RAFFLES INSTITUTION

YEAR 6 H1 ECONOMICS

MACROECONOMICS LECTURE NOTES

ECONOMICS

CONTENTS:

@dream

Students will understand the concept of standard of living and its significance for countries. Students will examine domestic and external factors that affect a country's standard of living. Students will examine how governments make policy choices at the national level in order to improve living standards.

RAFFLES INSTITUTION
YEAR 6 H1 ECONOMICS

INTRODUCTION TO MACROECONOMIC

Outline of Contents

Reference

Mankiw, Gregory N., Quah, Euston, & Wilson, Peter, Principles of Economics: An Asian Edition, Chapter 33, Cengage Learning.

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

1. Explain what is meant by macroeconomics.
2. Explain the key determinants of AD and AS.
3. Explain how equilibrium output and price are determined using the AD/AS model.
4. An awareness of an increase in AD having a multiplied effect on national income

1 A QUICK RECAP

1.1 What is Macroeconomics?

Economics is traditionally divided into 2 parts: Microeconomics and Macroeconomics.

Macroeconomics is on the **aggregate** economy as it considers the **economy as a whole.** Macroeconomics also studies **relationships** and **connections** between one country and another for example, how a slowdown in the Chinese economy can affect Singaporean businesses or how Brexit will affect Singaporean based firms exporting to UK and also other countries around the world.

The scope of macroeconomics includes looking at the success or failure of **government policies** – for example does the government have effective and fair policies for cutting unemployment? Or has the government succeeded in creating the conditions for a durable and balanced recovery?

In macroeconomics we look at things **'in the whole'** and, in doing so, we use these terms regarding the different stakeholders of every economy:

Households: Receive **income** through wages and salaries from their jobs and then buy the output of firms (this is known as **consumer spending** and is labelled as **C**)

Firms: Businesses hire land, labour and capital inputs when making products for which they pay wages and rent. Firms receive payment from consumers and profitable businesses may **invest (Investment** is given the label **'I')** a percentage of their profits into new producer goods such as equipment and technology

Government: Collect **taxes (T)** to fund spending on public services such as education, healthcare and defence. **Government spending** is given the label (**G**)

International/Foreign sector: Singapore buys **imports** (**M**) from other countries, and overseas businesses/consumers buy Singapore's products – known as **exports** (**X**). International trade is important for Singapore. Thousands of jobs depend directly or indirectly on Singapore remaining competitive in overseas markets. It is common to analyse **net exports (X-M)** rather than look at imports and exports separately.

2. AGGREGATE DEMAND (AD) / AGGREGATE SUPPLY (AS) MODEL

The aggregate demand and aggregate supply (AD/AS) framework is used to provide a more complete picture of how the economy works, in particular **the causes behind economic growth, unemployment and inflation**. The AD/AS framework helps us to understand how the equilibrium level of national income and the general price level in an economy are determined.

2.1 AGGREGATE DEMAND (AD)

What goes on in the aggregate goods and services market is central to the health of an economy. Fluctuations in economic activity occur in all countries and in all times throughout history. Fluctuations in the economy are often called the business cycle. Economists use the model of aggregate demand (AD) and aggregate supply (AS) to analyse economic fluctuations. AD and AS interact and determine the equilibrium level of national income or output as well as the general price level. The vertical axis of the diagram reflects the general price level while the horizontal axis could refer to real national output or income.

Definition: Aggregate demand refers to the total level of spending in an economy at various price levels. It shows the amount of domestically produced goods and services which households, firms, government and foreigners desire to buy at each price level.

AD = C + I + G + (X–M)

In a 4-sector economy *(households/firms/government/international),* total expenditure on domestically produced goods and services consists of consumer spending by households (C), investment expenditure by firms (I), government spending (G) and expenditure by foreign buyers (X).

Other factors remaining constant, the higher the price level, the lower the quantity demanded of goods and services. Referring to Figure 1, when the general price level falls from P_1 to P_2, the quantity demanded for goods and services increases from Q_1 to Q_2. In short, there is an **inverse relationship** between the **general price level** and **level of national output (or income)**.

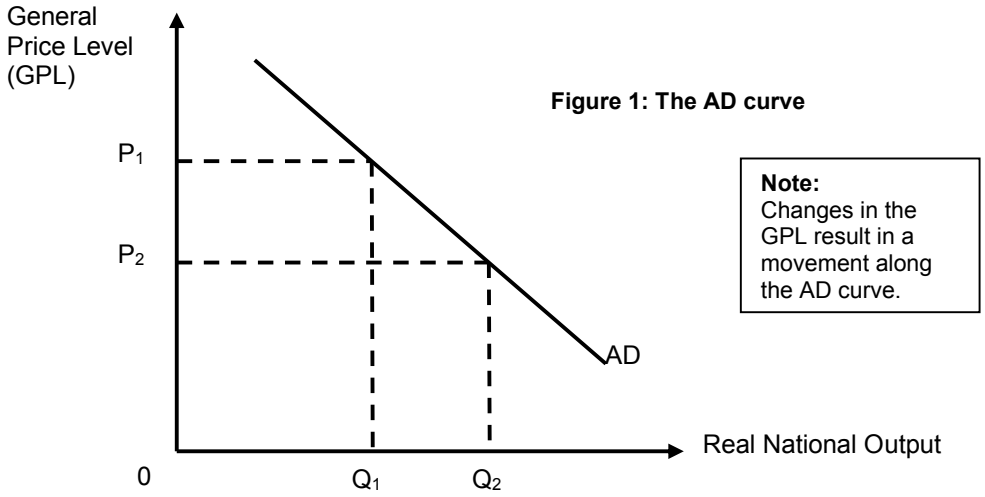


Figure 1: The AD curve

2.1.1 Why does the AD curve slope downwards?

a. The general price level (GPL) and consumption (C): the wealth effect

When the general price level falls, the purchasing power of households rises since their nominal incomes now can buy more goods and services. Thus, ***a fall in the general price level makes consumers feel wealthier, which in turn encourages them to spend more.*** *The increase in consumption means a larger quantity of goods and services demanded and thus a larger output.*

