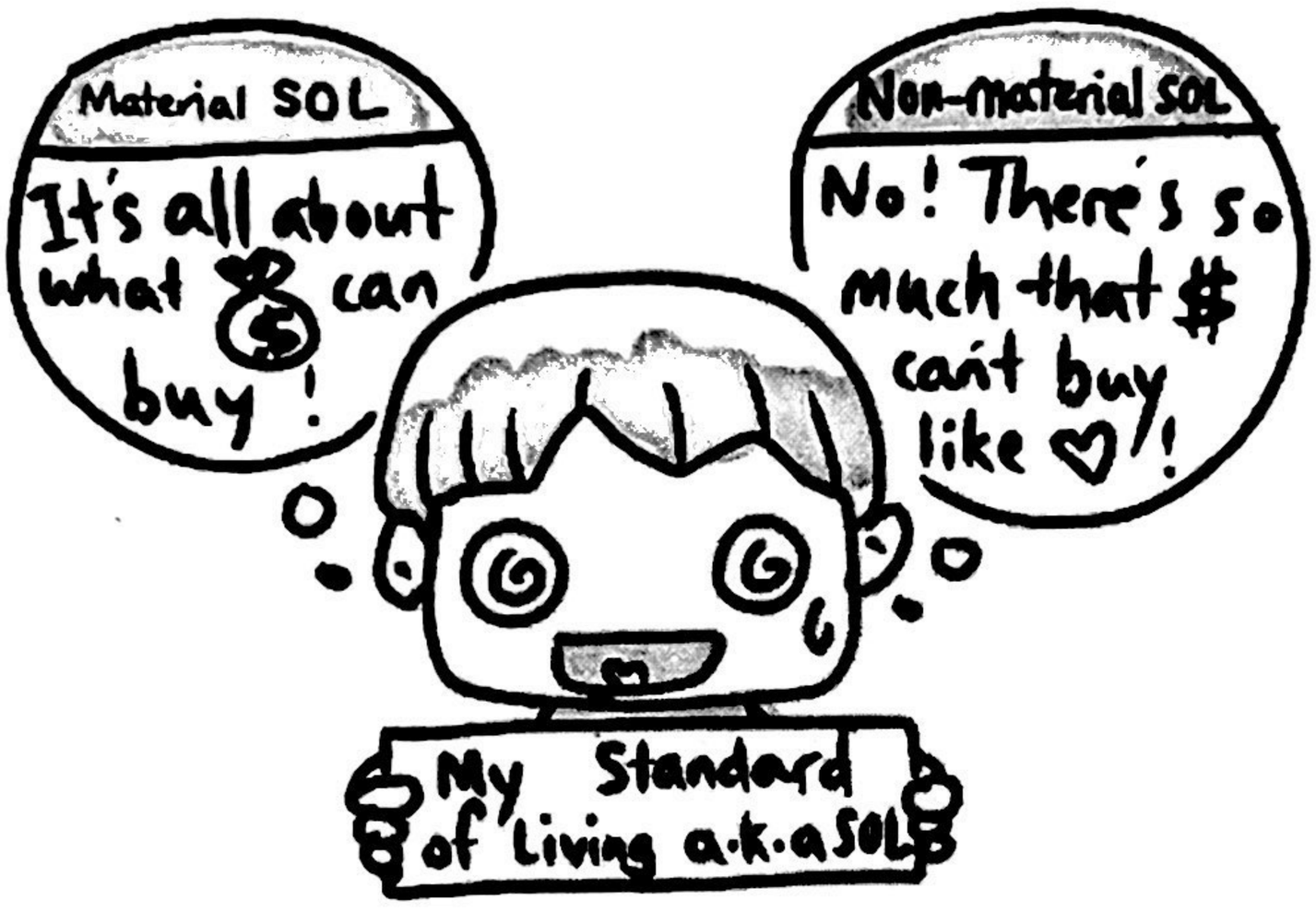
HWA CHONG INSTITUTION
Year One H2 Economics 2022
Chapter #5: The National and International Economy (I) –
Introduction to Macroeconomics (Circular Flow of Income & AD/AS Model)

PART 1: INTRODUCTION TO MACROECONOMICS AND STANDARD OF LIVING



Name: _____
CT Class: 22 _____

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

HWA CHONG INSTITUTION
Year One H2 Economics 2022
Chapter #5: The National and International Economy (I) –
Introduction to Macroeconomics (Circular Flow of Income & AD/AS Model)

PART 1: INTRODUCTION TO MACROECONOMICS (Standard Of Living)

CHAPTER OUTLINE

5.1 INTRODUCTION TO MACROECONOMICS

5.1.1 INTRODUCTION TO MACROECONOMICS
5.1.1.1 The transition from the study of Microeconomics to Macroeconomics
5.1.1.2 Importance of the Macroeconomy
5.1.1.3 Macroeconomic goals and problems

5.1.2 NATIONAL INCOME ACCOUNTING
5.1.2.1 Gross Domestic Product (GDP) & Gross National Income (GNI)
5.1.2.2 Real vs. Nominal National Income
5.1.2.3 Real National Income per capita
5.1.2.4 General difficulties in measuring National Income

5.1.3 COMPARISON OF STANDARD OF LIVING OVER TIME AND SPACE
5.1.3.1 Limitations of using national income statistics to compare standard of living over TIME
5.1.3.2 Limitations of using national income statistics to compare standard of living over SPACE

5.1.4 OTHER INDICATORS OF ECONOMIC WELFARE

5.1.5 CONCLUSION

Recommended readings
Appendices

Tutorial 5.1

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

HWA CHONG INSTITUTION
Year One H2 Economics 2022
Chapter #5: The National and International Economy (I) –
Introduction to Macroeconomics (Circular Flow of Income & AD/AS Model)

A LEVEL QUESTIONS IN RECENT YEARS

A LEVEL ESSAY QUESTIONS

N2020 Q4

Government expenditure on large-scale infrastructure projects such as airports and mass rapid transit (MRT) can contribute significantly to a country's economic growth.

(a) Explain how government expenditure on large-scale infrastructure can contribute to a country's economic growth. [10]
(b) Discuss the extent to which such government expenditure on infrastructure projects will lead to a rise in living standards of a country. [15]

N2017 (9757)

Singapore is considered to have a high standard of living, a high cost of living and a strong overall macroeconomic performance.

(a) Explain the link between the standard of living, the cost of living and the macroeconomic performance of a country. [10]
(b) Discuss the economic policies which might have resulted in Singapore arriving at this position. [15]

N2017 (9732)

The standard of living is affected by a wide range of factors of which economic growth is one.

Explain what determines the standard of living of an economy and discuss whether rapid economic growth will always lead to improvements in the standard of living. [25]

N2014

In 2011, Singapore's GDP at 2005 prices grew by 4.9%, the total population grew by 2.5%, inflation (as measured by the consumer price index) was 5.2% and overall unemployment stood at 1.9%.

Source: http://www.singstat.gov.sg/stats/latestdata.html, accessed 30 January 2013

Discuss the limitations of these statistics in both assessing the change in the standard of living in the Singapore economy in 2011 and comparing it with that of other economies. [25]

N2012

(a) How do economists compare the economic performance of different countries? [10]
(b) Assess the extent to which Singapore's economic performance is the main determinant of its population's standard of living. [15]

N2011

'The Singapore economy is open to the world, for trade and investment. This is both a matter of policy and necessity because of our size and limited resources. In 2008, our trade to GDP ratio was 360%, the highest in the world.'

Ministry of Trade and Industry, Singapore, 2009

Discuss whether the openness of the economy is beneficial or harmful to the standard of living in Singapore. [25]

N2009

Economic measures of the Singapore economy for 2007 indicate that GDP was S$243 billion. The current account on the balance of payments was S$59 billion in surplus.

(a) Explain how you might use GDP and balance of payments data to measure the performance of an economy. [12]
(b) Assess whether these economic indicators are the best measures of the economic performance and standard of living in Singapore. [13]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

5.1 INTRODUCTION TO MACROECONOMICS

5.1.1 INTRODUCTION TO MACROECONOMICS

5.1.1.1 The transition from the study of Microeconomics to Macroeconomics

It is best to begin the study of macroeconomics by understanding the difference in approach between microeconomics and macroeconomics.

'Micro' is the Greek word for "small" and 'macro' for 'big". The term "microeconomics" suggests that a small or "microscopic or closed up" approach is used in the study of the economy. In microeconomics, the economy is stripped down to its smallest components or **individual units** and each unit or component is studied in isolation e.g. microeconomics includes the study of **individuals** as consumers and producers and the determination of market prices of **individual** goods and services like food or taxi rides.

Macroeconomics, on the other hand, looks at the "big picture". It looks at the nation or economy as a single unit or entity. Compared to microeconomics which deals only with **individual units** such as how each separate market (e.g. food or fuel) within an economy functions in isolation, macroeconomics deals with how the **aggregate** or sum of all markets function together as a single entity or economy.

'Forest' versus 'Trees' analogy

A good analogy to use is that of the distinction between the forest and the trees. In microeconomics the focus of our study and analysis is on individual trees or 'The Market'.

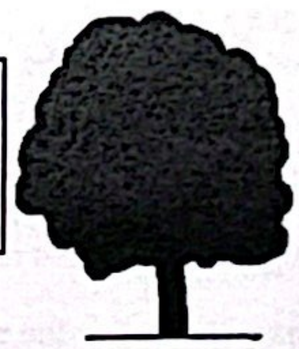
However, in macroeconomics, the focus is on the entire forest which includes not only the trees but also the assortment of animals living in it, ie, the relationship of the living things within the entire eco-system in the forest or 'The Economy'.

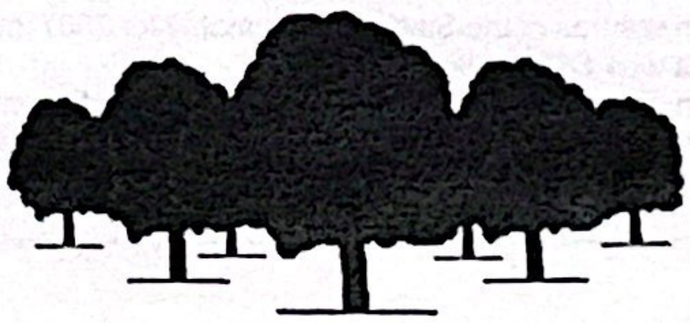
Key Focus:

Microeconomics:
The Market and Resource Allocation

Macroeconomics:
The Government and Macroeconomic Goals, Problems and Policies.

Individual tree
→ Market
→ Focus on Microeconomics





Aggregate of trees and other living things living in the forest
→ Economy
→ Focus on Macroeconomics

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

5.1.1.2 Importance of the Macroeconomy

The study of Economics begins with the central idea that we live in a world of **scarcity**, where resources are limited but our wants for material goods and services are unlimited. The satisfaction of material wants must first begin with the **production** of goods and services from the available resources, and end when the goods and services reach the final consumer. It is this continuous cycle of **production and consumption** within an economy that enables us to satisfy our material wants. This process/cycle can be illustrated clearer via the **circular flow of income model.**

All things being equal (ceteris paribus), an economy that is more productive or is able to produce more output will benefit consumers more. More output implies more goods and services are available for consumption. Hence, the people living in the economy should be able to satisfy more wants and enjoy a higher level of welfare or **material well-being,** which improves the **standard of living.** The ability to achieve a good standard of living for its people is one of the concerns of governments.

5.1.1.3 Macroeconomic goals and problems

The government plays an important role in managing the economy. Like the captain of a ship, the role of the government is to steer the 'ship' of the economy towards achieving a set of economic goals, which include microeconomic goals[1] as well as macroeconomic goals. Macroeconomic goals can be broadly classified into internal (domestic) macroeconomic goals and external macroeconomic goal. The ability to achieve these goals will have an impact on the overall standard of living of people in the country. Consequently, the inability to meet these goals will result in the respective macroeconomic problems.

Macroeconomic goals

Internal goals	• **Economic Growth**: Sustained, Sustainable and Inclusive Growth • **Domestic Price Stability**: Low and stable Inflation rate • **Full employment**: Non-zero, low rate of unemployment
External goal	• **Favourable balance of trade position.**

Macroeconomic Problems

The macroeconomic problems are simply the undesirable outcomes experienced by the economy whenever it fails to achieve the above desired outcomes. The main macroeconomic problems are:

- Negative economic growth, slow economic growth or inflationary economic growth
- Price Instability: High Inflation or deflation
- High Unemployment
- Persistently large Balance of Trade Deficit → external

} internal

[1] Microeconomic goals of a government are broadly:
- **efficiency** in resource allocation (i.e. Allocative Efficiency and Productive Efficiency)
- **equity** in income distribution i.e. achieving "fairer" or equitable income distribution.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

5.1.2 NATIONAL INCOME ACCOUNTING

What is National Income Accounting?

National income accounting is a bookkeeping system that a government uses to measure the level of national income in a country in a given period of time.

Why are National Income Statistics important?

National income statistics can be used for 2 main purposes:

(1) To indicate the overall standard of living of the people in a country

National income statistics or economic indicators can be used to show the progress or deterioration in the living standards of a country over the years. This is known as a comparison of living standards over time. They can also be used to compare the living standards between different countries. This is known as a comparison of living standards over space.

(2) To track the economic performance of a country

The government's role is to achieve the four macroeconomic goals of economic growth (sustained, sustainable and inclusive), low inflation, full-employment and favourable balance of payment over time. Towards this end, National income statistics provide invaluable information to assist policymakers in monitoring economic performance and formulating appropriate policies to achieve macroeconomic goals.

Examples:

To measure the rate of economic growth

Economic growth is measured by the rate of growth of real GDP over time. If the rate falls below the desired level, policymakers can implement policies to increase GDP growth such as through boosting labour productivity, net investment, or using better technologies in production.

To measure the contribution to output by different sectors of the economy

National Income estimates can show the contributions by various sectors of the economy – primary, secondary and tertiary. They help to indicate whether each of the sectors is growing, stagnating or declining, and this enables policymakers to arrest any undesirable trends.

There are 2 common but distinct measures of national income: Gross Domestic Product (GDP) and Gross National Income (GNI).

5.1.2.1 Gross Domestic Product (GDP) & Gross National Income (GNI)

Gross Domestic Product (GDP)

The GDP is the market value of all final goods and services newly produced within the geographical boundary of an economy in a given period of time (usually one year).

The GDP is a measure of the final output of goods and services produced from resources located within a country, regardless of who owns the resources. The term 'domestic product' or 'domestic output' is used to describe goods and services that are produced within the domestic or geographical confines of a country. It does not matter if the output is produced and owned by foreigners or locals. As long as the output is produced within the country, it is counted as part of GDP.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

For example, there are many firms or companies with foreign ownership that are located in Singapore e.g. Hewlett Packard, HSBC, and GlaxoSmithKline. Since their businesses or production plants are based or located within the geographical confines of Singapore, their output is counted as part of Singapore's GDP but not GNI. **GDP is about the location i.e. where the output is produced.**

Gross National Income (GNI) or Gross National Product (GNP)

The GNI or GNP is the **market value** of all **final goods and services newly produced anywhere in the world** from **resources belonging to residents** of a country in a given **period of time (usually one year).**

In contrast, the GNI or GNP of a country measures output that can be **produced from anywhere in the world**, provided it **belongs to the residents of a country.** In a globalised world, it is possible for residents of a country to work or invest abroad and therefore create an output. The output they produced abroad from work or investment counts as part of the country's GNI. For example, many Filipinos work abroad and remit incomes to their families back home in the Philippines. The incomes remitted or sent home count as part of the GNI of the Philippines. Similarly, many Singaporeans own businesses and property abroad. The returns from their investments in the form of rents, interests, dividends and profits also count as part of Singapore's GNI. **GNI is about the ownership i.e. who owns the output.**

1. If a Japanese Toyota car is made in India, should it be recorded as part of Japan's GDP or GNI?
   - Japan's GNI
   - India's GDP

Converting from GDP to GNI

In accounting for GNI, the usual practice is to first work out the GDP. Using the GDP data, 2 adjustments are required to convert it to GNI:

(a) Add factor incomes earned by the residents (nationals) working or investing abroad (i.e. ownership of assets). This item is sometimes called factor incomes **from** abroad (FIFA). FIFA consists of wages, rents, interest, dividends and profits.

(b) Subtract incomes earned by non-residents or foreigners from working or investment in assets located within the country. This item is sometimes called factor incomes **paid** abroad (FIPA).

The difference between the factor income received from abroad and the factor income paid abroad is known as the **Net Factor Income from Abroad (NFIA).** It may be either positive or negative in value depending on whether there is a net inflow or outflow of funds.

Net Factor Income from Abroad (NFIA) =

Factor Income from Abroad (FIFA) – Factor Income Paid Abroad (FIPA)

GNI = GDP + NFIA

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

- Countries with relatively larger foreign investments undertaken by their residents abroad relative to investments made by foreigners in the country. Such countries are said to have a large external wing.

2(a) Which countries are likely to have a bigger GNI than GDP?

- Countries with a large proportion of the population working abroad eg. The Philippines. The remittances of Filipinos abroad constitute a substantial proportion of Philippines' GNP.

2(b) Why is it said that a country like Singapore should focus on growing its economy via GNI rather than GDP?

- SG is a small economy with very limited natural resources, so our local firms & people are encouraged to invest abroad.
- The income earned from abroad (RIFA) increases our GNP.

5.1.2.2 Real vs. Nominal National Income

In practice, the volume or quantity of the nation's physical or real output is measured or expressed in monetary terms (i.e. money is used as a unit of account).

Formula: **Value of National Income (Y) = P x Q**

Y = Y is the symbol for national income. It can be used to represent either GDP or GNI
P = General Price Level
Q = Quantity or volume of physical output

With reference to the formula Y = P x Q, a change in the value of Y could be due to the following:
(i) a rise in the price level while the quantity produced remains unchanged (i.e. nominal change in value)
(ii) a rise in physical output while prices remain unchanged (i.e. real change in value)
(iii) a rise in both prices and quantity of output (i.e. both nominal and real change in value)

Hence, it is important to draw a clear distinction between real and nominal change in national income.

The distinction between real and nominal change

To determine whether changes in GDP or GNI are due to price and/or quantity changes, it is useful to obtain GDP or GNI figures in **current prices** and **constant prices**.

1) **Real GDP** is GDP measured at **constant prices or base year prices** (e.g. GDP at 2010 prices). It is GDP with **effects of price changes being removed.** Any increase in real GDP indicates that output has risen in terms of physical quantity with prices held constant.

2) **Nominal GDP** is GDP measured at **current or prevailing market prices**. This means that effects of price changes have NOT been removed. For this reason, an increase in nominal GDP does not necessarily indicate an increase in physical output. The increase could be partly or entirely due to an increase in price levels or inflation.

3) When considering National Income statistics, always **assume nominal GDP** or GNI data is used unless otherwise specified by the source.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Discounting the effects of inflation

A major factor that causes a change in nominal national income is inflation. Inflation causes the general price level or prices of goods and services to rise over time. For instance, the same cup of coffee or tea sold at coffee shops in Singapore has risen from 60 cents just a few years ago to $1.20 today. This phenomenon applies across the board to other goods and services produced in the economy such as fuel, food, housing, transport and medical services. The effect of inflation causes the nominal value of national income to be 'inflated' or exaggerated over time.

Therefore, in order to measure the change in real output accurately, it is important to adjust or discount the nominal change by using a **GDP deflator**. The idea is to 'deflate' away the effects of inflation so as to obtain the real GDP.

Formula:

$$\text{Real National Income or Real GDP} = \frac{\text{Nominal GDP}}{\text{GDP Deflator}} \times 100$$

Note: The CPI (Consumer price index) is used as a proxy measure if the GDP deflator is not available.

Numerical example:
Assuming the Nominal GDP measured in 2018 for Singapore is S$200 million. If the price level over the relevant period has risen by 12%, then the GDP Deflator will be (100+12) =112. Hence, real GDP = (S$200m /112) x 100 = S$178.6 million. Conversely, if the price level over the same period has fallen by 4%, then the GDP Deflator will be (100-4) =96. Hence, real GDP = (S$200m /96) x 100 = S$208.3 million.

Application – measuring the Real Growth rate in National Income

A key performance indicator for the economy is the real GDP growth rate. It can be calculated by using the formula (See Page 28 of Case Study Skills Package):

Growth in Real NI (% change) = Growth in Nominal NI (% change) – Inflation rate (%)

Numerical example:
In 2018, a hypothetical economy grew at a nominal rate of 10%. Inflation was running at the rate of 4% per annum. Find the real rate of economic growth for the economy.

% change in Real NI = % change in Nominal NI – Inflation rate (%)
= 10% – 4%
= 6%

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

- 2010 market prices means that prices used to measure this GDP value are those that prevailed in 2010, which is the base year (the chosen year of comparison)
- GDP at 2010 market prices therefore measure real (not nominal) output (the level of output after the effects of inflation have been removed)

REAL ECONOMIC GROWTH OF SINGAPORE

Overall Economy		2013	2014	2015	2016	2017	2018
GDP at 2010 Market Prices	$m	375,762	391,227	401,028	412,435	428,640	442,491
GDP at Current Market Prices	$m	381,843	396,916	421,046	437,339	464,928	487,087

Source: Singapore Department of Statistics, May 2019

3(a)(i) Explain what is meant by 'GDP at 2010 market prices'.

- GDP refers to the total value of final output produced within the geographical boundary of a country in a given time period, usually a year.

(ii) Why is Singapore's GDP at 2010 market prices consistently lower than her GDP at current market prices?

- Since real GDP only measures changes in physical output & ignores price changes (keep price constant at 2010 level) while nominal GDP measures both (P↑, Q↑), nominal GDP is naturally higher when there is inflation.
- Thus GDP at 2010 prices (real GDP) was lower than GDP at current prices (nominal GDP) as Singapore had experienced inflation (rising general price levels) over the given time period.

(b) Is it possible for GDP at current market prices to be lower than GDP at 2010 market prices? Justify your answer.

- It is possible if an economy experienced an overall fall in the general price levels (deflation).

5.1.2.3 Real National Income Per Capita

The basic indicator of standard of living is the **real national income per capita** – it can be Real GDP per capita or Real GNI per capita. Real national income per capita for a country measures the quantity of goods and services available for consumption on a per capita basis. The term "per capita" refers to per person or per head.

This is very important economic data used as a basis for tracking changes in **standards of living**. This measure can be obtained as follows:

$$\text{Real GNI per capita} = \frac{\text{Real GNI}}{\text{Population}}$$

Changes in economic welfare of the average citizen are thus measured by comparing real national income per capita figures over time.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

5.1.2.4 General Difficulties in Measuring National Income

In practice, the compilation of national income is a complicated statistical process. General difficulties arise due to the following:

a) Omissions in measurement of national income

If many of the following activities are omitted, the national income statistics will tend to understate the actual living standard of the economy.

- **Non-marketed activities** such as housewives' services and voluntary community work
- **Illegal activities** like gambling and smuggling
- **Unreported activities** such as casual jobs in the summer, private tuition, freelance jobs etc. These activities are often unreported to avoid paying taxes. This type of unofficial economic activity is seen as constituting a shadow or hidden economy, which economists refer to as the **black economy**.

b) Danger of double-counting

Double-counting arises because of the difficulty in distinguishing between

- final and intermediate products
- earned and transfer incomes

c) Difficulty in obtaining reliable and complete information

It is often difficult to obtain complete and reliable information since sources from which the data are obtained are not designed specifically for NI calculations, e.g. income tax returns fail to cover the lower income groups, incomes tend to be under-reported when individuals try to avoid paying high taxes etc.

Above section examines the problems of computing the national income.

Next section (below) examines the problems of using or interpreting the statistics.

5.1.3 COMPARISON OF STANDARD OF LIVING OVER TIME & SPACE

As mentioned earlier, one of the main uses of national income statistics is to indicate the overall standard of living of the people in a country.

Standard of living refers to the level of well-being or welfare enjoyed by an **average** person or resident of a country. Conceptually, the overall standard of living measures the **material plus non-material** well-being of the economy.

