus, at price RM3000, the total producer surplus is RM1500, i.e the sum of Ann’s producer surplus RM1000 and Nazmi’s producer surplus RM500.

Let us look how an increase in price affects the producer surplus. As illustrated in figure 9.5 below, as price increases from Po to P1, there is an increase in consumer surplus by the area BCFD. At Po the producer surplus is the area ABC. When the price increased to P1, the new consumer surplus is the area BCFD. Area BCED is the additional producer surplus to the existing producers and area CEF is the producer surplus to new producers.
Consumer surplus and producer surplus are the basic instruments which economists use to study the welfare of buyers and sellers in a market. The instrument can help us address fundamental economic question: Is the resource allocation determined by the free markets desirable?

Efficiency is the property of a resource allocation of maximizing the total surplus received by all members of society. Figure 9.6 below shows consumer surplus and producer surplus when the market reaches its equilibrium of supply and demand. In equilibrium three outcomes are achieved. They are:

I. Free markets allocate the supply of goods to the buyers who value them most highly, as measured by their willingness to pay.

II. Free markets allocate the demand for goods to the sellers who can produce them at least cost.

III. Free markets produce the quantity of goods that maximizes the sum of consumer and producer surplus.

Figure 9.6 Consumer and Producer Surplus in the Market Equilibrium
Summary
Welfare economics is the study of how the allocation of resources affects economic well-being. Buyers and sellers receive benefits from participating in the market. The equilibrium in a market maximizes the total welfare of buyers and sellers. Consumer surplus is the amount a buyer is willing to pay for a good minus the amount the buyer actually pays for it. It measures how much the buyer values the good or service. Producer surplus is the amount a seller is paid for a good minus the seller's cost. It measures the benefit to sellers participating in a market. Efficiency is the property of a resource allocation of maximizing the total surplus received by all members of society.

Activity
1. Explain the relationship between buyer's willingness to pay with consumer surplus and the demand curve.
2. Using supply and demand curves show producer surplus and consumer surplus in the market equilibrium.
3. Explain the relationship between sellers cost with producer surplus and the supply curve.
Unit Introduction

In a free market economy, scarce resources are allocated by price mechanism. This is where the preferences and spending decisions of consumers and the supply decisions of businesses meet to determine equilibrium prices. The free market works via price signals. When demand is high, the potential profit from supplying to a market increases, leading to an increase in supply or output to meet rising demand from consumers.

The government may choose to intervene in the price mechanism mainly on the principles of wanting to change the allocation of resources. By this, the government perceives that there will be an improvement in economic and social welfare. All governments of every political persuasion intervene in the economy to influence the allocation of scarce resources among competing uses.

Learning Outcomes: Students are able to:

1. discuss the reasons for government intervention in the market.
2. describe some policy intervention adopted by the Malaysian government.
3. analyze the impact of government policy interventions.

1. Reasons for Government Intervention

The main reasons for government or policy intervention are:

- To correct for market failure
- To achieve a more equitable distribution of income and wealth
- To improve the economic performance
A market failure occurs when the free market that influences individual decisions do not lead to socially desirable outcomes. When a market failure exists, there is a motivation for possible government intervention into markets to improve the outcome. However, government intervention may not necessarily improve the situation as the implementation of the policy often leads to further problems.

2. Government intervention in Agriculture and Agri-food sector in Malaysia
The government intervention in agriculture and agri-food sector comes in many facets. The basic goals are to improve the livelihood of poor populace and reduce the production costs for agriculture or food small scale producers. For instant, paddy farmers are among those who receive input and price subsidies; fertilizer and pest control chemicals subsidies are among the subsidy programs for paddy farmers. On the other side of coin, consumers are assured of lower food prices from price control on necessary food products. This includes products like sugar, wheat flour, cooking oil, chicken and beef. Import quota for cabbage has been instituted by the Ministry of Agriculture and Agro-based Industries in order to ensure local cabbage farmer receive reasonable prices.

3. Some examples of government interventions
i. Government Legislation and Regulation
An example, the Parliament can pass laws that prohibit the sale of cigarettes to teenagers who are below 18, or ban smoking in hospital and school compounds. The laws of competition policy act against examples of price-fixing cartels or other forms of anti-competitive behavior by firms within markets. Employment laws may set some legal protection for workers by setting maximum working hours or by setting a minimum wage. The government appoints regulators who can impose price controls in electricity, petroleum, and some food items. Free market economists often criticize the extent of regulation in the economy arguing that it incurs unnecessary costs for businesses where government’s “red tape” might limit the competitiveness of businesses.

ii. Fiscal Policy Intervention
Fiscal policy can be used to influence the level of demand for different products and also the pattern of demand within the economy.
(a) **Indirect taxes** can be used to increase the price of de-merit goods and products with negative externalities designed to increase the opportunity cost of consumption and thereby reduce consumer demand towards a socially optimal level. *(Externalities are the effect of a decision on a third party that is not taken into account by the decision-maker. Externalities can be both positive and negative. **Negative externalities** occur when the effect of a decision on others that is not taken into account by the decision-maker is detrimental to the third party. **Positive externalities** occur when the effect of a decision on others that is not taken into account by the decision-maker is beneficial to others. Examples of negative externalities include second-hand smoke, water pollution, and congestion. Examples of positive externalities include innovation, education, and new business formation.)*

(b) **Subsidies** to consumers will lower the price of the goods. They are designed to increase consumption and output of products. Subsidies normally result in positive externalities whereby they cause an increase in market supply and leads to a lower equilibrium price.

(c) **Tax incentives**: The government may provide financial assistance such as tax relief for business that invests in research and development. Or a reduction in corporate tax meant to promote new capital investment and create more job opportunities. This is often given in Foreign Direct Investment initiatives, newly start-up small and medium enterprise, etc.

(d) **Welfare payments and poverty alleviation program** to influence the distribution of income and wealth such as an increase in the value of welfare benefits for the poor. In poverty alleviation program, the government creates funds for the poor to undertake economic activities.

iii. **Intervention aimed at closing the information gap**

Lack of information pertaining to benefits and costs of products in the market place among consumers is one of the causes of market failure. Government can play a vital role in improving information dissemination to help consumers and producers
value the ‘true’ cost and/or benefit of a good or service in the market place. Some examples include:

- Compulsory labeling and health hazards warning on cigarette packages to discourage smoking
- Compulsory nutritional information on foods to counter the risks of growing obesity or other diseases
- Mandatory price labeling on products and services sold.