b. The general price level (GPL) and Investment (I): the interest rate effect

The lower the general price level, the less money households need to hold to buy the goods and services they want. When the general price level falls, households try to reduce the amount of money they hold by lending some of it out, driving down the prevailing interest rate. Lower interest rates, in turn, encourage borrowing by firms that want to invest in new plants and equipment and by households who want to invest in new housing since the interest rate is the price one pays to borrow money. ***Thus, a lower general price level reduces the interest rate, encourages greater spending on investment goods****, and thereby increases the quantity of goods and services demanded.*

c. The GPL and Net Exports (X-M): the international substitution effect

When the domestic general price level falls while foreign prices remain constant, domestic goods have become relatively cheaper compared to the price of foreign substitutes. This is called a fall in the relative price level of domestic and foreign goods. Ceteris paribus, residents are likely to buy less foreign goods leading to a fall in import expenditure. At the same time, foreign demand for the country's goods and services rises. Thus, export expenditure increases. Net export earnings (i.e. the value of exports minus value of imports) will tend to rise. ***Therefore, a fall in the domestic general price level stimulates the home***

country's net exports *and thereby increases the expenditure on domestically produced goods and services.*

Note: While it is useful to know the reasons why Aggregate Demand slopes downwards, it is more critical to understand what causes the entire AD to shift.

2.2 AGGREGATE SUPPLY (AS)

Aggregate supply measures the amount of goods and services produced at each price level. AS depends on the decisions of firms to use workers and other inputs to produce goods and services to sell to households, governments, other firms, and for exports.

There is much discussion over the shape of the AS curve. Different economic models have proposed AS curves of different shapes and interpretations.

2.2.1 What is the Shape of the AS curve?

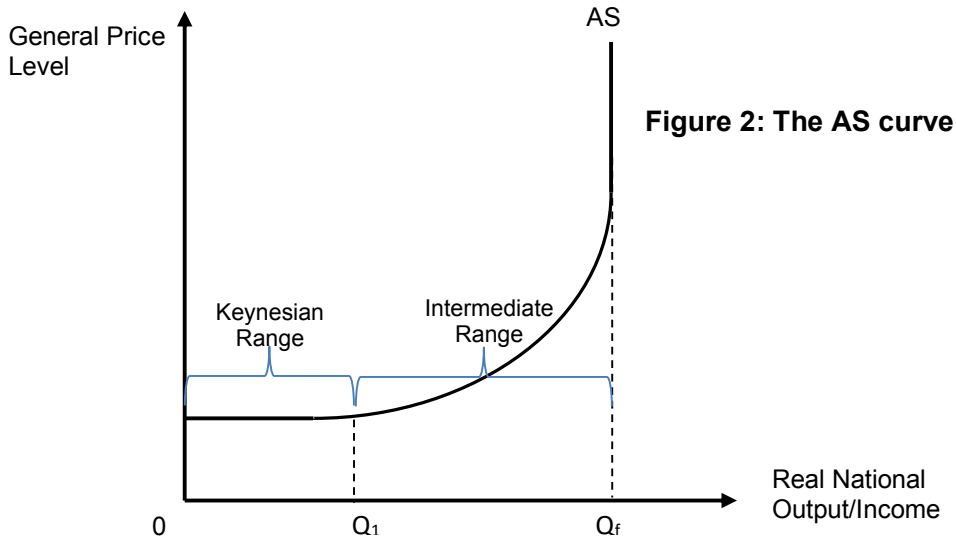


Figure 2: The AS curve

To capture the diversity of views over the shape of the AS curve, we can think of the AS curve as one that comprises three segments, as shown in Figure 2.

1. Horizontal (Keynesian) range ($0Q_1$)
Over this range, real national output is much lower than its full employment level. Full employment refers to a situation where resources have been used to maximum capacity. There is an abundance of un-utilised and under-utilised resources including capital goods and labour. This implies significant unemployment in the economy. Should there be a rise in aggregate demand, the spare capacity will allow output to be increased easily without any pressure on the general price level. Aggregate supply is thus perfectly price-elastic.

2. Upward sloping (Intermediate) range (Q_1-Q_f)
At this range, when output is increased, the general price level also rises. If aggregate demand rises, the increase in output to meet the shortage of goods will cause bottlenecks to arise in production. This is because resources such as capital goods, raw materials and labour have become increasingly scarce, resulting in rising costs which translate into a higher general price level.
As the economy approaches full employment, a rising output due to higher demand is accompanied by a higher price level as a result of such bottlenecks.

3. Vertical (Classical) range (Q_f)

Eventually, when the economy has reached full employment, output can no longer rise as resources have been used to their maximum capacity.
The level of output where the AS curve is vertical is known as the potential or full employment level of output and is denoted as Q_f.

If aggregate demand were to rise, only the general price level would increase with no change in real output. Aggregate supply is perfectly price inelastic in this range.