(1) **Material** (or tangible) well-being refers to the **quantity and quality of goods and services available to the residents for consumption**. The **real GDP per capita** is commonly used to measure material well-being as it measures the output of the country per person.

(2) The **non-material** well-being includes working hours, stress level, pollution level in the country or what is generally referred to as **'intangibles' or quality of life**.

Comparisons of the standard of living can be made in 2 different contexts:

(1) Inter-temporal comparison (over time): National income statistics are used to determine whether the standard of living of an average Singaporean (or any economy's citizen) is higher today compared to, say, 20 years ago.

(2) International comparison (over space): National income statistics are used to determine whether the standard of living of an average Singaporean is higher than, say, an American, Malaysian or Swiss national.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

However, the use of national income statistics to compare standard of living is not without problems. These statistics tend to **overstate** or **understate** the standard of living in economies. In fact, economists often point out that such comparisons must be made with careful qualifications, taking into account the various limitations. By the end of this chapter, you will become familiar with the various limitations of National Income as an indicator of living standards and also be aware of other supplementary indicators of economic welfare.

LIMITATIONS OF USING NATIONAL INCOME STATISTICS (assuming Nominal GDP is given) TO COMPARE STANDARD OF LIVING	
OVER TIME	**OVER SPACE**
MATERIAL aspects	**MATERIAL aspects**
a) **Changes** in general price level	a) **Different** currencies involved hence **purchasing power/ cost of living** might be inaccurately reflected
b) **Changes** in population	b) **Differences** in population
c) **Changes** in composition of NI	c) **Differences** in composition of NI
d) **Changes** in the distribution of NI	d) **Differences** in the distribution of NI
	e) **Different** sizes of the non-monetised sector
	f) **Differences** in the availability and reliability of data
Non-material aspects	**Non-material aspects**
e) **Changes** in Negative Externalities	g) **Differences** in negative externalities
f) **Changes** in disamenities	h) **Differences** in disamenities

5.1.3.1 Limitations of using national income statistics to compare standard of living over TIME

There are several difficulties encountered or limitations to note when using national income statistics (e.g. GDP) to compare living standards of a country over time. These limitations can be sub-categorised into **material** (quantitative) and **non-material** (qualitative) aspects.

❖ **Material/ Quantitative aspects**

a) Changes in general price level

Very often, national income statistics given in many publications are in **nominal terms**, i.e. Nominal GDP or GNI data are published, due to the ease of obtaining such data. However, nominal GDP or GNI is a **misleading indicator** of economic growth, especially for a country experiencing **high rates of inflation.** For purposes of comparison, **real GDP or GNI figures should always be used.**

Real national income should be used because it **measures the value of output at constant prices,** and **any increase** must mean a **rise in output** and **hence living standards.** On the other hand, a rise in nominal national income could be due to increases in prices with negligible increase in output. This would lead to negligible improvement in living standards.

Exemplification: In the case of Zimbabwe, the economy was facing hyperinflation in 2008. Figures from November 2008 estimated Zimbabwe's annual inflation rate at 89.7 sextillion (10^{21}) percent. By December 2008, annual inflation was estimated at 6.5 quindecillion novemdecillion percent (6.5×10^{108} %). If we were to use the nominal GDP figures to measure the performance of Zimbabwe for 2008, we would see that the growth in nominal GDP will be the highest in the world and hence conclude that Zimbabwe was doing very well in 2008. But this conclusion will be far from the truth if we were to use real GDP figures. With hyperinflation, one would expect the real GDP for Zimbabwe to be of a low value (refer to formula in Section 5.1.2.2).

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

The Zimbabwe case is an extreme one. A more moderate situation would be the issue of *overheating* in emerging economies such as China and India. With high inflation rates, nominal GDP or GNI figures will tend to overstate the standard of living in the economy.

b) Changes in population

Population tends to grow over time, so one has to consider how the rate of change in population compares with the rate of change in national income. If the population grows faster than real national income, the average individual's share of real national income will fall. In other words, the standard of living of an individual may be overstated or understated if we don't take into account population growth. Thus, a more accurate indicator of changes in the standard of living over time is **real GDP per capita** (same applies for GNI).

Exemplification: Singapore's average annual population growth hovers around 2% over the years. On the other hand, Singapore's economic growth rates are usually above 2% (with the exception of recession years). Using the formula on Page 10, it can then be said that Singapore's GDP per capita has seen an increase over time.

For easy inference, as long as the real GDP (or GNI) growth rate is more than the population growth rate, real GDP per capita is said to have increased.

NOTE:
It is **very important** to scrutinise the National Income data given in answering 'A' level questions. If the data given is **real GDP per capita**, it is not necessary to highlight the limitations of the data, namely its lack of consideration of (a) changes in general price level and (b) changes in population, as clearly, the data has already considered both.

However, if the data given is **real GDP**, then it is necessary to point out the limitation is (b) changes in population have not been considered. Similarly, if the data given is **GDP per capita**, the general assumption made is that the data given is in nominal terms. Hence, the limitation of this data is that (a) changes in general price level have not been considered.

Having considered the change in price level and population size, it is also important to look at the **composition** and **distribution** of national income. This is because even if real GDP per capita has increased may not always imply that the standard of living of residents has improved.

c) Changes in the composition of national income

consumption goods / capital goods

National income measures a country's level of **production/ output** but may be a poor indicator of the **consumption level** by a country's residents. This is because output includes both consumption goods and capital goods, but **current** living standards depend only on consumption goods.

Capital Goods (or Non-Consumption / Investment Goods)

Hence, for judging changes in consumer welfare, it is important to consider the composition of GDP. If a large proportion of the increase in GDP is derived from higher spending on capital goods (or non-consumption goods), such as defence or military goods (e.g. fighter jets; military tanks; aircraft carriers; guns and ammunitions), then we cannot say that the average citizen is better off, especially if these are produced at the expense of consumer goods.

Capital goods such as industrial machines, tools, equipment and factories, are not meant for consumption. They are used instead by producers as inputs. Hence, even though they are included in the country's GDP, capital goods do not contribute directly to the consumption or material well-being of the people.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

In fact, many developing countries such as China and Russia experienced difficult periods of "belt-tightening" during their early phase of rapid economic development and industrialisation. Much of their countries' resources were diverted to huge investments in infrastructure and the building up of industrial capacity e.g. road building, steel and manufacturing industries. As a result, their people had to forgo consumption. In some extreme instances, the people suffered deprivation and starvation e.g. Soviet Union under Stalin and China under Mao Zedong, when resources were diverted from growing food towards building up heavy industries, e.g. steel and power generation.

Exemplification: Whilst most of the rest of the world suffered negative growth in 2008 due to the global recession, North Korea on the contrary registered a 3.7% growth in its GDP. Before we conclude that North Korea performed well, we have to first look at the composition of its GDP. It is widely known that North Korea spends a substantial amount on military and nuclear power development, which are military goods. These are usually produced at the expense of consumption goods and therefore we cannot say that the average North Korean is better off. In fact, a large portion of its population still lives in poverty. Hence, changes in standard of living may be **overstated** by the GDP growth figures.

d) Changes in the distribution of national income

Looking at changes in real GDP per capita alone is still insufficient as it measures the average income per person in the economy. It does not reflect how the increase in national income has been distributed. In cases where increases in real GDP per capita are not equitably distributed to the people in the country, one cannot say that the average person is better off when there is an increase in real GDP per capita as a small minority might reap the greatest benefits of this increase in national income while the majority remain poor. In addition, if income disparity worsens as the economy experiences higher growth rate, standard of living does not improve for all but only for certain groups of people.

Exemplification: China has experienced almost double-digit growth for the past decade and this information may lead one to conclude that the Chinese economy is performing well. However, China's development has been concentrated mainly in urban cities along the coastal regions e.g. Shanghai. Rural areas remain poor and undeveloped. Hence, standard of living may be **overstated** in China if we do not take into account the distribution of the GDP.

The performance of different sectors in an economy can also contribute to a varying distribution of income. For example, being in a financial hub, workers employed in the banking and finance industries will tend to earn higher income then those employed in the low-end manufacturing industries. Also, being export-oriented, workers working in the export sectors will receive higher income than those employed in domestic sectors such as transport.

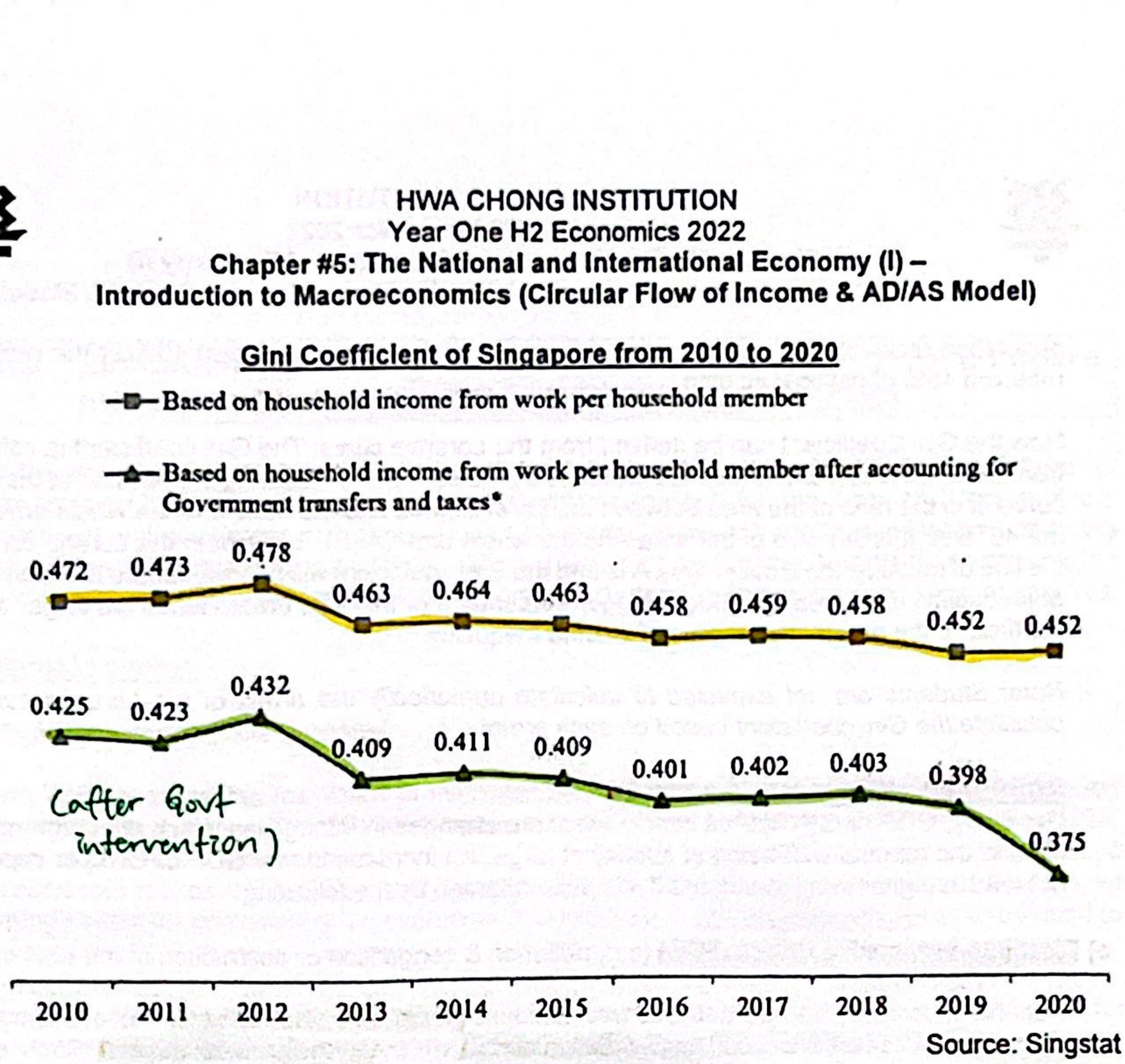
Gini Coefficient and Lorenz Curve

A better measure of distribution of income is the Gini coefficient. The Gini coefficient is a measure of the inequality of a distribution, with a value of 0 expressing total equality and a value of 1 representing maximal inequality. It is commonly used as a measure of the inequality of income or wealth.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

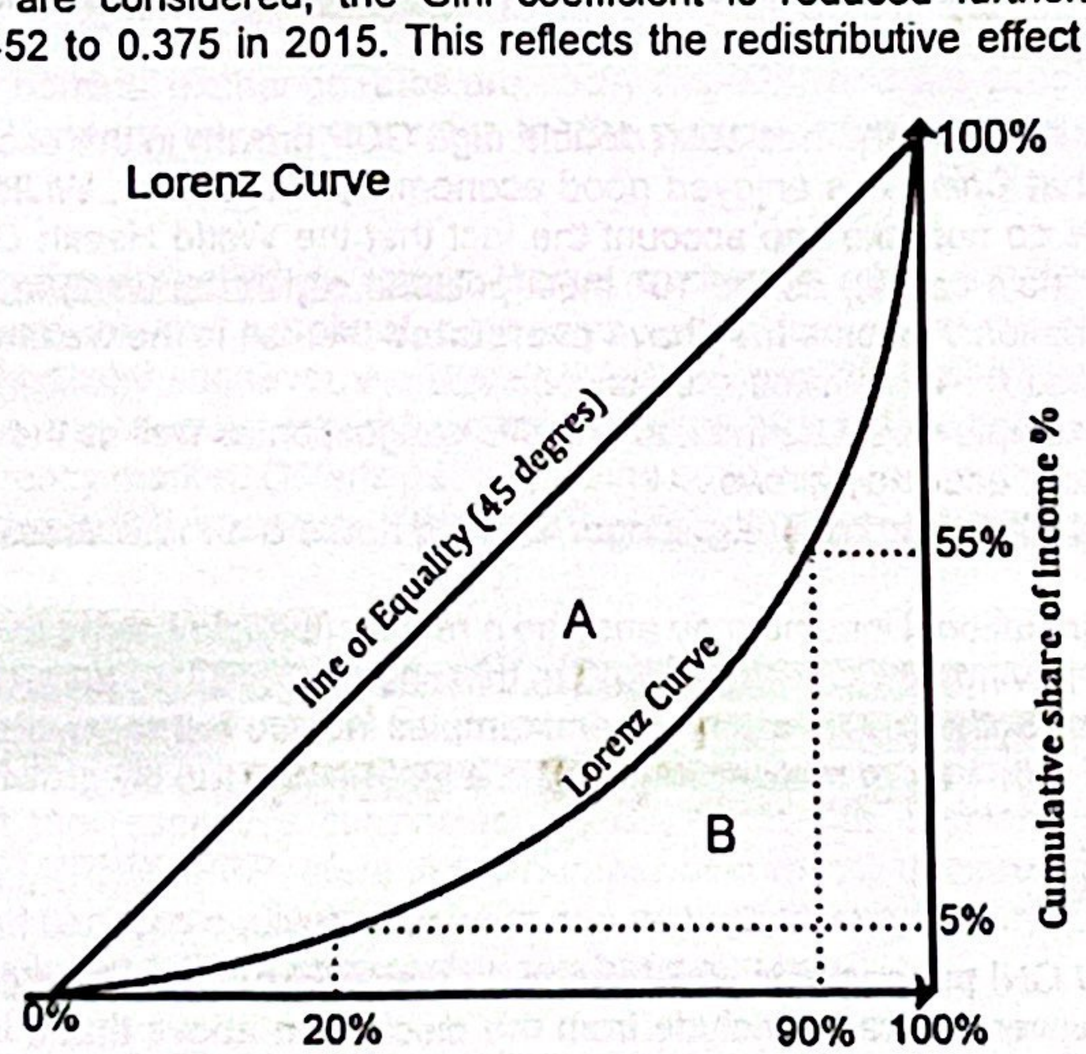
Scanned with CamScanner

Gini Coefficient of Singapore from 2010 to 2020



Source: Singstat

From the chart above, Singapore's Gini coefficient fell from 2010 to 2020. If government transfers and taxes adjustment are considered, the Gini coefficient is reduced further. E.g. the Gini coefficient fell from 0.452 to 0.375 in 2015. This reflects the redistributive effect of government taxes and transfers.



What the Lorenze curve aims to show: The Lorenz curve shows the proportion of national income earned by any given percentage of the population (measured from the poorest upwards). It is a way of showing the distribution of income (or wealth) within an economy. In this Lorenz curve, the poorest 20% of the population earned 5% of the national income. The poorest 90% of the

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

population received 55% of the national income. That means the richest 10% of the population received 45% of national income.

How the Gini Coefficient can be derived from the Lorenze curve: The Gini coefficient is calculated from the Lorenz curve. The Gini coefficient is a precise way of measuring the position of the Lorenz curve. It is the ratio of the area between the Lorenz curve and the 45°line to the whole area below the 45° line. It is the ratio of the area A to the whole area (A+B). The closer the Lorenz curve is to the line of equality, the smaller area A is and the Gini coefficient will be low. If there is a high degree of inequality, then area A will be a bigger percentage of the total area. Hence the larger the Gini coefficient, the greater the degree of income inequality.

Note: Students are not expected to calculate numerically the areas of the Lorenze curve nor calculate the Gini coefficient based on such areas.

❖ **Non-material/ Qualitative aspects**

Generally, GDP or GNI figures cannot measure changes in intangibles which affect the quality of life and the general well-being of society at large. An increase in real GDP or GNI per capita may not lead to higher living standards if it is accompanied by the following:

e) **Changes in negative externalities** (e.g. pollution & congestion or destruction of the environment)

National income figures do not take into account externalities produced by the economy. Many production processes create harmful by-products, which harm the environment. Such external costs are difficult to measure and are also not captured in the national income figures, which only reflect private costs. Thus, if increases in output are accompanied by increases in pollution, the greenhouse effect etc., then the resultant rise in national income would **overstate** the rise in society's welfare.

Exemplification: China has seen double digit GDP growth in the past decade. Hence one might conclude that China has enjoyed good economic performance. Whilst this may be true, GDP or GNI figures do not take into account the fact that the World Health Organisation in 2011 ranked Beijing (China's capital) as the 10th most polluted city in the world in terms of air quality. Hence, the rise in national income may have **overstated** the rise in the welfare of Chinese economy.

A further example would be the rise in traffic congestion as well as the strain on public transport as the Singapore economy grows.

f) **Changes in Disamenities** (e.g. longer working hours & a more stressful lifestyle)

Increases in national income may arise as a result of people having to work harder or longer hours and hence having less time for leisure. In this case, a growth in national income will **overstate** the improvement in the quality of life. Other examples include increased suicide rates and divorce rates associated with a more stressful lifestyle in a fast-paced, rapidly growing affluent economy.

❖ **Conclusion**

The real GDP / GNI per capita is widely used as a standard measure of changes in standard of living over time. However, we can conclude from the discussion above that it is useful but by no means a perfect measure of the level of well-being or welfare of the people of a country. It must be supplemented with other relevant information e.g. intangibles, to give a more complete picture of the actual change in overall standard of living over time.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

5.1.3.2 Limitations of using national income statistics to compare standard of living over SPACE (between countries)

Most of the above limitations covered in Section 5.1.4.1 apply when using national income statistics to compare standard of living between different countries, except for the additional key problem associated with using different currencies. The problems are especially pronounced when comparing different groups of countries at significantly different levels of development, such as comparing the standard of living in **developed** (advanced) economies with **developing** (emerging / poor) economies.

❖ **Material aspects**

a) Different currencies are involved

Every country measures the value of its output or GDP in their respective domestic or national currencies. For instance, the GDP of Singapore is measured in SGD, whereas the GDP of USA, Japan, and Sweden are measured in USD, JPY and SWK respectively. A major problem arises because this makes it difficult to compare the GDP of different countries because there is no common basis for comparison. To overcome this problem, a common currency has to be used to measure the GDP of every economy.

Today, it is standard practice to use the **US dollar** as the common currency to measure GDP for the purpose of international comparison of standard of living. Before any comparison is made, the GDP of different countries must be first converted into US$. However, this poses a problem for international comparison, because the set of exchange rates commonly used are based on market or official exchange rates prevailing in the currency markets.

Although the market or nominal exchange rates are easily available and are used on a daily basis by banks and money changers, using these rates for the purpose of international comparison of GDP pose 2 key problems:

(1) **Fluctuations of market exchange rates:** Market exchange rates are determined by the market forces of demand for and supply of currencies in the foreign exchange markets. The exchange rates may fluctuate whenever the demand for or supply of currencies changes. The official exchange rates could even be the result of speculative activities and government interventions in the currency market. Ceteris paribus, using such exchange rates causes the value of the GDP to change arbitrarily whenever exchange rates fluctuate, making comparison of GDP meaningless.

(2) **Inaccurate reflection of Purchasing Power/ Cost of Living:** An even more serious drawback is the fact that international comparisons of GDP based on market exchange rates are misleading as they do not reflect the **differences in cost of living** between countries, i.e. the relative **Purchasing Power** of the respective currencies. To overcome this problem, economists use **Purchasing Power Parity (PPP)**. PPP refers to the number of currency units required to purchase an amount of goods and services equivalent to what can be bought with one unit of currency of the base country, for example the US$ (a commonly used base currency).

Simple Illustration
For example, if the same Big Mac Burger costs S$6 in Singapore and US$3 in America, then it can be said that the PPP between the 2 respective currencies is S$2: US$1 (or S$1: US$0.50). In other words, the purchasing power of S$1 in Singapore is equivalent to the purchasing power of US$0.50 in America.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

overvalued: market exchange > PPP rate

undervalued: market exchange < PPP rate

Unlike PPP, market exchange rates do not reflect differences in purchasing power. Thus, using market exchange rates could result in either under-valuation or over-valuation of the currency in terms of PPP. The currency is said to be under-valued if the market exchange rate is below the PPP and over-valued if it is above its PPP.

In addition, the comparison of standard of living especially between rich developing countries and poor developing countries may be misleading if market exchange rates are used.

This is because market exchange rates generally tend to **undervalue** the purchasing power of the currencies of poor developing countries. This is because the **cost of living** and prices for the same goods and services available in poor developing countries are typically much lower than in rich countries. Whilst it is said that a person cannot survive on US$2 a day in countries such as the USA or the UK, the same amount could possibly afford the same person adequate basic necessities in poorer countries such as Bangladesh or Myanmar. This disparity in relative price levels is at the nub of the issue over the merits of using PPP exchange rates to adjust for differences in price levels across different countries to better reflect actual differences in standards of living.

Converting each country's GDP using PPP rates rather than official exchange rates tends to lead to more accurate use of statistics to compare standard of living over space.

Table 1: Rank of selected economies by GDP per capita (PPP) and GDP per capita (current exchange rates) in US$, 2014

	World Rank (PPP)	GDP per capita (PPP)	World Rank (current exchange rates)	GDP per capita (current exchange rates)
Singapore	**2**	**83,066**	**9**	**56,287**
United States	10	54,370	11	54,370
China	88	13,224	80	7,572
India	124	5,808	145	1,608
South Korea	30	35,379	30	27,970
Hong Kong	9	55,097	25	40,033
Taiwan	19	46,036	37	22,600
Sweden	17	46,219	7	58,536

Source: International Monetary Fund, World Economic Outlook Database, October 2015

Table 1 above illustrates the different values of GDP per capita measured in terms of current exchange rate and PPP. By using GDP per capita (PPP), Singapore's national income per capita appears much larger than that suggested by GDP per capita (current exchange rates in US$). This is true for some of the economies listed in Table 1, and especially so for Hong Kong and South Korea.

It should also be noted that if we were to compare standards of living between Singapore and United States using GDP per capita (current exchange rates) in US$, one would conclude that the average Singaporean has a lower standard of living than the Americans. However, if we were to use the GDP per capita (PPP), which would have taken into account the differences in cost of living between the two economies, the average Singaporean would then seem to have a higher standard of living. This means that without the use of PPP figures, standard of living comparisons may not be fair as it may **overstate** or **understate** the standard of living of the economies under comparison.