This policy intervention generally does not directly influence the market prices, but aims at influencing the demand of the product in question which in the long run will affect output and consumption. As an example, health hazard picture on cigarette packages will discourage smoking and in the long run will influence demand for cigarette.

4. **Effects of Policy Intervention**

4.1 **Price Controls**

Price controls are normally enacted when policymakers believe the market price is unfair to buyers or sellers. Two forms of price controls, namely price ceilings and price floors. Examples of price control goods are sugar, flour, milk etc. They are listed as price control item under the Ministry of Domestic Trade, Cooperatives and Consumerism.

a. Price ceiling is the maximum price allowed by law. It is fixed below the equilibrium price. Figure 10.1 below illustrates the an example of the effect of chicken price ceiling policy.
From the above figure, at the equilibrium price of chicken at RM6.50/kg, the quantity demanded and supply (equilibrium quantity) is 100,000 kg of chicken. This situation is when there is no price control or free market. Imagine that lower income consumers complain the chicken price which is RM6.50/kg is too high. When the government institutes a ceiling price at RM5.50/kg, the quantity supplied dropped to 75,000 kg. (price line intersects supply curve) and the quantity demanded increased to 125,000 kg. (price line intersects demand curve). This creates shortage of 50,000 kg. (125,000-75,000) of chicken in the market. When shortage of chicken occurs in the market, seller must ration (eg. one buyer can only buy a limited kg of chicken) the shortage goods among the large number of buyers. Another possible effect is the existence of black market where better off consumers are willing to pay a higher price (above Pc) so that they get the quantity they need.

b. Price floor is a legal minimum on the price at which a good can be sold. To be effective it is set above the equilibrium price.
The above figure illustrates the price floor for cuplump rubber. The equilibrium price of cuplump rubber is RM1.50/kg, the quantity demanded and supply (equilibrium quantity) is 100,000 kg of the rubber. Imagine that rubber small holders complain that this price is not giving them any profit as the cost of production is high. They file complaint to the government request for floor price. When the government institutes a floor price at RM3.50/kg, the quantity supplied increased to 150,000 kg. (price line intersects supply curve) and the quantity demanded dropped to 50,000 kg. (price line intersects demand curve). This creates surplus of 100,000 kg.(150,000-50,000) of rubber cuplump in the market.

4.2 Taxes
Governments levy taxes to raise revenue to fund public projects. They include schools, road and hospitals. Taxes are important policy tools and thus they affect our live in many ways. To analyze the effects of taxes we need to understand who bears the burden from the tax, buyers or sellers? Economists use the term tax incidence to refer to the distribution of the tax burden.
a. Effect of taxes on buyers: Suppose the Malaysian government imposes a tax rate of RM0.50 per kg. of flour that buyers purchase. The graph below (Figure 10.3) illustrates the effect of taxes on buyers.

Initially (before taxes imposed) the price of flour is RM1.50 per kg. and quantity demanded is 130,000 kg. Since the taxes are collected from buyers, the demand curve shifts downward by the amount of tax rate, leading to decrease in quantity demanded from 130,000 kg to 100,000 kg. The new demand curve is represented by D1. The price buyers pay increased from RM1.50 to RM1.80. However the price received by sellers decreased from RM1.50 to RM1.30. Buyers and sellers share the burden from tax. In this case, RM0.20 is collected from sellers and RM0.30 is collected from buyers.

b. Effect of taxes on sellers: Suppose the Malaysian government imposes a tax rate of RM0.50 per kg. of flour that sellers sell. The graph below (figure 10.4) illustrates the effect of taxes on sellers.
Using the same product, let us examine the effect of taxes levied on sellers. When taxes are collected from sellers, the supply curve shifts upward by the amount of tax rate, leading to decrease in quantity supply from 130,000 kg to 100,000 kg. The new supply curve is represented by $S_1$. The price buyers pay increased from RM1.50 to RM1.80. However the price received by sellers decreased from RM1.50 to RM1.30. Although tax is levied on sellers, both buyers and sellers share the burden from tax.

4.3. Quota

Quota is the maximum quantity supplied of a given good allowed by law or an act. For illustration let us come back to our flour example. Recall the equilibrium quantity of flour was 130,000 kg. For instant, the government set a maximum quantity supplied for flour is only 80,000 kg. To be effective the quota must be set below the equilibrium quantity.
When quota is set at 80,000 kg, the supply curve turns vertical at 80,000 kg, indicated as S1. The flour price rises to RM2.50 per kg. The transaction quantity falls from 130,000 kg to 80,000 kg. In auction, sellers are willing to compete for quota at the maximum cost of, in this example, RM1.50 (RM2.50 – RM1.00).

4.4. Subsidy

Subsidy is a payment made by the government to cover part of the cost of a product. In Malaysia, input subsidy specifically fertilizer subsidy is given to paddy farmers. Petroleum subsidy and certain food products are given. Let us use flour again for our illustration on the effect of a subsidy.
Before subsidy is given, the equilibrium price of flour is RM1.80 per kg and the equilibrium quantity is 130,000 kg. This is shown at the intersection point between $S_0$ and $D_0$. When subsidy is granted to sellers, sellers increase quantity supplied causing the supply curve to shift rightwards, which means increase in supply of flour as illustrated by $S_1$. The intersection point between $D_0$ and $S_1$ indicates the quantity supplied and demanded increase to 150,000 kg when the price is reduced to RM1.50 per kg. This is the price buyers pay ($P_b$). With the subsidy of RM0.50, the sellers receive RM2.00 per kg. ($P_s$).

**Summary**

The government may choose to intervene in the price mechanism mainly on the principles of wanting to change the allocation of resources. By this, the government perceives that there will be an improvement in economic and social welfare. The main reasons for government or policy intervention are to correct for market failure, to achieve a more equitable distribution of income and wealth, and to improve the economic performance. Examples of policy interventions are price control, input subsidy and taxes.

