Catholic Junior College

THEME 3: THE NATIONAL AND INTERNATIONAL ECONOMY

3.1 INTRODUCTION TO MACROECONOMICS

ENDURING UNDERSTANDING

After learning about the four macroeconomic aims and the key economic indicators, we now seek to understand how the economy really works. The macroeconomy is made up of 4 sectors, namely Households, Firms, the Government, and the Foreign Sector. The interactions between these sectors determine the outcomes of an economy.

ESSENTIAL QUESTIONS

- How is a country's national income determined?
- What may cause changes in a country's national income?

UNIT SUMMARY

This topic will introduce you to a conceptual understanding of the macroeconomy and how it functions.

The framework that will help to illustrate the working of a macroeconomy is the ***AD/AS*** framework. Using this framework, you will be able to analyse how the equilibrium level of national income is determined in the macroeconomy. They will also help to analyse effects on the general price level and employment, as well as shed light on the government's role in the macroeconomy.

Lastly, you will also learn about the policy implications and the limitations of Keynes' argument.

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CONTENT

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H2 9570 SYLLABUS REQUIREMENTS

3.1.1 Circular Flow of Income

Students should be able to:

- explain the circular flow of income between firms and households and how this flow is affected by withdrawals and injections in the form of
    - savings and investments
    - taxes and government spending from the actions of the government
    - imports and exports from the external sector

- explain why income that is generated by the production of goods and services for domestic use and for exports will in turn be translated to expenditure on both domestically produced output and on imports, such that the national income and the national expenditure of an economy are equivalent.

3.1.2 Aggregate Demand and Aggregate Supply

Students should be able to:

- understand that AD refers to the total demand for all the goods and services produced by a country for a given general price level (GPL), where components are C, I, G and (X-M).

- explain the factors that can affect the various components of AD:

    - C: Income, economic outlook, access to credit, demographics, technological changes
    - I: Economic outlook, access to credit, technological changes
    - G: The various microeconomic and macroeconomic aims of the government, government revenues, access to credit
    - X: foreign income, relative inflation rates, exchange rates, foreign protectionism
    - M: domestic income, relative inflation rates, exchange rates, local protectionism

- understand that aggregate supply (AS) refers to the total output of goods and services produced by an economy for a given General Price Level (GPL).
- explain the factors that affect AS, which includes the costs, availability and quality of factors production
    - quantity of labour is affected by domestic population growth and immigration
    - quality of labour is affected by investments in human capital
    - quantity of capital is affected by investments which affects the rate of capital accumulation
    - quality of capital is affected by technological changes

- understand that national output and the GPL of an economy at any given time is determined by the intersection of the AD and AS curve
- explain with a diagram how changes in AD and AS will affect national output and the GPL
- explain the multiplier effect using a numerical example and illustrate this effect with a diagram showing multiple rightward shifts of the AD curve for a given AS curve
- state the multiplier formula, which is either 1/(1-MPC) or 1/MPW, where MPC refers to the marginal propensity to consume while MPW refers to the marginal propensity to withdraw
    - The MPW consists of the sum of the marginal propensities to save, tax and import i.e., MPS, MPT and MPM respectively

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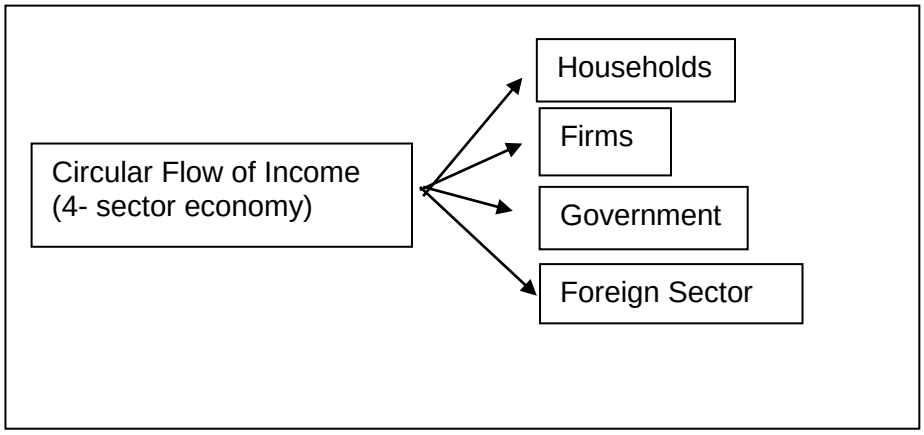
- Define these concepts and use them to explain the size of a country's multiplier.
- For example, Singapore has a high MPS due to a high rate of mandatory CPF social security savings, and a high MPM as it lacks land and other natural resource, so it is highly dependent on imports for food, fuel and all other raw materials. This explains why Singapore has a large MPW and consequently a small multiplier.

Concept Map for Circular Flow of Income



Note: Households, firms, government and foreign sector played key role in the circular flow of income. Injections and withdrawals from these various sectors will have an overall effect on the circular flow of income. More to be explained in the notes ahead.

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Summary Table of AD/AS Analysis

	AD	SRAS	LRAS
Factors that cause curve to shift	Changes to C, I, G, (X-M)	Changes to **cost of production** for reasons other than changes in the GPL, e.g. change in price of factors of production/inputs	Changes to **productive capacity** caused by: (i) Technology; and (ii) Quantity and/or Quality of Resources
Direction of shifts	AD increases → shifts right AD decreases → shifts left	SRAS increases → shifts downwards (Yf no change) SRAS decreases → shifts upwards (Yf no change)	LRAS increases → Yf shifts rightwards LRAS decreases → Yf shifts leftwards
Effects on the economy	An ***increase in AD*** → Leads to a **multiplied increase in real national income** (RNY) via the multiplier effect (K) assuming the economy has spare capacity → Extent of increase in RNY depends on the size of K	An ***increase in SRAS*** → Leads to an increase in real national income (RNY); Level of full employment **(Yf)** national income **remains unchanged**	An ***increase in LRAS*** → Leads to an increase in real national income (RNY) + Level of full employment **(Yf)** national income **increases**

Note: This summary table of AD/AS analysis shows the **shifts** in AD and AS curves. For movements, please refer to the notes.

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1 CIRCULAR FLOW OF INCOME

Definition: The ***Circular Flow of Income*** is a theoretical model for understanding the workings of an economy. It illustrates the flow of money as well as goods and services between the 4 sectors – *Households*, *Firms*, *Government* and *Foreign* sectors, in an economy. It shows how these different economics agents are inter-related and how a country arrives at a certain level of national output, national expenditure and national income.

The concept of a circular flow of income involves 2 principles, assuming that there is *no withdrawal from or injection into the economy*:

i) In every economic transaction or exchange, the seller receives exactly the same amount that buyer spends.

ii) For every real (goods and services) flow in one direction, there is a corresponding money (payment) flow in the other direction.

1.1 The 4 Sectors in an Economy

The 4-sector economy consists of:
(i) *Households*, (ii) *Firms*, the (iii) *Government* & the (iv) *Foreign sector*.

i) <u>Households</u>

Households receive factor income (interest, profit, rent and wages) from firms for providing factor services, i.e., providing factors of production (CELL: Capital, Entrepreneurship, Land and Labour) for production of goods and services. Households then spend money on these goods and services produced by the firms — represented by Consumption expenditure (Cd). Cd represents consumption of domestically produced goods and services.

Households also save a part of their income. The savings (S) of households are a form of *withdrawal* from the circular flow because when people save, the money is not available for spending on domestic goods and services.

Households pay a part of their income as tax. The tax (T) paid by households is a form of *withdrawal* from the circular flow because this amount is also not available for spending on domestic goods and services.

ii) <u>Firms</u>

Firms employ the factors of production (CELL) provided by households and pay households factor incomes in the form of interest for capital, profit for entrepreneurship, rent for land and wages for labour. In turn, households pay firms for their output. This comprises consumer expenditure on domestically produced goods and services (Cd).

Firms invest in capital goods. The investment (I) of firms is an example of an *injection* as it is an expenditure on capital goods (such as machinery and equipment) that creates income. This expenditure decision will inject a new source of income and create an overall higher income within the circular flow, ceteris paribus.

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Firms also pay tax (T) to the government which is a form of withdrawal from the circular flow.

iii) Government

Government spending or also commonly known as government expenditure (G) on goods and services is another *injection* into the circular flow.

iv) Foreign Sector

In the foreign sector, there are exports and imports of goods and services. Export revenue (X) is received from goods and services produced within the country but sold abroad to earn income. Cars produced by Toyota in Japan but sold to consumers outside of Japan are examples of Japan's exports. It is an *injection* to the circular flow of income of the economy.

Imports expenditure (M) *is incurred on* goods and services produced abroad but bought by domestic firms and households. The purchase of a car manufactured by Toyota by Singapore consumers is an example of imports. It is a *withdrawal* from the circular flow of income.

1.2 Withdrawals and Injections

Definition: Withdrawals (W) refer to any part of household income that is not spent on goods and services produced by the domestic firms. The effect of any withdrawals is to cause the flow of income to *contract* or diminish.

From the circular flow diagram in Figure 1, household 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) Imports (M), e.g. purchases of goods produced in other countries.

In symbols: W = S +T + M

Definition: Injections (J) refer to expenditure on domestic output that do not arise from domestic households. The effect of any injections is to cause the flow of income to *expand*.

Injections occur in the following situations:

(1) Investment (I)
(2) Government expenditure (G)
(3) Exports (X)

In symbols: J = I + G + X

The four sectors of the economy, i.e., Households, Firms, Government, Foreign sector, along with the injections and withdrawals, are illustrated in the Circular Flow of Income diagram in Figure 1.