It is assumed that the potential output is attained in the long-run and in the short-run the actual output level is below Q_f.

2.3 AD-AS MODEL AND EQUILIBRIUM LEVEL OF NATIONAL OUTPUT AND GENERAL PRICE LEVEL

An economy tends to move to equilibrium where aggregate demand for goods and services equates aggregate supply. In Figure 3, the equilibrium level of national output is at Q_e. (You may use National Income or National Output to label the X-axis).

Should there be a deviation, pressures on firms and consumers will move the economy towards equilibrium national output Q_e and price level P_e.

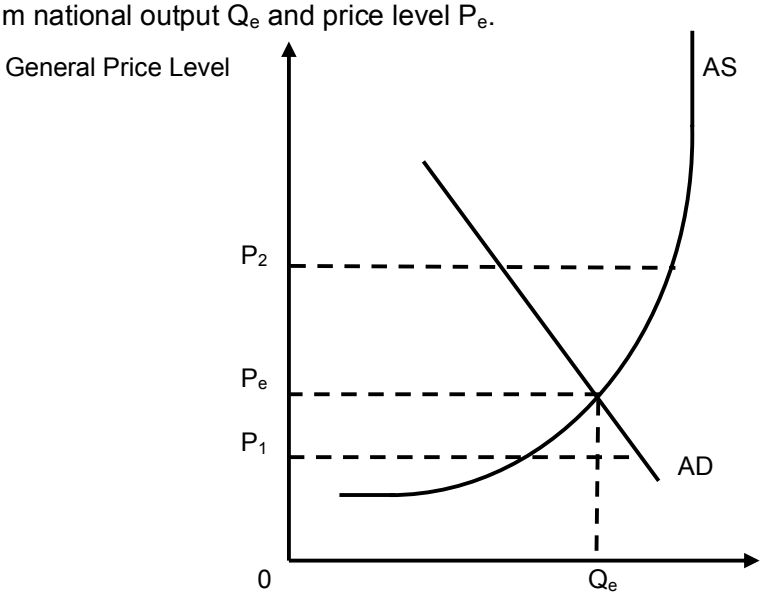


Figure 3: Equilibrium level of National Output and General Price Level

Adjustment Process

Suppose the general price level was initially at $0P_1$. This means that output produced by firms lower than the expenditure of economic agents i.e., the aggregate quantity demanded for goods exceeds the aggregate quantity supplied. The resulting shortage will cause some consumers to bid higher prices for the goods. As prices rise, the aggregate quantity demanded falls (movement along the AD curve) because of the wealth, interest-rate and international substitution effects. At the same time, profit-maximising firms increase output by employing more workers increasing quantity supplied (movement along the AS curve). Hence, the national output will rise (shown by a movement along the AS curve) towards its equilibrium level Q_e and price level to P_e. At the equilibrium general price level of P_e, AD=AS, and real national output, Q_e and there is no tendency for it to change.

Conversely, if the general price level were at $0P_2$, the aggregate quantity demanded is less than aggregate quantity supplied. The resultant surplus will force firms to reduce prices in order to clear the excess stock. With a fall in prices, profit maximising firms reduce quantity supplied (movement along the AS curve) and economic agents increase their spending on domestically produced goods due to the wealth, interest-rate and international substitution effects, increasing aggregate quantity demanded (movement along the AD curve). Thus the national output falls, moving again towards its equilibrium level Q_e. At the equilibrium general price level of P_e, AD=AS, and real national output is at Q_e and there is no tendency for it to change.

3. CHANGES IN EQUILIBRIUM LEVEL OF NATIONAL OUTPUT CAUSED BY NON-GENERAL PRICE LEVEL FACTORS

The general price level is not the only factor that influences the aggregate demand for and aggregate supply of goods and services. While a change in the general price level causes a movement along the AD and AS curves, **changes in non-general price level factors** can **cause a shift** in the AD and / or AS curves, altering the amount purchased and / or produced at each price level.

3.1 Changes in Non-General Price Level (Non-GPL) Factors That Affect Aggregate Demand

When non-price factors change, the entire AD curve shifts. Examples of these ***non-price factors*** that will affect the different components of AD and shift the entire AD curve, altering the amount purchased at each price level, are explained below.

a. Shifts Arising from Consumer Expenditure (C):

Consumer expenditure is incurred by **households** when they use their income to **purchase final goods and services to satisfy current wants**. These goods can be domestically produced or imported.

Consumption comprises of autonomous consumption and induced consumption. Autonomous consumption refers to consumption that is independent of the current level of income. Autonomous consumption is dependent on factors such as changes in consumer confidence and changes in interest rate. Induced consumption, on the other hand, refers to consumption that is dependent on the current level of income. When the current level of real income (or national output) increases, households' ability and willingness to purchase consumer goods and services will increase.

i. Changes in Expectations of Future Prices and changes in Consumer Confidence
When consumers expect prices to increase in the future, they will increase their demand for more goods and services now because these goods and services are cheaper now than in the future, hence, consumption will increase, ceteris paribus.
Consumer confidence is a measure of how optimistic consumers are about their future income and the future of the economy. If consumers expect their incomes to increase, or if they are optimistic about the future of the economy, they are likely to spend more on buying goods and services now, hence consumption (autonomous) increases.

ii. Changes in personal income taxes
If personal income taxes are lowered, the result is higher disposable income and a greater ability to buy, hence a rise in consumption. Thus, a fall in personal income tax rates leads to a shift of the AD curve to the right as households will spend more at a given price level.

iii. Changes in availability of credit and or interest rates
Some consumer spending is financed by borrowing and is influenced by whether borrowing is easy or if interest rate is changing. If borrowing is made easier or if a fall in interest rates occurs and thus reduces the costs of borrowing, then an increase in consumer spending especially on big ticket items will happen. Hence, consumption increases.

b. Shifts Arising from Investment Expenditure (I):

Investment is the spending on **new fixed capital goods** like buildings, plants, equipment and machineries **by firms** (Economists usually term this as '**fixed capital formation'**). Investment also includes the **increase of stocks and inventories** (e.g. raw materials, semi-finished goods and finished goods held by the producer (Economists usually term this **'changes in physical stocks'**).