**Activity**

1. **Suppose the Malaysian government set a price floor for rice in the market. Draw a supply and demand diagram to show the effect of this policy on the price of rice and the quantity of rice sold. Is there a shortage or surplus of rice in the market?**
2. **Continuation from the above question, local farmers complain that the price floor has reduced their revenue. Explain how this is possible.**
3. **Using welfare economic approach, analyse the impact of the floor price policy. What is the net surplus?**
UNIT 11
GOVERNMENT INTERVENTION 2- EXTERNALITIES

Unit Introduction

The economic system is composed of thousands of producing units such as farms, food manufacturing, service companies and the like, and millions of consuming units. The producing and consuming units are linked together repeatedly by billions of economic transactions in the market. These transactions are driven by self-interest such as maximizing profits and satisfaction. The self-interest of one individual does not affect the self-interest of other individuals. Hence the resultant of one transaction might positively or negatively affect other individuals who are not involved in the transaction. Externalities arise whenever someone’s actions affect another person and this impact is not considered in the decisions made by the person making these decisions.

Learning Outcomes: Students are able to:

1. understand the concepts of externalities
2. graphically demonstrate the social cost from negative externalities and social value from positive externalities.
3. identify government’s policy options to solve externality problems.

4. Externalities

Externalities are defined as the effect of a decision on a third party that is not taken into account by the decision-maker. An externality arises when a person involves in an activity which neither influence the well-being of other person but neither the affected person pay nor receive any compensation. If the person is adversely affected it is known as negative externality but if the person gets benefits from it, it is positive externality.

Externalities resultant from buyers and sellers neglect the external effects of decisions and actions (to demand or to supply), cause market to become inefficient.
It means that the market equilibrium fails to maximize the total benefits to the society as a whole. An example of a negative externality: Vegetable farmers on highland of the Cameron Highlands try to save some cost by not mitigating hill slopes erosion, cause water run-offs during heavy rain. The run-offs carry along muds and possible agriculture chemicals into rivers and streams and pollute the river. The polluted river causes hardship to people who use river water for their consumption, or fishermen who depend on the river. An example of a positive externality: Research and innovation provides positive externality as it create knowledge and innovative products that other people can use and get benefits from using it.

2. Externalities and Market Inefficiency

i. Negative Externalities

Assume food factories releases heavy smoke and cause pollution and it causes health hazards to people living nearby. How these externalities affect the efficiency of the market? Due to the externality the cost to society from producing the foods is more than the cost to the food factories. The social cost of producing a unit of food is the sum of private costs of the food factories and the cost to the people who are badly affected by the pollution. Let us look at illustrations in figure 11.1 below.

Figure 11.1 below shows the social cost of producing foods. The social cost curve is above the supply at private cost as it takes into account external costs imposed on society by foods producers. The distance between the two curves reflect the cost of air pollution caused by food production by food factories. The optimal production from society point of view is the point where social cost curve intersects with demand curve. Below this production level the consumer value (demand) exceeds social cost and above this production level social cost exceeds consumer value (demand). As shown in the diagram, the market quantity is more than the optimal quantity. This is said the market is inefficient as the market equilibrium only considers private costs of production. One of the way to achieve the optimal equilibrium is to tax the food producers. The use of tax is known as internalizing the externality as it provides both sellers and buyers incentive to consider the external effects of their actions. The tax would shift the
supply curve upward by the amount of tax. This will reduce or close the gap between social optimal and market equilibrium points.

**Figure 11.1: Pollution and Social Optimum from Negative Externality**

### ii. Positive Externalities

Another example of positive externality is health provision. Improve health among society reduces work absenteeism and improve productivity, creates a better quality of life and higher living standards. As shown in figure 11.2 below, the demand curve does not really reflect the value to the society of the good. It is because the social value is more than private value: the social value curve lies above demand curve. The optimal quantity is the point where social value curves intersects supply curve. Thus the social optimal value is greater than the quantity determined by the market, private value. One of the ways to reduce gap between market equilibrium and social optimum is by subsidy. Indeed in Malaysia health treatments in government hospitals is heavily subsidized.
To summarize, negative externalities lead markets to produce a larger quantity than is socially desirable. Positive externalities lead to markets to produce less than socially desirable. The address these issues the government can internalize the externalities by imposing tax on goods which have negative externalities and providing subsidy to goods which have positive externalities.

3. Solutions to externalities

As it has been mentioned earlier, externalities lead markets to allocate resources inefficiently. Both private individuals and policy makers practically respond to externalities in various ways.

3.1. Private remedies to externalities

   a. Moral code and social sanctions. Example, Laws against littering is available but is not vigorously enforced. Most people do not litter as it is morally wrong.
   b. Charities. Some charity organizations are established to deal with externalities. For example, SAM (Sahabat Alam Malaysia) is a non-profit organization established to protect the environment.
   c. Integrated farming. For example bee keeping in an orchard by different farmer. Individually each farmer made their own decisions as how many trees to plant and how many bees to keep which results in externalities. If both activities can be done by one firm/farmer, decision on optimal number of trees
and number of bees could be done. Internalizing externalities is one of the reasons that some firms involved in different type of business.

3.3 Public policies toward externalities

Two approaches the government respond to externalities.

a. Command and control policies are more toward enacting and enforcing laws and regulations. For example, it is a crime to dump toxic waste in rivers or alike. Environment quality act prohibits open burning is enforced by the Ministry of Environment.

b. Market-based Policy via Corrective Taxes and Subsidy. The government can internalize the externalities by taxing activities which have negative externalities. Taxes impose on activities which have negative externalities is called corrective taxes. In contrast, the government can provide subsidies to activities which have positive externalities. This is called corrective subsidy.

c. Market-based Policy via tradable Pollution Permits. This explanation is best made with an example. Assume 2 food manufacturing companies, company A and company B. Suppose the Department of Environment (DOE) adopts the regulation and require each factory to reduce its pollution to 200 tons/year of waste. After the regulation has been complied by both companies, one day the 2 companies go to DOE with a proposal. Company A wants to increase its emission of waste by 50 tons and Company B agrees to reduce its waste by the same amount if Company A pays it RM3 million.