4. From Table 1, why is there a difference in the economies' world rankings based on the 2 indicators GDP (PPP) vs. GDP (US$)?

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Evaluation: Difficulties in deriving the GDP based on PPP

Whilst it is more accurate to use PPP based exchange rates, in practice such information is not easily available. Unlike information on market exchange rates, which can be obtained from currency markets (e.g. banks), PPP rates have to be specially constructed or derived from painstaking research. Moreover, economists involved in the construction or derivation of GDP based on PPP rates face many challenges.

A key challenge is to find a common basket of goods and services for the purpose of making international comparisons of prices across different countries. To find common ground for comparison, the basket of goods and services chosen must reflect international tastes and preferences.

However, this is easier said than done because consumption patterns vary across countries. For example, rice might be a staple item in Asian countries but not in Western countries, or winter clothing is common in cold countries but not in tropical countries. And the quality of goods might also differ.

b) Differences in population size

Similar to comparing national income over time, it is crucial to look at per capita figures to ascertain the difference in material aspects of standards of living, since population size will be different for different economies.

Table 2: Rank of Selected Economies by GDP per capita (PPP) and GDP (PPP), 2020

	World Rank GDP per capita (PPP)	GDP per capita (PPP)	World Rank GDP (PPP)	GDP (PPP)
Singapore	**2**	**93,397.05**	**39**	**560,200m**
United States	10	59,919.82	2	209,366,600m
China	74	16,315.82	1	242,733,360m
India	125	6,165.75	3	9,907,028m
South Korea	28	42,335.87	14	2,233,001m
Hong Kong	12	56,153.97	46	443,304m
Luxembourg	1	112,557.31	99	74,836m
Sweden	18	50,923.11	38	564,916m

Source: The World Bank, accessed July 2022

From Table 2 above, if we were to use GDP (PPP) to compare the standard of living between economies, one would possibly say that China has a higher standard of living than Singapore since its GDP is around 433 times higher. Such a conclusion would be **understating** the standard of living for Singapore and **overstating** the standard of living for China. This is because if we were to compare using the GDP per capita figures, then the outcome would be very different. Singapore's GDP per capita is about 6 times higher than China's, indicating that the average Singaporean is able to consume more goods and services, therefore enjoying greater material well-being and thus a higher standard of living.

In addition, Sweden and Singapore have similar GDP of around US$560bn and this may mislead people to think that an average resident in both countries is able to consume a similar quantity of goods and services. However, Sweden's population size is almost twice that of Singapore and hence in terms of GDP per capita, Singapore's is almost twice that of Sweden. This implies that an average person in Singapore gets to enjoy more goods and services and hence has a higher material standard of living.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

5. Summarise the above information in (a) and (b) to answer the essay question:

"In 2014, Singapore's GDP per capita was US$56,287 while Sweden's was US$58,536.

How useful is GDP per capita in US$ for comparing living standards between Singapore and Sweden?"

HIGHLIGHT/ BRACKET the necessary information, **Include additional information**, and **draw arrow(s)** to rearrange the information when required.

c) Differences in the composition of national income

In the US and China, a significant proportion of their national income is derived from the production of military and space equipment. Such goods are considered capital or investment goods and are not available for current consumption. This contributes very little to consumers' welfare even if the real national income per capita is high. On the other hand, the real income of some developing countries may be lower, but their production is concentrated on consumer goods and services. Thus, their people would enjoy greater consumer welfare and hence current standard of living, despite their lower real income.

d) Differences in the distribution of national income

A country's GDP per capita may be higher than that of another country but its living standards may be lower due to greater inequality in the distribution of income. Again, a better measure might be to use the Gini coefficient as a basis for comparison.

Global Gini coefficients range from 0.23 (Sweden) to 0.70 (Namibia). While developed European nations and Canada tend to have Gini coefficients between 0.24 and 0.36, The United States' and Mexico's Gini coefficients are both above 0.40, indicating that The United States and Mexico have greater inequality. Singapore's Gini coefficient was at 0.463 in 2013, suggesting greater income inequality than the US and developed European nations. Also, poor or developing countries usually have wider disparities in income distribution. Wealth is concentrated in the hands of a minority of people who might also wield political power.

Although the Gini coefficient in Singapore is on a downward trend, there is still an issue of income disparity. In fact, according to the UN, Singapore has a Gini coefficient that is one of the highest amongst developed countries.

e) Different size of the non-monetised sector

Comparisons of GDP per capita between countries will be misleading if the relative importance of non-monetised sectors is vastly different. Generally, developing economies tend to have a larger non-monetised sector than developed economies. For instance, developing countries with rural farming populations typically have large non-monetised sectors. In farming communities, it is common to have unpaid family members and relatives helping out on the farms. Farmers also engage in subsistence farming, i.e. growing food for their own consumption. Such outputs are not measured and therefore not reflected in the official national income statistics.

The role of women in society also influences the size of the monetized sector. For example, if more women stay at home as full time housewives, the services provided by full-time housewives are not counted in the national income. Hence, national income statistics would tend to **understate** the true level of activity since they are not able to capture this level of economic activity in the economy.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

f) Differences in the availability and reliability of data

One of the greatest limitations when comparing standard of living between countries is the lack of accurate data. Comparing the relatively more accurate estimates of advanced countries with that of more backward countries will yield misleading results.

It is not an easy task to collect accurate statistics in a big country where a large part of the population live in rural areas, and where the administrative machinery for gathering official statistics is relatively inefficient - not to mention that corruption is also a big problem.

❖ **Non-material aspects**

g) Negative externalities

Developed economies tend to have higher GDP per capita than emerging economies. However, the higher output levels may be accompanied by higher levels of pollution, congestion and depletion of natural resources. Hence, it can be seen that higher output levels could lower the standard of living for such countries. Therefore, looking at national income statistics alone is insufficient to give a true picture of the standard of living between countries, i.e. it may **overstate** or **understate** the standard of living. Economists sometimes refer to the concept of green GDP which takes into account differences in environmental quality. (Refer to Chapter 6 Section 6.1.3.1.1 for more information on green GDP)

h) Disamenities (Differences in the hours of work vs. leisure time)

The higher real GDP per capita in some countries may be the result of people working harder or longer hours. A higher real GDP per capita does not therefore necessarily mean a better standard of living, if the increased GDP is due to longer working hours.

In today's context, a key issue is work-life balance. The quality of life in a fast-paced urbanised society is often marred by 'unhealthy' work-life balance, i.e. a disproportionate amount of time is spent working. In order to improve the quality of life, people are increasingly striving to achieve a so-called satisfactory work-life balance, i.e. striking a balance between earning a desired income and having sufficient time for leisure.

5.1.4 OTHER INDICATORS OF ECONOMIC WELFARE

Clearly, the use of national income statistics as a measure of the economic welfare of an economy has its limitations. To overcome some of these limitations, economists have devised or constructed more holistic measures of standard of living, which include other information to supplement the use of national income statistics as the basic indicator of standard of living. Such **composite indicators** 'add on' to existing measures of standard of living by including data such as the distribution of income, negative externalities and disamenities. Two of the more well-known ones are the **Human Development Index (HDI)** and the **Net Economic Welfare (NEW)**.

Human Development Index (HDI)

The HDI is a composite indicator developed by the United Nations in 1990 to broaden the measure of standard of living beyond National Income figures. It is intended to capture what is typically considered to be key dimensions of human development: decent material well-being, a long and healthy life and being knowledgeable. It is used by the UN to distinguish whether a country is developed, developing or underdeveloped.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

The HDI takes a value between 0 and 1, with highly developed countries obtaining higher scores. It is based on a weighted average of three indicators: (i) **real GNP or GNI per capita (PPP)**; (ii) **life expectancy** at birth; and (iii) **educational attainment** as measured by mean years of schooling and expected years of schooling (refer to Appendix3 for more details).

In 2020, Singapore came in 12th place in world HDI rankings (see Table 3).

Table 3: Rank of Selected Economies by HDI and GDP per capita (PPP), 2020

	World Rank HDI	HDI	World Rank GDP per capita (PPP)	GDP per capita (PPP)
Singapore	**12**	**0.938**	**2**	**93,397.05**
United States	17	0.926	10	59,919.82
China	82	0.761	74	16,315.82
India	127	0.645	125	6,165.75
South Korea	24	0.916	28	42,335.87
Hong Kong	4	0.949	12	56,153.97
Luxembourg	23	0.916	1	112,557.31
Sweden	7	0.945	18	50,923.11

Source: The United Nations, Human Development Report, 2020

Net Economic Welfare (NEW)

Net Economic Welfare (NEW) or Measure of Economic Welfare (MEW) is a composite indicator developed in the 1960s to provide a better indicator of standard of living. It adds to GNP certain items such as leisure and non-marketed activities (e.g. housewives' services). It also subtracts from GNP undesirable costs of pollution and other disamenities of modern urbanisation (e.g. longer worker hours/ environmental degradation).

Supplementary Indicators
There are many other indicators available besides the standard NI data for measuring standard of living. In recent years, an interesting index called the *GHI or Gross Happiness Index* has been popularised by the Kingdom of Bhutan to measure welfare.

5.1.5 CONCLUSION

This chapter focused on explaining how the various national income statistics (e.g. GDP, GNI, Real national income, real national income per capita, etc.) can be used to compare living standards over time and space. Furthermore, the limitations of using these statistics to compare living standards over time and over space were also discussed in detail. Other indicators of economic welfare were also introduced.

Recommended Reading

Miller, Roger L.R., Economics Today (8th Ed) Chapter 8: Measuring the Economy's Performance
Sloman, John, Economics (7th Ed), Pg. 493 - 397
Maunder, Peter et al, Economics Explained (3rd Ed), Pg. 241 – 258

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Appendix 1: Key Economic Indicators & SOL

Table 1: Selected Singapore's Economic Indicators, 2011 – 2019

	2014	2015	2016	2017	2018	2019	Indicators explained
Nominal GDP (S$ millions)	398,947	423,444	440,218	472,079	503,395	507,567.7	Nominal GDP refers to GDP at current prices. This means that effects of price changes have not been removed. This is *not* the indicator to use for comparison purposes.
Real GDP (S$ millions) Calculated @ 2015 prices	411,156	423,444	437,178	456,137	471,819	475,279	Real GDP refers to GDP at constant prices. This means that the effects of price changes have been removed. It measures the national income in terms of physical quantities of goods and services. Calculated at 2010 prices means 2010 is the base year used in the calculation in this case.
Population Growth (%)	1.3	1.2	1.3	0.1	0.5	1.2	The rate of change of population. If the population grows faster than real national income, the individual's share of real national income will be falling.
Real GDP (% Change)	3.9	3.0	3.2	4.3	3.4%	0.7%	This indicator measures the economic growth. As long as the growth is positive, GDP is rising. From 2011 to 2012, although growth fell, GDP still rose, but at a slower rate than 2007.
GDP per capita (S$) Calculated @ current prices	72,938	76,503	78,364	83,265	87,108	88,991	GDP per capita refers to average GDP. It is calculated using GDP divided by population size. (*Note that in this case it is calculated at current prices this means that this is a nominal figure.*)
Unemployment Rate (%)	2.0	1.9	2.1	2.2	2.1	2.3	This measures the percentage of people (in the labour force) of working age, who are willing and able to work but are unable to find employment. This is an important indicator of employment but it does not tell you about the cause of unemployment (cyclical / structural / frictional / seasonal). You would need to read accompanying extracts to get a better picture.
Inflation Rate (%)	1.0	-0.5	-0.5	0.6	0.4	0.6	This measures the rate at which general price level in the economy is rising. It is too an important indicator of the health of the economy. However, it does not tell you the cause of inflation (Demand-pull or cost-push). You would need to read the extracts.
Total Trade in Goods & Services (S$ millions) At Current Prices	1,438,077	1,395,127	1,338,043	1,491,829	1,645,794	1,619,894	Total trade is export revenue + import expenditure. It is used to measure the openness of the economy. Looking at the figure as a proportion to GDP, total trade is about 4 times of GDP in Singapore illustrating our dependency on trade.
Exports of goods and services (S$ millions)	765,795	755,359	726,774	805,864	894,449	880,718	If we take export revenue – import expenditure (X-M), we get trade balance/balance of trade/net exports. This is one of the components in AD. *Note: Total trade volume and net exports are different.*
Imports of goods and services (S$ millions)	672,282	639,768	611,269	685,965	751,346	739,177	

Source: Singapore Department of Statistics, 2020

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Appendix 2: The Big Mac Index

The **Big Mac Index** is published by The Economist as an informal way of measuring the Purchasing Power Parity (PPP) between two currencies and provides a test of the extent to which market exchange rates result in goods costing the same in different countries. It "seeks to make exchange-rate theory a bit more digestible".

A McDonald's Big Mac.

The index takes its name from the Big Mac, a hamburger sold at McDonald's restaurants.

The Big Mac index was created as a semi-humorous illustration of PPP.

One suggested method of predicting exchange rate movements is that the rate between two currencies should naturally adjust so that a sample basket of goods and services should cost the same in both currencies Purchasing Power Parity. In the Big Mac Index, the basket in question is a single Big Mac burger as sold by the McDonald's fast food restaurant chain.

The Big Mac PPP exchange rate between two countries is obtained by dividing the price of a Big Mac in one country (in its currency) by the price of a Big Mac in another country (in its currency). This value is then compared with the actual exchange rate; if it is lower, then the first currency is under-valued (according to PPP theory) compared with the second, and conversely, if it is higher, then the first currency is over-valued.

For example, using figures in the price of a Big Mac was $3.57 in the United States.

1. the price of a Big Mac was £2.29 in the United Kingdom
2. the implied purchasing power parity was $1.56 to £1, that is $3.57/£2.29 = 1.56
3. this compares with an actual exchange rate of $2.00 to £1 at the time
4. (2.00-1.56)/1.56 = 28%
5. the Pound was thus overvalued against the US dollar by 28%

While economists widely cite the Big Mac index as a reasonable real-world measurement of purchasing power parity-the burger methodology has some limitations. In many countries, eating at international fast-food chain restaurants such as McDonald's is relatively expensive in comparison to eating at a local restaurant, and the demand for Big Macs is not as large in countries such as India as in the United States.

Nevertheless, McDonald's is also using different commercial strategies which can result in huge differences for a product. Overall, the price of a Big Mac will be a reflection of its local production and delivery cost, the cost of advertising (considerable in some areas), and most importantly what the local market will bear — quite different from country to country, and not all a reflection of relative currency values.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

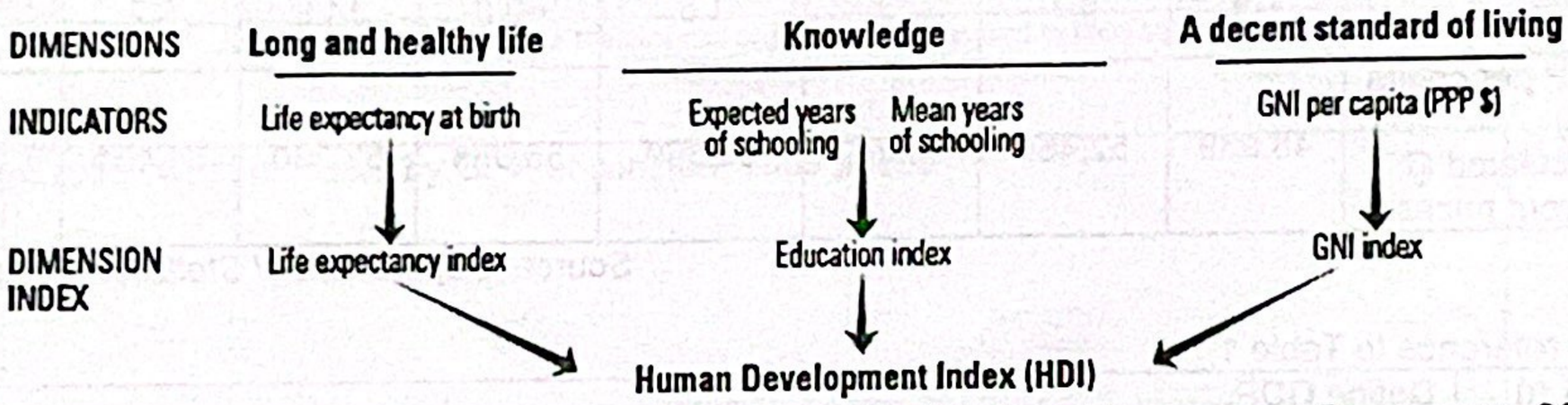
Appendix 3: The Human Development Index

The **Human Development Index** (HDI) is a composite statistic designed to measure average achievements in three basic aspects of human development – leading a long and healthy life, being knowledgeable and enjoying decent material well-being. As such, it comprises of indicators measuring:

(i) Life expectancy at birth;
(ii) Educational attainment (as measured by both the mean number of years of schooling as well as the expected years of schooling);
(iii) Income per capita (as measured by GNI per capita in PPP$).

Note: In calculating the HDI, GNI per capita is fixed at a maximum of $75,000. The effects of income per capita beyond this level on the HDI are thus not considered. This is meant to reflect the idea that while income is instrumental to human development, it contributes less as incomes rise. In this way, higher incomes are prevented from dominating the HDI value. At present, only 4 countries have GNI per capita above the cap – Liechtenstein, Kuwait, Qatar and Singapore.

Figure 1: Composition of the HDI



Source: United Nations Development Programme, 2015

HDI values range from 0 to 1. A country scores higher HDI when the life expectancy at birth is longer, the education period is longer, and the income per capita is higher.

The HDI has its roots in the annual Development Reports of the United Nations Development Programme. It was created by economists Mahbub ul Haq and Amartya Sen in 1990 and is meant to emphasise that expanding human choices – not economic growth alone – should be the ultimate criteria for assessing development results. Since its inception, it has been used for

The UN acknowledges, however, that the HDI simplifies and captures only part of what human development entails. For example, it does not reflect on inequalities, poverty, human security, empowerment, etc. The concept of human development is in fact much broader than what can be captured by the HDI, or by any other composite index – composite indicators are simply focused measures of human development, which zoom in on a few selected areas. A comprehensive assessment of human development requires analysis of other human development indicators and information.

The use of the HDI nonetheless provides a more holistic assessment of standards of living than NI figures alone.

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

HWA CHONG INSTITUTION
Year One H2 Economics 2022
Chapter #5: The National and International Economy (I) –
Introduction to Macroeconomics (Circular Flow of Income & AD/AS Model)

Tutorial 5.1

Question 1: National Income of Singapore

Table 1: Singapore's Gross Domestic Product

	2005	2006	2007	2008	2009	2010	2011	2012
Nominal GDP (S$ millions)	208,764	230,509	267,254	267,952	274,655	315,921	334,092	345,560
Real GDP (S$ millions) Calculated @ **2005 prices**	208,764	226,933	246,846	250,516	249,559	286,446	301,228	305,201
Real GDP (% Change)	7.4	8.7	8.8	1.5	–0.8	14.8	5.2	1.3
GDP per capita (S$) Calculated @ current prices	48,939	52,466	58,243	55,369	55,068	62,230	64,451	65,048

Source: *Department of Statistics, Singapore*

With reference to Table 1,

a)	(i)	Define GDP.	[1]
	(ii)	Distinguish between real and nominal GDP.	[2]
	(iii)	Describe the changes in Singapore's real GDP from 2007 to 2010.	[2]
	(iv)	Describe Singapore's real GDP growth from 2007 to 2010.	[2]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Question 2: Gross Domestic Product of the United States [Extra Practice]

The data below relates to GDP in the US economy based on adding up the components of expenditure – consumption, government spending, fixed investment and net exports.

**Table 2: Expenditure on the Gross Domestic Product
(US$ billions at constant 2009 prices) in the United States of America**

Years	Consumers' expenditure (C)	Gross domestic fixed capital formation (I)	Government expenditure (G)	Net Exports of goods and services (X-M)	GDP
2010	10,201.9	2,100.8	3174.0	-518.5	14,958.3
2011	10711.8	2232.1	3158.7	-568.7	15,533.8
2012	11149.6	2475.2	3167.0	-547.2	16,244.6
2013	11496.2	2673.7	3124.9	-491.3	16,797.5

Source: Annual Report of the Council of Economic Advisers to the President of the United States, 2014

(a)		Explain what is meant by GDP at constant 2009 prices.	[2]
(b)	(i)	State the additional information that is required to calculate GNP from Table 2.	[1]
	(ii)	Explain what additional information economists would require to compare living standards in the US between 2010 and 2013.	[4]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Question 3: Composition of National Income and Standard of Living

Table 3: Gross Domestic Product (GDP) and its components in selected economies (% of total), 2006

	China	US	Singapore
Total GDP (US$ billion) 2006	2765.4	12433.9	132.2
Composition:	%	%	%
Private consumption	36.5	69.9	40.1
Government consumption	13.8	19.2	11.1
Gross fixed investment	41.9	16.7	23.1
Exports of goods and services	39.7	11.1	249.6
Imports of goods and services	-31.9	-16.9	-223.9

Discuss how current and future living standards are affected by the composition of national incomes in terms of the expenditure components as shown in Table 3.	[8]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Question 4: Macroeconomic Indicators and Standard of Living (N2007 CSQ1)

Table 4a: Macroeconomic Indicators: China

	2003	2004	2005	2006
Annual rate of growth in real GDP	9.5	9.7	9.0	9.2
Rate of inflation	1.2	3.9	4.0	4.2
Government budget balance (% of GDP)	-1.9	-0.9	-0.4	-0.2
Current account balance (US$ billion)	45.9	68.7	100.0	101.0
Current account balance (% of GDP)	3.1	4.0	5.2	4.6

Table 4b: Macroeconomic Indicators: Brazil

	2003	2004	2005	2006
Annual rate of growth in real GDP	0.5	5.2	3.7	3.5
Rate of inflation	9.3	7.6	6.3	5.0
Government budget balance (% of GDP)	-5.1	-2.7	-3.8	-2.8
Current account balance (US$ billion)	4.2	11.7	6.5	2.0
Current account balance (% of GDP)	0.8	1.9	0.9	0.3

Table 4c: Macroeconomic Indicators: Russian Federation

	2003	2004	2005	2006
Annual rate of growth in real GDP	7.3	7.1	6.0	6.0
Rate of inflation	12.0	11.7	13.0	12.0
Government budget balance (% of GDP)	1.2	4.5	2.0	1.5
Current account balance (US$ billion)	39.5	58.2	92.0	80.0
Current account balance (% of GDP)	8.3	10.0	12.0	8.5

Source: Organisation for Economic Co-operation and Development Outlook No 77

(a)(i)	What is the difference between real GDP growth and nominal GDP growth?		[1]
(a)(ii)		Identify the economy which is projected to have the highest growth in nominal GDP in 2006.	[1]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(b)		Discuss whether the data provided are sufficient to assess changes in the standard of living in these economies over the period.	[8]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

HWA CHONG INSTITUTION
Year One H2 Economics 2022
Chapter #5: The National and International Economy (I) –
Introduction to Macroeconomics (Circular Flow of Income & AD/AS Model)

Question 5: N2014 (adapted)

In 2011, Singapore's GDP at 2005 prices grew by 4.9%, the total population grew by 2.5%, inflation (as measured by the consumer price index) was 5.2% and overall unemployment stood at 1.9%.

Source: http://www.singstat.gov.sg/stats/latestdata.html, accessed 30 January 2013

b) Discuss the limitations of these statistics in the change in the standard of living in the Singapore economy in 2011. [15]

b) Discuss the limitations of these statistics in comparing the standard of living in Singapore with that of other economies. [15]

Question 6: N2020 (to go through after Part 2 of Chapter 5)

Government expenditure on large-scale infrastructure projects such as airports and mass rapid transit (MRT) can contribute significantly to a country's economic growth.