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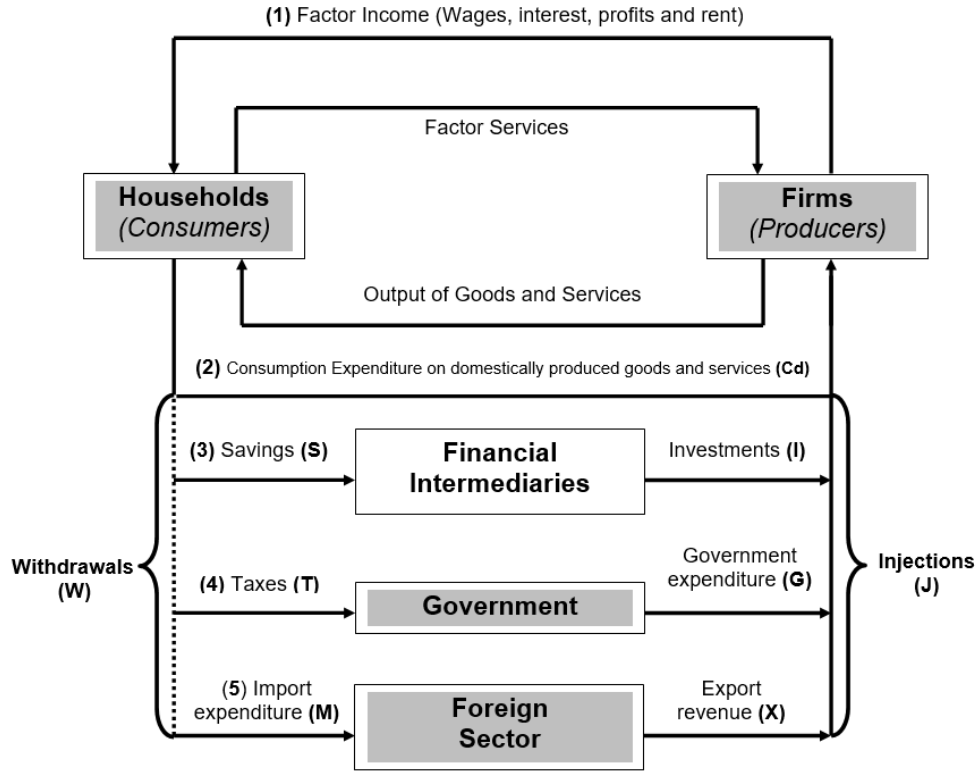

Figure 1: The Circular Flow of Income

(1) Figure 1 above shows the flow of factor income from firms to households. This consists of payments (wages, interest, rents and profits) for use of factor services (labour, capital, land and entrepreneurship) that are owned by the households.

This national income is then distributed by households into four flows – (2) to (5).

Part of this national income returns directly to domestic firms. **(2)** shows the flow of consumption expenditure (Cd) on domestically produced goods and services that goes back to the firms as a payment for the output. Hence, this loop (1) and (2) depicts a process whereby firms produce output which generates an equal amount of income to the household sector.

There are three other flows out of the household sector in addition to consumption expenditure to the domestic firms. These are the:

- **(3)** The savings (S) flow;
- **(4)** The flow of tax (T) payments to the government; and
- **(5)** The imports (M) flow to the foreign sector.

If we regard the loop linking the households and the firms as the central income-generating and output-generating mechanism, **the savings, tax and import flows are withdrawals (W)** from this central loop.

Moreover, not all expenditure to the domestic firms comes from the domestic consumers. Some are injected from outside the central loop in the form of **investments by firms (I), government expenditure (G) on goods and**

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services and purchase of exports generating export revenue (X) by foreigners. I, G and X are called injections (J).
It should be noted that at the ***equilibrium level of income***, the ***sum of injections (J) should equal the sum of withdrawals (W)***. However, that does not mean that savings are equal to investments, taxes are equal to government expenditure, and imports are equal to exports.

The circular flow model helps economists to understand the likely causes of cyclical fluctuations in an economy (E.g. recession and economic growth).

When withdrawals are not equal to injections, the circular flow of income is in **disequilibrium.**

- If withdrawals exceed injections (W > J), the level of economic activity will fall and consequently, the level of income will fall.
- If injections exceed withdrawals (J > W), the level of economic activity will increase, and then the level of income will increase.

For example, assume a fall in exports, ceteris paribus.

- This would cause a fall in injections and therefore the economy would be in disequilibrium with J < W.
- This signals weaker demand for goods and services, resulting in firms reducing their production of goods and services.
- With less output produced, fewer factors of production would be employed by firms, resulting in lower factor incomes to households in the form of wages, interest, rent and profits.
- The fall in income results in a fall in savings, taxes paid to government and expenditure on imports.
- Withdrawals will continue to fall until withdrawals equals to injections at a lower level of income, i.e., new equilibrium level of national income.
- The extent of the decrease in national income will depend on the size of the multiplier which we will be looking at in Section 3.

Self-Assessment 1

Explain how equilibrium national income can be established given a rise in investment.
(Hints: Try to use the above example to aid your analysis!)

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1.3 The Three Methods of Measuring the Circular Flow of Income

The size of the income flow is an indicator of the amount of economic activity. There are three possible ways of measuring this flow with each way looking at a different part of the circular flow of income.

i) The ***expenditure*** method measures the total amount of spending by consumers, firms, government and foreigners on the final output produced within the economy in a specified time period, usually a year.
ii) The ***output*** method measures the total value of final output of goods and services produced within the economy in a specified time period, usually a year
iii) The ***income*** method measures the total income earned from all factors of production producing the final output within the economy in a specified time period, usually a year

These three methods should yield the same value
i.e. total output = total expenditure = total income of an economy.

This is illustrated by the ***circular flow of income.***

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2 AGGREGATE DEMAND AND AGGREGATE SUPPLY

2.1 Aggregate Demand Curve (AD)

Definition: The Aggregate Demand (AD) curve gives the total demand for a country's output at various general price levels, ceteris paribus.

The total demand comes from domestic households, firms, government and the foreign trade sector in the forms of:

- **total consumption expenditure on all products (C);**
- **investment expenditure (I);**
- **government expenditure (G); and**
- **net exports (export revenue of goods and services less import expenditure of goods and services or (X-M)).**

The relationship between each of these factors can be expressed in the following expression:

Aggregate Demand (AD) = C + I + G + (X-M)

The general price level of the output refers to the average prices of all the goods and services that make up the total output used to compute GDP.

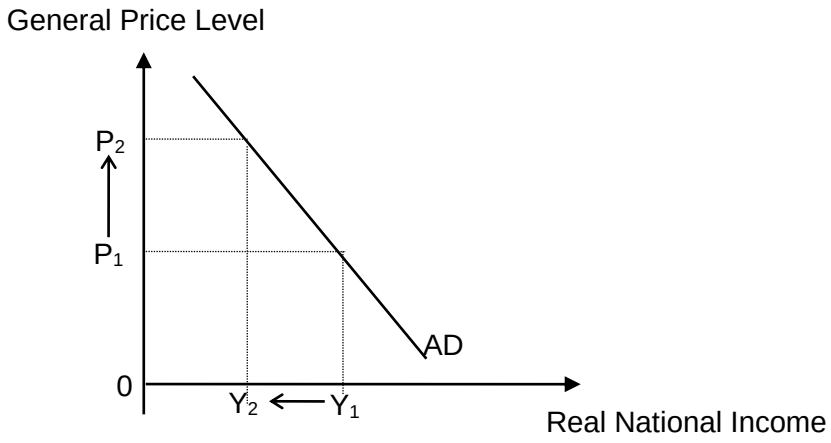

Figure 1: The Aggregate Demand Curve

The AD curve **slopes downward** from left to right in Figure 1, indicating that the higher the general price level, the lower the real GDP (real total output demanded by the economy), ceteris paribus. The reasons for the downward sloping AD curve are explained in Appendix 1.

2.2 Factors that Shift the Aggregate Demand Curve

Movement Along the AD Curve

The AD curve relates the aggregate demand to the general price level over a given time period. A *change in the general price level* will cause a *movement along* a given AD curve.

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Shifting of the AD Curve

All other (non-price) factors affecting aggregate demand cause a shift of the AD curve leftward or rightward. The shift of the AD curve can be caused by changes in consumption, investment, government expenditure or the net exports.

i) A *leftward* shift of the AD curve can be caused by a *fall* in consumption, investment, government expenditure or net exports, for reasons ***not*** associated with changes in general price level.
ii) A *rightward* shift of the AD curve can be caused by a *rise* in consumption, investment, government expenditure or net exports, for reasons ***not*** associated with changes in general price level

We shall now look at some of the determinants that can trigger changes in the components of aggregate demand and thus, shift the aggregate demand curve.

a) Consumption Expenditure (C)

Definition: Consumption is spending by households on consumer goods and services.
This spending covers non-durable goods (e.g. food), durable goods (e.g. cameras and cars) and services (e.g. entertainment, transport).

Note: The purchase of new housing does not come under consumption. It comes under the component of investment.

Determinants of Consumption include:

i) Size of Disposable Income of the Households (Affected by Direct Tax and Transfer Payment)

One of the most important determinants of consumption expenditure (and personal savings) is household's disposable income (Y_d).

Household disposable income = Personal income + (Transfer payments – Personal income taxes)

As such, household disposable income is dependent on *income tax rates* and amount of *transfer payments* received. Transfer payments refer to a payment made or income received in which no goods or services are being paid for, such as welfare pay-outs, pensions, unemployment benefits, grants, etc.

As disposable income (Y_d) rises due to lower tax rates and/or higher transfer payments given by the government, households have greater purchasing power to spend on goods and services. Ceteris paribus, this results in an increase in consumption.

ii) Households' Net Wealth

Households' net wealth = value of all assets (e.g. money in the bank, shares, houses) owned by households minus any liabilities, or debts owed (e.g. mortgage, car loans).

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An increase in households' net wealth could arise from rising prices of shares and housing prices. Ceteris paribus, this encourages households to increase consumption.

iii) Income Distribution

Different income groups will have different propensities to consume. Generally, lower income groups spend a ***larger*** proportion of their ***rise*** in income on consumption than the higher income groups. This is because lower income groups have more unmet needs and would need to spend a larger proportion of their rise in income on these needs.

A redistribution of income from the higher to the lower income groups by raising progressive personal income taxes and increase transfer payments to the poor will raise the total consumption level in the economy.

iv) Interest Rates and Availability of Credit

Many consumer goods, especially big-ticket items such as cars and domestic household appliances, are purchased with borrowed funds, either through bank loans or credit extended in hire purchase schemes. There is an interest rate charged by financial institutions and this is the ***cost of borrowing money***. The higher the rate of interest, the higher the cost of borrowing, the less will be spent on those items typically purchased on credit.

Also, interest is a source of income to savers and hence at a higher rate of interest, households will save more and spend less. This will also discourage and therefore reduce consumption by households.

An increase in down-payment[1] and the shortening of the repayment period will also discourage consumption resulting in a fall in consumption.

The main source of credit comes from banks and financial institutions. They are the money lenders. The Central Bank[2] routinely regulates the banks' ability to lend money by controlling interest rates through the use of **monetary policy.** (*More to be discussed in later topics)*

[1] The cash portion that must be paid upfront apart from the portion that is paid for in instalments.
[2] A central bank is an institution that manages a state's currency, money supply and interest rates.

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v) Consumers' Confidence – Expectations about Employment, Prices and Income

Consumption is influenced by consumer confidence, and their expectations regarding future changes in income, employment and prices.

If consumers expect poor economic conditions, such as lower levels of employment and income, precautionary savings may increase. Thus, there will be a reduction in consumption and a decrease in aggregate demand. Conversely, if consumers are optimistic about their economic prospects, they are more likely to buy major items such as cars or furniture. This will cause an increase in the real value of consumption at each price level and an increase in aggregate demand.