Summary

An externality arises when a person involves in an activity which neither influence the well-being of other person but neither the affected person pay nor receive any compensation. If the person is adversely affected it is known as negative externality but if the person gets benefits from it, it is positive externality. When people are unable to solve the problem of externalities privately, the government often intervenes in the market.
Activity

1. Give an example of a negative externality and an example of a positive externality.

2. Draw a supply and demand curves to illustrate and explain the effect of a negative externality in production.

3. In what way does a patent system help society solve an externality problem?

4. Provide some of the ways that the problems cause by externalities can be solved without government intervention.
UNIT 12
INTERNATIONAL TRADE 1

Unit Introduction

Countries involve in international trade for two basic reasons. First, countries trade because they are different from one another. Nations can benefit from their differences by reaching agreements in which each country contributes its strengths and attentions on producing goods in which a country is efficient in producing it. Second, countries trade to achieve economies of scale in production. Which mean, if each country produces only a limited variety of goods, it can produce each of these goods at a larger scale and hence more efficiently than if it tried to produce everything. In the real world, patterns of international trade reflect the interaction of both of these reasons. This unit introduces the meaning of trade, importance of trade to the Malaysian economy and the concepts of absolute advantage and comparative advantage.

Learning outcomes: Students are able to
1. define what international trade is.
2. explain the importance of trade to the Malaysian Economy.
3. demonstrate the concepts of absolute and comparative advantage.

1. What is international trade?

International trade refers to exchange of raw materials and manufactured goods (and services) across national borders.

The fundamental concept on which the theory of international trade is based on is the principle of comparative advantage. This principle may be defined by the statement that trade will be mutually advantageous whenever the relative prices of
various commodities differ from country to country before trade by an quantity great enough to over-offset the costs of transferring the commodities in question from one country to another. A country will export those goods that it produces at relatively lower costs before trade in exchange for imports of those goods that it produces at relatively higher costs before trade. This process of profitable exchange leads countries to specialize (not necessarily completely) in the production of those commodities in which they have a comparative advantage. A country has a comparative advantage in producing a good if the opportunity cost of producing that good in terms of other goods is lower in that country than it is in other countries.

Trade basically involves imports and exports. Goods produced in other countries and sold domestically are called imports. Goods produced domestically and sold abroad are called exports.

2. Importance of trade to the economy

In general Malaysia is a net exporter, where it achieved trade surplus from 2008 to 2010, as shown in the table 12.1 below. Trade surplus is always been the trade goal for all nations. The positive balance of trade (total exports – total imports) or trade surplus will able to finance the development of the country and hence, enhances the economic development.

From table 12.1 below, we can see that palm oil is the major contributor of agricultural exports but the export values are in the range between RM36.3 billion to RM45.9 billion. This is subject to the volatility of palm oil price.
Table 12.1: Malaysia Total Trade 2008-2010

MALAYSIA TOTAL TRADE: 2008 - 2010

<table>
<thead>
<tr>
<th>Exports</th>
<th>Unit</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total exports</td>
<td>RM mil</td>
<td>663,014</td>
<td>552,518</td>
<td>638,822</td>
</tr>
<tr>
<td>annual growth</td>
<td>%</td>
<td>9.7</td>
<td>-16.7</td>
<td>15.6</td>
</tr>
<tr>
<td>Major primary commodities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber</td>
<td>RM mil</td>
<td>8,112</td>
<td>4,460</td>
<td>9,210</td>
</tr>
<tr>
<td>Palm oil</td>
<td>RM mil</td>
<td>45,951</td>
<td>36,329</td>
<td>45,449</td>
</tr>
<tr>
<td>Sawlogs &amp; sawn timber</td>
<td>RM mil</td>
<td>5,885</td>
<td>5,137</td>
<td>5,387</td>
</tr>
<tr>
<td>Crude oil &amp; condensates</td>
<td>RM mil</td>
<td>43,582</td>
<td>25,360</td>
<td>30,765</td>
</tr>
<tr>
<td>Manufacturing products</td>
<td>RM mil</td>
<td>490,908</td>
<td>432,179</td>
<td>486,675</td>
</tr>
<tr>
<td>annual growth</td>
<td>%</td>
<td>3.6</td>
<td>-12.0</td>
<td>12.6</td>
</tr>
<tr>
<td>Electrical &amp; electronic products</td>
<td>RM mil</td>
<td>276,923</td>
<td>248,948</td>
<td>271,251</td>
</tr>
<tr>
<td>Chemical &amp; chemical products</td>
<td>RM mil</td>
<td>40,723</td>
<td>34,078</td>
<td>41,674</td>
</tr>
<tr>
<td>Manufactures of metal</td>
<td>RM mil</td>
<td>28,088</td>
<td>22,544</td>
<td>26,199</td>
</tr>
<tr>
<td>Optical &amp; scientific equipment</td>
<td>RM mil</td>
<td>15,032</td>
<td>13,275</td>
<td>18,332</td>
</tr>
</tbody>
</table>

Sources: Department of Statistics & Bank Negara Malaysia

<table>
<thead>
<tr>
<th>Imports</th>
<th>Unit</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total imports</td>
<td>RM mil</td>
<td>519,804</td>
<td>434,570</td>
<td>528,828</td>
</tr>
<tr>
<td>annual growth</td>
<td>%</td>
<td>3.9</td>
<td>-16.4</td>
<td>21.7</td>
</tr>
<tr>
<td>Consumption goods</td>
<td>RM mil</td>
<td>32,215</td>
<td>31,492</td>
<td>34,591</td>
</tr>
<tr>
<td>Intermediate goods</td>
<td>RM mil</td>
<td>378,944</td>
<td>297,465</td>
<td>363,154</td>
</tr>
<tr>
<td>Capital goods</td>
<td>RM mil</td>
<td>68,612</td>
<td>65,195</td>
<td>76,435</td>
</tr>
<tr>
<td>Others</td>
<td>RM mil</td>
<td>18,216</td>
<td>13,418</td>
<td>19,235</td>
</tr>
<tr>
<td>Imports for re-exports</td>
<td>RM mil</td>
<td>21,817</td>
<td>27,100</td>
<td>35,779</td>
</tr>
</tbody>
</table>

Notes: Imports data are based on Broad Economic Categories (BEC)
Sources: Department of Statistics & Bank Negara Malaysia

3. Agriculture and Food Trade

Table 12.2 below shows the summary of agriculture and food trade sector from 2006 to 2010. The balance of trade for the agricultural sector is positive or surplus but the negative balance of trade or deficits are recorded in the period. Thus, it shows that Malaysia is a net importer of food products. From the table the food trade deficits is showing an upward trend from RM8.5 billion in 2006 to almost RM12.1 billion in 2010. Increase in the number of population is one of the factors contributing to the food trade deficit. Furthermore, commodities like, wheat, corn and soya beans are highly demanded by both consumers’ products manufacturers and animal feed manufacturers and Malaysia is not having the comparative advantage to produce.
Table 12.2: Summary of External Trade of Agricultural Sector 2006-2010

