2.2 Aggregate demand and supply
- Aggregate demand (AD)

Syllabus item: 82 Weight: 3

1. The AD curve

IB Question

- Distinguish between the microeconomic concept of demand for a product and the macroeconomic concept of aggregate demand.
- Construct an aggregate demand curve.
- Explain why the AD curve has a negative slope.

- Aggregate demand: the total spending on goods and services in a period of time at a given price level

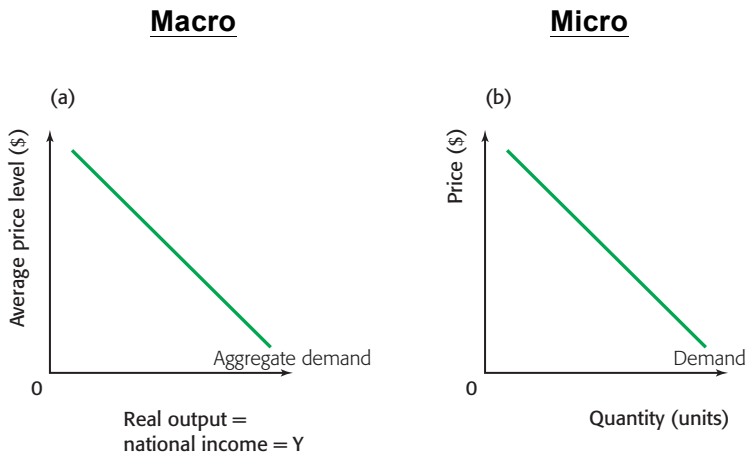


Figure 14.1 (a) Macroeconomic aggregate demand curve; (b) microeconomic demand curve

Aggregate demand curve

- X-axis: total quantity of all good and services. (National output = national income = national expenditure/ "real output" or national income (Y))
  *In Macroeconomic analysis, the x-axis is commonly labeled as "real output" (meaning that the value of national output adjusted for inflation.
- Y-axis: a measure of the average price level of all goods and services

Analysis:

- The demand curve → price of one good × demand for that one good (microeconomic), Aggregate demand → price of all goods × demand for all goods (macroeconomic)
- The AD diagram illustrates the **inverse relationship** between the average price level and the total real output demanded; at a lower average price level, a higher quantity is

demanded

- **Negatively sloped** because of the 'wit' effects: wealth, interest rate and trade effects
  - ✓ Reason 1: Wealth effects → A fall in price will stimulate the consumption component of AD since consumption usually reflects the real income
  - ✓ Reason 2: Interest rate effect → A fall in price will increase the real money supply, lower the interest rate and stimulate the investment and consumption components of AD.
  - ✓ Reason 3: Trade effects → A fall in price will, with a constant exchange rate, increase international competitiveness so that exports increase and imports decrease.

Syllabus item: 83 Weight: 3

2. *The components of AD*

IB Question

• Describe consumption, investment, government spending and net exports as the components of aggregate demand.

Definitions

- Export: domestic goods and services that are bought by foreigners → inflow of export revenues to the country
- Import: goods and services that are bought from foreign produces→ outflow of import expenditure

Aggregate demand = C + I + G + (X-M)

- Consumption (C)

  → Definition: Total spending by consumers on domestic goods and services

  → Consumer demand: We look at 1) **durable goods**: goods that are used over a period of time) ex. Cars, computer, mobile phones, bicycles etc.

  + 2) **non-durable goods**: goods that are used up immediately. Ex. Rice, toilet paper etc.

- Investment (I)

  → Definition: The addition of capital stock to the economy. Investment is carried out by firms. There are two types of investment:

  1) **Replacement investment** – occurs when firms spend on capital in order to maintain the productivity of their existing capital
  2) **Induced investment** – occurs when firms spend on capital to increase their output to respond to higher demand in the economy

➢ The economy's capital stock includes all goods that are made by people and are used to produce other goods or services such as factories, machines, offices etc.

➢ Investment is not to be confused with buying shares or putting money in a bank – we tend to call this "investment" in everyday English, but it is, in fact, "saving" as it is a leakage from the circular flow

- Government spending (G)

  → Definition: includes all government consumption and investment but excludes transfer payments made by state

  → Includes health, education, law and order, transport, social security, housing and defense

  → The amount of government spending depends on its policies and objectives

- Net exports (X-M)

  → Definition: Domestic goods and services that are bought by foreigners. When the firms in a country sell exports to foreigners, it results in an inflow of export revenues to the country. Imports are goods and services hat are bought from foreign producers. When imports are bought it results in an outflow of import expenditure.