(a) Explain how government expenditure on large-scale infrastructure can contribute to a country's economic growth. [10]

(b) Discuss the extent to which such government expenditure on infrastructure projects will lead to a rise in living standards of a country. [15]

Question 7: N2012 (optional. Can go through after Chapter 6)

(a) How do economists compare the economic performance of different countries? [10]

(b) Assess the extent to which Singapore's economic performance is the main determinant of its population's standard of living. [15]

©Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

PART 2: CIRCULAR FLOW OF INCOME & AD/AS MODEL

CHAPTER OUTLINE

5.2.1 CIRCULAR FLOW OF INCOME

5.2.2 THE MULTIPLIER
- 5.2.2.1 Definition
- 5.2.2.2 The multiplier process
- 5.2.2.3 The multiplier formula
- 5.2.2.4 Factors that affect the size of the multiplier
- 5.2.2.5 The size of Singapore's multiplier

5.2.3 The AD/AS MODEL
- 5.2.3.1 Introduction

5.2.3.2 Aggregate Demand (AD)
- (A) Shape of the AD Curve
- (B) Shifts of the AD Curve

5.2.3.3 Aggregate Supply (AS)
- (A) Shape of the Neo-Keynesian AS Curve
- (B) Shifts of the AS Curve
  1. Factors that Shift the Horizontal & Upward Sloping Range of the AS Curve
  2. Factors that Shift the Vertical Range of the AS Curve
  3. Factors that the Entire AS Curve

5.2.3.4 AD-AS: Macroeconomic Equilibrium
- (A) Equilibrium Level of Income and Output
- (B) Equilibrium and the State of the Economy

Recommended readings
Appendices

Tutorial 5.2

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

A LEVEL QUESTIONS IN RECENT YEARS

A LEVEL ESSAY QUESTIONS

N2020 Q4
Government expenditure on large-scale infrastructure projects such as airports and mass rapid transit (MRT) can contribute significantly to a country's economic growth.

(a) Explain how government expenditure on large-scale infrastructure can contribute to a country's economic growth. [10]

N2014

	$ billion
Private Consumption Expenditure	129
Gross Fixed Capital Formation	77
Government Consumption Expenditure	34
Exports of goods and services	531
Import of goods and services	444
GDP	327

(a) Economies consist of several key sectors such as households, firm, government and the rest of the world. Explain the relative importance of these key sectors of the circular flow of income in determining the national income in Singapore. [10]
(b) Discuss the likely effects on Singapore's national income and its components when its exchange rate appreciates. [15]

N2009
The relative importance of the components of the circular flow of income for a small and open economy, such as Singapore, is likely to be different from a large and less open economy, such as the USA.
(a) Explain this statement. [10]
(b) Assess whether a change in the external value of its currency is more likely to have a larger impact on Singapore or USA. [15]

N2002
(a) Assume there is an open economy with a government sector. Explain the conditions for equilibrium in the circular flow in such an economy. [10]
(b) Discuss how an increase in injections may affect the equilibrium level of national income. [15]

A LEVEL CASE STUDY QUESTIONS [30m]

N2010 Q2 – The effects on Asia of recession in the US
N2009 Q2 – China's Drive to Expand Overseas
N2007 Q1 – OECD report on China, Brazil and the Russian Federation, 2005

© Hwa Chong Institution Economics Unit. All Rights Reserved.

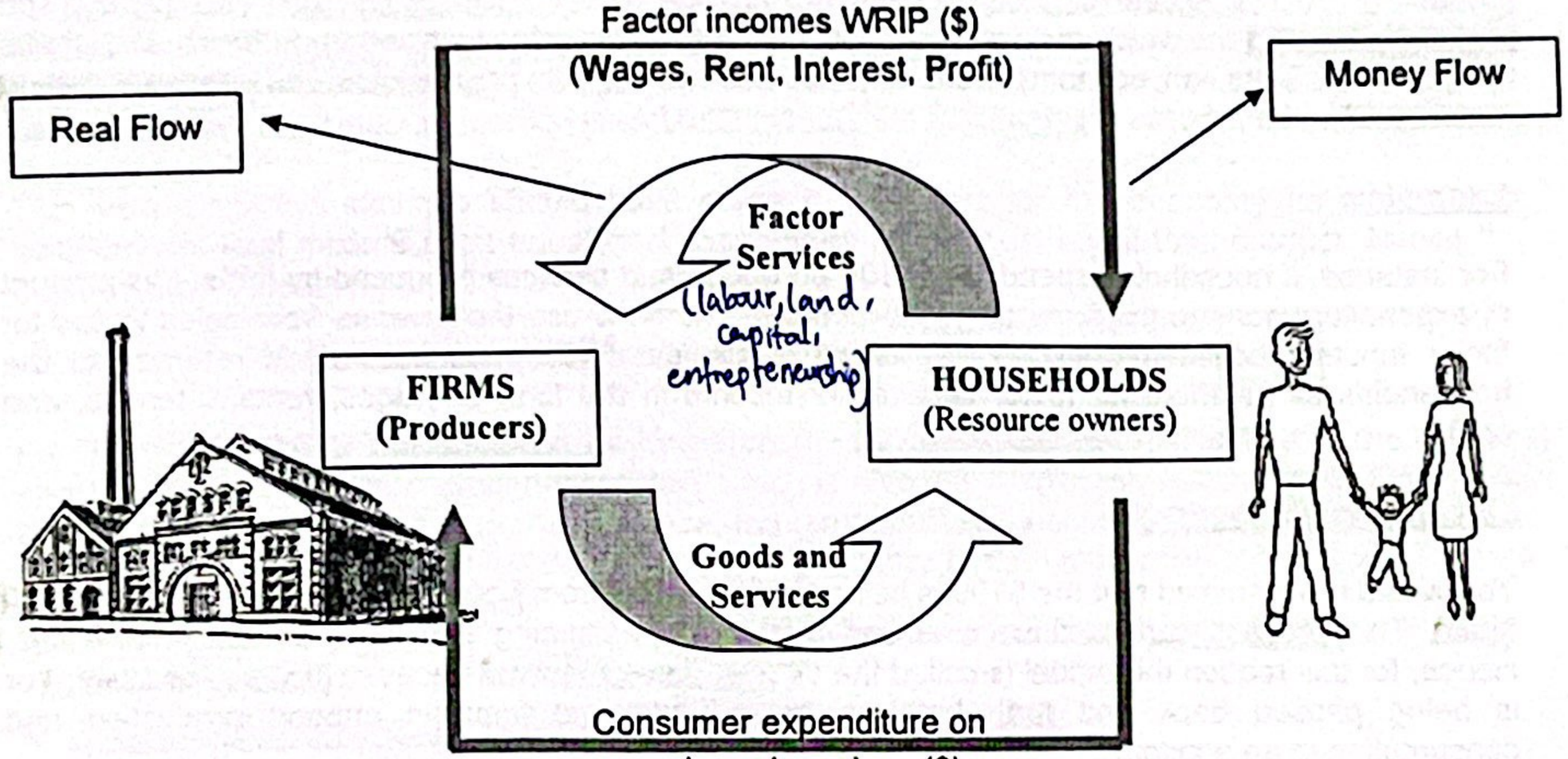
Scanned with CamScanner

5.2.1 CIRCULAR FLOW OF INCOME

The circular flow of income model is used to explain how production of the national output and level of income in an economy is driven by **expenditure (consumption)**.

The circular flow of income model of a simplified economy

Figure 1a: Circular Flow of Income & Expenditure for a 2-sector closed economy



With reference to Figure 1a above, a simplified economy is made up of 2 sectors:
(1) Consumers or Households (also resource owners)
(2) Producers or Firms

(1) How is the national income determined by expenditure in a simplified model of an economy?

Using a simplified model of an economy where there are only 2 sectors, the circular flow of income model can be used to help us understand how the national income is determined by expenditure. If you recall, the basic role of an economy is to organise production for the purpose of satisfying wants or human desire for consumption of goods and services. Hence, there must be at least 2 sectors - Households (i.e. consumers) and Firms (i.e. producers) to form a simple economy.

❖ **2-Sector Economy**

With reference to Figure 1a, the role of households as consumers is to spend (**C – Consumption Expenditure**) on goods and services produced by the firms. At the same time, the role of households as resource owners is to provide factor inputs/services (labour, land, capital, entrepreneurship) to firms for the purpose of production.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Expenditure Creates Income

demand ↑

First, production of output takes place only if there is expenditure on goods and services. In other words, expenditure represents demand by household for goods and services. It is demand that stimulates production or supply of the output because if there is demand, firms will have the incentive to produce the output for sale to make a profit.

However, in order to spend, households must have the financial means or purchasing power. As owners of resources or factors of production, the purchasing power of households comes from providing factor services to firms. Households provide the services of labour, land, capital, and entrepreneurship for which they are paid income in the form of wages, rents, interest, and profits respectively. Thus, an economy works like an eco-system with households and firms supporting each other in the process of production and consumption.

Example:

For instance, if households spend, say $100 on goods and services produced by firms, this amount of expenditure goes to the firms as sales revenue. The firms use the revenue from sales to pay for factor inputs purchased from the household. Thus, the $100 goes back or is returned to the households as payment for factor services or income in the form of wages, rents, interests, and profits.

Circular flow of income

You would have noticed that the $100 is being passed round from households to firms and then back again. This process can continue over and over again assuming that there are no withdrawals. Hence, for this reason the model is called the circular flow of income because income "circulates" or is being passed back and forth between households and firms to support production and consumption in an economy.

In summary, from the above explanation, you should be able to understand why expenditure (i.e. spending) leads to the creation of income (i.e. factor payments) and output (i.e. production of goods and services) in an economy.

(2) Income ≡ Output Identities

Income ≡ Output Identity

You would have noticed that from the accounting perspective, the value of output is always identical to the income. This is because factor incomes are paid out of firms' sales revenue. All revenue received from sales are used to pay the various factors for their services namely wages for use of labour, rent for use of land, interest for use of capital and the residual (or profits) goes to the owners of business or entrepreneurs.

services (eg. labour) ⟶ output
↳ paid with firm's revenue (income received)

Example:
If $100 worth of output is produced and sold by firms to households, then it can be said that both the national income and national output is $100. Why?

This amount can be split into payment by the firm for the use of various factor inputs as follows:

- $50 as wages for use of labour
- $10 as rent for use of land
- $10 as interest for use of capital
- $30 as profits (all residual payment are considered as profits paid to entrepreneurs)

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(3) Is the national output/income identical to the national expenditure?

Concept of Equilibrium
The term equilibrium means there is no tendency for the national income or output to change i.e. neither increase nor decrease. In other words, the national income has stabilized.

Example.
If households start by spending $100 on goods and services, this amount must represent also the value of output produced by the firms because it is revenue received by firms from the sale of the output to households. At the same time, the sales revenue generated from producing the output creates income for owners' factors of production when firm use it to pay wages, rents, interests, and profits. Thus, from the accounting perspective, whether it is expenditure, income or value of output it can be said that the amount recorded is identical I.e. $100.

This very simplified example should have made it clear that for the economy as a whole, at **equilibrium**, total income must equal total expenditure which must equal total product. Hence the basic income accounting identity is:

National Income ≡ National Expenditure ≡ National Output

I.e. the amount of income received by households as national income is identical to the amount spent by households as national expenditure, which is also identical to the value of output produced by firms as national output or product. Hence, the terms national income, national expenditure, and national output or product are used interchangeably to refer to the value of what a nation produces over a given period of time.

❖ 3-Sector Economy (Closed economy with Government)

The previous 2 sector economy has no government. Households are free to decide whether to consume or save out of the factor income that is paid to them by the firms.

We now introduce the government with the ability to tax the households and firms, and also to purchase goods. Governments can influence the circular flow of income. Government expenditure (G) is considered as an **injection** into the circular flow because it increases the level of income in the economy. In Figure 1b, government expenditure can be in the form of purchases of goods and services produced by firms e.g. government can engage the services of construction firms to build roads, hospitals and infrastructure.

Taxes (T) are a **withdrawal** from the circular flow. Taxes might be levied on households e.g. personal incomes or on firms e.g. corporate taxes on profits.

❖ 4-Sector Economy (The Open Economy with Government)

An economy that engages in international trade is described as an open economy.

Open economy involves the sale and purchase of goods and services overseas or abroad. Thus, two more components namely M (import expenditure) and X (export revenue) are added to the circular flow of income model.

Import Expenditure (M) is a **withdrawal** because the money paid for them 'leaks' out of the economy and, conversely, export revenue (X) is an **injection** because people overseas are now creating income for domestic households and firms.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

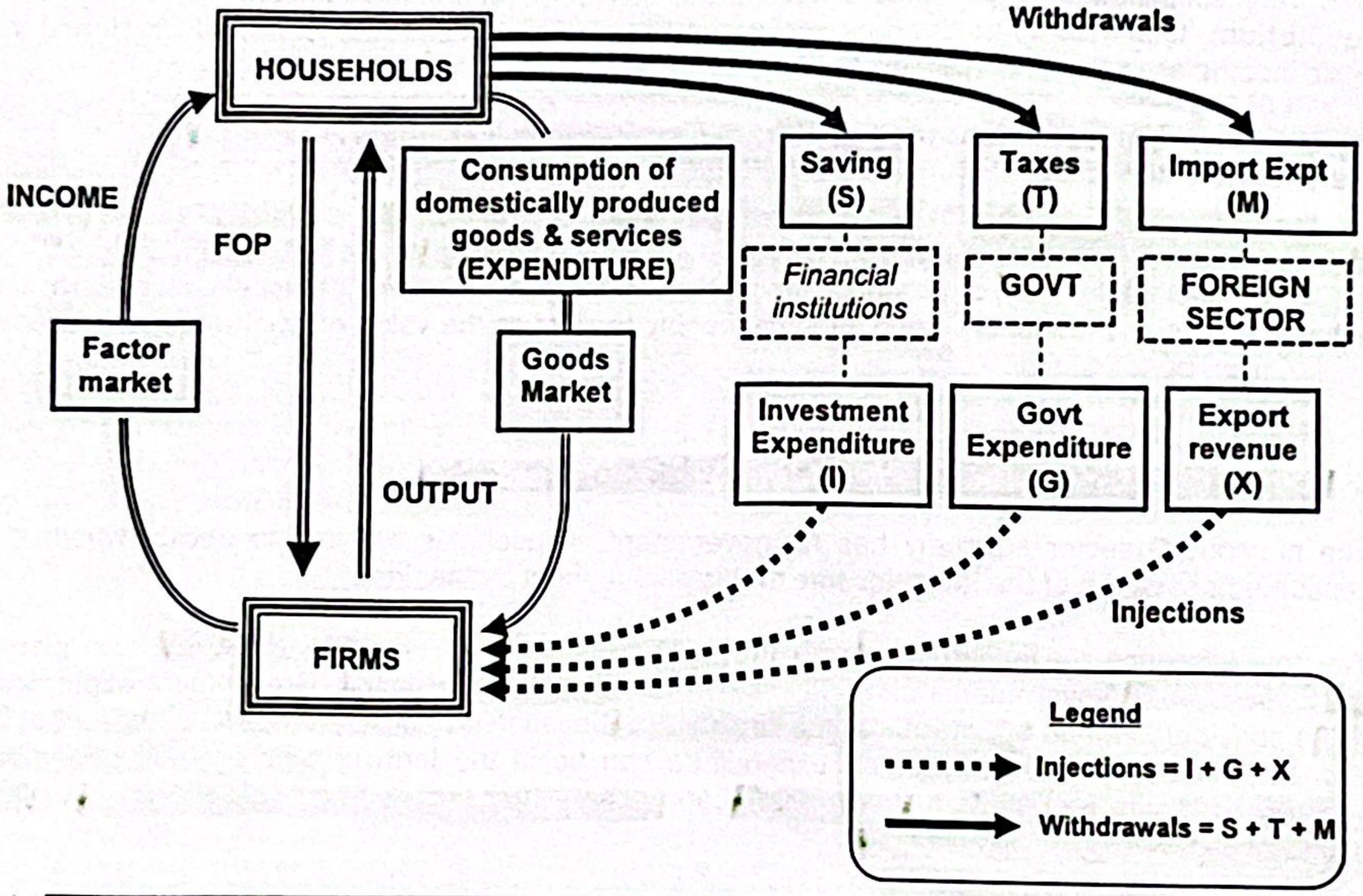
The real world economy is often represented by a **4-sector model.** It is an extension of the simplified 2-sector model.

In addition to firms (producers) and households (domestic consumers), a real world economy usually includes 2 other sectors, namely the government and the external (or foreign trade) sector.

Thus, a 4-sector real world model is made up of the following 4 sectors:

(1) Households
(2) Firms
(3) Government
(4) External or Foreign Trade

Figure 1b: Circular Flow of Income & Expenditure for a 4-sector open economy



★ *Refer to Appendix 1 for an examination-friendly 4-sector circular flow diagram*

Withdrawals and Injections

As seen in the analysis in the last section, **withdrawals (W)** are **leakages from the circular flow**. This happens when any income from households is not passed to firms. The effect of any withdrawals is to cause the flow of income to CONTRACT. From the circular flow diagram above, these incomes could "leak out" of the flow for the following reasons:

(1) **Savings (S)** e.g. household savings or business/corporate savings
(2) **Taxes (T)** e.g. personal income taxes or corporate taxes
(3) **Import Expenditure (M)** e.g. purchases of goods made by other countries

$$W = S + M + T$$

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

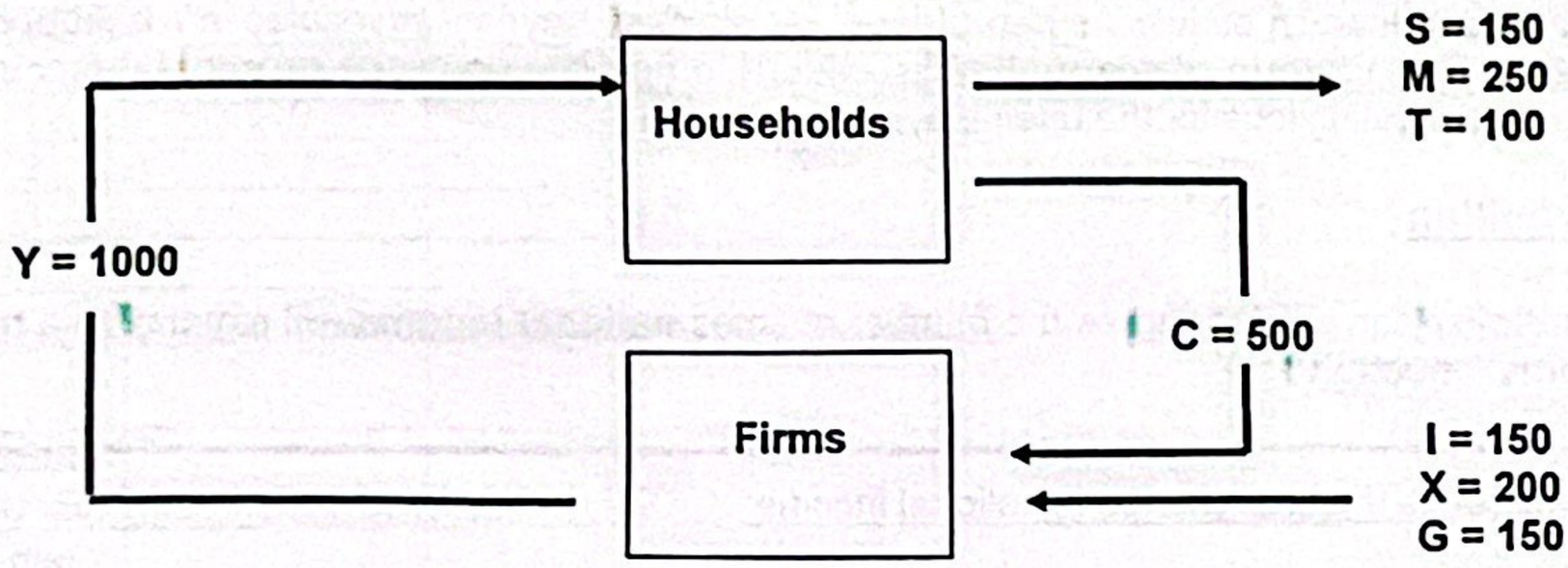
On the other hand, **injections (J)** are any spending that comes from 'outside' the flow. They are autonomous spending that is not dependent on the current level of income. The effect of any injections is to cause the flow of income to EXPAND. Injections occur for the following reasons:

(1) Investment (I) e.g. purchase of real capital goods (exclude stocks and shares)
(2) Government expenditure (G) e.g. spending on building of roads or infrastructure
(3) Export Revenue (X) e.g. sales of goods to other countries

$$J = I + X + G$$

The Equilibrium National Income

Figure 1c: The Complete Model of the Circular Flow of Income



Combining our understanding of the concepts of equilibrium with injections and withdrawals:

The effect of an increase in withdrawals, ceteris paribus, is to reduce the circular flow of income, whereas an increase of injections will increase it.

The numbers used in Figures 1c above indicates that the national income is in **equilibrium** because withdrawals are equal to injections. It is not necessary for each withdrawal to be equal to the corresponding injection for an equilibrium to exist, only that the total withdrawals is equal to the total injections.

Thus, national income is in equilibrium when:

Injections = Withdrawal
(I + X + G = S + M + T)
OR
Income = Expenditure
(Y = E)

Uses of the Circular Flow of Income

The circular flow of income model is useful in showing economists what are the likely cause(s) of cyclical fluctuations in an economy (e.g. recession and economic growth). Should there be any withdrawals or injections into the circular flow, the national income will be thrown into disequilibrium. For example, when total injections are more than total withdrawals from the circular flow, it will expand and lead to an expansion in output. Conversely, if total injections are less than total withdrawals, then the circular flow will contract and hence a recession will occur.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

In the next section, you will learn that any injections or withdrawals into the circular flow will lead to the national income changing by a multiple. E.g. An injection of $100m into the circular flow might cause the national income to increase by $250m. This is known as the multiplier effect.

5.2.2 THE MULTIPLIER

The multiplier is an important concept in the study of macro-economic analysis. It is also a concept that is closely associated with **Keynesian analysis**. You need to know how to explain the **multiplier process** with the aid of **numerical examples** and **appropriate framework** – either using the **circular flow of income model** (which you had learnt in the previous section) or the **AD/AS model** (which you will learn in the next section).

The idea of the multiplier was popularized by **Keynes** during the **1930s Great Depression**. When there is **excess capacity** or idle / **unemployed resources**, Keynes advocates an **injection of government expenditure** to **create multiplier effects** to help the economy recover by producing more output and creating jobs for the unemployed.

5.2.2.1 Definition

- The **multiplier** can be **defined** as the number of times **national income** will expand as a result of an **initial injection.**

Formula to calculate the final change in national income:

$$\Delta Y = k \times \Delta J$$

k : represents the multiplier
ΔJ : initial injection
ΔY : final change in national income

For example:
If k = 2, an initial injection of $10m would cause the national income to expand by $20m.
In other words, the multiplier has the power to increase income by a multiple of the amount injected.

Important:
- **Injections include autonomous expenditure such as I, G, X.**

5.2.2.2 The Multiplier Process

The operation of the multiplier can be explained using a simple example. If a **firm decides to construct a new building** which costs **$10m**, the **income of the builders** and the **suppliers of the raw materials** will **rise by $10m.** Hence, **national income increases by $10m.**

However, the process does not stop there. If we assume that the **recipients of the $10m** have a **marginal propensity to consume**[1] **(MPC) of 0.6**, they will **spend $6m on domestically produced**

[1] The **marginal propensity to consume (MPC)** measures the **proportion of the additional income** that is spent on consumption and is measured by taking the change in consumption for a given change in income: **MPC=ΔC/ΔY.**

$$MPC = \frac{\Delta \text{ consumption}}{\Delta \text{ income}}$$

If MPC is equal to 0.6, it means that out of every extra or additional dollar of income earned, households spend 60 cents on consumption. In theory, MPC is assumed to be constant for simplicity. In reality, MPC tends to

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

consumer goods and $4m will be withdrawn (i.e. saved, taxed or spent on imports). The extra consumption induced creates more income for households supplying resources to the consumer goods industry. If we assume that they also have an MPC of 0.6, they will spend $3.6m of the $6m and withdraw the rest as additional savings, taxes and imports. This process will continue, with each new round of spending being 0.6 of the previous round. This long chain of extra income, induced consumption and withdrawals is shown in Table 1.