<table>
<thead>
<tr>
<th>Summary of External Trade of Agriculture Sector 2006-2010 (million)</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Exports of Agriculture Sector</td>
<td>71,294</td>
<td>84,936</td>
<td>108,686</td>
<td>86,912</td>
<td>106,099</td>
</tr>
<tr>
<td>Total Imports of Agriculture Sector</td>
<td>40,262</td>
<td>47,196</td>
<td>58,994</td>
<td>54,244</td>
<td>64,580</td>
</tr>
<tr>
<td>Balance of Trade for Agriculture Sector</td>
<td>31,032</td>
<td>37,740</td>
<td>49,692</td>
<td>32,668</td>
<td>41,519</td>
</tr>
<tr>
<td>Total Exports of Foodstuff</td>
<td>11,399</td>
<td>13,760</td>
<td>17,757</td>
<td>15,722</td>
<td>18,099</td>
</tr>
<tr>
<td>Total Imports of Foodstuff</td>
<td>19,929</td>
<td>23,374</td>
<td>27,919</td>
<td>26,690</td>
<td>30,191</td>
</tr>
<tr>
<td>Balance of Trade for Foodstuff</td>
<td>-8,530</td>
<td>-9,614</td>
<td>-10,162</td>
<td>-10,968</td>
<td>-12,092</td>
</tr>
</tbody>
</table>

Source: Department of Statistics, Malaysia

4. Reasons for Trade

Nations or people trade simply because they feel that they can gain as a consequence. People trade is also because by doing so, they are able to obtain goods which have been produced efficiently by other people. There are two major reasons why people trade; practical reasons and economic reasons. From a practical perspective, without trade, the world could not feed itself nearly as it does currently because the distribution of food production in the world does not parallel the distribution of population.

For example the US can produce wheat more than domestic demand. The country produces about 16% of the world grain but its population is only about 5% of the world population. On the other hand, South Asia’s population is about 22% of the world population is able to produce only 12% of the world grain. Thus without trade countries with high population might face the problem of hunger and malnutrition.

From an economic perspective, trade results in higher world output and lower food costs. Countries that have abandon resources endowment are able to produce commodities efficiently at lower cost and buy commodities from other countries which are best qualified to produce. This is achieved through specialization. As a result, the total world output increases and resources are allocated to their best use.
The benefits of trade arise from advantage of specialization. Production conditions vary from country to country. Any country that specializes in producing those commodities in which it has the greatest advantage or the least disadvantage will reap the benefits of the largest production at the lowest cost. The advantages of specialization can be discussed under two basic economic principles; the absolute advantage and the comparative advantage.

**Absolute Advantage:** A country is said to have an absolute advantage when it can produce a product at less cost than any other country. Let us look at an example of absolute advantage. The table below shows a two country model producing wheat and corn.

Suppose the EU and the US have options of growing wheat and corn on 10 million acres of land each. In the US, the yield is 250 kg/acre of wheat and 1300 kg/acre of corn. In the EU, the yield is 200 kg/acre of wheat and 1000 kg/acre of corn. If the cost per acre is the same in both the US and the EU, the US is said to have an absolute advantage in the production of both wheat and corn. Suppose the US requires 1250 million kg. of wheat and 6500 million kg. of corn from the 10 mil acres of land. The EU requires a minimum of 1000 million kg of wheat and 3000 million kg of corn. This can be accomplished in each country using half the land for wheat and half of the land for corn. The total US and EU production of wheat and corn under this self-sufficiency strategy is 11,750 mil kg. (2250+9500).

<table>
<thead>
<tr>
<th>Country</th>
<th>Wheat Yield (kg/ac)</th>
<th>Wheat Acres (Million)</th>
<th>Wheat Production (Million kg)</th>
<th>Corn Yield (kg/ac)</th>
<th>Corn Acres (Million)</th>
<th>Corn Production (Million kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. EU</td>
<td>250/200</td>
<td>5/5</td>
<td>1250/1000</td>
<td>1300/600</td>
<td>5/5</td>
<td>6500/3000</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>10</td>
<td>2250</td>
<td>10</td>
<td>9500</td>
<td></td>
</tr>
</tbody>
</table>

**Comparative Advantage:** The principle of comparative advantage recognizes that total output can be increased when each country specializes in producing that
commodity for which it has the greatest advantages or the least disadvantages. To clarify this principle let us look at an example using the same information on wheat and corn production in the table above.

Even though the US has an absolute advantage in the production of both wheat and corn, output can be increased by specialization. From the table, the total wheat requirement of 2250 million kg can be attained by having the EU devotes all of its land to wheat and the US produce wheat on 1 million acres. The remaining 9 million acres of land in the US are devoted to corn, with a total corn production of 11700 million kg, as shown in table below. The resulting total US and EU production of wheat and corn is 13,950 million kg, 2200 million kg more than without specialization. To achieve this higher level of production, it is necessary to specialize and trade. The EU must buy/import 3000 million kg of corn from the US and the US must buy a minimum of 1000 million kg of wheat from the EU.

<table>
<thead>
<tr>
<th>Country</th>
<th>Yield (kg/ac)</th>
<th>Acres (Million)</th>
<th>Production (Million kg)</th>
<th>Yield (kg/ac)</th>
<th>Acres (Million)</th>
<th>Production (Million kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>250</td>
<td>1</td>
<td>1250</td>
<td>1300</td>
<td>9</td>
<td>11700</td>
</tr>
<tr>
<td>EU</td>
<td>200</td>
<td>10</td>
<td>1000</td>
<td>600</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11</td>
<td>2250</td>
<td></td>
<td>9</td>
<td>11700</td>
</tr>
</tbody>
</table>

**Summary**

International trade refers to exchange of raw materials and manufactured goods (and services) across national borders. The fundamental concept on which the theory of international trade is based on is the principle of comparative advantage. The principle of comparative advantage recognizes that total output can be increased when each country specializes in producing that commodity for which it has the greatest advantages or the least disadvantages.
Activity

1. Explain how absolute advantage and comparative advantage differ.
2. If a nation has a comparative advantage of a good, will it tend to import or export the goods? Discuss.
3. Give examples of agricultural commodities which Malaysia has comparative advantage. Discuss why?
UNIT 13
International Trade 2

Unit Introduction

Analyzing the effect of trade is important to gauge who will gain and who will loss from free trade. Due to some reasons, certain countries impose trade barriers and this will affect the world market for that commodity if the barrier come from large countries. But this unit assumes small country for analysis and hence price taker. This unit will provide students the tools in analyzing the effects of trade barriers and understand who will benefit and who will gain from trade policies adopted by both importing and exporting countries.