  → **Export revenue – import expenditure**, equivalent to (X-M)

  → Positive value: Export revenues > Import expenditure (Addition to AD)

  → Negative value: Import expenditure > Export revenues (Reduction to AD)

  → Aggregate demand: C + I + G + (X-M) which is shown in Figure 14.2

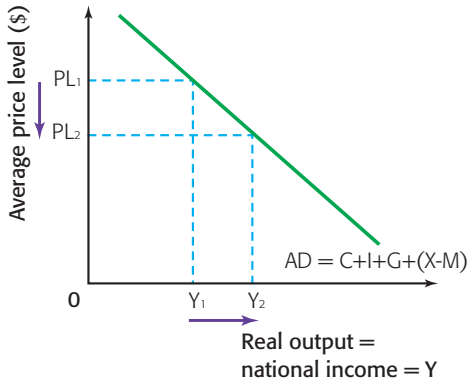


Figure 14.2 The aggregate demand curve

Syllabus item: 84 Weight: 4

3. *The determinants of AD or causes of shifts in the AD curve*

IB Question

• Explain how the AD curve can be shifted by changes in consumption due to factors including changes in consumer confidence, interest rates, wealth, personal income taxes (and hence disposable income) and level of household indebtedness.

Changes in AD: Any changes in the components of aggregate demand will cause a shift in the demand curve as shown in figure 14.3

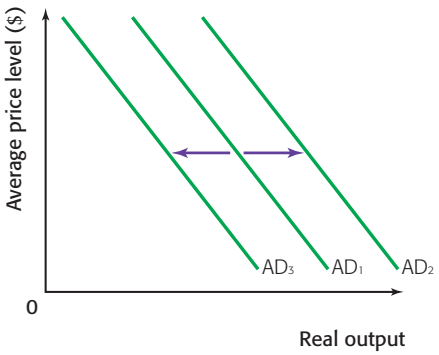


Figure 14.3 Shifts in aggregate demand

- Increase in any of components of AD → AD curve shift to the right
- Decrease in any of components of AD → AD curve shift to the left

1st determinant: Consumption

1) Changes in expectations/ consumer confidence

→ If people are optimistic about their economic future that they are likely to spend more now.

→ Ex) If they think that they are likely to get a promotion in the future due to a booming economy and strong sales then they will feel more confident about taking a loan or using up savings.

→ The higher the consumer confidence is, the higher consumption (shift to the right) and vice versa.

→ **"Consumer confidence index"** or **"Consumer sentiment index"**

2) Changes in interest rates

→ Definition of interest rates: the price or cost of borrowing money

→ Some of the money that is used to buy durable goods comes from money which people borrow from the bank. When people borrow money they must pay for the borrowed money by paying interest to the bank. Thus, if there is an increase in interest rates, then there is likely to be less borrowing (because it is more expensive to borrow). Therefore consumption will fall, resulting in a fall in AD.

→ Borrowed money is usually used to buy houses. To buy a house, most consumers get a loan for housing called a mortgage. If interest rates increase then this loan becomes more expensive on a month-to-month basis.

→ The higher the interest rate, the lower the consumption and vice versa.

→ Also, a rise in the interest rate makes saving more attractive.

3) Changes in wealth

Definition of wealth: assets that people own including **physical assets** (ex. house, arts, antiques) and **monetary/financial assets** (ex. shares in companies, government bonds, or bank savings)

→ 2 main factors that can change the level of wealth in economy:

1. A change in house prices: when house prices increase across the economy, consumers feel more wealthy and likely to fell confident enough to increase their consumption by spending less or borrowing more
2. A change in the value of stocks or borrowing more: If the value of shares increases, people feel wealthier. This might encourage them to spend more.

*"Income" and "Wealth" are different!!!

4) Changes in income

→ Increase in income means that they have more money to spend on goods and services, thus higher the consumption and vice versa.

5) Changes in household indebtedness

Definition of household indebtedness: the extent to which households are willing and able to borrow money

→ If it is easy to borrow money (easy credit) and interest rates are low then it is likely that households will take on more debt by getting loans or using their credit cards other means.

→ If interest rates rise, households will have to spend more to re-pay their loans and mortages.