Table 1: Example of the Multiplier at Work

Round (Stage) [1]	Initial change in injection ($ m) ΔJ [2]	Change in national income ($ m) Δ Y [3]	Change in induced consumption ($ m) Δ induced C [4]	Change in savings, taxes and imports ($ m) Δ W (S, T, M) [5]
1	$10	10	6	4
2		6	3.6	2.4
3		3.6	2.16	1.44
4		2.16	1.296	0.864
. . .		. . .	. . .	. . .
Other rounds		3.24	1.944	1.296
Total	Δ I = $10m	Δ Y = $25m	Δ C = $15m	Δ W = $10m

The process will come to a halt when the total withdrawals (Δ W) is equal to the initial injection (Δ J). At this point, the rise in national income (ΔY) = $25m. Thus $10m initial injection has created a $25m rise in income; therefore, in this case, the value of the multiplier is 2.5.

The strength of the multiplier, or its coefficient, is given the symbol k. In our example, the multiplier would be:

$$k = 1 / (1 - MPC)$$
$$= 1 / 0.4$$
$$= 2.5$$

In this case the multiplier is 2.5. This means that for $1 of injection, national income will rise by $2.5. This effect can also work in reverse, so that a fall in injection or rise in withdrawals would cause a multiple decrease in national income. The multiplier principle is that a change in the level of injections (or withdrawals) brings about a relatively greater change in the level of national income.

diminish as income level rises. Once a person crosses a certain threshold level of income where expenditure on basic necessities is already met, it is easier to save. This can be seen from the fact that poorer economies tend to have a higher MPC than richer ones. Similarly, the rich have a lower MPC and a higher **marginal propensity to save (MPS)** than the poor.

On the other hand, the **average propensity to consume (APC)** is the proportion of total income that is spent on consumption and is calculated by dividing total consumption by total income: APC = C/Y. As MPC could be hard to estimate, APC is sometimes used as a proxy in the calculation of the multiplier size.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

1. What will happen to the multiplier effect if individuals belonging to the Household sector received $10 million from government spending on infrastructure and decide not to spend at all?

5.2.2.3 The multiplier formula

$$k = \frac{1}{1 - MPC} \quad \text{or} \quad k = \frac{1}{MPW}$$

MPC = marginal propensity to consume domestically produced goods
MPW = marginal propensity to withdraw.

The greater the MPC, the larger the k. Or the greater the MPW, the smaller the k.

5.2.2.4 Factors that affect the size of the multiplier

With reference to the formula for calculating the size of the multiplier, it is clear that the value of the multiplier is dependent on 2 basic factors: MPC and MPW. (Note: MPW=MPS + MPT + MPM)

In fact, MPC and MPW are 'mirror images' and both are just opposite sides of the same coin. An increase in MPC must imply a fall in MPW and vice versa. Hence, ***the higher the MPC, the weaker the MPW and the larger is the multiplier value.***

*Note: It must be made clear that when explaining these marginal concepts, you have to link it to the **additional** dollar of income received, and NOT the proportion of income.*

Let us now look at some underlying determinants:

❖ **Marginal Propensity to Save (MPS)**

- **Social security system in the country**
  Higher MPS: If the government encourages savings, MPS will be higher. In Singapore, there is a national saving scheme whereby all working individuals have to make compulsory monthly contributions (36% of total income) to the Central Provident Fund (CPF). CPF savings ensures that individuals have sufficient savings for retirement as well as medical expenses. This compulsory aspect of savings, together with the prudent attitude, results in Singapore being one of the countries with the highest saving rates in the world.
  Lower MPS: On the other hand, it could be argued that Western developed countries have better and more generous social security schemes for their citizens e.g. unemployment and disability benefits and pensions for retirees. They are less worried about saving up for a 'rainy day' and have a lower saving rate.

- **The attitude towards thrift in society**
  This may vary from country to country. In general, Asians tend to be thriftier. For example, the Japanese are well known for their thriftiness. On the other hand, western societies are often seen as more spend-thrift e.g. Americans and Western Europeans.

- **The level of interest rate in the economy**
  Higher MPS: A larger MPS level may result when interest rates are high. When the opportunity cost of consumption is higher than before, consumers may be more willing to

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

save when they receive additional income.
Lower MPS: On the other hand, low interest rates, especially if they are below the rate of inflation tend to discourage savings. In times of high inflation, nominal interest rates may not match the inflation rate, thus real interest rates may turn negative. Negative real interest rates penalize savers by eroding away the purchasing power of their savings. [Real interest rates = nominal interest rates – inflation rate].

- **The level of income**
  MPS tends to be smaller for the poor as the basic necessities have to be purchased before there is any income left for saving. In general, the poor have a relatively lower MPS than the rich. Hence, as a society becomes more affluent, MPS should rise. Also, when the distribution of income becomes more equitable, MPS tends to rise as well.

❖ **Marginal Propensity to tax (MPT)**

- **Progressiveness of the tax system**
  A progressive taxation system implies that as income rises, more tax will have to be paid out of the additional income earned. For example, a person earning $1000 per month may face a **marginal tax rate (MTR)** of say 2% (i.e. 2 cents out of each additional dollar of income earned), whereas a person earning $10,000 per month may face a higher MTR of say 20% (i.e. 20 cents out of each additional dollar of income earned).

  A state with more welfare benefits probably need to have a more progressive tax system and hence a higher level of MPT as a larger amount of tax revenue has to be collected to finance such benefits. Given the higher leakages through taxation, the value of k will be smaller.

Marginal Propensity to Import (MPM)

- Attitude towards foreign imports: If the country has a strong preference for foreign goods, MPM tends to be high. It also depends on the price competitiveness and availability of imports relative to domestically produced substitutes. If imports are relatively cheaper, the level of import tends to be higher.

- Openness of the economy: A country with high dependency on imports such as Singapore will have a high MPM. The lack of natural resources results in the dependency on imported raw materials for production and consumption. This means that with additional income received, the bulk of it will be spent on buying imports.

5.2.2.5 The size of Singapore's multiplier

As discussed above, withdrawals or leakages (in the context of circular flow of national income) play an important part in determining the size of the multiplier value. In fact, so huge are the withdrawals that the multiplier value for Singapore has been estimated to be very small.

- As Singapore is small and lacks natural resources, she has to import raw materials and intermediate goods to produce almost all goods and services. As such her MPM and hence MPW is high. This is the main reason for Singapore's low multiplier value.

- In addition, a significant proportion of Singaporean's wealth is "locked up" in the Central Provident Fund (CPF), which is a form of mandatory savings chiefly for retirement and medical purposes. Furthermore, the Singapore government does not provide pensions or unemployment benefits, so households tend to be thriftier as they have a greater need to save. These factors lead to a high MPS and thus MPW, which reduces the multiplier effect.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Distinction between autonomous and induced expenditure

Autonomous expenditure refers to expenditure that **does NOT depend on income.** Typically, government spending, investment and exports are assumed to be autonomous for simplicity. Such autonomous expenditure kickstart the multiplier process.

Induced expenditure on the other hand, refers to expenditure that **varies with income.** This is the concept that we covered earlier under the multiplier process. When households receive factor incomes from firms, their income increases, hence households will be induced to consume more. Such consumer spending is deemed to be induced expenditure and is what creates the rounds of induced consumption that causes the multiplier effect.

Example of a succinct explanation of the multiplier process

An injection (e.g. autonomous investment or government spending) will generate income for individuals employed by firms whose goods and services are initially being demanded for. These individuals will spend a proportion of the additional income on induced consumption, depending on their marginal propensity to consume (MPC), and the rest will be withdrawn as savings, taxes and import spending. The increase in induced consumption creates income for individuals employed in other sectors, who will then spend their additional income on induced consumption. This cycle of spending and re-spending will continue until the increase in income becomes negligible, i.e. when the change in withdrawals is equal to the change in injections. The eventual increase in national income is several times the initial increase in injection. The multiplier, k, represents how many times the national income increases with respect to the initial change in injection.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

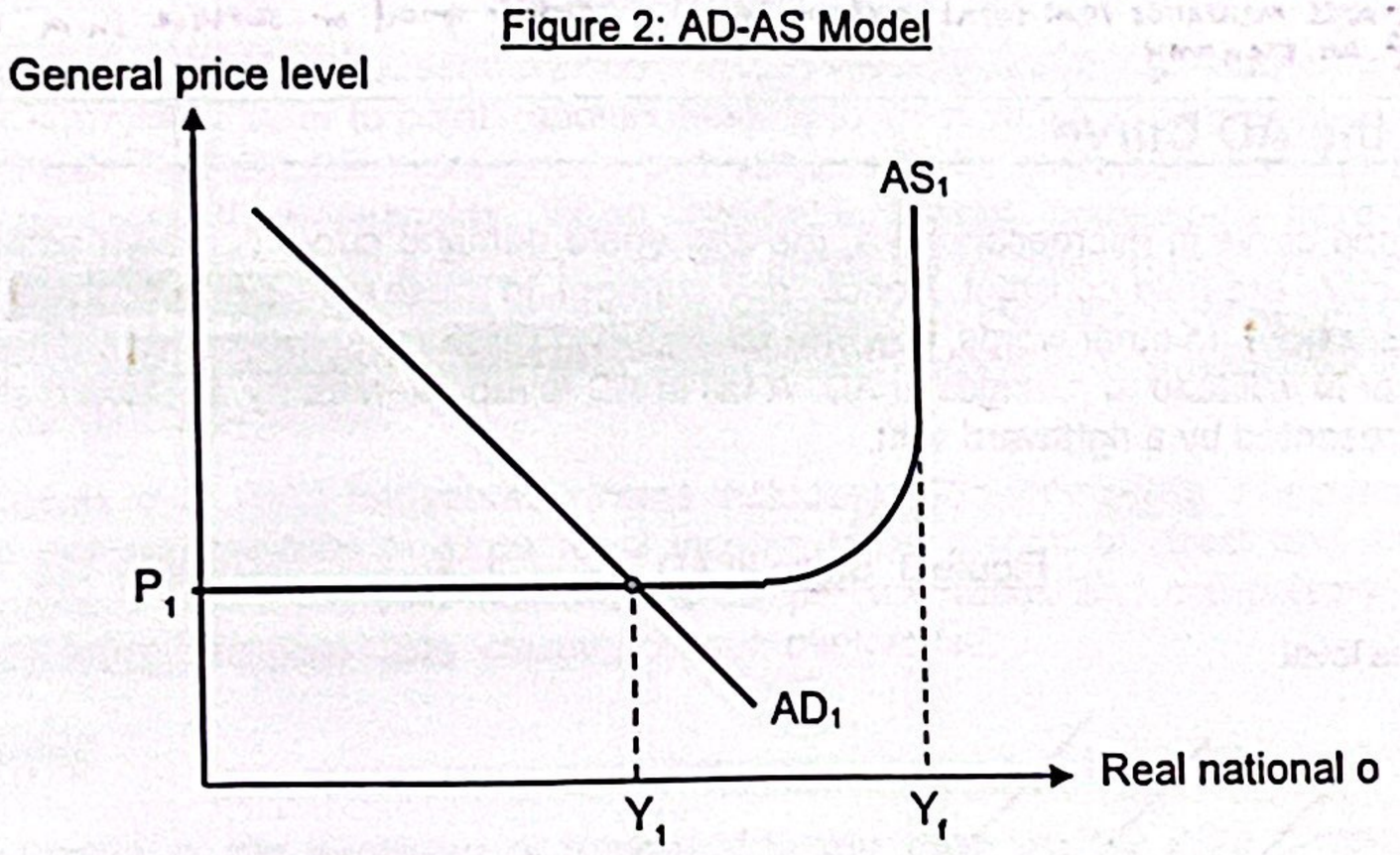
5.2.3 THE AD/AS MODEL

5.2.3.1 INTRODUCTION

In the previous sections, you have learnt about the circular flow model and the multiplier. Recall that the circular flow model suggests that higher injections (e.g. government expenditure) leads to more than proportionate increase in national income via the multiplier process and hence higher employment. However, it does not explain how much injection is required to achieve full employment and when and why this would instead cause inflation. Therefore a more advanced model is needed to provide greater precision and functionality.

In this section, we shall explore how national income is determined using the Aggregate Demand – Aggregate Supply (AD-AS) model. In a four-sector economy, **Aggregate Demand (AD)** refers to the total demand for all domestically produced goods and services (i.e. produced by the resources located within the country) by households (consumers), the firms (producers), the government and foreigners. On the other hand, the summation of the supply of all firms located within an economy is called the **Aggregate Supply (AS).**

Figure 2: AD-AS Model



The AD-AS model provides a useful economic framework to analyse the impact of economic events and policies on the health of an economy. The interaction of the AD and AS determines the country's level of real national output (Y_0) and general price level (P_0) and has direct and indirect influences on the four macroeconomic goals of an economy.

5.2.3.2 AGGREGATE DEMAND

The summation of the demand for all goods and services produced by an economy is called **Aggregate Demand (AD),** which consists of the demand for goods and services by domestic households i.e. **consumption (C),** firms i.e. **investment (I),** the government i.e. **government spending (G)** and by foreigners i.e. **exports (X).** We then have to deduct the demand by domestic economic agents for **imports (M)** (which consists of **imported final goods** and services as well as **imported inputs** as these goods and services are produced by other countries. Thus:

$$AD = C + I + G + X - M$$
$$= C + I + G + (X - M)$$

where (X-M) is collectively termed as **Net Exports**

net exports

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(A) Shape of the AD Curve

The AD curve is drawn **downward sloping** with respect to the general price level[2], which illustrates the **inverse relationship** between **prices** and **real national output**. A change in the general price level (as shown along the y-axis) causes a **movement along** the AD curve. As general price level rises, the wealth, interest rate and international trade effects result in consumers, firms, and foreigners buying less domestic output. This upward movement along the AD curve is accompanied by a fall in real national output. *(Refer to Appendix 5 for the detailed explanation)*

, both are downward sloping.

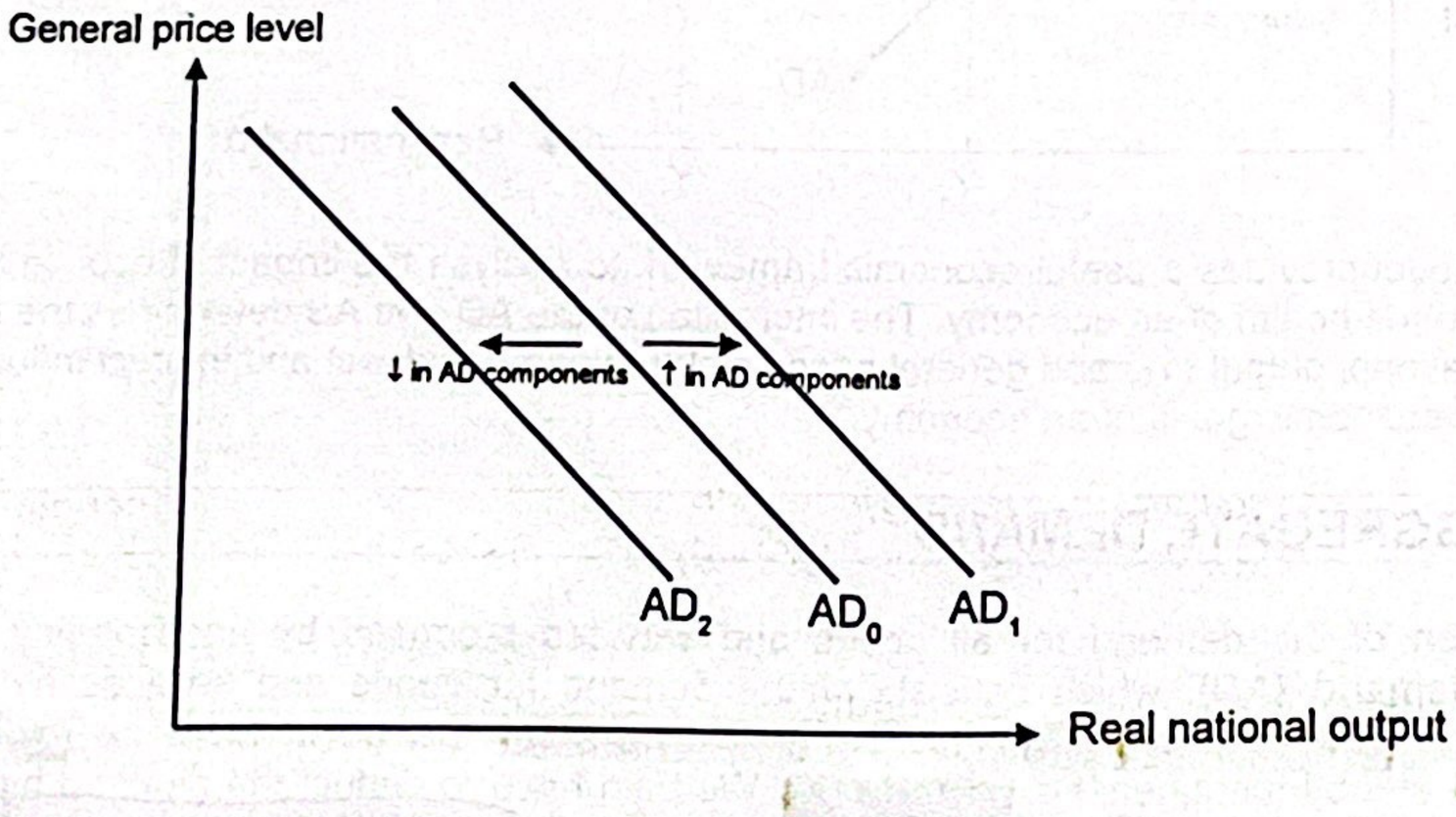
2. Compare the similarities and differences between a market demand curve and an aggregate demand curve. *[Hint: Micro versus Macro analysis]*

Aggregate Demand Curve:	Market Demand Curve:
- Represents demand in an economy for the real national output. - Y-axis measures the general price level (average prices of all goods & services available in the economy) - X-axis measures real total output (GDP) of an economy	- Represents demand in a market for a single good or service. eg. car, clothes. - Y-axis measures price of a single good or service - X-axis measures the quantity of a single good or service in a market

(B) Shifts of the AD Curve

Just like the demand curve in microeconomics, the aggregate demand curve is drawn assuming all other non-price factors are held constant. Hence, any changes in these **non-price factors** will lead to a **shift in the AD curve**. In other words, **holding the general price level constant,** changes in the level of C, I, G, X or M will lead to changes in AD. A fall in AD is represented by a leftward shift while a rise in AD is represented by a rightward shift.

Figure 3: Shifts in AD



[2] The general price level is a concept that is used to refer to the weighted average prices of all goods and services sold in an economy. In practice, it is measured using a Consumer Price Index (CPI). The general price level is measured using a price index e.g.112. This number means the weighted average prices of consumer goods and services have risen by 12% over the base period. CPI will be further explored in Chapter 6 Part 3.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

1. Consumption (C)

Consumption refers to **demand by domestic households** for goods and services to satisfy current needs and wants. E.g. **spending on food, clothes, transport and entertainment.** There are many factors affecting consumption and each of them will be explored in this section.

FACTORS AFFECTING CONSUMPTION

(i) Economic outlook

Economic outlook (or **consumer confidence**) affects households' **willingness to spend.** If households believe that the economy will grow strongly, they will **EXPECT better job opportunities, pay rises** and higher dividends and are hence **willing to spend more now** as they can finance such spending from future earnings. Hence, consumption increases. Conversely, if households **expect** to **face future unemployment** or if **incomes are EXPECTED to decline** or stagnate, they are likely to **save more** for rainy days and hence **spend less.** Thus, consumption falls.

(ii) Income

The main factor affecting household income is **economic growth**. With economic growth, **economic outlook improves** (refer to point i above), leading to an increase in consumption and investment by private firms. This causes more goods and services to be produced, and hence more income is earned by domestic households. When **income increases**, households have **higher purchasing power**, and they will spend a proportion of the additional income on consumption while the rest will be withdrawn. The increase in **induced consumption** will increase income for individuals employed in other sectors and **trigger subsequent rounds of spending** and **re-spending** until the increase in income becomes negligible.

Other factors that affect household income include **government policy**. For example, if households need to **pay more taxes** (e.g. personal income tax – a form of direct tax) and **social security contributions** (e.g. unemployment insurance, pension funds and compulsory savings like CPF), their **disposable income[3] falls**, causing consumption to fall.

(iii) Wealth

Income refers to the earnings of households per time period. After paying income taxes and social security contributions, the remaining disposable income can either be spent or saved. Instead of merely saving their income in bank deposits, households often also purchase **assets** which can be **physical** (e.g. property) or **financial** (e.g. stock and shares) because such assets may **appreciate in value** and they also **generate future income** in terms of rental and dividends.

Wealth refers to the **total monetary value of all assets** that have been **accumulated by households**, such as **cash, deposits, bonds, property and stocks** that are currently owned by households. As the stock and property prices fluctuate over time, the main sources of variations in household wealth are associated with these assets. During a **stock or property market upturn,** some **households will 'feel richer'** and hence be **willing to consume more.** Conversely, when such markets are facing a downturn, some households will feel poorer and thus consume less.

[3] *Disposable income refers to the amount of money that households have available for spending or saving after they have paid their direct taxes and received any state welfare benefits. Disposable income = Original income earned – direct taxes + cash benefits (e.g. state pension).*

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(iv) Availability and cost of credit

Households tend borrow from financial institutions for **'big ticket' items** like cars, housing, renovation and costly **consumer durables** like furniture and large television sets as they may lack the savings to pay upfront for such items. If **credit conditions** were **relaxed** (e.g. less initial deposit or collateral required, or a reduction in minimum income requirement), then such loans become more easily available. Also, if interest rates were cut, the **cost of credit is reduced** as households will now find it cheaper to borrow. Thus a **rise in the availability of credit** and a **fall in the cost of credit** will increase the ability of households to finance their spending, hence boosting their level of consumption. Conversely, consumption is likely to fall if credit conditions were tightened and interest rates were raised.

In many countries, the **base interest rate** and credit conditions are set by the central bank. The interest rates charged by financial institutions for providing loans will then move in tandem with this base interest rate. The conditions for loan eligibility are also based on the guidelines set by the central bank. If the central bank intends to boost consumption and AD to counter an economic downturn, it will loosen its **monetary policy** by easing its regulations regarding loan eligibility and also cut interest rates. Conversely if the central bank intends to reduce consumption and hence AD to fight inflation, it will tighten its monetary policy by tightening credit conditions and raise interest rates instead. *(You will learn more about this in Chapt 6: National and International Economy: Part 2)*

3. Savings are income that is not spent; they are thus a withdrawal or leakage from the circular flow of income. Is higher savings beneficial for an economy during a recession?

2. Investment (I)

Investment thus refer to spending by firms on new **capital goods,** which refers to goods that are used to produce other goods. E.g. factories, offices, machinery, delivery vehicles, intermediate inputs etc.

*(Note: The investment here refers to **physical** investments **instead of financial** investments like shares and bonds.)*

TYPES OF INVESTMENT

(A) Business investment

(i) Working capital

Working capital consists of **inventories of final goods** as well **intermediate inputs.**

Inventories of final goods are classified as investments because they have yet to be sold, so they cannot be classified under other components of AD. For example, a TV set has been produced but not yet sold cannot be classified as consumption, government spending or exports because it has yet to be purchased by households, the government or foreigners respectively. However, as this good will eventual be sold and hence contribute to the future income of the firm, it can be classified as investment (as opposed to consumption) because investments in a general sense refer to actions that aim to generate future output, income or wealth.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Inventories of intermediate inputs (e.g. raw materials, parts, and semi-finished goods) are not demanded for its own sake but are eventually used to produce final goods that contribute to the future earnings of the firm. Hence they fit the economic definition of investment as well.