Learning outcomes: students are able to:

1. explain the effects of free trade.
2. explain the effects of trade barriers using
3. use consumer surplus and producer surplus to analyse trade policy impact.

5. Trade Theory

Trade occurs because government, businesses, farmers, and consumers, as buyers or sellers, realize benefits from trade. Trade will occur to the point where the costs of goods (including transportation and transaction costs) are equal among countries. However benefits from trade for importing and exporting countries are unequal.

Consumers in exporting countries generally pay a higher price for a commodity being exported than they would if the commodity were not being exported. Nevertheless producers receive higher prices. In contrast consumers in importing countries pay a lower price for the commodity that they would if it were not being imported but the
importing country’s producers receive a lower price. This can be illustrated with the following diagrams.

First, assume the trade model consists of 2 countries as shown in Figure 13.1: exporting country and importing country; the model considers one commodity, example bananas; everything is measured in the same currency and no transportation costs. Initially, there is no trade or close economy condition called autarky. Prices are determined independently in importing country and exporting country using their respective supply and demand curves. The resulting equilibrium is price $P_e$ and quantity $Q_e$ for the exporting country and price $P_i$ and quantity $Q_i$ for the importing country.

When trade is introduced into the two-country trade model a world market is introduced as shown in the middle graph. The quantity available for trade by the exporting country, referred to as excess supply (ES), is the horizontal distance between S and D curves above price $P_e$. At $P_e$, supply equals demand in the exporting country and there is nothing available for export. This provides the vertical axis intercept in the world market graph. For the importing country, price below $P_i$, the importing countries have excess demand (ED) of the difference between their S and D curves. The world market excess demand curve ED, begins at $P_i$ and slopes downward to the right. The quantity imported at each price in the difference between the quantities supplied and demanded at each price below $P_i$. In the world market graph, at $P_w$, excess supply and excess demand are identical with the quantity traded being $Q_i$. Observe that in the exporting country’s graph, the quantity exported
(S_e-D_e) is identical to quantity imported (D_i-S_i) in the importing country’s graph which is Q_i in the world market graph.

The benefits of trade are: the quantity and price received by the exporting countries are increased from the level it would have been at under autarky. The quantity consumed by the importing countries is increased at the world price. World production and consumption are increased by trade. However not everybody is better off. The exporting country consumers pay a higher price and the importing country producers receive a lower price.

Figure 13.2: Free Trade

6. Effects of Free Markets

To analyse the welfare effects of free trade, country A is assumed to be a small country compared to the rest of the world, hence its action will have little impact on world market. For example country A produces bananas and the country change its trade policy. Its policy change will not affect the world banana price. Therefore country A is said to be price takers in the world economy, i.e. to them the world price of bananas is given. County A can sell bananas at this price and be exporter or by bananas at this price and be importer.
To illustrate the effects (gains and losses) of free trade, let us consider the following cases:

a. International Trade in an Exporting Country

From the figure 13.3 below, before trade the domestic banana price equilibrium is below the world price. Once free trade is allowed the domestic price rises to equal to the world price. When the price increased the quantity supplied differs from quantity demanded in domestic market. The difference is represented by exports. Note that even though disequilibrium in domestic market, the equilibrium is achieved in the world market.

Who gains and losses from free trade? Let’s look at the changes in consumer surplus and producer surplus. Before trade is allowed, domestic banana price adjust to balance between supply and demand. The consumer surplus is area A+B and producer surplus is area C. The total surplus before trade is A+B+C. After trade is allowed, domestic price of banana equals world price. Consumer surplus is reduced to A and loses B. Producer surplus is B+C+D. Gain B+D. The total surplus is A+B+C+D. The welfare computations show who wins (gains) and who loses from trade in an exporting country.

Two conclusions are derived from this analysis.

i. When a country allows free trade and become an exporter, producers in the exporting country will be better off (higher price received) and consumers will be worse off (pay higher price).

ii. Trade increases the economic well-being of a country in the case of gains exceed losses.
b. International Trade in an Importing Country

From the figure 13.4 below, before trade the domestic banana price equilibrium is above the world price. Once free trade is allowed the domestic price drops to equal to the world price. When the price decreased the quantity supplied also differs from quantity demanded in domestic market. The difference is represented by imports. Again let us look who gains and losses from free trade (imports)? Let's look at the changes in consumer surplus and producer surplus. Before trade is allowed, domestic banana price adjust to balance between supply and demand in domestic market. The consumer surplus is area A and producer surplus is area B+C. The total surplus before trade is A+B+C. After trade is allowed, domestic price of banana equals world price. Consumer surplus is increased to A+B+D (gains B+D). Producer surplus is reduced to C, loses B. The total surplus is A+B+C+D. The welfare computations show who wins (gains) and who loses from trade in an exporting country. Conclusions derived from this analysis are:

i. When a country is allowed to trade (imports) a good, consumers will be better off (pay lower prices) and producers will be worse off (receive lower prices).
ii. Trade increases economic well-being of a country when gains exceed losses.

![Figure 13.4 Trade in an Importing Country](image)

7. Effects of Trade Barriers
   a. Tariff
   Import tariff is taxes levied on imported goods. An *ad valorem* tariff is a set percentage of the value of the good that is being imported. A *specific* tariff is a tariff of a specific amount of money that does not vary with the price of the good. Tariff reduces quantity of imports and moves the domestic market closer to equilibrium without tariff. Domestic market price of imported goods increases by the amount of tariff. Hence quantity demanded reduces from $Q^D_1$ to $Q^D_2$ and quantity supplied increases from $Q^S_1$ to $Q^S_2$. Let us say that Country imposes import tariff on bananas imported and analyse the effect of import tariff to the domestic market.
Figure 13.5 Effect of Import Tariff

Figure 13.5 above illustrates the effects of import tariff imposed by Country A. Tariff increases domestic price and hence producers are better off from receiving higher prices and consumers are worse off for having to pay higher price relative to without tariff. Before tariff is imposed by the government, the domestic price is equal to the world price. Consumer surplus are areas A+B+C+D+E+F, while producer surplus is G. Here, government receives no revenue. The total surplus is A+B+C+D+E+F+G.