Also, if prices are expected to rise in the future, consumer spending could rise in the present time period as consumers seek to avoid spending more in the future. However, for people who save for some definite target, such as the deposit for a new house or for retirement, rising prices could cause them to put more effort into saving and cause them to spend less.

vi) Invention of New Consumer Goods and the Influence of Advertising

The invention of new consumer appliances that incorporate the latest technological advancements often attracts consumers. Furthermore, through persuasive advertising and marketing techniques, consumption of such goods may rise and become prevalent even though there is no real need for these items by households.

vii) Tastes and Attitudes towards saving

If people have a 'buy now, pay later' mentality, they are likely to have a higher level of consumption in the present time period than if they are anxious to avoid getting into debt. Similarly, if people have a craving for more consumer goods presently, they will spend more than if their tastes are more frugal.

b) Investment Expenditure (I)

Definition: Investment is the acquisition of new fixed capital goods (including housing, plant and machinery) and accumulation of inventory stock (raw materials, semi-finished goods and finished goods held by the producer).

Firms make investment choices based on what they think they will be producing in the future. Investment decisions are generally based on:

i) The expected rate of return on the investment (MEI);
ii) The cost of the investment (Interest rate); and
iii) Profits and other costs of production incurred by the firm.

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Determinants of Investment include:

i) MEI vs. Interest Rate

Definition: The Marginal Efficiency of Investment (MEI) is the expected rate of return of investment or the Internal Rate of Return (IRR) of the investment in a capital good.

Definition: Interest rate is the cost of borrowing funds to make the investment i.e. the cost of the investment

The *MEI curve* shows the inverse relationship between interest rate and the level of desired investment, holding the price of the investment constant.

According to MEI Theory, a firm will only invest if the expected rate of returns on investment (MEI) is greater than the current rate of interest.

- For example, let us assume that a firm expects that upgrading its current machines would yield 8% returns. However, the firm would need to borrow from the banks at an interest rate of 3%.
- This investment is considered profitable because the MEI (8%) is greater than interest rate of 3%. As the net expected rate of returns is 5%, the firm will go ahead with the investment.

The *MEI curve* illustrates an inverse relationship between investment and interest rate.

- With reference to Figure 2, when interest rate falls from r_1 to r_2, investment increases from I_1 to I_2. This is because projects that were previously unprofitable are now profitable as the costs of interest payments fall.

As such, ***the lower the interest rates, the less costly it is for firms to borrow to make investments, the more investments will be deemed profitable, and hence firms will undertake more projects, resulting in an increase in investment.***

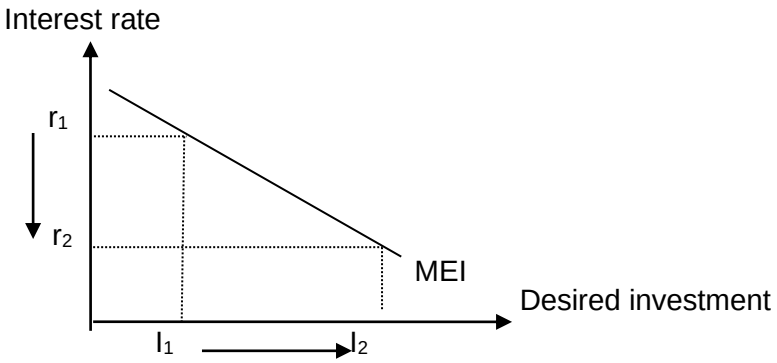

Figure 2: The MEI Curve

Note: A fall in interest rate is ***not*** likely to attract more foreign direct investments (FDIs) into the country as foreign investors are likely to come with their own source of money to invest and not borrow funds in the country they intend to invest in.

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ii) Expectations of Businesses

Investment decisions made by firms are usually in the present time period for the production and sale of output in the future. It is believed that level of investment is crucially dependent on 'animal spirits', i.e. business confidence about the future. Optimism or pessimism can be influenced by past profit, expected future demand for goods/services produced by the firm, future state of the economy, prices, political stability and many other variables.

Pessimism or optimism of the future can affect the level of investment. In a recession, businessmen are pessimistic about the future. Their expected rate of return on the investment falls. Thus, the *MEI curve* shifts leftward in Figure 3 below from MEI_0 to MEI_1. This causes the level of investment to fall from I_0 to I_1 at the interest rate of r_0.

The central bank's attempt to raise the level of investment by lowering the rate of interest is unlikely to encourage investment in this situation due to pessimism.

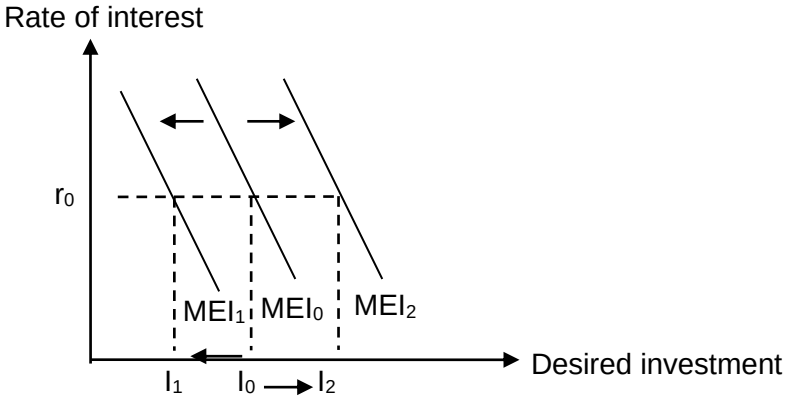

Figure 3: <u>The MEI Curve</u>

If businesses are confident about the future, the MEI curve shifts rightwards in Figure 3 above from MEI_0 to MEI_2. This causes an increase in the expected rate of return on the investment at the same interest rate at r_0, resulting in an increase in the level of investment from I_0 to I_2.

The central bank's attempt to lower the level of investment to prevent an overheating of the economy by raising the rate of interest is unlikely to discourage investment in this situation due to irrational exuberance and optimism of firms.

iii) Technological Progress

Technological progress can make existing capital equipment obsolete and inefficient. New products and new methods of producing the same good provide the prospects of new markets or cost reductions in existing markets. Firms will thus seize the opportunity to raise their profits by raising their level of investment in new capital goods.

The *MEI curve* in Figure 3 will thus shift rightward from MEI_0 to MEI_2, as the investment in new capital goods with improved technology will now yield higher

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expected rates of return because it will likely result in higher efficiency in production and reduce unit cost of producing the output, thus stimulating an increase in investment from I_0 to I_2.

However, certain types of investment, e.g. investment in factories that use the latest technology, will not take place if the economy's labour force does not have the necessary education and technical skill required for them to produce the required goods.

vi) Prices of Inputs & Availability of Inputs

If the price of labour is rising while the price of capital is constant, producers will substitute capital for labour when the possibility of substitution exists. This is because capital is now cheaper relative to labour and hence firms will switch to the use of capital in their production processes. If they do not have adequate capital goods, they will raise their level of investment to meet the desired amount of capital goods.
This is especially so when labour cost takes up a large percentage of total cost. Investment levels in an economy are affected by total business cost. Factors to take into consideration include the cost of machine, cost of labour and rental cost amongst other factors.

v) Government Policies

If government announces an increase in corporate tax, the expected post-tax profits on investment would fall. This reduces the expected rate of returns from the investment. Hence, firms are likely to cut investment.

Government grants to new investment projects, will reduce the cost of capital. This will encourage investment as cost of investment falls, ceteris paribus.

When price of capital is being subsidised, it makes capital relatively cheaper than labour. This encourages firms to substitute capital for labour and hence increase the level of investment.

c) Government Expenditure (G)

Definition: Government Expenditure constitutes government spending on final goods and services. These include spending on public goods like defence for the nation, for economic growth (e.g. spending on education), for social needs of the population (e.g. building of community centres and homes for the aged).

Note: Government expenditure does not include transfer payments which are spending by the government for which there are no current goods and services in exchange. Transfer Payment affects AD through C or I – see above under Government Policies affecting I and page 12 on Disposable income affecting C.

Any change in government purchases, ceteris paribus, will affect aggregate demand. An increase in government purchases increases aggregate demand; a decrease in government purchases decreases aggregate demand.

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Many economists argued that reductions in defence spending in the wake of the collapse of the Soviet Union in 1991 tended to reduce aggregate demand. Similarly, increased defence spending for the wars in Afghanistan and Iraq increased aggregate demand in USA. Dramatic increases in defence spending to fight World War II accounted in large part for the rapid recovery from the Great Depression.

Determinants of Government Expenditure include:

The level of government expenditure is often determined by political, social and economic reasons.

If a government decides to improve the healthcare infrastructure or the number of educational institutions within the economy, government expenditure is likely to rise. Governments may also intervene in an economic recession by raising G to boost the overall national income of the country.

d) Net Exports (X—M)

Exports are goods and services produced within a country but sold abroad (to foreign households, firms and governments) while imports are goods and services produced abroad but sold within the country to domestic firms and households.

Net exports = value of exported goods and services *minus* value of imported goods and services

As import expenditure is not part of the expenditure on domestic output, it is *not* part of AD.

A change in the value of net exports at each price level shifts the aggregate demand curve.

Determinants of Net Exports (X—M) are as follows:

Exports are sold abroad and hence the conditions of the economies abroad will affect domestic exporters.

i) National Income of Trading Partners

The demand for exports depends on the national income of an economy's trading partners.

For example, if the US, which is a major trading partner of Singapore, experiences strong economic growth, this would mean that US consumers enjoy an increase in their disposable incomes and therefore higher purchasing power. Assuming Singapore's exports are normal goods (YED >0), the demand for Singapore's export will increase and therefore Singapore's export revenue (X) increases, causing (X-M) to increase too. On the other hand, the US experiences a recession, such as during the 2009 Global Financial Crisis, then Singapore's X will fall.

Try this:
What is likely to happen to import expenditure if Singapore experiences strong growth?

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Tip: Remember to assume that YED>0

ii) Relative Prices with Other Economies

This depends on the price levels in the domestic economy relative to those in the rest of the world. The relative price of the goods of domestic economy as compared to the rest of the world may be affected by:

a) Inflation rates in other countries relative to domestic inflation rate; and/or
b) Changes in exchange rate.

a) Inflation Rates in Domestic Economy Relative to other Economies

If the inflation rate of the domestic economy is higher than that of foreign economy, the goods sold by the domestic economy (exports) would be relatively more expensive whereas the imports would be relatively cheaper.