Inventory levels as an economic indicator

Fluctuations in inventory levels provide useful data for economists to monitor the state of the economy. Rising inventories suggests that goods are 'stuck' in the shops because of slow sales. Businesses will eventually produce less to prevent stocks from piling up and in the process retrench workers, causing unemployment to rise. On the other hand, falling inventories suggest that sales exceed output so firms will eventually need to ramp up production and thus hire more workers, causing unemployment to fall.

(ii) Fixed capital

Fixed capital refer to goods like commercial and industrial buildings, vehicles, tools, equipment and machinery etc. Such goods as termed as fixed rather than working capital because they can be used over and over again to produce goods and services, unlike intermediate inputs, which are used only once. Investment in fixed capital is referred to as **capital accumulation** or **capital formation.** Such investments lead to an increase in the future productive capacity of firms and hence the economy.

(B) Residential housing

While the **renting of residential housing** is classified as **consumption**, the **production and sale** of residential housing is typically not classified as consumption but as **investment.** This is because buildings generally last a very long time (easily hundreds of years) and thus generate welfare for over a prolonged period, hence the nature of the good is very similar to capital goods which also typically last a long time.

(C) Foreign Direct Investment

Some investment in capital goods are carried out not by local firms but by foreign firms. Such investments by **multi-national companies (or MNCs)** are classified as **foreign direct investments (or FDIs)** as opposed to investments by domestic firms. The reason why a distinction is made is that the factors affecting domestic vs foreign investments may differ. For example, domestic firms generally rely on domestic funding while foreign firms have access to foreign funding. Hence, changes in domestic interest rates are more likely to affect domestic investments rather than FDIs.

FACTORS AFFECTING INVESTMENT

(A) MEI

Firms invest in capital goods to produce final goods and services. Their decision to invest thus depends on the expected profitability i.e. the **expected rate of return** of the investment. Economists often use the concept of **marginal efficiency of investment (or MEI)** to refer to this expected rate of return *(refer to Appendix 6 for more details on MEI).*

The MEI depends on the **expected cost** of purchasing or producing a capital good as well as the **expected benefits** that it can generate. For example, if a machine were to cost $100 and is expected to generate $110 worth of revenue (benefits), then the MEI is 10%. A fall in the expected cost or a rise in expected benefit will raise the MEI and thus increase the incentive for a firm to undertake that particular investment.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Firms often have to borrow to invest and have to pay interests on their loans. The **interest rate (r)** represents the **cost of borrowing.**

If MEI > r, then the firm expects to earn more than the cost of the loan so the investment is expected to be profitable and will be undertaken. If MEI < r, then borrowing costs will exceed the expected earnings that investment can generate so the investment is expected to be unprofitable and hence will not be undertaken. For example, if a new machine is expected to yield 12% returns and a firm can borrow at an interest rate of 5%, the **expected net return,** which is the return in excess of the cost of borrowing is 7%. Hence, the investment is expected to be profitable.

Factors affecting MEI

i) Business expectations

If firms expect the economy to do well (**positive business outlook / confidence / sentiments**), they will likely also expect their revenues to rise. This raises MEI which makes firms more willing to invest. Conversely, if business outlook is bleak, then MEI falls and firms become less willing to invest. Such business expectations are highly volatile because they depend on a variety of unpredictable economic, political and social factors. Hence Keynes termed such expectations as **"animal spirits".**

ii) Corporate taxes

Corporate taxes are **taxes on a firm's profits.** Firms estimate rates of returns based on **after-tax profits** rather than pre-tax profits. A rise in corporate tax rates reduces after-tax profits, MEI and investments while a fall in in corporate tax rates raises after-tax profits, MEI and investments.

iii) Cost of capital goods

The cost of the capital asset (e.g. the cost of buying new airplanes for airlines) is another factor that businesses consider before they embark on an investment. The cost of purchasing capital goods can be looked at from an **absolute** or a **relative** angle.

Absolute costs: If prices of new plant and equipment were to fall, firms will incur lower capital costs and hence earn higher profits. MEI will rise, thus causing investments to rise.

Relative Costs: If wages were to rise, capital goods will become relatively cheaper, <u>even if their prices remain unchanged</u>. Firms will replace workers with machines to reduce costs and boost profits, thus resulting in more investments in labour-saving devices.

iv) Technological innovation

Technological innovation causes capital goods to become **more productive.** Firms can then produce more goods with less resources, thus reducing their expected **marginal / variable costs**.

Technological innovation also **reduces the costs** of **producing capital goods** (and not just the final good). This **reduces the prices** and hence **costs of capital goods** resulting in **lower fixed costs.**

Finally, technological innovation **improves the quality of products**, enabling firms to sell more and charge higher prices, which will **boost revenues.**

In summary, technological innovation can raise MEI and hence investments because in can **both** lower the **costs** and **raise the expected benefits / revenues** of an investment.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(B) Interest Rates

In an economy, **different types of investments** will have **different MEIs** depending economic conditions in which a firm in a particular industry is operating in. If interest rates were to fall, then more investments are expected to yield positive net returns, so more investments will be undertaken. Conversely, if interest rates were to rise then less investments are expected to yield positive net returns, so less investments will be undertaken. Hence, a reduction in interest rates will stimulate overall investments in an economy while a hike in interest rates will deter them.

Similar to consumption, the country's **central bank** often sets interest rates to influence the level investment and AD (**monetary policy**), where interest rates are raised to fight **inflation**, and lowered to stimulate **economic growth** and **employment**, so as to achieve **macroeconomic stability**.

4. **Business expectations play a key role in influencing investment decisions. If you are a businessman and banks offer cheap loans, would you borrow to invest in an economic downturn? Why?**

3. Government Spending (G)

TYPES OF GOVERNMENT SPENDING

Government spending / demand for goods and services can be broadly grouped into the following:

- **Recurrent expenditure** (e.g. purchases of goods and services like drugs, utilities and security services) to **operate** various **publicly provided services** such as healthcare and education.
- **Fixed expenditure** (e.g. purchases of goods and services like building materials, equipment and construction services that are used to build **infrastructure** like roads, airports, hospitals and schools).

Note: For A Levels, you can for simplicity treat all forms of government spending as G even though it is may not be conceptually accurate to do so. This is because some forms of government spending are not for the purchase of goods and services but for transfer payments (e.g. pensions and unemployment benefits). Such transfer payments result in higher income, consumption and savings which causes the C component of AD to rise instead.

FACTORS AFFECTING GOVERNMENT SPENDING

(i) Budgetary considerations

Government spending can be financed from **taxes, borrowing or reserves** accumulated from past budget surpluses. Higher tax collections, easier credit conditions and a rise in reserves may result in higher government spending because it increases the **ability** of a government to do so.

(ii) Microeconomic factors

To improve **efficiency** in resource allocation, governments often subsidizes the production of **merit goods** such as education and healthcare that may otherwise be under-consumed because of extensive **positive externalities** and **information failure**. For **equity** reasons, governments also often subsidize the consumption of **necessities** like food, housing and transportation for poorer households. Hence government spending may rise or fall depending on such microeconomic considerations.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(iii) Macroeconomic factors

During an **economic downturn**, governments tend to raise spending to boost AD, output and employment (**expansionary fiscal policy**) while during periods of **high** and/or **rising inflation**, government tends to curb spending to bring down AD and general price levels (**contractionary fiscal policy**). Such changes in government spending are used as **counter-cyclical measures** (i.e. to counter business cycles) to achieve **macroeconomic stability**.

The government may also raise spending on **physical capital** (infrastructure) and **human capital** (training and education) to raise future **productive capacity** to achieve higher and sustained **long run economic growth**. Finally, if the country is facing large and sustained **current account (or trade) deficits**, it may engage in **expenditure reducing policies** in order to curb AD, income and hence imports to improve its **balance of payments**.

(iv) Political factors

Governments tends to spend more when elections are approaching to raise their popularity before voting takes place. They are also likely to spend more on their supporters or on potential swing voters to secure or win the votes from such groups of people.

4. Net Exports (X – M)

Net exports (X-M) in the AD model refers to the difference between foreign demand for a country's export and its domestic demand for foreign imports.

FACTORS AFFECTING NET EXPORTS

(i) Income

A rise in **income of other countries** will raise their ability to buy goods and services from the country that is exporting to them, thus raising the latter's **export** demand. Better **technology** and **human capital** development will improve a country's **quality** of **goods** and **services**, thus raising foreign demand for its **exports**.

A rise in a **country's income** will raise its ability to buy foreign goods and services, thus raising its demand for **imports**. Improvements in the **quality** of **goods** and **services** produced by **other countries** will also cause a country to demand more **imports** from the former.

(ii) Relative Inflation Rates

When a country has **relatively higher inflation** as compared to its trading partners, **exports** will become increasingly **more expensive** thus **reducing** its **export demand**. At the same time, **imports** will become increasingly **cheaper** thus **raising import demand** instead.

(iii) Exchange rates

When a country's currency **depreciates** against its trading partners, this causes its exports to be cheaper in foreign currency, thus **raising export demand**. Conversely, **imports** from other countries become **more expensive** in domestic currency, thus **reducing import demand** instead. Hence **net exports** will **rise**.

In contrast, when a country's currency **appreciates** against its trading partners, this causes its exports to be **more expensive** in foreign currency, thus **reducing export demand**. Conversely, **imports** from other countries become **cheaper** in domestic currency, thus **increasing import demand** instead. Hence **net exports** will **fall**.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

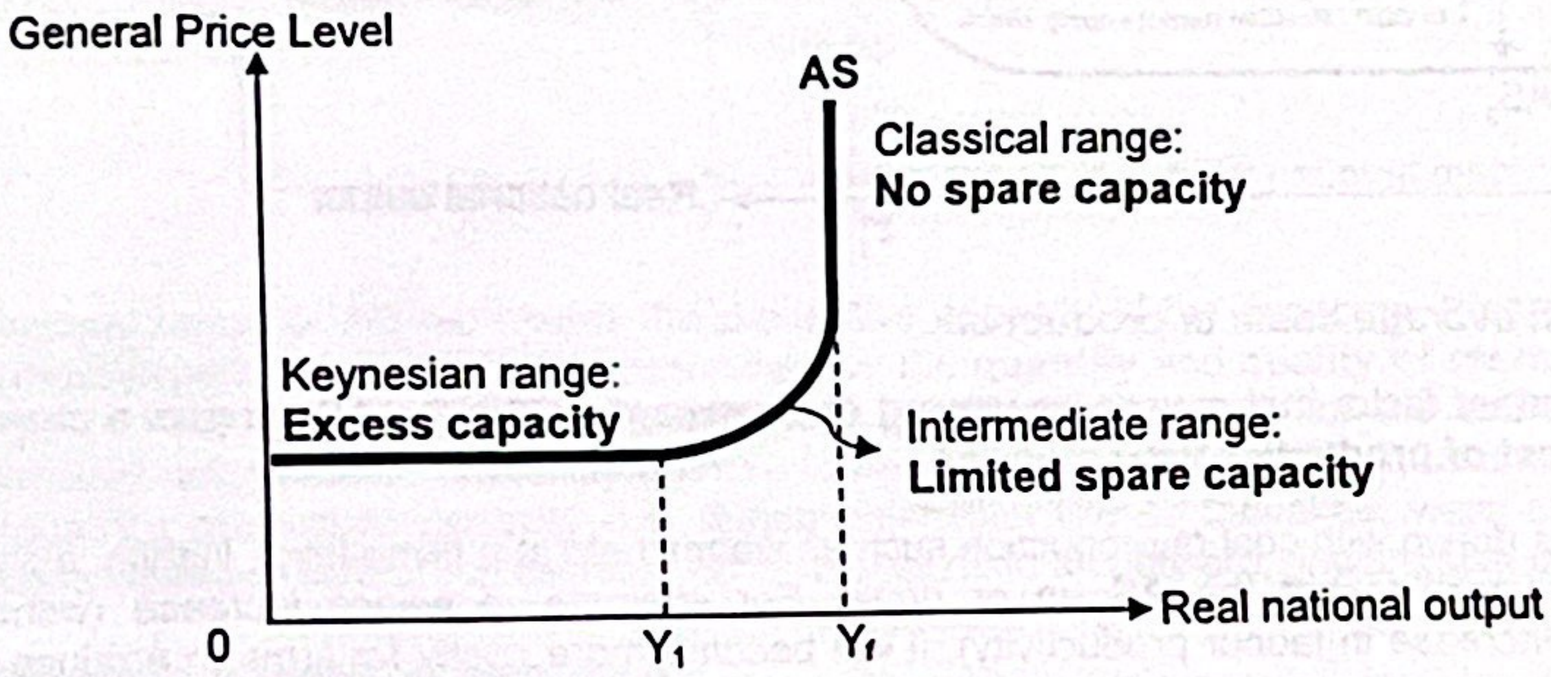
5. Which of these changes <u>WILL NOT</u> cause a shift in the AD curve to the left?
(A) loss in consumer confidence in future income due to recession
(B) a fall in government spending
(C) a rise in interest rates
(D) an increase in the general price level → effect, not cause

5.2.3.3 AGGREGATE SUPPLY

The **Aggregate Supply (AS)** shows the total output of goods and services that domestic firms would like to produce and sell at each general price level for a given period of time.

(A) Shape of the Neo-Keynesian AS Curve

<u>Figure 4: Different ranges along the Neo-Keynesian AS Curve</u>



Neo-Keynesian AS curve comprises of three distinct segments:

- <u>Horizontal (Keynesian) Range</u>

In this range, AS is **horizontal** up to output Y_1. There are **large** amounts of **unused / excess capacity / resources** and significant **demand deficient unemployment**. There is no need for producers to compete and bid for resources from each other. Prices remain stable as the cost of inputs remains unchanged as there are enough resources for all producers. This corresponds to points **deep within the PPC.**

- <u>Upward Sloping (Intermediate) Range</u>

In this range, AS is **upward sloping**. As production is close to full capacity, **bottlenecks** in resource supplies appear. Firms have to use increasingly less suitable resources, resulting in rising cost of production (even if prices of resources (e.g. wages) were constant). The only way for firms to produce more is to raise prices to compensate for the rise in unit costs. Thus, the general price level rises as real national output rises from Y_1 to Y_f. This corresponds to points **close to the PPC.**

- <u>Vertical (Classical) Range</u>

In this range, the AS curve is **vertical** because the economy has utilized all available resources. At Y_f the economy is operating at its **full employment or potential output.** There are no more idle resources for producers to draw on. This corresponds to points **on the PPC.** Any rise in AD only leads to higher prices with real output remaining unchanged.

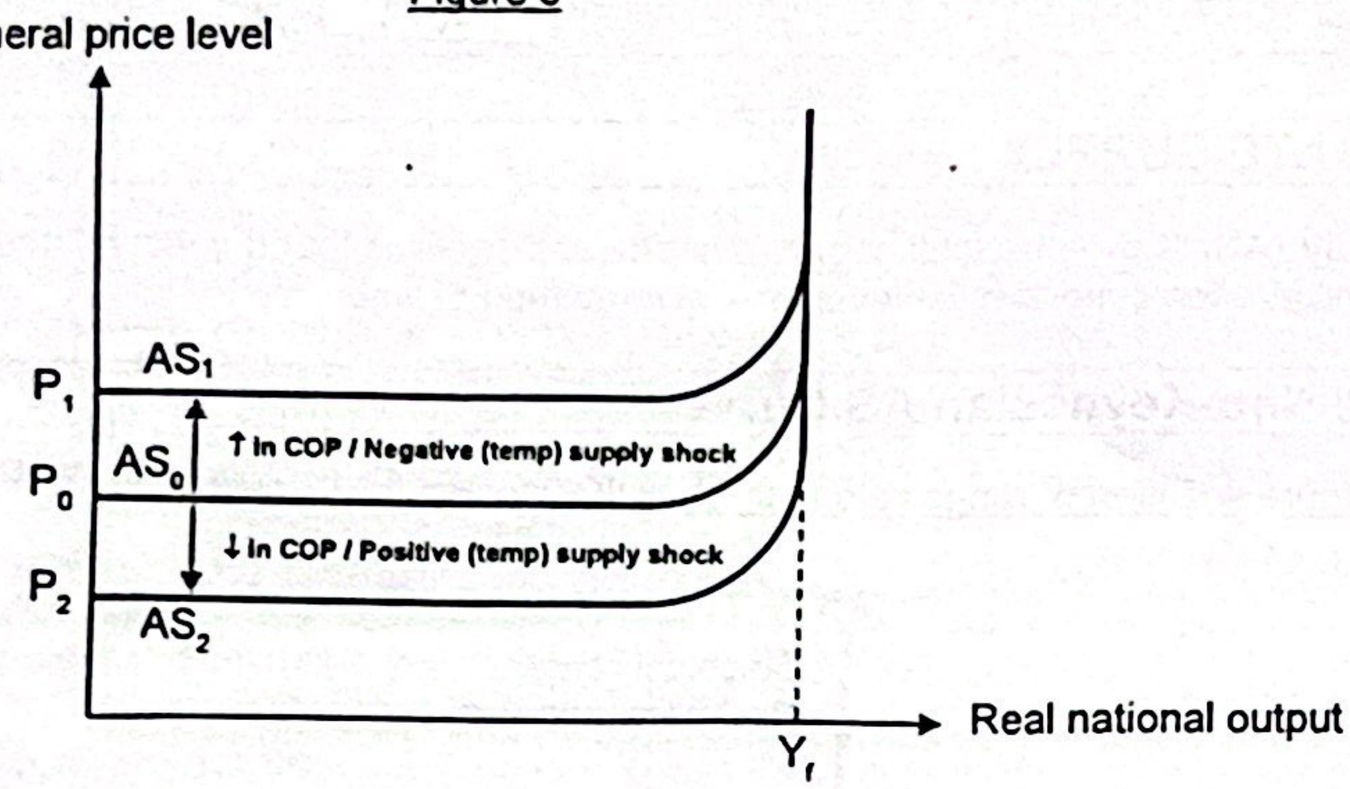
© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(B) Shifts of the AS Curve

1. Factors that Shift the Horizontal & Upward Sloping Range of the AS Curve

Figure 5



a) Changes in average costs of production

The most important factor that causes an upward or downward shift in the AS curve is a change in the **average cost of production.**

The AS curve is drawn with cost of production such as wages held at a given level. Hence, a change in factor prices would shift the AS up or down. For example, if wages increase (without a corresponding increase in labour productivity), it will become more costly for firms to produce each unit of good or service. Hence, AS falls and shifts up from AS_0 to AS_1. Any other factors that changes production costs e.g. higher rentals, oil prices, indirect taxes, etc., will have a similar impact. Such upward shifts in the AS curve result in **cost-push inflation.** *(Refer to Chapter 6 Part 3 for more details).* Conversely if cost of production were to fall, AS increases and shifts down from AS_0 to AS_2.

Note: The vertical range of the AS will not shift in such situations since changes in average cost of production do not affect the productive capacity of an economy.

b) Supply shocks

A temporary supply shock may cause an unanticipated shift in the AS curve as well. An example of a positive supply shock would be a bumper harvest, while an example of a negative supply shocks would be natural disasters such as floods. The former implies an increase in the aggregate supply (i.e. shifts down) and the latter a decrease (i.e. shifts up). In the cases of temporary supply shocks, once the temporary effects of the harvests and disasters have been felt, no substantial change or permanent damage to productive capacity would have occurred, leaving the vertical range of the AS that reflects the productive capacity of the economy unchanged.

6. Which of the following would cause only the AS curve to shift up?
(A) a depreciation of the currency
(B) an decrease in trade union bargaining power
(C) a reduction in the general price level
(D) an increase in the number of women available for work

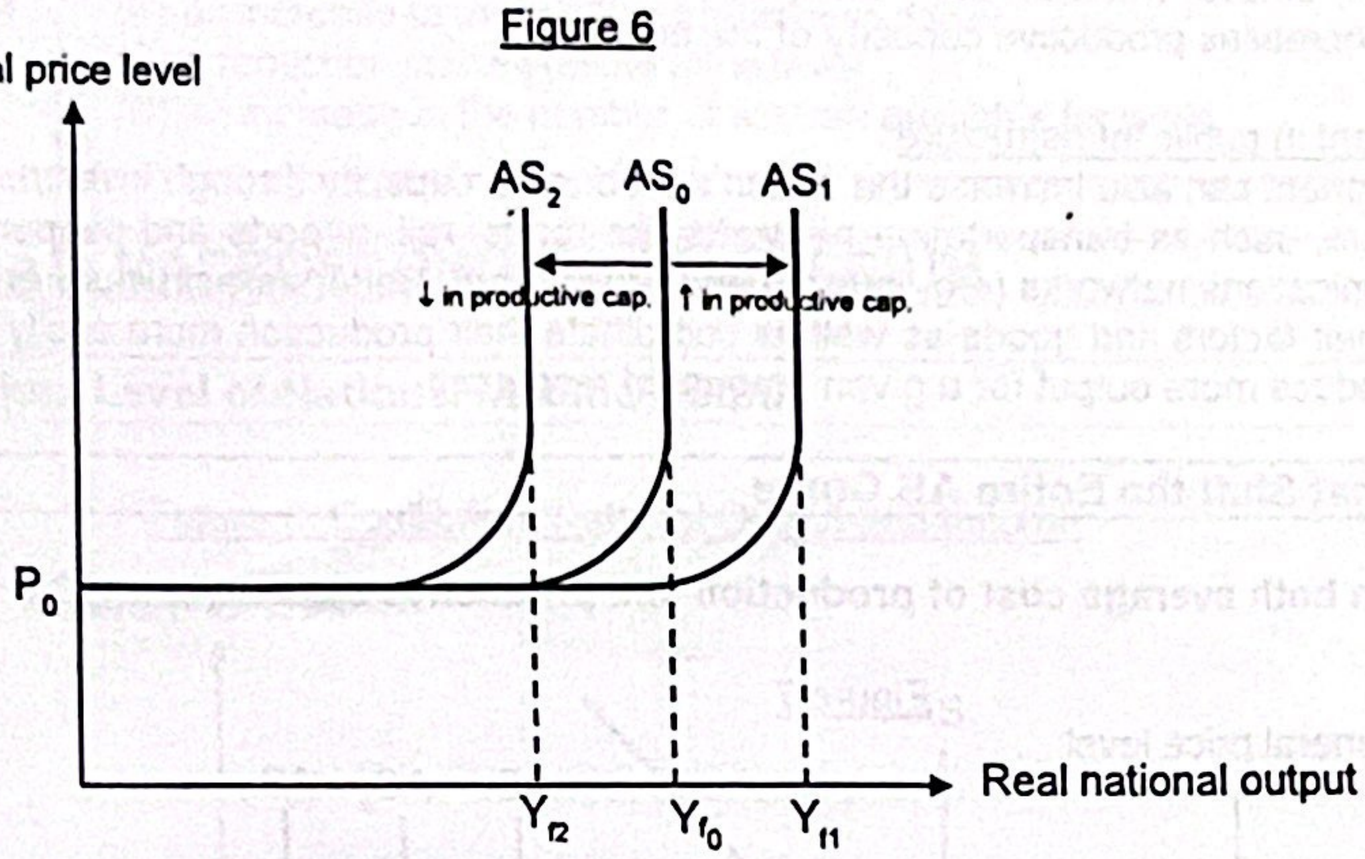
© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

2. Factors that Shift the Vertical Range of the AS Curve

a) Changes in productive capacity

Figure 6



The vertical range of AS represents the productive capacity of the economy. It corresponds to the **full-employment output Y_f** and is determined by the **quantity** and **quality of resources** available. In Figure 5, AS_0 shifts right to AS_1 when the **productive capacity** of the economy rises. Full employment output hence increases from Y_{f0} to Y_{f1}. AS shifts left if there is substantial destruction to the country's productive capacity e.g. during calamities like earthquakes, wars or pandemics. A rightward / leftward shift of the **vertical AS** corresponds to an outward / inward shift of the **PPC.**

(i) Changes in <u>quantity</u> of resources

<u>1. Size of the labour force</u>

Labour represents human resources that are needed in production. The increase in potential output is partly determined by the rate of growth of the labour force over time. In Singapore this is estimated at around 2-3% annually. The increase in the country's labour force can come from either indigenous sources such as natural births within the resident population or foreign migrant labour.