Investment in new fixed capital assets in the economy need **NOT** be done only by its own residents. Many countries, including Singapore, China, India, rely on inflows of foreign direct investment (FDI) from transnational corporations (TNCs) as a key source to shift the AD curve and achieve economic growth. E.g., in Singapore's history of economic growth, foreign firms like Phillips, Texas Instruments, Shell, etc. injected huge amount of investment. Till today, FDI remains an important component of AD. The Economic Development Board reported that foreign investment commitment in Singapore is worth US$50b in 2016.

Investment projects yield a stream of returns over time. ***Hence, the main determinant of investment is the anticipated profitability of the investment project.***

Determinants of investment

i. Changes in interest rates
The interest rate is the cost of borrowing to finance the investment project. The higher the interest rate, the lower the quantity demanded for investments because there would be fewer investment projects that will be profitable at the higher interest rate. Most businesses need to borrow to buy capital goods and expand their business activities.

ii. Changes in business confidence
Business confidence refers to how optimistic firms are about their future sales and economic activity. If firms become more optimistic about future sales and economic activity, they will expect the rate of return on investments to increase, causing the demand for investments to increase. The economist John Maynard Keynes used the term "animal spirits" to describe this instinctive, gut feeling that influence decisions.

iii. Changes in technology
Improvements in technology could lead to lower prices of capital goods. This would make investment projects more profitable and the demand for investments will increase as a result.

iv. Changes in corporate tax rates
If the government reduces tax on profits of businesses (corporate taxes), firms' after-tax profits increase. This increases firms' willingness and ability to invest, leading to an increase in investment expenditure.

c. Shifts Arising from Government Expenditure (G):

Government expenditure refers to **spending by governments** within a country. It includes purchases by the government of factors of production, for example labour services. It also includes public investment by the government, for example building roads, airports, power generators, schools and hospitals, etc.

i. Changes in economic priorities: Deliberate efforts to influence AD
The government can use its own spending as part of a deliberate attempt to influence aggregate demand. For example, the government may decide to increase its expenditures to promote actual growth. This will be further discussed under fiscal policy.

ii. Changes in political priorities
Governments have many types of expenditures (operational and developmental), arising from provision of merit goods and public goods, spending on subsidies and pensions, payments of wages and salaries to its employees, purchases of goods for its own use, and so on. It may decide to increase or decrease its expenditures in response to changes in its priorities.

d. Shifts Arising from Net Exports (X-M):

An open economy is an economy in which there are economic activities between the domestic economy and the rest of the global economy, as opposed to the closed economy which is domestic based only. Countries have trade and investments activities among each other in the increasingly integrated world brought much closer by technology.

Exports are goods and services produced within the country and sold to foreigners. This must be included in the measurement of aggregate output. **Imports, however, involve domestic spending on goods and services that have been produced in other countries, and so must be subtracted from the measurement of aggregate output. Net exports** refer to the value of all exports minus the value of all imports.

i. Income Level of the country / other countries

When the income levels of a country (Country A) increases, this rise in consumers' purchasing power will lead to an increase in expenditure of goods and services. These goods and services consumed include both local as well as imported products. All else remaining constant, when a country's income rises, the import expenditure will also rise (and since export is assumed to be unchanged), net exports will fall.

If the income levels of Country A's trading partners increase rapidly, foreign demand for Country A's goods may rise. Its export earnings increases, and the AD curve shifts to the right. Conversely, when the trading partners are experiencing recession, the reduced income will induce them to buy less foreign goods. Country A's export earnings fall, shifting its AD curve to the left.

ii. Price levels of other countries (Relative Inflation rates)

If the inflation rate of trading partners is higher than that of Country A, the demand for A's goods will rise as they are relatively cheaper. Thus, the export earnings of Country A will increase. On the other hand, Country A's citizens will turn to domestic goods (i.e. import substitutes), thus reducing its import spending. The resultant rise in net export earnings shifts the AD curve to the right.

The reverse is true when Country A's trading partners have lower inflation rates. Whilst the trading partners reduce spending on A's goods, the citizens of Country A buy more foreign goods which have become relatively cheaper. This leads to a fall in export earnings and rise in import spending respectively. The AD curve shifts to the left as a result.

iii. Changes in Foreign Exchange Rates

*Refer to Topic on exchange rate:

Changes in foreign exchange rates affect the price of imports and exports. If the Singapore dollar depreciates relative to that of its trading partners, Singapore's goods and services become cheaper **in foreign currency**. Conversely, foreign goods are now more expensive **in Singapore dollar**.

This increases foreign demand for Singapore's goods (i.e. Singapore's exports) and reduces Singapore's demand for goods of trading partners (i.e. Singapore's imports). A **possible effect*** is a rise in net export earnings, thus shifting the AD curve to the right.