Assuming that demand for the country's exports is price elastic, a relatively higher prices of exports will result in a more than proportionate fall in quantity demanded for exports and hence a fall in export revenue.

Also, given that domestic goods and imports are substitutes, the relatively higher price of domestic goods will cause people to switch consumption from domestic goods to foreign imports leading to an increase in demand for imported goods, causing an increase in total import expenditure in the domestic country.

This will decrease Country's A net exports, since value of exports decreases and value of imports increases.

b) Changes in Exchange Rate

A country's exchange rate is the price of its currency in terms of another currency. **An appreciation of the Singapore dollar against the US$** means that it takes less Singapore dollars to purchase one US$ i.e. the SGD becomes stronger relative to USD; and more USD is needed to purchase one Singapore dollar.
As such exports from Singapore will be more expensive in foreign currency while imports from US will become cheaper in domestic currency.

Hence, Americans are likely to buy fewer goods and services from Singapore while Singaporeans are likely to purchase more US goods and services.

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Analysis of an appreciation of SGD against USD:

A stronger currency will help lower the price of goods and services and curb inflation through two channels – the direct channel via import prices and the indirect channel via external demand for Singapore's goods and services.

With a stronger currency, the prices of imports in SGD falls and firms enjoy lower costs of production from the relatively cheaper imported raw materials.

With a stronger currency, the price of exports in foreign currency will be more expensive and this leads to a fall in demand for exports. At the same time, the appreciation would lead to the price of imports (in terms of SGD) to fall leading to an increase in quantity demanded of imports. This will lead to a fall in net exports (X-M). This will reduce aggregate demand and bring down general price levels (assuming that the economy was originally producing in the intermediate range of the aggregate demand curve).

Try this:
Explain the effect of a depreciation of the Singapore dollar against the US$ on net exports of Singapore.

Effect on Singapore's export revenue:

Effect on Singapore's import expenditure:

Overall effect:

iii) Relative Quality of Goods Produced Locally Compared to Foreign Goods

If quality of locally-produced goods falls relative to foreign-produced goods, the demand for local goods in foreign markets will fall and the demand for foreign goods in the domestic market will rise. As a result, total expenditure on imports will rise and total revenue from exports will fall, resulting in a fall in the (X—M) component of AD.

iv) Trade Policies

Trade policies of various countries can also affect net exports. Governments can promote exports and support domestic firms to gain greater access to foreign markets by signing free trade agreements with other economies. For example, the signing of the 2020 Regional Comprehensive Economic Partnership (RCEP) by 16 Asia-Pacific nations, including Singapore, China, Japan and Australia, would boost export revenue of member countries. This

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is due to the lowering of trade barriers, e.g. tariffs (or tax) on imports that facilitate more imports and exports among member countries.

On the other hand, when trading partners adopt protectionist measures, the economy's exports to such trading partners will be reduced.

Self-Assessment 2:

Components of AD Affected	Event(s)	Effects on Singapore's AD
C	i) Singapore Government announces "end of the year" bonus for all civil servants	
I	ii) Interest rates hikes likely in the US	
	iii) Singapore govt to provide more support to start-ups via Business Angels Scheme	
G	iv) Singapore govt to increase expenditure on infrastructure	
(X—M)	v) Depreciation of Singapore's currency against US dollar	

Note:
The above determinants will affect the size of the components of aggregate demand.

It should also be noted that the relative share of the components of aggregate demand tells us **the nature of the economy**. As shown in Tables 1 and 2 below, consumption and investment take up a large portion of AD in the U.S. In contrast, consumption takes up a relatively smaller fraction of AD in Singapore. Instead, the largest component of AD is exports. Based on this information, we can see that Singapore, as a small economy, has a small

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domestic market and hence Singapore depends on **external demand** (exports) for growth.

Table 1: Share of AD components as percentage of GDP in Singapore 2020

Component		**% Share of GDP**
Private Consumption Expenditure	C	33.1
Gross Fixed Capital Formation & Changes in Inventories	I	22.6
Government Consumption Expenditure	G	12.4
Net Exports of goods & services	(X-M)	31.9
Exports of goods and services	X	176.2
Imports of goods and services	M	144.3
Gross Domestic Product	**GDP**	100

Table 2: Share of AD components as percentage of GDP in the US Economy 2020

Component		**% Share of GDP**
Private Consumption Expenditure	C	67
Gross Fixed Capital Formation & Changes in Inventories	I	21.5
Government Consumption Expenditure	G	14.7
Net Exports of goods & services	(X-M)	-3.2
Exports of goods and services	X	10.1
Imports of goods and services	M	13.3
Gross Domestic Product	**GDP**	100

2.3 Aggregate Supply Curve (AS)

Definition: The aggregate supply (AS) refers to the total value of domestic goods and services produced within the economy at every general price level.

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In simple terms, the AS represents the willingness and ability of an economy to produce goods and services either in the short run or in the long run, at every general price level in a given time period, ceteris paribus.

The assumptions made are as follows: Input prices remain fixed, the level of technology, and quantity and quality of resources within the economy remains constant. When these assumptions change, the AS curve will shift. The AS curve slopes upwards since, under these assumptions, output is more profitable at higher prices.

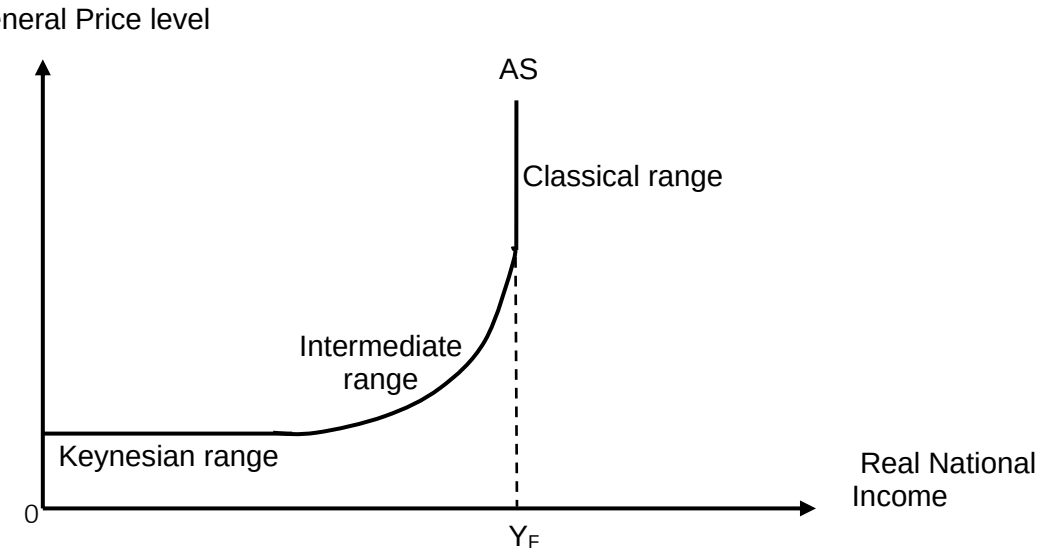

Figure 4: <u>The Aggregate Supply Curve</u>

To capture the diversity of views over the shape of the AS curve, as seen in Figure 4, we can think of the AS curve as one that comprises **<u>three segments</u>**:

1) <u>The Horizontal (Keynesian) range:</u>

- This corresponds to a point *within* the PPC
- Factories are operating at lower than full capacity and many individuals are unemployed (i.e. there are plenty of idle factors of production)
- It is possible to increase output level without any pressure on prices because there are ample resources for all producers and hence there is little need for producers to compete and bid up prices of resources

2) <u>Intermediate (Upward Sloping) range:</u>

- This corresponds to a point within and close to the PPC
- Most available factors of production have been utilised; only some excess/spare capacity in certain parts of the economy.
- The economy starts to experience supply constraints
- To increase production, firms have to start using less productive resources, which results in an increase in cost of production per unit of output.

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- Hence firms will only be induced to increase output if they can be compensated with higher prices to cope with higher unit costs of production.

3) <u>Vertical (Classical) range:</u>

- This corresponds to a point on the PPC
- There is no excess/spare capacity within the economy
- All factors of production are already fully utilised; there are no more idle resources
- Therefore, the economy is at full employment, i.e. national income is capped at Y_F ***in Figure 4.*** This is also known as the ***potential output or the full employment level of national income is*** Y_F ***in Figure 4.***
- This means that the national output can no longer increase unless LRAS/ productive capacity increases
- Impossible to increase production of goods and services
- Any further increase in AD will only lead to an increase in general price level

2.4 Factors that Shift the Aggregate Supply Curve

AS relates the general price level to the output of goods and services produced by an economy over a given time period, holding resource quantity, quality, prices and technology constant.

The factors affecting AS can be categorised by those that affect:

- Short-Run Aggregate Supply (SRAS); and
- Long-Run Aggregate Supply (LRAS)

Changes in input prices and productive capacity of the economy (generally due to quantity of resources, quality of resources and technology) will cause aggregate supply to shift. (Note that these are very similar to the factors that cause a shift in the PPC.)

a) Determinants of Short-Run Aggregate Supply (SRAS)

Changes in cost of production can change the SRAS.

- A ***rise*** in price of factors of production/ resources, e.g. labour, oil, ***increases*** the cost of production and shifts the SRAS curve ***upwards*** *(i.e., decrease in SRAS, see Fig. 7 below)*. This is because at each general price level, firms are only willing and able to sell a lower quantity of real national output.
- A ***fall*** in price of factors of production/ resources ***decreases*** the cost of production and shifts the SRAS curve ***downwards***. This is because at each general price level, firms are willing and able to sell a higher quantity of real national output.

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b) Determinants of Long-Run Aggregate Supply (LRAS)

i. Changes in the Quantity of FOP

Recall that factors of production (FOP) include: Capital, Entrepreneurship, Land & Labour (C.E.L.L.). The shrinking fertility rate and rapidly ageing population are key concerns in Singapore as these will reduce quantity of labour input. This could be exacerbated by policies to reduce inflow of low-skilled foreign labour. As such, over time these could cause the LRAS to shift to the left because of a reduction in long run productive capacity, ceteris paribus.

ii. Changes in the Quality of FOP

Improvements in the productivity of resources e.g. output produced per labour hour (and hence quality of inputs) will likely improve the economy's long-term ability to produce more goods and services at each price level. An improvement in productivity causes the LRAS curve to shift to the right. Due to improvements in productivity, the same number of workers would now be able to produce more goods and services, resulting in an increase in productive capacity, increasing LRAS which cause the LRAS to shift to the right. *(See Fig. 8 below)*.

iii. Changes in Technology

Technology is the key to expanding an economy's productive capacity. In fact, economic growth today is very much driven by technological advancement and enterprise. Computers and the internet as well as specialized software have led to many cost savings- automated production using robots, self-service technology, biotechnology and increased productivity across the board. These improvements in technology enable producers to produce more output with a given quantity of input. Therefore, the LRAS shifts to the right to reflect increase in productive capacity *(See Fig. 8 below).*

c) *Government Policies can affect both SRAS and LRAS*

Government policies play an important role in affecting aggregate supply. Whether it affects SRAS or LRAS will depend on the type of policy. Examples:

- Lowering of GST or provision of subsidies and grants to firms will lower cost of production and will therefore increase SRAS, shifting the SRAS curve downwards
- Reduction in corporate tax rate, increases post-tax profit, which is likely to increase investment. This will lead to an increase in quantity and quality of capital goods, increasing the productive capacity of the country and will therefore increase LRAS, where the LRAS curve will shift to the right *(See Fig. 8 below)*.