Shrinking fertility rate and rapidly ageing population are concerns in Singapore because they have an adverse impact on productive capacity and future economic growth. To address this concern, the government has adopted a policy of importing foreign workers to supplement the ageing and shrinking indigenous labour force so as to fuel economic growth.

<u>2. Land and natural resources</u>

Land represents the geographical space as well as non-human natural resources needed in production. Discovery of new natural resources such as oil reserves, mineral deposits or fishing grounds could expand the productive capacity of the economy and fuel growth. For example, the discovery of North Sea oil led to an economic boom for the UK in the early 80s. Moreover, land reclamation from the sea and deserts can be used to create more usable land for various economic purposes such as agriculture, industrial or commercial activities.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

3. Investment in private capital stock

Physical capital is a man-made (non-natural) resource. Changes in the stock of capital will alter the amount of goods and services that the economy can produce. Investing in capital goods such as factories, offices, warehouses, plants, equipment and machines raises the amount of capital stock that increases productive capacity of the economy.

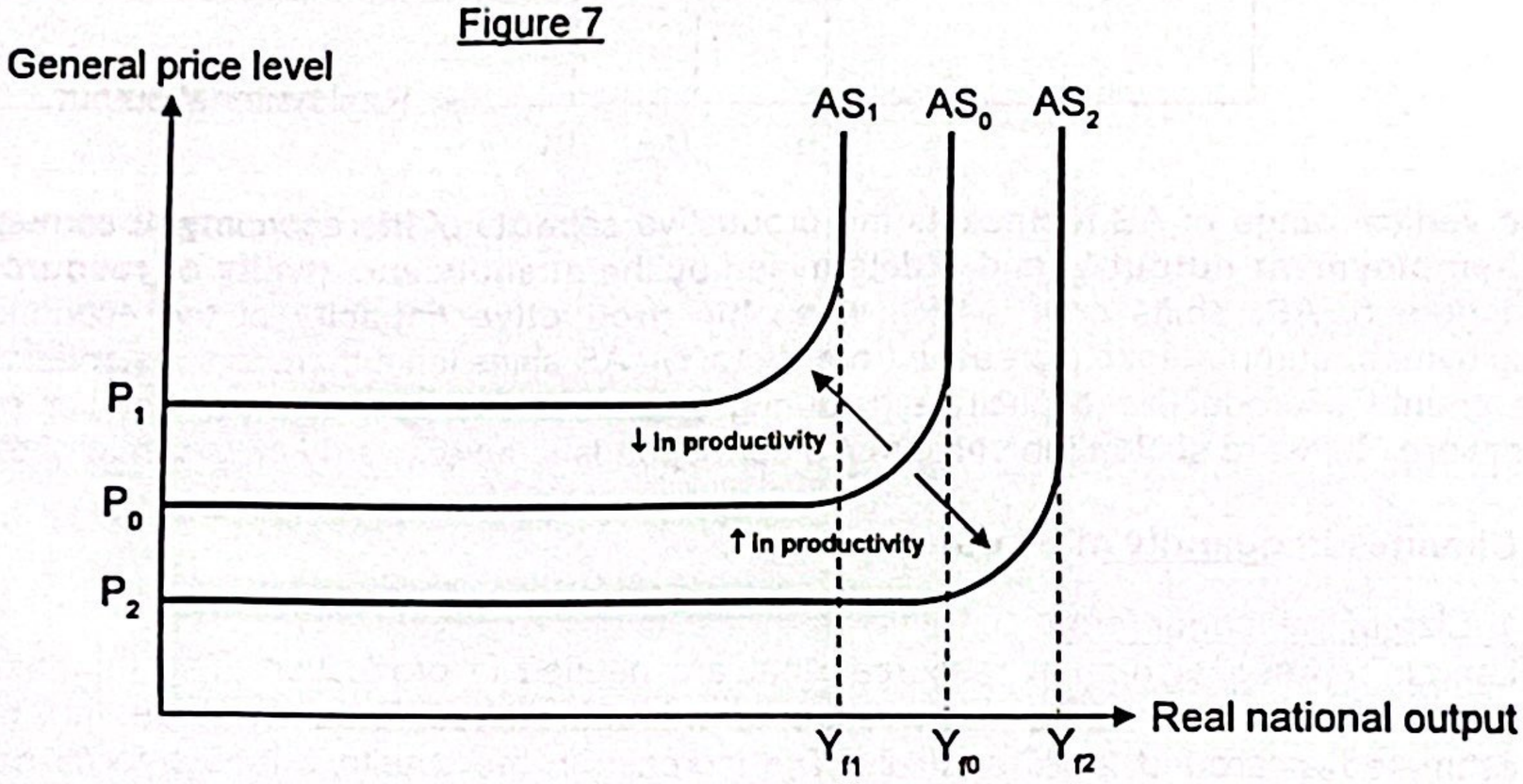
4. Investment in public infrastructure

The government can also increase the nation's productive capacity through investment in physical infrastructure, such as transportation networks like roads, rail, airports and seaports, as well as telecommunications networks (e.g. internet and broadband). Better infrastructure enables firms to transport their factors and goods as well as coordinate their production more easily thus enabling them to produce more output for a given amount of resources.

3. Factors that Shift the Entire AS Curve

a) Changes in both average cost of production and productive capacity

Figure 7



(i) Changes in <u>quality (productivity)</u> of resources

1. Investment in human capital

Human capital refers to the skills and capability of the workforce. Investment in human capital commonly takes the form of **education and training**. Training equips current or potential workers with work related skills while formal school education gives students the ability to acquire training when they enter the workforce in the future. The objective of human capital investment is to eventually to raise the productivity or quality of the workforce. A well-educated, skilled and trained workforce is more productive and can add more value to what they produce (i.e. they are more efficient and innovative). Such increases in labour productivity reduces the average labour costs per unit of output as well as increase the productive capacity of the economy.

2. Improvement in technology

Technology plays a key role in expanding an economy's productive capacity. Improvement in technology is usually the outcome of investment in research and development. However, as technology is also embedded in capital goods, technological improvements can also be achieved if a country were to import more advanced capital goods from overseas. New technology enables production to be carried out more efficiently with the use of automation. Improvements in communication technologies such as the use of emails; smartphones and web-conferencing also help reduce average costs and increase the productive capacity for businesses.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

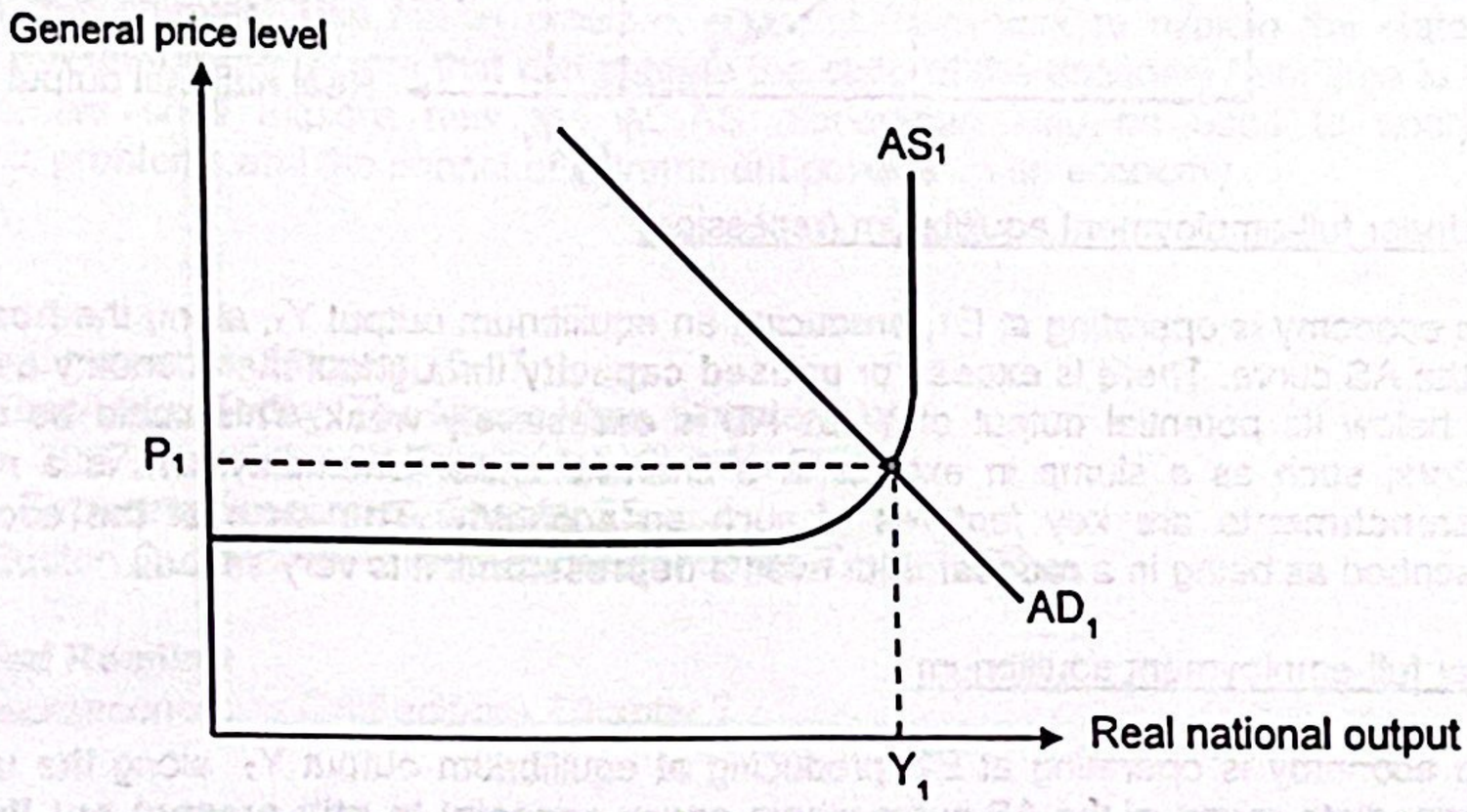
7. Which of the following could cause the AS curve to shift rightwards?

(A) an appreciation of the currency
(B) an increase in trade union bargaining power
(C) a reduction in the general price level
(D) an increase in the number of women available for work

5.2.3.4 AD-AS: MACROECONOMIC EQUILIBRIUM

(A) Equilibrium Level of National Income/Output

Figure 8: Equilibrium National Output and Income



In the AD-AS model, the equilibrium level of national income occurs at the intersection of the aggregate demand and aggregate supply. For Figure 8, the intersection of AD_1 and AS_1 results in the equilibrium real national output Y_1 and the general price level P_1. At this output level, planned expenditure equals the planned output (or income) so there is no accumulation or depletion of inventories. Total withdrawals are also equal to total injections. At this juncture, firms will not attempt to further reduce or raise output therefore the equilibrium level of national output and income is achieved.

(B) Equilibrium and the State of the Economy

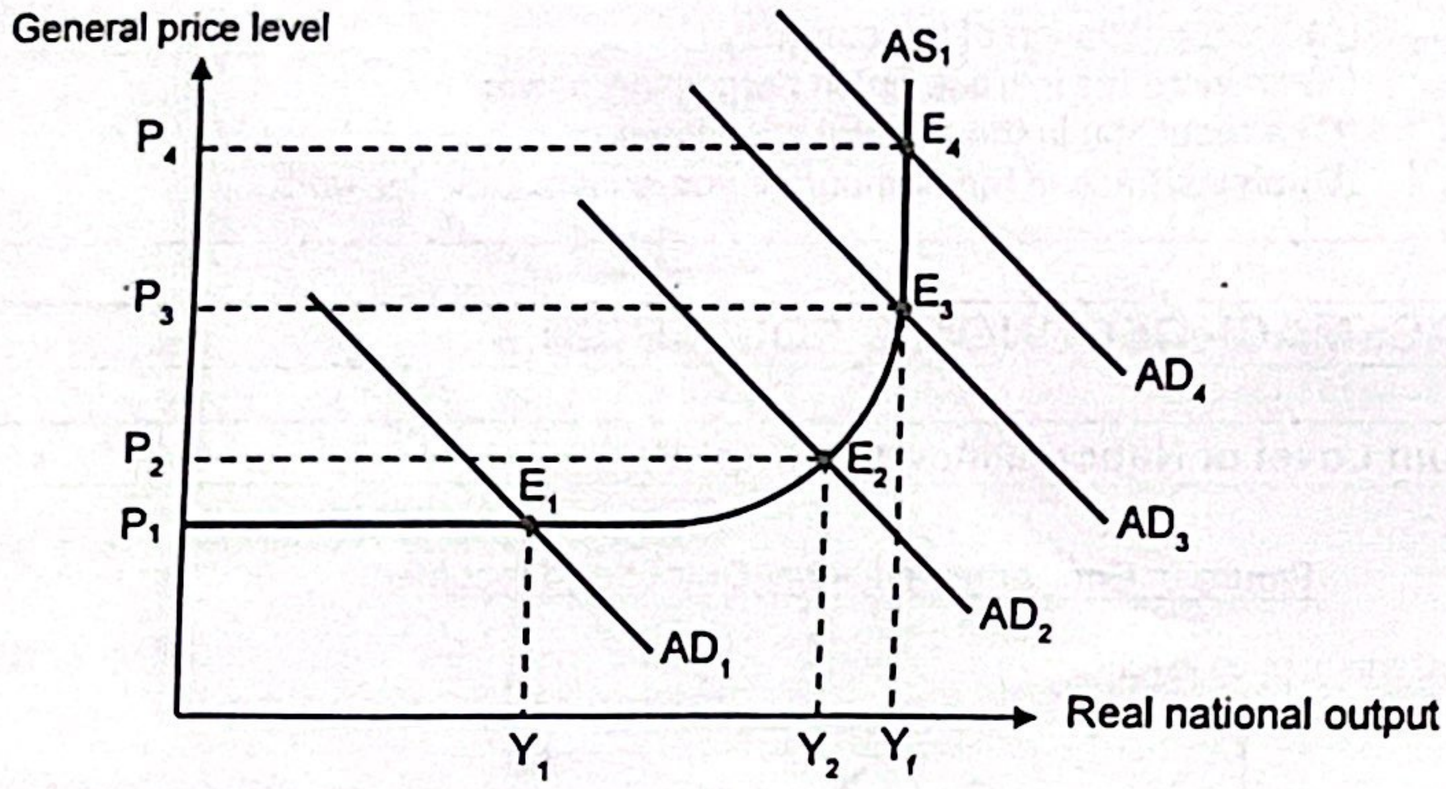
An economy in equilibrium may be experiencing full-employment, unemployment or inflation. Thus, even though an economy is in equilibrium, the state of the economy may not necessarily be ideal.
With reference to Figure 9:

Type of equilibrium	Corresponding state of the economy
E1: Below full employment (Y_1)	Recession: serious unemployment
E2: Near full employment (Y_2)	Approaching full capacity: threat of inflation
E3: At full employment (Y_f)	Full employment: ideal situation
E4: Above full employment (Y_f)	Overheating: inflation becomes serious

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Figure 9: State of the Economy



1. Under full-employment equilibrium (recession)

The economy is operating at E1, producing an equilibrium output Y_1, along the **horizontal range** of the AS curve. There is **excess** or **unused capacity** throughout the economy as it is operating far below its potential output of Y_f as AD is excessively weak. This could be due to various factors, such as a slump in exports or a financial crisis. Unemployment is a major problem. **Retrenchments** are key features of such an economy. The state of the economy can be described as being in a **recession** or even a **depression** if it is very serious.

2. Near full-employment equilibrium

The economy is operating at E2, producing at equilibrium output Y_2, along the upward-sloping intermediate range of the AS curve where **spare capacity is still present but limited**. As AD_2 rises to AD_3, demand for all goods and service outpaces the ability of the economy to supply such goods thus putting **inflationary pressure** on the economy. As households are willing to pay higher prices, firms will bid higher to obtain scare for resources. Cost of production rises leading to **demand-pull inflation** with general price levels rising from P_2 to P_3.

3. Full-employment equilibrium

The economy is operating at E3, producing at the **full employment** equilibrium output of Y_f. At this output level, there is **no cyclical** or **demand-deficient unemployment** but there could still be frictional and structural unemployment.

4. Above full-employment equilibrium

The economy is operating at E4, along the **vertical range** of the AS, producing an equilibrium output Y_f. Real national output cannot be expanded as the economy has reached its productive capacity. If AD_3 rises to AD_4, this simply translates into a rise in the general price level from P_3 to P_4 without any rise in real national output. There is **only demand-pull inflation** and the economy is said to be **"overheating"**. (More details can be found in Chapter 6 Part 3)

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

8. Using AD/AS analysis, draw a diagram to explain the impact on the economy of a government encouraging the improvement of skills of workers through subsidised training programmes.

CONCLUSION

The importance of the AD-AS model for macroeconomic analysis have been explained and exemplified in this chapter. This model provides a useful framework to explain the state of the economy and the underlying factors that can change the state of the economy from time to time. In later chapters, we shall explore how the AD-AS model can also be used to analyse the macroeconomic problems and the impact of government policies on an economy.

References

Sloman, 2009, Economics, Chapter 16-17
Miller, 2007, Economics Today, The Macro View, Chapter 11
Case and Fair, 2007, Principles Of Economics, Chapter 26
Sexton, 2008, Exploring Economics, Chapter 25
Mankiw and Euston Quah 2008, Principles of Economics, Chapter 33

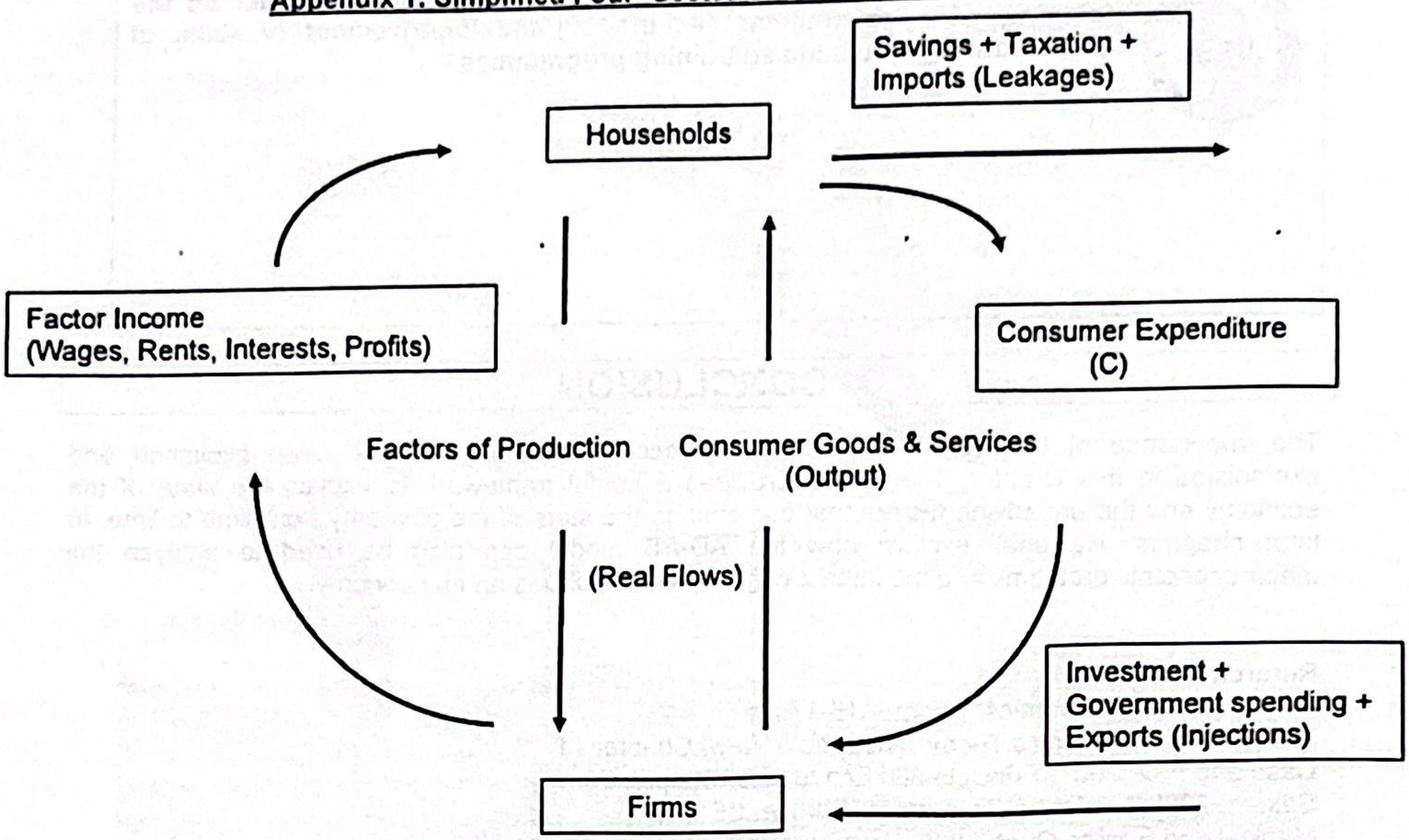
Recommended Reading

Blanchard, Macroeconomics (2nd edition), Chapter 7

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Appendix 1: Simplified Four- Sector Circular Income Flow Diagram



© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Appendix 2: Mathematical derivation of MPW = MPS + MPT + MPM

Accounting identity:

$$Y = C + S + T + M \quad \text{.....(1)}$$

Therefore:

$$\Delta Y = \Delta C + \Delta S + \Delta T + \Delta M \quad \text{..... (2)}$$

Dividing both sides ΔY:

$$1 = \frac{\Delta C}{\Delta Y} + \frac{\Delta S}{\Delta Y} + \frac{\Delta T}{\Delta Y} + \frac{\Delta M}{\Delta Y}.$$

$$1 = MPC + MPS + MPT + MPM$$

$$1 = c + s + t + m \quad \text{..... (3)}$$

Therefore, $c = 1 - \{s + t + m\}$

$$= 1 - w \quad \text{..... (4)}$$

Appendix 3: Mathematical derivation of the multiplier

i.e. $\Delta Y = \$ [(10 + 0.6(10) + 0.6 (0.6 \times 10) + 0.6 (0.6 \times 0.6 \times 10) \text{.....}]$ billion

$= \$ [10 (1 + 0.6 + 0.6^2 + 0.6^3 + 0.6^4 + \text{.....}]$ billion

$= \$ [10 (1/ (1 - 0.6))]$ billion = $25 billion

Note: ΔY ($25 billion) is larger than ΔG ($10billion), which triggered the initial growth in national income.

The mathematical derivation uses a geometric progression series to sum up the initial injection + all induced consumption.

Appendix 4: Aggregate Demand Curve

Why is the AD curve downward sloping?

The AD curve is drawn **downward sloping** with respect to the general price level. This illustrates the **inverse relationship** between the **general price level** and the **total demand** for **goods and services** in an economy.

This is explained by the following effects:

(1) **The Wealth Effect:** When prices rise, it costs more to purchase the same basket of goods and services as before. In other words, the purchasing power of cash or money balances falls as general price level rises. The same amount of cash will be worth less in terms of goods and services that can be purchased. As a result, households feel poorer and therefore reduce their **consumption (C)**.

(2) **The Interest Rate Effect:** When prices rises, consumers spend more of their income on consumption so they save less. Banks have then have less funds to loan out so they will raise interest rates. This makes it costlier for firms and households to borrow, thus reducing the demand for **consumption (C)** and **investment (I)** respectively.