Summary: It is useful to assess common factors that affect across all components of AD rather than individual components, e.g. future expectations have an impact on consumption as well as investment.

Table 1: Factors that shift AD curve include non-GPL factors that affect the components of AD

	Consumption	Investments	Government spending	Exports	Imports
Expectations	Due to changes in e.g. Consumer confidence Expectations of future prices	Due to changes in e.g. Business confidence	Due to changes in …	Due to changes in …	Due to changes in …
Government Policies	Interest rates Personal income tax rates	Interest rates Corporate tax rates ER can affect FDI which can affect I	Economic priorities (deliberate actions)	Exchange Rate	Exchange Rate
Other factors	Real NY	Technology			Real NY (domestic country)
External Factors				Real NY abroad Price levels in other countries	Price levels in other countries

3.2. Changes in Non-General Price Level (Non-GPL) Factors That Affect Aggregate Supply

Changes in non-price determinants of supply lead to a shift in the AS curve. It affects the production cost and/or productive capacity of the economy. It can be temporary or permanent. A temporary disaster such as a flood will reduce current output, but that does not alter the country's long term productive capacity. On the other hand, a tsunami will cause both temporary and permanent decrease in an economy's productive capacity as its resources would have been depleted.

Table 2: Factors that cause AS curve to

Shift downwards / upwards: Figure 4 & 5	Shift outwards / inwards: Figure 6 & 7
Changes in cost of production	Changes in productive capacity

Generally, a rise in production cost only will shift the AS curve upwards from AS_0 to AS_1 as shown in Figure 4. This is because firms are willing to produce less at the prevailing price level. Note that production costs is affected by labour costs, other costs like rental, key inputs like oil, electricity, iron ore, exchange rates (since most inputs may be imported),

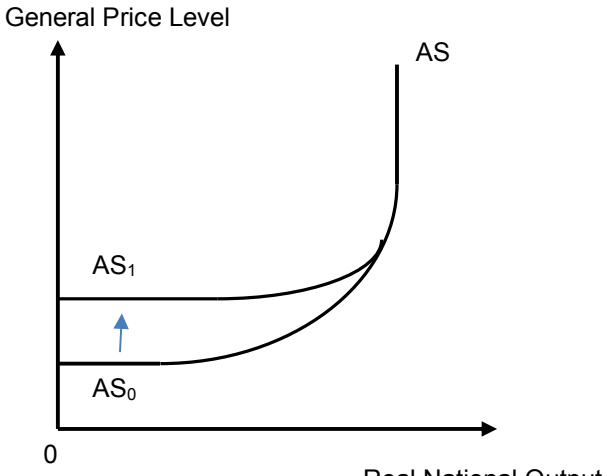


Figure 4

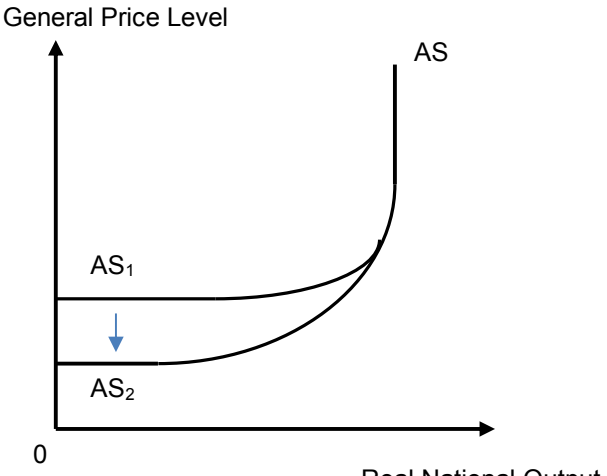


Figure 5

On the other hand, when production cost falls, firms are willing to produce more at the given price level. This increases aggregate supply, and shifts the AS curve downwards from AS_1 to AS_2, as shown in Figure 5.

A rise in productive capacity (Q_{f1} to Q_{f2}) implies an increase in the ability of the economy to produce more goods and services. This has the effect of shifting the AS curve to the right from AS_0 to AS_1, as shown in Figure 6 or 7 depending on the specific factor contributing to the shift. In other words, the full employment frontier has been pushed outwards. This is similar to an outward shift of the Production Possibility Curve.