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2.5 Equilibrium Income Determination

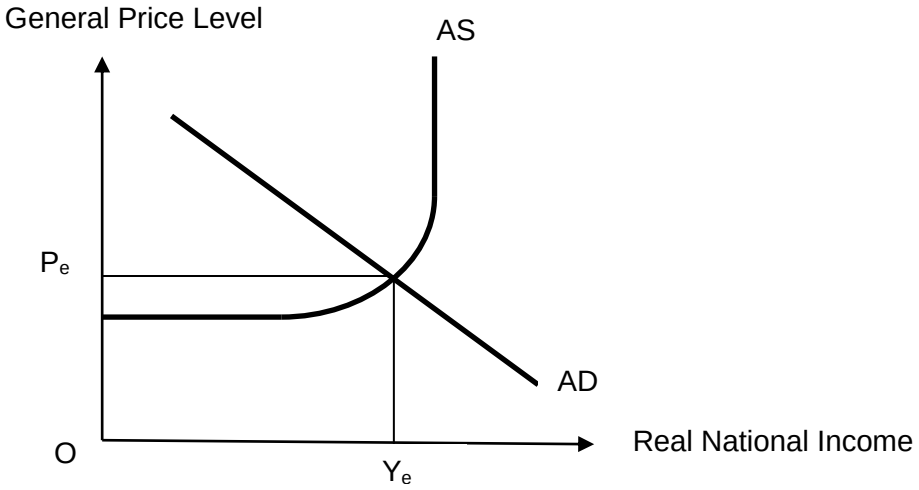

Figure 5: Equilibrium Income

As seen in Figure 5, the equilibrium income is determined through the interaction of the aggregate demand and aggregate supply curve.

When the AD meets AS, the equilibrium income is determined at Y_e and the general price level for that level of income is P_e.

2.6 Effects of Changes in AD on Equilibrium Real Income, Price Level and Employment

The effects of changes in AD will depend on where the country is operating along the AS curve.

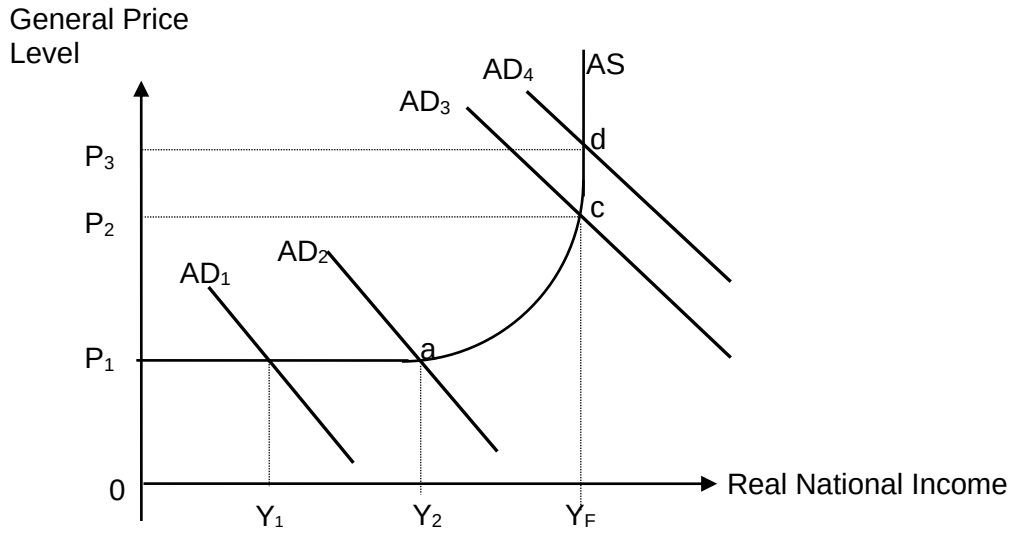

Figure 6: Changes in Aggregate Demand

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a) Horizontal (Keynesian) Range of AS Curve – Output Changes and Prices are Stable

- At the Horizontal (Keynesian) range of the AS curve, i.e. between points P_1 and a of the AS curve, there is *spare/unused productive capacity or resources* (e.g. idle equipment and unemployed labour) in the economy.
- When there is an increase in aggregate demand (e.g. from AD_1 to AD_2), more output can be produced by utilizing idle resources, with no upward pressure on prices.
- Therefore, there will be a rise in <u>real</u> national income from Y_1 to Y_2 and employment while the general price level remains unchanged at P_1.

b) Intermediate Range – Both Price Level and Output Change

- Between points *a* and *c* of the AS curve, firms are *operating closer to full employment*.
- A rise in AD (e.g. anywhere between AD_2 to AD_3) increases real national income from Y_2 to Y_F and employment with general price levels starting to rise from P_1 to P_2.
- Increasing output may require that less efficient standby machines and plants are used and less efficient workers are employed. Thus, the cost per unit of additional output increases due to the utilisation of less efficient resources.
- Therefore, prices rise and act as an incentive for firms to increase output.

c) Vertical (Classical) Range – Only Price Changes

- The AS curve is vertical from point c to d indicating the economy has reached *full employment* i.e. productive capacity has been *fully maximised/ no more spare capacity.*
- Over this "Classical" range, any increases in AD (e.g. from AD_3 to AD_4) will <u>not</u> lead to a rise in real GDP (remains at the full employment level of national income Y_F) as all available resources are fully utllised.
- The excess demand will cause the general price level to rise from P_2 to P_3 with no increase in real national income/ national output.

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2.7 Effects of Changes in AS on Equilibrium Real Income, Price Level and Employment

a) Changes in SRAS

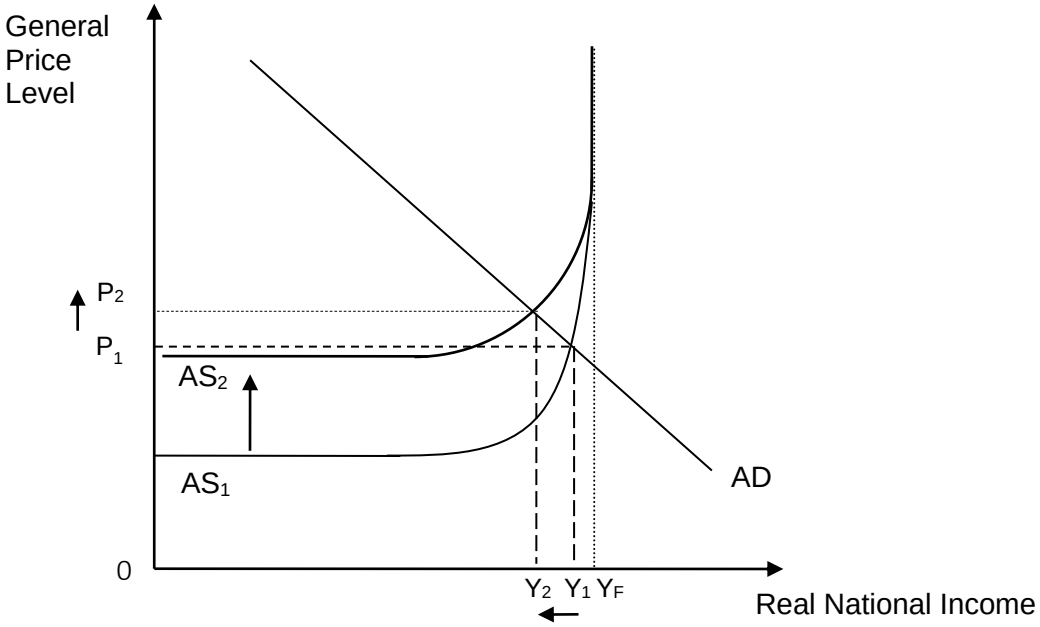

Figure 7: Fall in Short Run Aggregate Supply (SRAS)

From Figure 7, a fall in SRAS, from AS_1 to AS_2, leads to an ***upward*** **shift** of the *Horizontal* and *Intermediate* sections of the AS curve with no change in the productive capacity of Y_F. This is generally referred to as a decrease in Short Run AS (SRAS).

This is likely to be due to a **rise in the costs of production** such as the spike in the price of oil (an essential factor input) that has **no impact on the productive capacity (Yf) of the economy**.

This results in a fall in Real National Income from Y_1 to Y_2 while general price level increases from P_1 to P_2.

The opposite would happen when there is a fall in resource prices, resulting in a fall in the costs of production and increase in SRAS.

Note: a change in SRAS is always in the opposite direction of change in cost of production. Therefore:

- a rise in cost of production leads to a fall in SRAS. This is illustrated by the SRAS curve shifting upwards, reflecting the higher cost of production; and
- a fall in cost of production leads to an increase in SRAS. This is illustrated by the SRAS curve shifting downwards, reflecting the fall in cost of production.