(3) **The International Trade Effect:** When domestic prices rise, domestic consumers demand less domestically produced goods and substitute them with imported goods. Hence the demand for **Imports (M)** rises. On the other hand, instead of buying the exports of this country, foreigners will switch to buying their own goods or the exports of other countries. This causes the **exports (X)** of this country to fall. The rise in import demand and fall in export demand of the country causes its **net exports (X-M)** to fall.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Appendix 5: The MEI curve

Economists used the term "MEI" or marginal efficiency of investment to refer to the rate of **EXPECTED profitability** or **rate of return** from investment.

(1) The concept of MEI refers to "expected" not actual or realized returns.

The decision to invest has to be made at the point when the capital good has not yet been acquired e.g. an airline has to decide whether to buy new aeroplanes to add to its existing fleet.

At the point of making a decision to invest, no firm can guarantee that an investment will definitely yield a positive return. All expected profits or returns are made on the basis of projection of future sales and operating costs. Thus expectations play an extremely important role in the investment decisions.

Expectations or projections, is by nature volatile or subject to fluctuations based on changes in business or economic outlook. For instance, expectations can be lifted by good news (e.g. projection of good economic growth ahead) or dampened by bad news (e.g. impending recessions or economic slowdown).

Calculation of MEI

The MEI is calculated by estimating expected revenue from making an additional unit of investment expressed as a % of the capital cost. For example:

An airline is thinking of purchasing a new aeroplane that cost $20m and expects to earn $2m per annum from it. Its MEI or expected rate of return is based on the projected revenue expressed as a percentage of the capital cost, which is 10% (i.e. $2/$20 x 100).

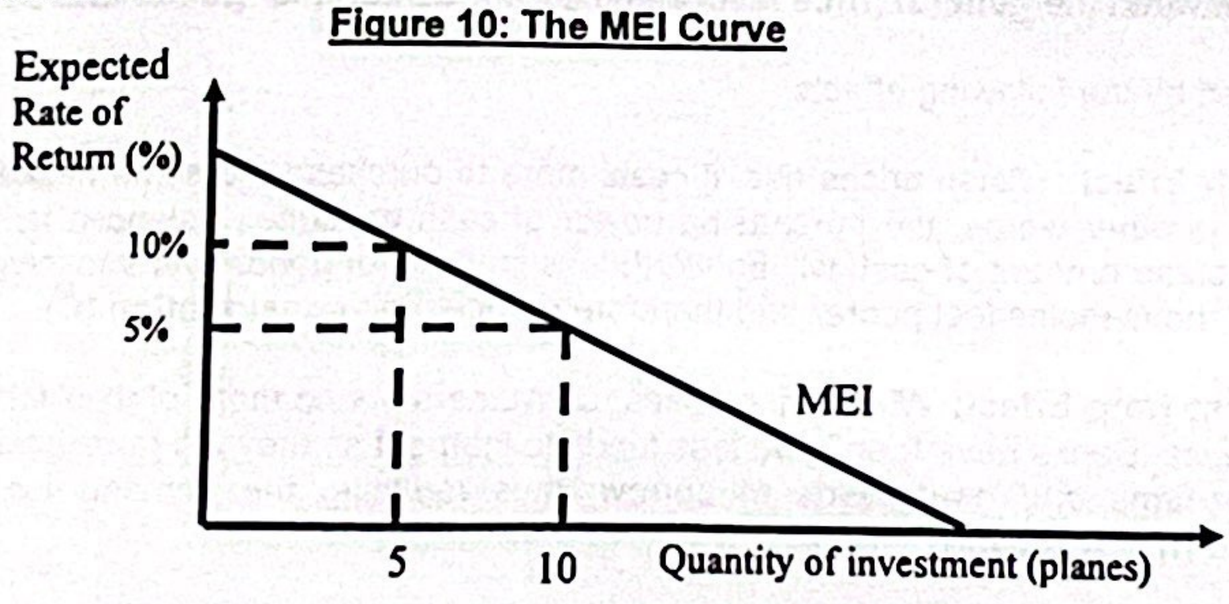
(2) The concept refers to *marginal* (not total) returns

The MEI measures return on an **additional unit** of investment. In the above example, if the airline intends to purchase 20 new aeroplanes, the MEI does not measure the return to total number of aeroplanes but to each additional unit such as 1st, 2nd, 3rd.... 20th aeroplane.

(3) Derivation of the MEI curve

The MEI curve is downward sloping or inversely related to the interest rate. It is derived by working out the expected rate of return for each new additional unit of investment based on **ALL** prospective investments which a firm intends to undertake.

Figure 10: The MEI Curve



For example, in the case of an airline, some route are more profitable than others as the former could be more popular, catering to richer countries, or facing less competition from other airlines. Hence the expected rate of return for each plane purchased will differ depending on which route they are used for. By lining up each unit of investment (i.e. planes) according to their rate of return from the highest on the left to the lowest on the right, the MEI of the airline can be derived. In figure 10, the expected rate of return for the 5th plane could be 10% while that of the 10th plane purchased could be much lower at 5%.

Similarly the MEI for the entire economy can also be derived by lining up from left to right all investments across all industries with the highest rates on the left and the lowest on the right.

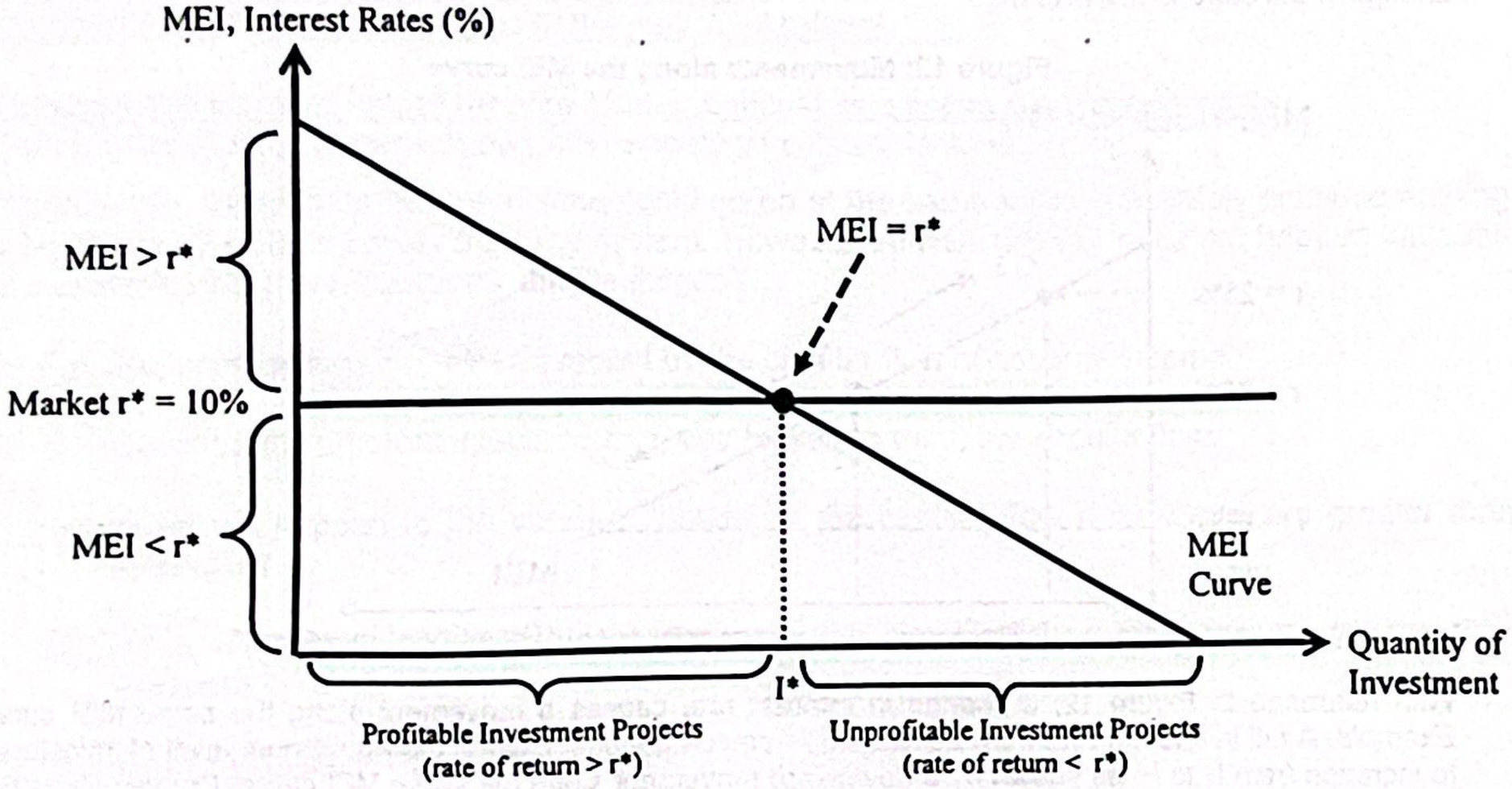
© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

(4) Equilibrium or Optimal Level of Investment

Given the MEI curve or expected rate of return for ALL prospective investment which a firm or a country intends to undertake, what would be the best or optimal level of investment? To answer this question, there is a need to compare the MEI (m) with the current interest rate (r).

Figure 11: The MEI Curve – Profitable & Unprofitable Investment Projects



The interest rate represents the cost of borrowing the funds to invest. It is profitable to invest if the MEI or expected rate of return is above the current market interest rate. In figure 11, if the current interest rate is 10%, any investment with an MEI above 10% would be profitable and conversely, if the MEI is below 10% the firm makes a net loss from the investment after deducting the cost of borrowing funds.

For example if a new machine is expected to yield 17% and the current market interest rate is 10%, the expected net return is positive at 7%, which is profitable as it exceeds the cost of borrowing. Even if the firm does not borrow and use its own funds to finance the investment, as long as the MEI > r, it is better for the firm to use its own fund to invest than to leave them in the bank as returns from investing is more than its **opportunity cost.**

Conversely if a new machine is expected to yield on 7% and the current market interest rate is 10%, expected net return is -3%. This mean that the firm will make losses on the investment as the expected returns cannot cover the cost of borrowing. Even if the firm were to use its own funds to finance the investment, as long as the MEI < r, it is better for the firm just leave these funds in the bank as returns from saving is more than the returns from investing.

The best or optimal level of investment to undertake is at the point where the MEI is exactly equals to the current market interest rate (r) i.e. **MEI = r**

Note:

- *The vertical axis represents the 2 key variables measured i.e. interest rates and MEI. Both are measured in terms of %.*
- *FDIs are not affected by interest rates of the country they are investing in. They are affected by their own country's interest rates.*

© Hwa Chong Institution Economics Unit. All Rights Reserved.

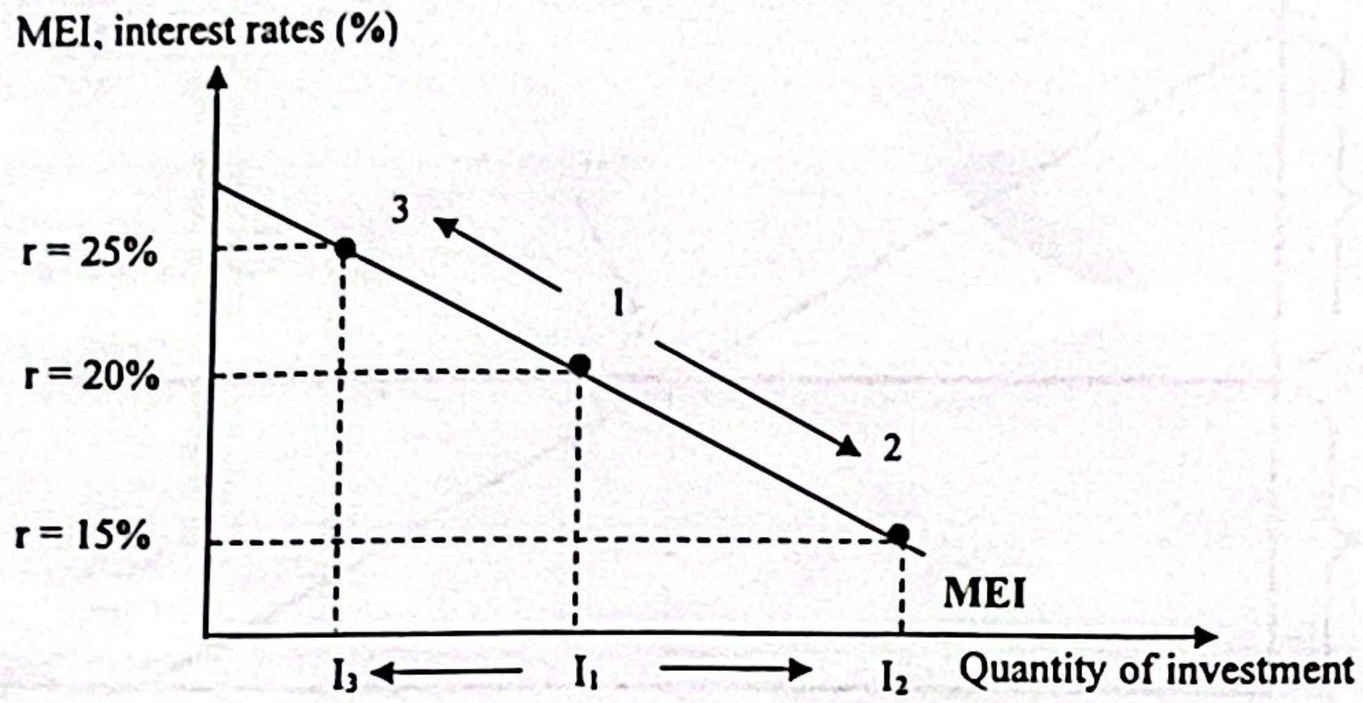
Scanned with CamScanner

(5) Movement along the MEI Curve

From the above explanation of the 2 key determinants of investment, a distinction should be made between what causes a **movement** and what causes a **shift** of the investment schedule or MEI curve.

A movement along the MEI curve is caused by a change in the current interest rate, ceteris paribus. On the other hand, a shift of the MEI curve is caused by a change in MEI or expected rate of return, assuming there is no change in the current interest rate.

Figure 12: Movements along the MEI curve

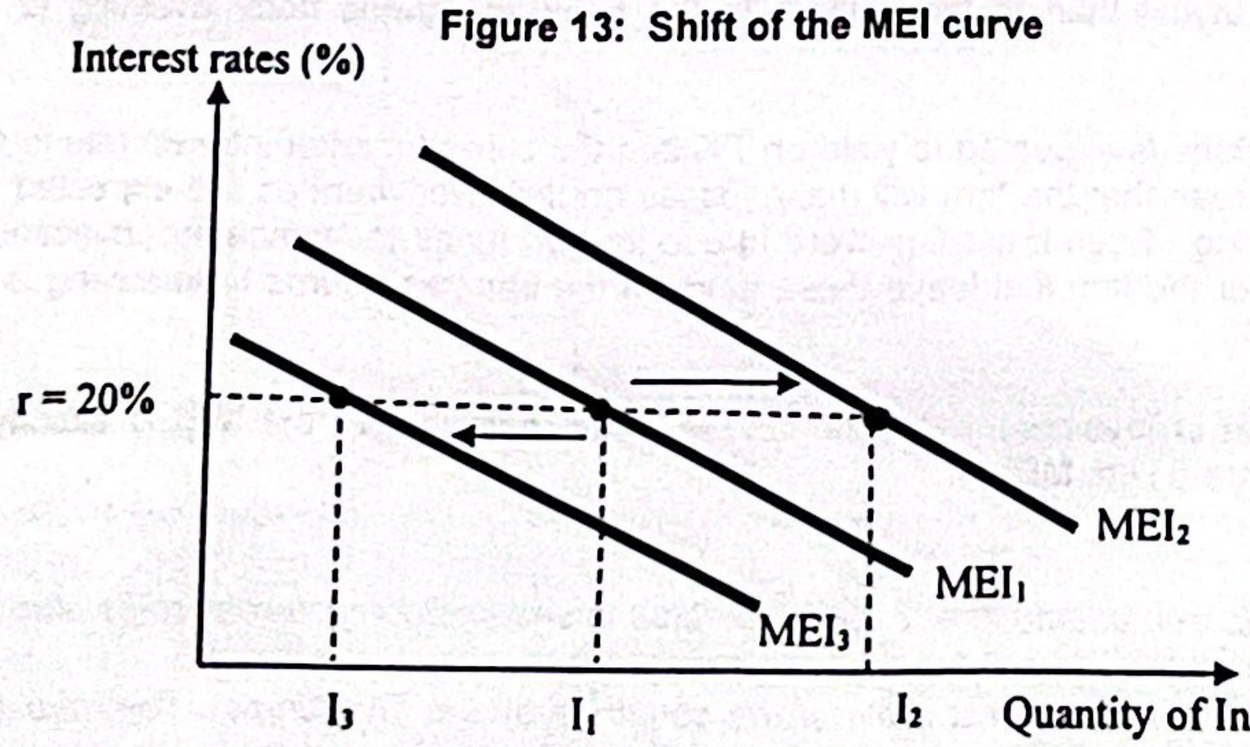


With reference to Figure 12, a change in interest rate causes a movement along the same MEI curve. *Example:* A fall in interest rate from 20% to 15%, ceteris paribus, causes the equilibrium level of investment to increase from I_1 to I_2, as shown by a downward movement along the same MEI curve. Conversely, a rise in interest rate from 20% to 25%, ceteris paribus, causes the equilibrium level of investment to fall from I_1 to I_3, as shown by an upward movement along the same MEI curve.

(6) Shift of the MEI Curve

Any change in non-interest rate determinants of investment will result in a shift of the whole MEI curve. Besides the interest rate, the key non-interest rate determinants that can affect the MEI are business expectations, corporate taxes, technological innovation and prices/costs of capital goods

Figure 13: Shift of the MEI curve



For example in figure 13, if business expectations were to improve, then MEI_1 will increase (shift right) to MEI_2. At the current interest rate of 20%, total investment will rise from I_1 to I_2. Conversely if, corporate taxes were raised, then future post tax profits will fall causing MEI_1 to decrease (shift left) to MEI_3. At the current market interest rates of 20%, total quantity of investment will instead fall from I_1 to I_3.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Tutorial 5.2

Circular Flow simulation game (Supplementary):
http://welkerswikinomics.com/blog/2010/09/08/circular-flow/

Question 1: Circular Flow of Income Model (optional as a practice on foundations)
The **circular flow of income** shows how income 'circulates' in an economy.

Theoretically, the circular flow of income could go on at the same value indefinitely because nothing is being added or taken away from the system. However, realistically this does not happen because all economies will have 'injections' and 'leakages'.

(a) Explain, using a diagram, what is meant by the circular flow of national income

(b) (i) Describe the different injections into, and leakages from, the circular flow.

(ii) What will happen to the value of income in the circular flow if injections are greater than leakages?

(iii) What will happen to the value of income in the circular flow if leakages are greater than injections?

(c) When will the level of National Income be in equilibrium?

Question 2: Multiplier Activity (optional as a practice on foundations)
In 2010, Singapore completed the building of two Integrated Resorts with a total investment of nearly S$5 billion. 35,000 jobs were created in the process.

Task: Illustrate and explain using a mind-map the so-called "ripple" effects (i.e. the multiplier process) of building the integrated resorts / a new hospital and analyse how it will increase Singapore's national income.

Key pointers in explaining the K process....	
(1)	**What triggers off the K process?**
	Exemplify
(2)	**Initial Impact? First Round**
	Exemplify
(3)	**Subsequent Rounds**
	Exemplify
(4)	**Final Impact**
	Exemplify
(5)	**Evaluation**
	Exemplify

Reflection Questions
(a) Do you expect the value of the multiplier in the Singapore economy to be small or large? Justify your answer.

(b) What are the implications of the size of the multiplier on the effectiveness of an increase in the size of government spending on growing the real national income in Singapore?

© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner

Question 3: TYS N2009 CSQ2 (Selected data)

Table 1: Gross Domestic Product (GDP) and its components in selected economies (% of total), 2006

	China	US	Singapore
Total GDP (US$ billion) 2006	2765.4	12433.9	132.2
Composition:	%	%	%
Private consumption	36.5	69.9	40.1
Government consumption	13.8	19.2	11.1
Gross fixed investment	41.9	16.7	23.1
Exports of goods and services	39.7	11.1	249.6
Imports of goods and services	-31.9	-16.9	-223.9

Source: United Nations Statistics Division

(a) Comment on the likely size of the multiplier in the three economies shown in Table 1. [6]

Question 4 - N2002(a) (adapted)

(a) Using the circular flow of income diagram, explain how an increase in injections may affect the equilibrium level of national income. [10]

Question 5 - N2011(a)

(a) Using an AD-AS diagram, explain the process whereby an increase in government expenditure can lead to a bigger change in national income. [10]

Question 6 – Optional Question

(b) Discuss the extent to which an increase in government spending would increase the real national income of a country. [15]

Question 7: Application of AD-AS Model to given scenarios

You are given several scenarios in this tutorial. For each scenario, you are to:

1. **Explain** the impact of the scenarios on the domestic economy using AD-AS analysis. *(Hint: link to the internal macroeconomic goals)*
2. **Consider** the short-run and long-run effects of the given scenarios.
3. **Exemplify** where possible i.e. create a context if the scenario is arbitrary.
4. **Evaluate** the relative size of the shifts in AD and AS (when both shift).
5. **Illustrate** using an AD-AS diagram
6. **Take a stand** at the end of your analysis with clearly stated **assumptions.**

Scenario 1:
A significant fall in world oil market price on an oil-importing country such as Singapore.

Using an AD-AS diagram, explain the impact on the Singapore economy.

© Hwa Chong Institution Economics Unit. All Rights Reserved.

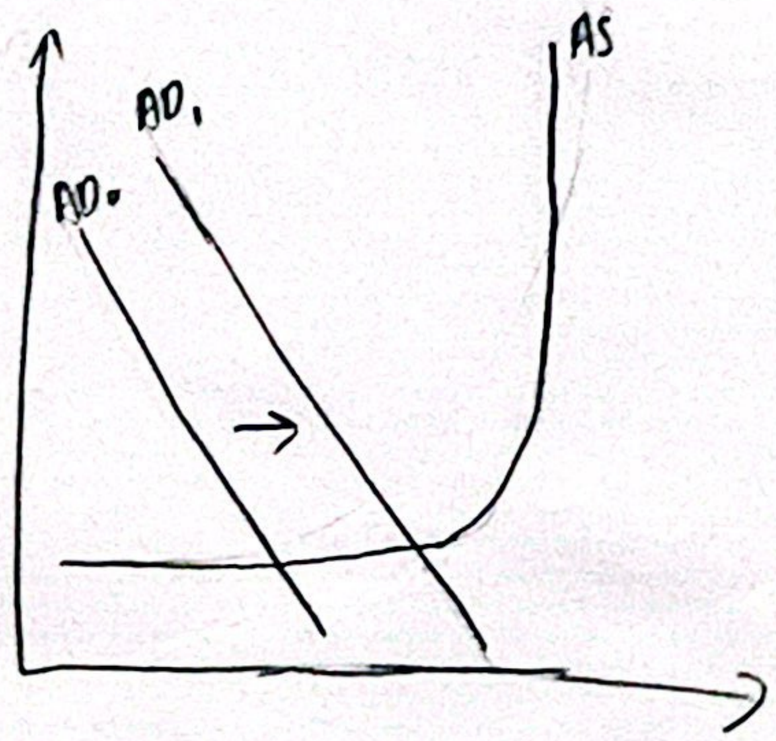
Scanned with CamScanner

Scenario 2:
Assume an economy is initially below the full-employment equilibrium.

Using an AD-AS diagram, explain the impact on the economy of the combined effect of a rise in export earnings and an increase in size of labour force.

Scenario 3:
Assuming economic growth is slowing down due to pessimistic global economic conditions. The Singapore government decided to lower corporate tax rate from 18% to 17% and give tax rebates to individuals to stimulate growth.

Using an AD-AS diagram, explain the impact of the policy on the Singapore economy.



© Hwa Chong Institution Economics Unit. All Rights Reserved.

Scanned with CamScanner