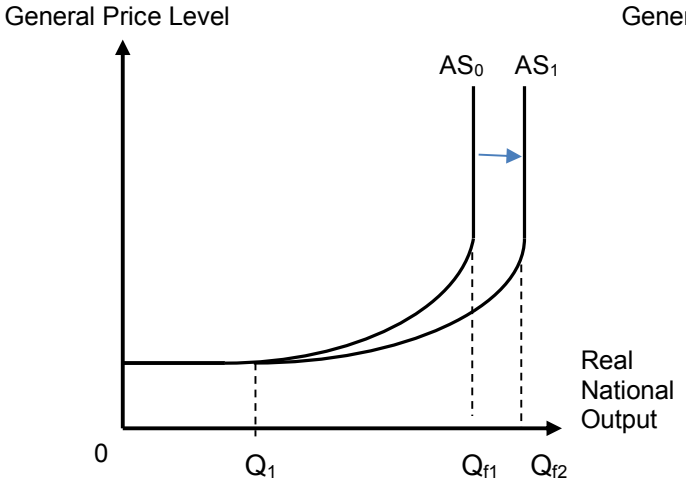


Figure 6

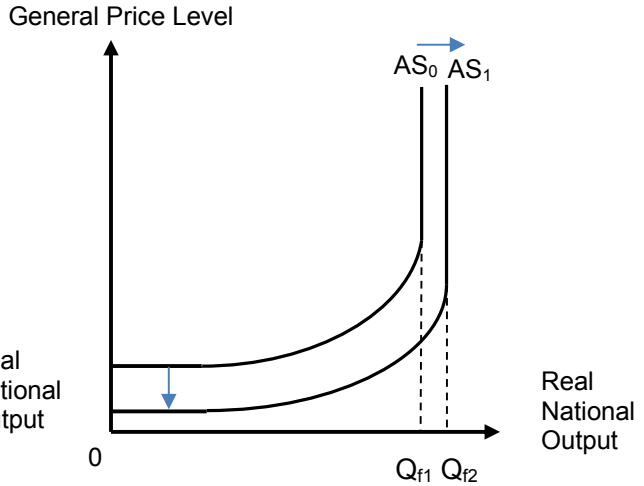


Figure 7

The reverse is true for a fall in productive capacity, resulting in a leftward shift of the AS curve.

a. In general, the following rules apply when shifting the AS curve:

i. Right downward or left upward shifts - The potential output (Q_f) or productive capacity will shift when there are changes in the quality and quantity of factors of production, or technology.
If productive capacity increases (decreases), cost of production will also decrease (increase). For example if there is immigration, the labour force increases and the output which the country can produce in the long-run when all resources are fully utilized increases. At the same time because the labour supply has increased the wage rate will fall which means that labour costs has fallen.

ii. Upward or downward shifts with no change in potential output -Changes in the cost of production alone will not affect the productive capacity. For example, if the oil price increases, the cost of production increases but that does not affect the amount that can be produced in the economy when all factor of production are fully utilized in the long-run.

Temporary changes do not affect the potential output. Any changes in the conditions of supply for different sectors in the economy will shift the AS.

b. Examples of factors that will shift the AS curve:

i. Changes in input prices

A rise in the price of inputs such as the cost of labour, commodity prices like petrol, gold, iron ore and flour, etc. will increase business or production costs and shifts the AS curve upwards. The exchange rate can also affect the prices of key imported products. (See figure 4)

However, if this rise in input prices is due to a long term depletion of non-renewable resources in the economy, e.g. the depletion of the crude oil in country's oil fields, then the AS curve could even shift leftwards as the productive capacity has been reduced.

Conversely, a fall in input prices lowers production cost, and firms are willing to produce more. Aggregate supply rises, and the AS curve shifts downwards. (See figure 5)

ii. Changes in quality of labour input

An increase in educational levels and training in an economy will increase the skills of its people. This will increase the economy's ability to produce more goods and services. Ceteris paribus, this will increase the productive capacity and shift the AS curve to the right. (See Figure 7)

iii. Changes in the expected rate of inflation

A change in the expected rate of inflation affects both aggregate demand and supply.

If producers expect prices of their goods to rise in the future, they will be less motivated to sell them in the current period. This has the effect of shifting the AS curve upwards, reflecting a fall in aggregate supply (See figure 4).

At the same time, trade unions will negotiate for higher wage increases with expected higher inflation to help workers cope with the rising cost of living. This raises production cost, and thus shifts AS curve upwards.

iv. Changes in technology

Improvements in technology, such as the discovery of less costly ways of production, enable producers to 'squeeze' a larger output from a given amount of resources.

The discovery and adaptation of technologically superior ways of transforming factors of production into goods and services over the last 250 years has significantly improved standards of living. The development of electricity and nuclear power has significantly altered our energy sources, while railroad, automobiles and airplanes have reduced transportation costs dramatically. More recently, the development of computers, fax machines, and of course the internet, have cut the cost of businesses and expanded our productive capacity. Thus, the AS curve shift downwards and to the right (figure 7).

v. Impact of government policies

Government policies can affect aggregate supply, e.g. environmental taxes such as carbon

duties & business regulations which affect the costs of production and leads to upwards shifts in the AS. Providing subsidies to firms helps to lower the cost of production, shifting the AS curve downwards. Alternatively, government policies which subsidies the upgrading of workers' skills has the effect of improving quality of labour, hence shifting the AS curve to the right (figure 7). This will be covered in greater details under Supply-Side Policies.

Summary:

- Aggregate demand consists of consumer spending by households (C), investment expenditure by firms (I), government spending (G) and expenditure by foreign buyers (X) i.e. .AD=C+I+G+X-M
- A rise in AD, arising from a change in any components of AD, can increase the national income, leading to actual growth. The reverse is true for a fall in AD.
- The AS curve shows the total output of goods & services that firms as a whole would like to produce and sell at each price level. The AS curve can be seen as comprising of three segments, namely, the horizontal range with an abundance of unemployed resources, an upward sloping range as well as the vertical range where the economy has reached full employment.
- A rise in production cost shifts the AS curve upwards while a fall in cost shifts it downwards. This affects the actual growth of the economy.
- A rise in productive capacity shifts the AS curve outwards while a fall in productive capacity shifts the AS curve inwards. This affects the potential growth of the economy.
- It is possible for an event to *simultaneously* cause the cost of production and productive capacity to change.

4. Change in Equilibrium Level of National Income

A. IMPACT OF A CHANGE IN AD

[Factors that cause a change in AD would be the factors that bring about changes in the components of AD – please refer to 'Change in Non-GPL Factors that affect AD']

In Figure 8, the equilibrium level of national income is at Y_e where the initial AD_0 equates AS.