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b) Changes in LRAS

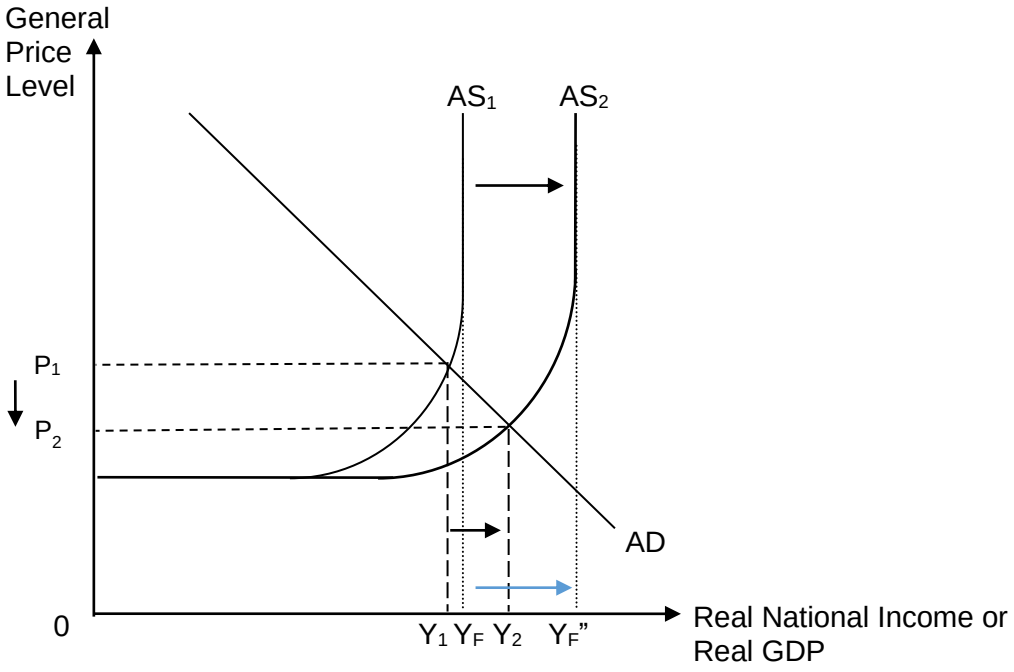

Figure 8: Rise in Long Run Aggregate Supply (LRAS)

From Figure 8, a rise in LRAS from AS_1 to AS_2, leading to a *rightward* shift of the *intermediate* and *Classical* sections of the AS curve with no change to the *Keynesian* range, reflects a rise in productive capacity from Y_F to Y_F".

This is due to determinants of AS that leads to a rise in the economy's potential output level or productive capacity.

For example, any increase in the ***quantity* and/or *quality* of resources** in the economy or an **improvement in technology**, holding all other factors constant will result in an increase in LRAS.

When there is an **increase in LRAS, both actual and potential output increase** from Y_1 to Y_2 and Y_F to Y_F" respectively with a fall in general price level from P_1 to P_2.

The opposite would be the case if there is a fall in LRAS. However, note that this seldom happens except in situations where war or natural disaster cause a fall in productive capacity.

Note: Some factors that affect the LRAS such as **increase in productivity and improvement in technology** may affect both the SRAS and LRAS.
For example:

i) When productivity of labour (i.e. output per labour hour) increases

- Each unit of labour can produce more output, unit COP decreases, increasing SRAS and shifting SRAS downwards.
- The same number of workers would now be able to produce more goods and services, resulting in an increase in productive capacity,

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increasing the LRAS.

ii) When there is an improvement in technology,

- Efficiency of production increases, unit COP decreases, increasing SRAS and shifting SRAS downwards.
- The same amount of resources would now be able to produce more goods and services, resulting in an increase in productive capacity, increasing the LRAS.

Try this:
How can a change in SRAS and LRAS due to an improvement in technology be illustrated? What would be the effect on real NY and GPL?

3 THE MULTIPLIER PROCESS

An increase in the AD due to an *autonomous* increase (i.e. independent of the level of national income) in any of the components of AD will lead to a change in the equilibrium national income. Due to the multiplier effect, the final change in income is greater than the initial change in AD.

$$\Delta Y = k \Delta \text{ AD or } \Delta Y = k \Delta J$$

Where k = multiplier, Y = national income/output, AD = autonomous aggregate demand , J= Injection

Definition: The multiplier/ national income multiplier shows the number of times by which national income changes when there is an autonomous change in AD.

The multiplier effect works because an initial rise in autonomous AD will create many rounds of new income, some of which in turn will be spent, thereby creating more income.

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Distinction between Autonomous and Induced Expenditure

Autonomous expenditure refers to expenditure that does NOT depend on income. (i.e., variations in income (or real GDP) do not affect autonomous spending)

- Changes in autonomous expenditure depends on other factors such as discretionary government policies, interest rates, and global economic growth.
- Changes in autonomous expenditure triggers the multiplier process

Induced expenditure refers to expenditure that varies with income.

- Some components induced expenditure as consumption, investment, and government spending is positively correlated with real GDP. When real GDP grows, they increase. Conversely, when real GDP falls, they decrease.
- Increases in induced consumption causes the multiplied increase in real national income via the multiplier process.

3.1 The Circular Flow of Income and the Multiplier Process

Stage	Initial change in AD (G) ($ bn)	Change in national income ($ bn)	Change in ***induced*** consumption ($ bn)	Change in withdrawals ($ bn)
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	**10**	**25**	**15**	**10**

Table 1: Illustration of the Multiplier Process

Stage 1

The Circular Flow of Income is assumed to be in equilibrium (i.e. W=J)

Assume that there is an initial **autonomous** increase in government expenditure of $10bn to build infrastructure in the country.

In Table 1, once the government initiates spending by injecting $10 billion to build the Downtown Line, this causes the national income to expand initially

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by $10 billion as shown in column 3 of the Table. The $10 billion spent on the Downtown Line will be used to pay various individuals such as engineers, construction workers; suppliers of buildings materials, etc.

Assume this first group of individuals who received the $10 billion decide to spend 60 cents for every dollar of income on consumption (MPC_d = 0.6). This will increase national income by $ 6 billion. $4 billion will also be withdrawn from the economy as this group of individuals will also use the money on savings, taxes and import expenditure (MPW = 0.4)

Stage 2

The expenditure of $6 billion in the form of **induced consumption** will become income of another groups of resource owners (households) in the economy.

Upon receiving $6 billion as income, these second group of individuals also spend 60 cents for every dollar of income on consumption. This will increase national income by $ 3.6 billion. $2.4 billion will also be withdrawn from the economy in the form of savings, taxes and import expenditure (MPW = 0.4)

Thus, as long as each successive group of income receivers continues to spend 0.6 of every extra dollar of income on consumption, the multiplier effect will continue to operate.

When will the multiplier process end?

The increase in income will eventually come to an end because with each subsequent round, the change in income gets smaller and smaller (see column 3) until there is no more increase in income.

This multiplier process will end when the new equilibrium income is achieved. This occurs when the initial injection is exactly equal to the total rise in withdrawals, i.e. the initial rise in government expenditure of $10billion will lead to a total rise in withdrawals of $10billion (see last column of table 1).

At the end of the multiplier process, the total increase in national income is $\Delta Y = k\,\Delta J$ (in this case G) = 2.5 x 10 billion= $ 25billion

$$\text{Given that mpw} = 0.4,\ k \text{ is therefore} = \frac{1}{\text{mpw}} = \frac{1}{0.4} = 2.5$$

Determinants of the size of multiplier

The larger the size of multiplier, the larger the final increase in national income will be, with a given increase in injection. If k = 4, then the eventual increase in income is 4 times the initial increase in injections.

The value/size of the multiplier is inversely related to the size of the withdrawals/leakages from the economy. The higher the marginal propensity to withdraw, the smaller the size of multiplier.

It can be determined from the following estimates:

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$$k = \frac{1}{mpw}$$

where, MPW = marginal propensity to withdraw

Thus, the multiplier formula can be rewritten to be:

$$\mathrm{k} = \frac{1}{\mathrm{mpw}} \text{ or } \mathrm{k} = \frac{1}{1 - \text{mpc of domestic output}}$$

The second expression occurs because MPW + MPC of domestic output (MPC_d) = 1. This is because a given change in national income that is not spent on domestic output is withdrawn from the circular flow in the form of taxes, savings or imports.

To further explain MPW, the marginal propensity to withdraw is given by the formula

$$MPW = MPS + MPT + MPM$$

where

- *MPS* = Marginal Propensity to Save
  Proportion of an increase in national income that is saved

- *MPT* = Marginal Propensity of Taxation
  Proportion of an increase in national income that is taxed

- *MPM* = Marginal Propensity to Import:
  Proportion of an increase in national income that is spent on imports

The values of MPS , MPT, MPM affects the size of MPW which then affects the size of the multiplier. But what causes the differences in the size of MPS, MPT and MPW? Let us examine some underlying causes:

- **MPS**

Forced savings/social security program: Countries that have forced savings programs will have a higher MPS. An example is like Singapore that has the CPF scheme that mandates working persons to save a percentage of their monthly savings.

Savings Mentality: In Asian societies, where there is a culture of thrift, the MPS could also be higher than countries that have more liberal spending habits.

- **MPT**

Tax rates of a country: The MPT depends on a country's tax rates. If a country has a higher tax rate, then MPT will be higher.

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- **MPM**

Nature of economy: Small Open Economies tend to have a higher MPM due to its dependency on imports. For example, Singapore, due to its lack of natural resources, is dependent on imported raw materials. Thus, its MPM will be higher than countries who may have abundant natural resources.

An increase in injection will lead to a multiplied increase in incomes via the multiplier process. Thus, **the multiplier is always larger than 1.**

3.2 AD/AS Model and the Multiplier Process

Recall that AD = C + I + G + (X-M). Since the aggregate demand model helps to explain how the equilibrium level of national income of an economy is determined, it is important for us to know how much this equilibrium income will change with a change in any of the components. This is where the multiplier effect comes in.

Assume the following:

- Economy has plenty of idle resources or excess capacity. To see the full multiplier effect, the economy is assumed to have spare capacity (i.e. operating on the horizontal (Keynesian) segment of the AS curve.

- Economy is made up of four sectors

- The marginal propensity to consume domestic output is constant and equals to 0.6 (MPC_d =0.6; MPW which is the sum of MPS, MPT and MPM = 0.4)

- The government decides to inject $10 billion into the building of the Downtown Line in the Mass Rapid Transit network to stimulate economic activity. (Note: this initial change can be in any autonomous component of AD).

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Explanation using the AD/AS diagram

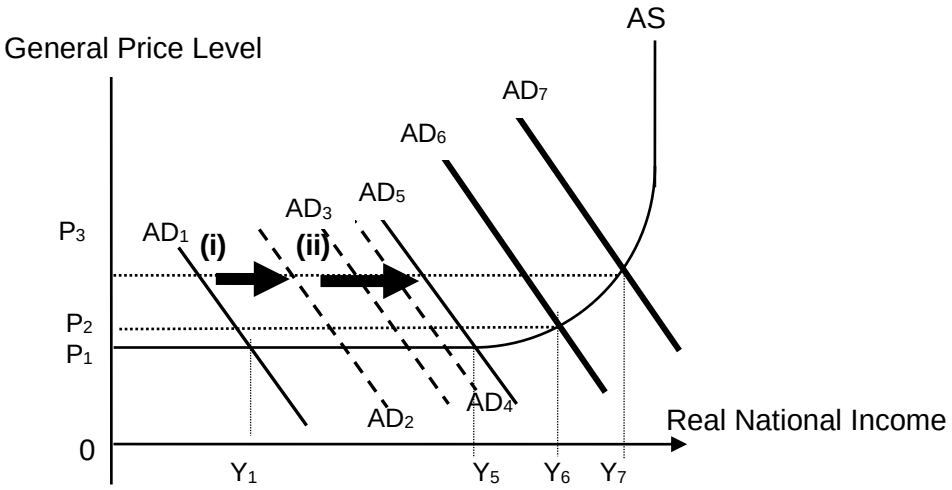

Figure 9: <u>Changes in Aggregate Demand</u>

Assuming that the economy is operating on the Keynesian range of the AS:

(i) represents the initial increase in **autonomous** government spending of \$10 billion, from AD_1 to AD_2, which increases real national income by \$10 billion

(ii) represents the multiplier effect which causes the AD to increase further, from AD_2 to AD_5 due to the **induced consumption** that arises due to the increase in national income at each additional expenditure round.