When the government imposes an import tariff, the domestic price increases by the amount of tariff (world price + tariff). The consumer surplus now areas A+B and producer surplus are areas C+G. The government's revenue is area E. The total surplus is A+B+C+E+G. The total welfare effect of tariff is as in table 13.1 below. The reduction of total surplus (D+F) is called the deadweight loss of the tariff. Because of the tax, the deadweight loss incurred and therefore it distorts the market and pushes the allocation of resources away from optimum.
Table 13.1: Welfare Effects of Import Tariff

<table>
<thead>
<tr>
<th></th>
<th>Before Tariff</th>
<th>After Tariff</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer surplus</td>
<td>A+B+C+D+E+F</td>
<td>A+B</td>
<td>-(C+D+E+F)</td>
</tr>
<tr>
<td>Producer surplus</td>
<td>G</td>
<td>C+G</td>
<td>+C</td>
</tr>
<tr>
<td>Government revenue</td>
<td>0</td>
<td>E</td>
<td>+E</td>
</tr>
<tr>
<td>Total surplus</td>
<td>A+B+C+D+E+F+G</td>
<td>A+B+C+E+G</td>
<td>-(D+F)</td>
</tr>
</tbody>
</table>

The effects of import tariff are:

i. Tariff on imported bananas increases the domestic price of bananas which motivates local producers to produce more bananas.

ii. Price increase resultant from tariff encourages consumers to consume less quantity of bananas.

iii. Deadweight loss D occurs due to over production and deadweight loss F occurs due to under consumption.

b. Import Quota

Import quota is a governmental restriction on the quantities of a particular commodity that may be imported within a specific period of time, usually with the goal of protecting domestic producers of that commodity from foreign competition. Suppose Country A imposes an import quota for bananas below the free trade level of imports, i.e, \( Q = Q^D - Q^S \). A reduction in imports will lower the supply on the domestic market and raise the domestic price. In the new equilibrium, the domestic price will rise to the level at which import demand equals the value of the quota. Since the country is small, there will be no effect on the world price.

The welfare effects of import quota are similar to that of import tariff except for government revenue in in terms quota rents on area E. Welfare effects on the quota rents depends on how the government administers the quota.
1. If the government auctions the quota rights for their full price, then the government receives the quota rents. In this case, the quota is equivalent to a specific tariff set equal to the difference in prices ($Quota Rents = (Price \text{ with quota} - \text{ price without quota}) \times (Q^2_D - Q^2_S)$)

2. If the government gives away the quota rights, then the quota rents accrue to whoever receives these rights. Typically, they would be given to someone in the importing economy, which means that the benefits would remain in the domestic economy.

3. If the government gives the quota rights away to foreigners, then people in the foreign country receive the quota rents. In this case, the rents would not be a part of the importing country effects.

Figure 13.6 Effect of Import Quota

Summary

Trade occurs because government, businesses, farmers, and consumers, as buyers or sellers, realize benefits from trade. However, benefits from trade for importing and exporting countries are unequal. Consumers in exporting countries generally pay a higher price for a commodity being exported than they would if the commodity were not being exported. Nevertheless, producers receive higher prices. In contrast, consumers in importing countries pay a lower price for the commodity that they would if it were not being imported but the importing country’s producers receive a
lower price. Trade policy normally attempt to protect domestic producers, but along the way certain money allocated are benefited by any parties and this is called the deadweight loss.

Activity

1. The Malaysian government imposes import quota on imported cabbage to protect local cabbage producers from foreign competition. Assume Malaysia is a price taker in the world cabbage market. With the illustration of graph, show the effects of the import quota in terms producer surplus and consumer surplus. Show loss to the Malaysian consumers, gains to local producers, quota rents revenue and deadweight loss.

2. County X is a closed economy. The equilibrium cost for a kilogram of strawberry is $5.00 and the equilibrium quantity is 1 million kg. One day one economist recommends to the government that Country X should allow international trades for all industries. The world price of strawberry is $8.00/kg. The amount of strawberry consumed in the country falls 300,000kg. while the amount of strawberry produced increased to 1.5 million kg.

   a. Illustrate the case in a graphical presentation.
   b. Compute the changes in producer surplus, consumer surplus and net surplus resulting from the trade.
UNIT 14
PUBLIC GOODS AND COMMON RESOURCES

Unit Introduction

In discussing various goods in the market, they are grouped into two main characteristics: excludability and rivalry in consumption. Excludability goods are goods which a person can be prevented from using it. In this category, the questions are: is the good excludable? Can people be prevented from using the good? The property of a good whereby a person can be prevented from using it is excludable. Rivalry in consumption means that a good that is used by one person cannot be used by other person. The questions are: Is the good rival?, Does one person’s use of the good diminish another person’s ability to use it? The property of a good whereby a person can be prevented from using it is rivalry.

Learning Outcomes: Students are able to

1. understand the concepts of public goods and common resources.
2. categorize goods in terms of excludability and rivalry of consumption.
3. identify policy intervention to regulate common resources.

1. Categories of Goods

Using excludable and rivalry in consumption characteristics, goods are divided into four major categories. Table 14.1 shows the four categories of goods.
Table 14.1 Four categories of goods.