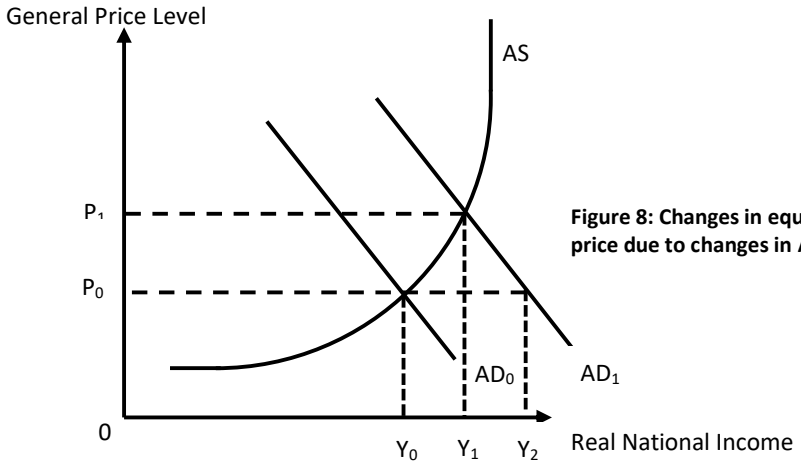


Figure 8: Changes in equilibrium output and price due to changes in AD

If the AD were to increase, causing the AD curve to shift AD_0 to AD_1, there will now be disequilibrium in the economy. Decisions made by households and firms will move the economy towards a new higher equilibrium national output Y_1 and price level P_1.

At original price level P_0, there is a shortage as the quantity demanded for goods exceeds quantity supplied. The resulting shortage of Y_0Y_2 will cause some consumers to bid higher prices for the goods. As prices rise, the aggregate quantity demanded falls (movement along the AD curve) because of the wealth, interest-rate and international substitution effects. At the

same time, profit-maximising firms increase output by employing more workers and increasing quantity supplied (movement along the AS curve). Hence, the national output will rise towards the equilibrium level Y_1 and price level rises to P_1.

Conversely, if the AD were to fall, the leftward shift of the AD curve will cause a surplus of goods and services at general price level P_0. This will force firms to reduce prices in order to clear the excess stock. With a fall in prices, firms reduce output and need fewer workers while aggregate quantity demanded increases. Thus the national output falls, moving to a new lower equilibrium.

B. IMPACT OF A CHANGE IN AS

[For factors that cause a change in AS, please refer to 'Change in Non-GPL Factors that affect AS']

An increase in aggregate supply due to a **fall in production costs** is represented by a **downward shift of the AS curve** as shown in Figure 9. A surplus (or current output exceeds current spending at P_1) is created by the downward shift of the AS curve, which in turn causes a downward pressure on the general price level from P_1 to P_2. As the general price level falls, spending on goods and services increases and this is represented by a movement along the AD curve. The general price level continues to fall until the disequilibrium is eliminated at P_2 and equilibrium level of real national income is higher at Y_2. E**quilibrium level of real national income increases** from Y_1 to Y_2 when aggregate supply increases, as represented by a downward shift of the AS curve.

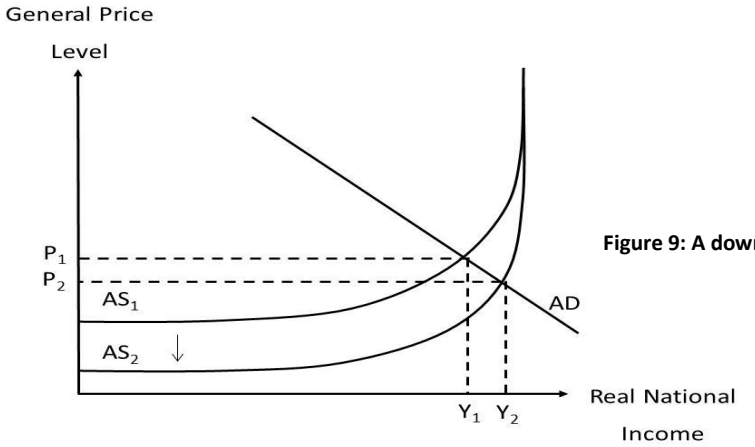


Figure 9: A downward shift of the AS curve

An increase in AS due to an **increase in the quantity and quality of resources** and/or an **increase in efficiency** with which these resources are used and/or advancement in technology are used will **shift the AS curve outwards** and contribute to **potential growth**. This type of growth can be represented by a shift of the aggregate supply (AS) curve to the right and hence, **full employment level of national income increases** from Yf_1 to Yf_2 as illustrated in Figure 10.