Total increase in national income, from Y_1 to Y_5 is the sum of (i) and (ii)

- With reference to Figure 9, the increase in government expenditure of \$10 billion will increase AD by \$10 billion from AD_1 to AD_2.
- Real national income will increase by the same value as the autonomous increase in AD of \$10 billion. This is because to increase production by \$10 billion, firms will have to hire \$10 billion worth of factors of production.
- Out of this \$10 billion received by households, they will spend \$6 billion, which is 60% of the additional income received, on domestic goods and services (since $MPC_d = 0.6$) and the remaining \$4 billion or 40% of additional income, will be withdrawn in the form of savings, taxes and import expenditure (since MPW = 0.4).
- The expenditure of \$6 billion in the first round will prompt producers to produce an additional \$6 billion in output and the income of households will again increase, this time by \$6 billion.
- The households will spend \$3.6 billion which is 60% of the additional \$6 billion in income, on domestic goods and services, while the remaining \$2.4 billion or 40% of additional income, will be withdrawn from the circular flow in the form of saving, taxes and import expenditure.
- This process is repeated over many rounds with the increase in income and therefore induced consumer expenditure and withdrawals will get smaller and smaller in each subsequent round.
- This means that the rightward shift in AD, from AD_2 to AD_5 gets

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smaller and smaller with each subsequent round **until a new equilibrium real national income is established at Y_5** where the **cumulative increase in withdrawals is equal to the initial increase in autonomous AD** which in this case is $10 billion increase in government expenditure.

Since k = 1/mpw, in this case, size of k = 1/0.4 = 2.5

At the end of the multiplier process, the total increase in national income is $\Delta Y = k \Delta G = 2.5 \times \$10 \text{ billion} = \$25 \text{ billion}$

Succinct Explanation of the Multiplier Process
Assuming the economy is not at full capacity, firms will employ more factors of production to increase production of output. This leads to an increase in national income will increase income induced consumption, causing further increases in AD. This triggers successive rounds of increases in national income and income induced consumption. At each round, the increase in both gets smaller. The multiplier process will end when the increase in national income is too small to generate further increase in induced-consumption. This results in a multiplied increase in RNY.

Whether the country is able to benefit from the **full multiplier effect** or not depends on the **<u>capacity utilisation in the economy</u>**.

- If there are significant unused resources in the economy and as such the economy is currently on the horizontal (Keynesian) segment of the AS curve (for example, at the initial equilibrium level of national income Y_1, where AD_1 cuts AS), the increase in AD would result in an increase in real national income from Y_1 to Y_5 with the general price level unchanged as AS is horizontal (perfectly price elastic). As such the economy is able to experience the full effects of the multiplier.

However, if the economy is currently on the intermediate segment of the AS curve where the AS is upward sloping (for example, at the initial equilibrium level of national income Y_6, where AD_6 cuts AS), the increase in AD will result in a shortage at the initial price level $0P_2$. To alleviate the shortage, firms will step up production in the next period. However due to increased competition for resources as the economy approaches full employment, the additional cost of producing each additional unit of output increases. As such firms will only be willing to sell additional units at a higher price and therefore the general price level increases from $0P_2$ to $0P_3$. The ***increase in general price level will have a dampening effect on the multiplier*** as the higher prices would cause purchasing power of households to fall, dampening the increase in induced consumption due to the higher income. **Hence, the equilibrium real national income is likely to increase but by a smaller extent, as seen from Y_6 to Y_7.**

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Self-Assessment 3:

1. Calculate the size of the multiplier when

a) MPW = 0.2
b) MPW= 0.5
c) MPW = 0.6

2.Assuming MPCd = 0.5 and MPW = 0.5, what happens to the Real National Income (RNY) when there is an increase in net exports of $33 million due to an economic boom?

a) RNY falls by $33 million
b) RNY rises by $33 million
c) RNY rises by $66 million
d) RNY rises by $19.8 million

3.3 Significance of the Multiplier

If the size of the multiplier is large, a relatively small change in any component of the AD (e.g. investment) can trigger a large change in the equilibrium income.

Fluctuations in the AD can magnify the fluctuations in income in the course of a business cycle. It is important to note that the multiplier effect can also apply to an autonomous decrease in any component of AD. This is known as the reverse multiplier effect. For instance, given k = 4, a decrease in autonomous consumption expenditure (C) of $1m will lead to a multiplied fall in real national income by $4m.

The size of multiplier is relevant to policy makers. If the multiplier is large, the government may seek to influence AD to stabilise income and employment. However, the multiplier process requires some time to fully develop before its effects can be seen.

4 POLICY IMPLICATIONS

Since aggregate demand can be at any level, the economy could be at equilibrium with full employment ($Y_e = Y_F$), with unemployment ($Y_e < Y_F$) or even inflation.

An equilibrium position is a position that will remain unchanged, if left alone. So, if equilibrium income occurs with inflation or unemployment, these problems will remain if there is no government intervention.

According to John Maynard Keynes whose theory undergirds the AD/AS analysis, free market forces in the economy do not automatically lead to stable prices and full employment. Keynes attributed the 1930s Great Depression (low income and employment) to an AD that had fallen too low relative to the full employment level. He recommended that the government must intervene in the economy to produce full employment. The government should raise AD to eliminate unemployment and lower AD to remove inflation. Government intervention implies that it is no longer a completely free market economy.

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He recommended the use of **Fiscal Policy** to influence AD. Fiscal policy refers to the use of government expenditure (G) & taxes (T) to influence AD and therefore the level of income, employment and prices.

[IMPORTANT] In Singapore, the government does not put emphasis on fiscal policy to influence AD, income and employment. This is due to our high marginal propensity to import (MPM) due to our lack of resources and high marginal propensity to save (MPS) partly due to compulsory savings under the Central Provident Fund (CPF). This means that our marginal propensity to withdraw (MPW) is high and thus our multiplier effect is small. Hence, any autonomous change in AD due to fiscal policy will only lead to a small change in equilibrium income levels.

5 SUMMARY OF AD/AS ANALYSIS ON INCOME, EMPLOYMENT AND PRICES

a) The level of AD (on goods and services) determines Income, Employment and Prices.

The higher the AD (C + I + G + X - M), the higher the equilibrium income of an economy. In a less than full employment situation (assume Keynesian range of the AS), a rise in AD will lead to rising income through the multiplier process. Employment also rises and prices will remain stable.

In a full employment situation (at Y_F), a rise in AD will lead to rising general price level with no rise in output or employment. Only nominal income rises while real income is unchanged.

b) Need for Government Intervention

Keynes advocates a need for government intervention to regulate AD to eliminate deflationary and inflationary gaps to achieve full employment and stable prices.

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6 APPENDIX 1: REASONS WHY THE AD CURVE IS DOWNWARD SLOPING

The AD curve **slopes downward** from left to right in Figure 1, indicating that the higher the general price level, the smaller the quantity of output demanded.

This is due to the following reasons**:**

A. Wealth Effect

One reason for the downward slope of the aggregate demand curve lies in the relationship between real wealth (the stocks, bonds, and other assets that people have accumulated) and consumption (one of the four components of aggregate demand). When the price level falls, the real value of wealth increases since it packs more *purchasing power*.

For example, if the price level falls by 25%, then $10,000 of wealth could purchase more goods and services now than before the price fall. An increase in real wealth will induce people to increase their consumption. The consumption component of aggregate demand will thus be greater at lower price levels than at higher price levels.

The tendency for a change in the price level to affect real wealth and thus alter consumption is called the *wealth effect*; it suggests a negative relationship between the price level and the real value of consumption spending*.*

B. Interest Rate Effect

A lower price level lowers interest rates, which in turn increases investment and consumption, which are components of the AD.

A lower price level lowers the demand for money because less money is required to buy a given quantity of goods. A reduction in the demand for money, ceteris paribus, lowers the price of money, i.e., interest rate.

Lower interest rates make borrowing by firms and households less costly, thus increasing investment and (durable) consumption[3]. *More details in Section 2.2.*

The tendency for a change in the price level to affect the interest rate and thus to affect the quantity of investment demanded is called the *interest rate effect*. John Maynard Keynes, a British economist whose analysis of the Great Depression and what to do about it led to the birth of modern macroeconomics, emphasized this effect. For this reason, the interest rate effect is sometimes called the *Keynes effect*.

Conversely, a rise in prices means that more money will be demanded to carry out the same transactions. Ceteris paribus, this causes the interest rate to rise, increasing the cost of borrowing, thus causing investment and consumption to fall.

[3] Examples of durable goods include audio-visual equipment and vehicles; this is in contrast with *non-durable* goods, such as food and drinks, which are "consumed" and must be re-purchased.

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C. Substitution of Foreign Goods & Net Exports

All other things unchanged, a lower price level in an economy reduces the prices of its goods and services relative to foreign-produced goods and services. This results in:

- The economy's goods are more attractive to foreign buyers, increasing quantity demanded of exports more than proportionately, thus increasing export revenue (assume demand for exports likely to be price elastic due to large number of substitutes).
- Foreign-produced goods and services less attractive to the economy's buyers, reducing import demand, and thus reducing import expenditure.

The result is an increase in net exports (X-M). Hence, lower domestic prices will lead to a movement up the AD curve, causing the AD to be downward sloping.

The *international trade effect* is the tendency for a change in the price level to affect net exports. The converse in true for higher domestic prices.

Taking the above 3 reasons together, a fall in the price level means that the quantities of consumption, investment, and net export components of aggregate demand may all rise. Since government purchases are determined through a political process, we assume there is no causal link between the price level and the real volume of government purchases – government expenditure is autonomous. Therefore, the government expenditure component does not contribute to the downward slope of the curve.