<table>
<thead>
<tr>
<th>Excludable?</th>
<th>Rival in Consumption?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Private Goods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Ice-cream cones</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Clothing</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Congested toll高低ways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Common Resources</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fish in the ocean</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The environment</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Congested non-toll roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural Monopolies</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Water and Electricity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Satellite TV</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Uncongested toll highways</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Mankiw et. al (2013)

1.1 Definitions of Goods

i. **Private goods**: Both excludable and rival in consumption. An ice-cream cone is excludable because it is possible to prevent someone from eating it and it is rival because if one person eats it another person cannot eat the same cone. Similarly, clothing is excludable as you can prevent someone from wearing it. Most goods in economy are private goods.

ii. **Public goods**: Public goods are goods that are neither excludable nor rival in consumption. People cannot be prevented (non-excludable) from using a public good and one person’s use of a public good does not reduce another person’s ability to use it (non-rivalrous). Allows for simultaneous consumption of the goods. For instance, National defense, it is impossible to prevent any one person from enjoying the benefit of nation defense. Another example is the wetland which act as local public good by buffering economy from natural and man-made shocks by providing water purification and habitat services.

iii. **Common resources**: Common goods are goods that are rival but not excludable. For instance, fish in the ocean are rivalrous, because when person catches the fish, there are fewer fish for the next person to catch. Fish in the
ocean are not excludable, because it is difficult to stop fishers from taking fish out of the ocean.

iv. **Natural monopoly**: Goods that is non-rival but excludable. Sometimes called collective goods. Sometimes provided by government and sometimes provided by private. Uncongested highways are not rival in consumption as the use of the highway by one person does not affect the amount of use of another person. But it is excludable as one has to pay in order the use the highway.

2. **Public Goods – The Free-Rider Problem**

A free-rider is a person who receives the benefit of a good but avoids paying for it. Most often it is associated with public goods. This problem arises due to non-excludability characteristic of consumption. It implies that market will provide less of public good than is socially optimal as market fails to provide optimal outcome. An example of free rider problem is the government hospital medical services. The services are practically free (subsidized) for lower income populace and local people. But there are many wealthy people who enjoy the cheap medical services. One way of looking at this market failure is that it arises because of an externality.

2.1 **Three Important Public Goods**

There are numerous examples of public goods. The following three are considered the most important.

i. **National Defense**: The government spent a huge amount of money (resources) to defense our country from foreign aggressors. Once the country is defended we cannot prevent anyone from enjoying the benefits from the defense. Furthermore, the benefit will not be reduced if it is enjoyed by one person although it is being benefited by another person. Hence, national defense is neither rivalry nor excludable in consumption.

ii. **Basic Research**: Research is created through research. However, certain findings and process obtained from research are patented and thus make the
good excludable. General knowledge is a public good. Economic theory, for example, is not excludable and non-rivalry in consumption. Research grants are among government commitments to provide general knowledge as the public goods.

iii. Poverty alleviation: Government implemented many programs to reduce poverty among the population. The program ranges from school lunch program to provision of financial aid for the poor to carry out economics activities such as small scale livestock farming. The Hardcore Poor Eradication program was to alleviate poverty in rural areas. Although there are some disagreement among economists whether poverty fighting program is a public good, advocates of this antipoverty program claim that it is a public good.

3. Common Resources

Common resources, similar to public goods, are not excludable. They are available to anyone who wants to use it without any charges. However common resources are rival in consumption; i.e. one’s use of resources reduces other people ability to use it. Therefore the government has to be concerned about how much it is used. This problem is best understood from the classic parable known as Tragedy of the Commons.

To illustrate the Tragedy of the Commons, let us look at the insert from Mankiw et.al (2013).

“Consider life in a small town. Of the many economic activities that take place in the town, one of the most important is raising goats. Many of the town families own flocks of goats and support themselves by selling mutton. The goats spend much of their time grazing on the land surrounding the town, called Ladang Bersama. No family owns the land. Instead the town residents own the land collectively, and all residents are allowed to graze their goats on it. Collective ownership works well because land is plentiful. As long as everyone can get all good grazing land they want, Ladang Bersama is not rival in consumption, and
allowing residents’ goat to graze for free causes no problems. Everyone in town is happy. As years pass by, the population and goats increase. With the growing number of goat and the fixed amount of land, the land starts to lose it ability to replenish itself. Eventually land has no grass and thus raising goats become impossible and the town once prosperous with mutton industry disappears. Many families lose their source of livelihood.”

The tragedy occurs because of externality. When goats of one family graze on common land, it reduces the quality of the grazing land available for other family’s goats. When all family ignore the externality, the excessive number of goats grazing on limited grazing land causing the land to become barren. How to solve this externality problem? The government can regulate by having regulation and taxes to reduce the use of common resources. To certain extent the government can turn the common resource into a private good.

3.1 Some Important Common Resources

i. **Clean Air and Water.** Water and air pollutions are negative externalities. It is the resultant of no or less protection by the market. Government can address this problem by imposing taxes or regulations on pollution activities. Clean air and clean water are both common resources. Degradation of air and water quality is modern tragedy of commons.

ii. **Congested Roads.** When a road is not congested, it is a public good as its consumption is non-rivalry. If the road is congested then the use of the road results negative externality, i.e an increase of one person drives on the road make the road more congested causing other driver to drive more slowly. Thus the road is a common resource. A toll is one of corrective taxes to reduce road congestion can be implemented by the government. Increase in petroleum tax will reduce the demand for driving as petroleum is a complementary good.

iii. **Fish, Whales and Other Wildlife.** A lot of animal species are common resources. Fish and whales have commercial values and anyone can fish in the ocean. Sharks are caught excessively for their fins, delicacies amongst
Asian, cause the shark population to decrease significantly. This will destroy the commercial value of marine populations. In Malaysia, ocean is heavily regulated to protect both ocean wildlife and fish stocks. Fishermen are licensed, use fishing nets with a minimum mesh size of 38.8mm and release back small fishes into the ocean. The Department of Fisheries has also deployed artificial rifts as fish breeding area in order to increase fish stocks. Marine parks are built with similar objective, i.e enhance fish breeding and improve fish stocks.

Summary
Goods differ whether they are excludable and whether they are rival in consumption. Public goods are neither excludable nor rival in consumption. Common resources are rival in consumption but non-excludable. Since common resources are tend to be overused, government regulate its consumption through policies and regulations.

Activity
1. Using figure 14.1, explain which category each of the following goods falls into. 1. Government hospital services; 2. Malaysia fishing zone ocean; 3. Toll-free road; and 4.national defense.
2. Some economists argue that private companies are reluctant to undertake basic research.
   a. Explain what the possible reasons are.
   b. What kind of policy intervention has the Malaysian government implemented to address this problem?
3. Both public goods and common resources involve externalities.
   a. Are the externalities associated with the public goods positive or negative? Provide examples.