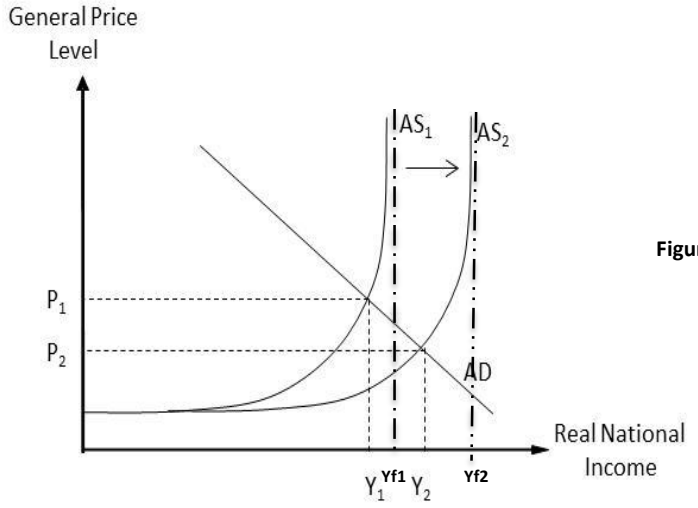


Figure 10: Rightward shift of the AS curve

5 THE MULTIPLIER EFFECT

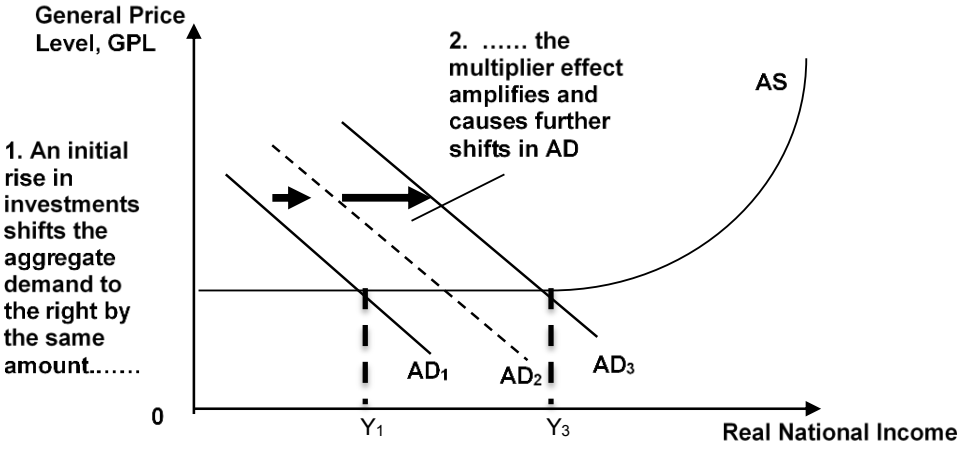
It is generally observed that **when the AD increases (due to an increase in any of the autonomous components of AD), this will lead to a more than proportionate increase in national income**. An increase in AD will lead to a more than proportionate increase in national income, while a decrease in AD will lead to a more than proportionate decrease in national income. This is due to the **multiplier effect**

HOW DOES THE MULTIPLIER EFFECT OCCUR?

As an example, if a firm makes an investment by building a new factory in Jurong Island or the government increases its spending by extending the MRT line, this creates income for the people directly employed. These people, in turn spend the money in restaurants, cinemas, supermarkets etc. This again creates more employment and income for others. At each round, some of the extra income is spent. This is known as induced consumption, and it creates income for another person. The rest 'leaks out' in the form of savings, taxes and import spending.

The multiplier process works on the premise that one person's spending generates income for the next, and the process goes through many rounds of induced spending to increase national income by a larger magnitude, compared to the initial autonomous increase in AD.

Thus, in this case, an initial increase in investment can cause a much bigger increase in national income. The magnitude of the increase will depend on the rate at which income leaks out (i.e. MPW) or is spent on domestically produced goods and services (MPC out of domestically produced goods and services). The (full) multiplier effect should be illustrated on the horizontal segment of the AS curve.



1. The initial autonomous spending will increase AD from AD_1 to AD_2. E.g. Rolls-Royce invested S$1b million in manufacturing, assembly and test facility for Trent aero engines, as well as research and training facilities at the Seletar Aerospace.

2. As spending by one person is income to another, national income initially increases by the same amount of expenditure (S$1b). Rolls Royce employed workers and contractors to build and produce its new Roll Royce Seletar campus whose incomes now have increased by S$700m: Real national income (RNY) increased by S$1b.

3. The workers and contractors will spend part of their incomes (induced consumption), increasing the income of another group of people. While part of the increase in real national income will be spent on induced consumption, the remaining amount will be withdrawn as savings, taxes and imports.

4. The induced consumption will increase AD and real national income further. The cycle of income creation, induced consumption and withdrawals will continue with the AD shifting continually to the right until the initial autonomous increase in expenditure has been fully withdrawn.

5. The final position of the AD is at AD_3 and real national income has increased by a multiplied amount from Y_1 to Y_3.

6. The Size of the Multiplier
The multiplier effect will vary from country to country depending on the size of the multiplier.

The marginal propensity to withdraw (MPW) refers to the proportion of additional income that is withdrawn as savings, taxes and imports.
The higher the marginal propensity to withdraw, the smaller the proportion of additional income that is re-circulated back into the economy as induced consumption and the smaller the multiplier effect.

$$k = \frac{\Delta \text{NY}}{\Delta \text{AD}}$$

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

$$= \frac{1}{\text{MPS}+\text{MPT}+\text{MPM}}$$

Singapore's multiplier is relatively small. This is because Singapore has a very open economy, which means that the marginal propensity to import (MPM) is likely to be very high. Also, Singapore has a high savings rate due to compulsory savings scheme such as the CPF; hence the marginal propensity to save (MPS) is likely to be high.

In summary:

- Any increase in C, I, G, (X-M) not due to GPL will cause AD to increase (vice-versa).
- Shifts in the AS are due to changes in the cost of production, quality/quantity of factors of production, or technological improvements.
- Changes in AD will lead to an expansionary effect on Real National Output due to the multiplier effect.
- The size of the multiplier is inversely related to the MPW.
- The final change in AD from an injection also depends on the amount of spare capacity in the economy: how elastic is the AS curve.