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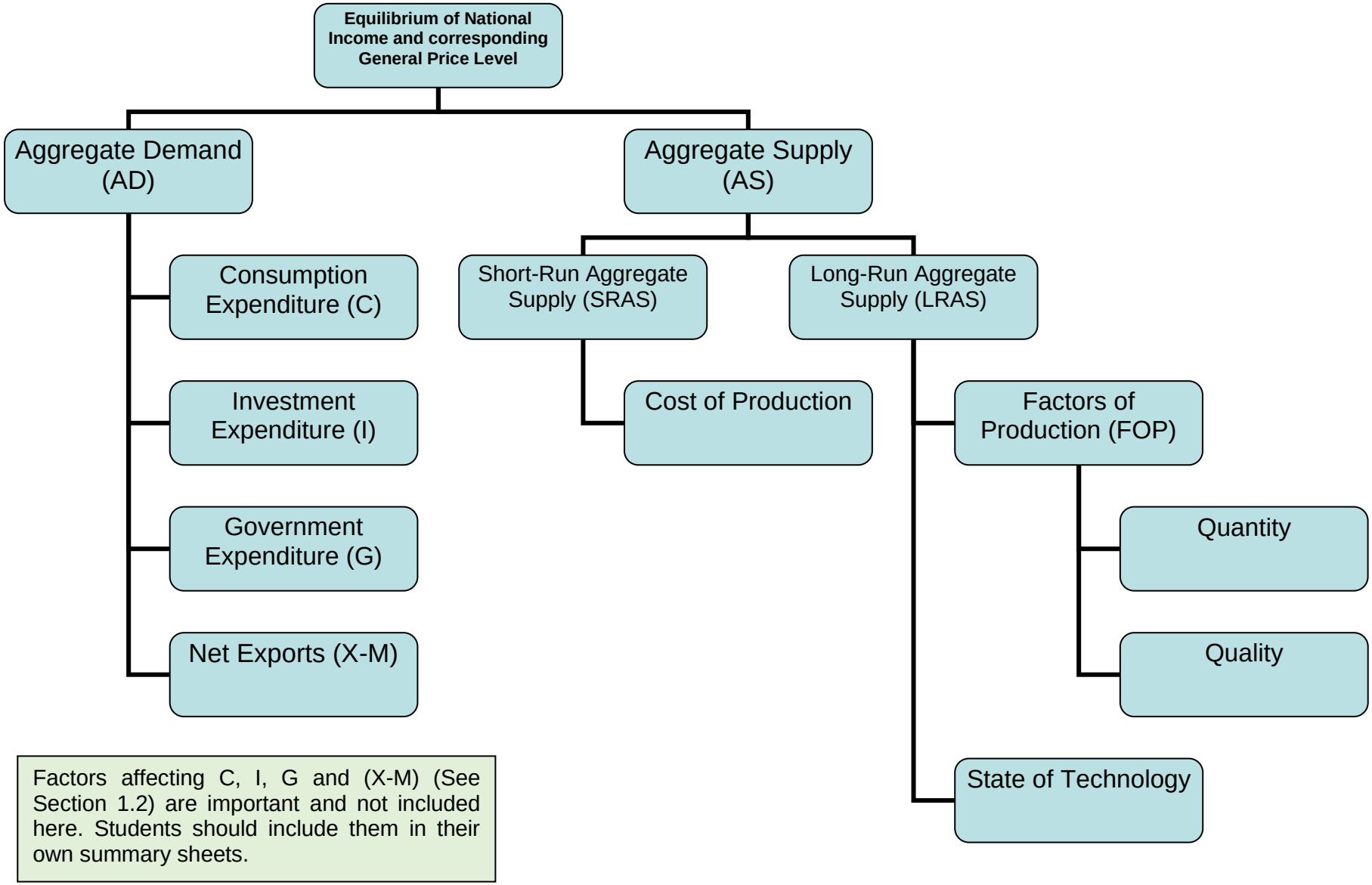
7 DETAILED CONCEPT MAP



Factors affecting C, I, G and (X-M) (See Section 1.2) are important and not included here. Students should include them in their own summary sheets.

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8 Glossary of key concepts

Aggregate Demand	The Aggregate Demand (AD) curve gives the total demand for a country's output at various general price levels, ceteris paribus.
Aggregate Supply	The aggregate supply (AS) shows the total output that will be supplied in the economy at different general price levels, ceteris paribus.
Consumption	Consumption is spending by households on consumer goods and services. This spending covers non-durable goods (e.g. food), durable goods (e.g. cameras and cars) and services (e.g. entertainment, transport).
Government expenditures	Government Expenditure constitutes government spending on final goods and services. These include spending on public goods like defence for the nation, for economic growth (e.g. spending on education), for social needs of the population (e.g. building of community centres and homes for the aged).
Interest rate	Interest rate is the cost of borrowing funds to purchase capital goods by firms. To households, it is also the cost of borrowing funds to purchase big-ticket items.
Investment	Investment is the acquisition of new fixed capital assets (including housing, plants and machinery) and accumulation of inventory stock (raw materials, semi-finished goods and finished goods held by the producer).
Marginal Efficiency of Investment (MEI)	The Marginal Efficiency of Investment (MEI) is the expected rate of return of investment or the internal rate of return (IRR) of the investment in a capital good.
Multiplier Process	The multiplier/ national income multiplier shows the number of times by which national income changes when there is an autonomous change in AD. The multiplier effect works because an initial rise in expenditure will create new income, some of which in turn will be spent and thereby create more income.

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Food for Thought – Selected Past Year A-Level Essay Question Related to this topic:

Note: Questions for this topic are almost always synoptic in nature

2022

During the pandemic, there was a fall in investment and a rise in unemployment. Innovation-based investment is a good way to stimulate the economy but, unless appropriate government policy action is taken, this might lead to another type of unemployment.

(a) Explain how a fall in investment might lead to one type of unemployment while a rise in innovation-based investment might lead to a different type of unemployment. [10]

(b) Discuss the extent to which a rise in Singapore government spending on investment in major capital projects and in human capital are both required to reduce unemployment in a post-pandemic world. [15]

2021

The rate of unemployment in more than 50 of the world's countries, including several European countries, exceeds 10%. Governments face a difficult decision about whether income tax rate cuts are the most effective policy measure to reduce unemployment to more acceptable levels.

(a) Explain how a reduction in the rate of income taxes paid by workers and firms might have consequences on an economy's aggregate demand and aggregate supply. [10]

(b) Discuss whether a reduction in the rate of income taxes is likely to be the best policy measure to reduce high unemployment in a country. [15]

2020

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 the living standards of a country. [15]

2017

The Singapore economy grew by 1.8% on a year-on-year basis in the second quarter of 2015, sharply lower than the 2.8% growth in the preceding quarter, the Ministry of Trade and Industry (MTI) announced on Tuesday 11 August 2015.

(a) Explain the internal and external factors that are likely to have contributed to this slowdown in the economic growth rate. [10]

(b) Discuss whether the policies aimed to increase the economic growth rate might cause difficulties for Singapore's economy. [15]

2014

The following data relate to the Singapore economy in 2011.

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

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

(a) Economies consist of several key sectors such as households, firms, 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 national income and its component when its exchange rate appreciates. [15]

2011

(a) Explain the process whereby an increase in government expenditure can lead to a bigger change in national income. [10]

(b) Discuss the extent to which conflicts in government macroeconomics objectives will limit scope of the use of fiscal policy in any economy. [15]

2009

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 the USA. [15]

Food for Thought – Selected 2022, 2021 and 2020 JC Prelim Questions

2022 ACJC

5 When faced with negative economic growth, governments often turn to fiscal stimulus to support their economy. Some governments provide transfer payments such as cash vouchers, while others spend on building infrastructures.

(a) Explain **one** possible demand-side cause and **one** possible supply-side cause of falling national output for a country. [10]

(b) Discuss whether transfer payments are the most appropriate policy tool to overcome negative economic growth for all economies. [15]

2022 JPJC

4 Singapore attracted about $17.2 billion in fixed asset investments in 2020, despite weathering its worst recession as a result of the Covid-19 pandemic.

(a) Using the circular flow of income, explain how an increase in investment expenditure can lead to a bigger change in national income. [10]

(b) Discuss whether the level of investment is the key determinant in influencing the living standards in Singapore. [15]

2021 ASRJC

5 The Covid-19 pandemic has severely disrupted global economic activity and ledto both demand and supply shocks that resulted in falling incomes in Singapore. In response, the government rolled out four Budgets over four months, equivalent to almost 20% of its GDP.

(a) Explain how demand shocks arising from the pandemic will affect the circular flow of income in Singapore. [10]

(b) Discuss whether fiscal policy is the most appropriate policy to deal with the adverse impacts of the pandemic on the Singapore economy in the short and long run. [15]

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2021 HCI

4 The Singapore dollar weakened to a four-month low after the Central Bank said there's "sufficient room" for the currency to ease if the economy weakens due to the impact of the coronavirus.

Source: The Star, February 2020

(a) Using the circular flow of income model, explain the effects on national income when a country's exchange rate depreciates. [10]

(b) Discuss the extent to which the depreciation of the Singapore dollar in 2020 would conflict with its various government macroeconomic objectives. [15]

2021 RI

5 (a) Using the circular flow of income, explain how the effects of an increase in exports on the equilibrium level of national income may differ between a small and open economy and a large and less open economy. [10]

(b) To what extent is a country's macroeconomic priority dependent on the openness of its economy? [15]

2020 ACJC

4 (a) Using the circular flow of income, explain why an increase in government spending may lead to larger changes in the national income of some countries compared to others. [10]

(b) In 2018, the real GDP growth rate for Singapore was 3.1% while that of UK was 1.4%. Discuss whether the use of national income statistics alone is sufficient for the comparison of SOL between countries. [15]

2020 CJC

4 The COVID-19 crisis has affected Singapore drastically. Resident unemployment rate rose to 3.3 per cent in March, GDP forecasts are also pessimistic due to a drastic fall in export volume and a potential fall in investment. In response to this, the government has dedicated close to $100 billion to support Singaporeans to tide through the damaging impacts of COVID-19.

(a) Using circular flow of income, explain how economic issues as a result of COVID-19 will impact Singapore's economic growth and unemployment. [10]

(b) Discuss whether an increase in government spending will have significant impacts on inclusive economic growth and unemployment in Singapore. [15]

2020 DHS

4 Indonesia's economic recovery momentum continued in 2018 with strong domestic demand, including the robust growth of gross fixed capital formation (GFCF), as the main driver of this expansion. Prosperity indicators of unemployment, poverty and inequality improved.

(a) Explain the short-run effect of a robust growth of GFCF on the circular flow of income and its components. [10]

(b) Discuss the extent to which an improvement in a country's prosperity indicators follows from its economic growth. [15]

2020 EJC

5 (a) Explain two factors that may limit the impact of firms' spending on capital goods on the circular flow of income in Singapore. [10]

(b) Discuss whether the Singapore government would need to revise its policies aimed at achieving a low rate of unemployment. [15]

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