IB Question

• Explain how the AD curve can be shifted by changes in investment due to factors including interest rates, business confidence, technology, business taxes and the level of corporate indebtedness.

2nd determinant: Investment

1) Changes in interest rates

→ In order to invest, firms need money. The money that firms use for investment can come from "retained profits" or they can borrow the money. Both of these are affected by the interest rate. If the money is to be borrowed, then an increase in the cost of borrowing money may lead to a fall in investment. If interest rates are high, then firms may prefer to put their retained profits in the bank to earn higher returns as savings, rather than use them to invest.

→ Inverse relationship between interest rates and the level of investment, as shown below.

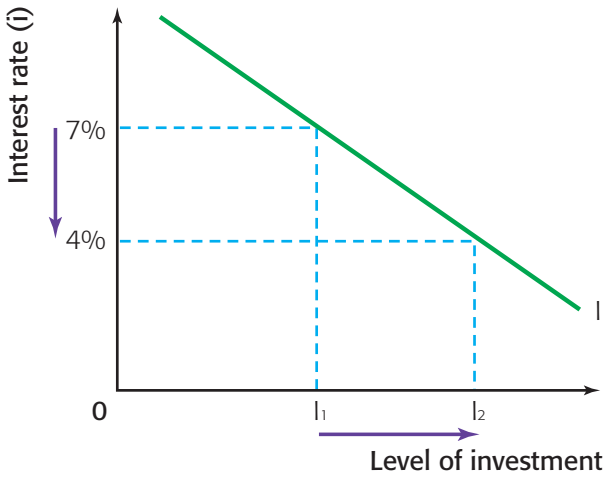


Figure 14.4 The relationship between investment and the interest rate

→ A decrease in the interest rate, from 7 to 4 percent, will decrease the incentive to save and decrease the cost of borrowing, so it is likely to lead to an increase in borrowing that is likely to result in an increase in the level of investment from I1 to I2, and vice versa.

2) Changes in expectations/business confidence

→ If businesses are vey confident about the future of the economy and expect consumer demand to rise then they will want to be ready to meet the increase in consumer demand by investing to increase potential output and productivity.

3) Changes in technology

In order to keep up with advances in technology, and to remain competitive, firms will need to invest.

4) Changes in business taxes

Business taxes can be structured to either encourage investment (shifting the AD to the right) or discourage investment (shifting AD to the left).

5) Changes in the level of corporate indebtedness

IB Question

• Explain how the AD curve can be shifted by changes in government spending due to factors including political and economic priorities.

3rd determinant: Government spending

1) Changes in political and economic priorities

- Political priorities: A new education or health policy might require increased public spending on schools or hospitals.
- Economic priorities: If the government has made a commitment to financially support a given industry, then government spending will rise.

IB Question

• Explain how the AD curve can be shifted by changes in net exports due to factors including the income of trading partners, exchange rates and changes in the level of protectionism.

4th determinant: Net exports

Imports perspective ***Exports perspective***

- Exports: goods and services that are bought by foreigners. If foreign income rise the their consumption of imported goods and services will rise.
- Imports:

1) Changes in income of trading partners

→ If foreign incomes rise then their consumption of imported goods and services will rise

→ Ex) As the Chinese national income rises, Chinese people are more willing and able to buy imported goods and services from Europe. Thus, European exports rise as the Chinese economy grows.

2) Changes in exchange rates

→ Changes in the value of a country's currency (its exchange rate) can affect a country's exports.

→ If a country's exchange rate becomes stronger, then this makes the country's exports relatively more expensive to foreigners.

Ex) As an example, let's say that it takes 90 Japanese Yen to buy one US dollar. If the value of the yen relative to the dollar change from 100 Yen to buy one US dollar, this will decrease the amount that Japanese citizens will buy in the US, and increase the amount that US citizens can buy in Japan. → **Cause net exports to fall and the AD curve to shift to the left.**

3) Changes in the level of protectionism

→ Trade protection or commercial policy refers to any policy that governments may implement to discriminate against foreign supplies.

→Ex) trading partners lift trade barriers (for example if they decrease tariffs, which are taxes on imports; or eliminate quotas, which are quantitative restrictions on imports) then exports will increase and so will AD.

$$C = f\,(IR, CC, W, PIT, Hd, \ldots)$$
$$I = f\,(Ir, BC, T, BT, CD, \ldots)$$
$$NX\ /\ (X\text{-}M) = f\,(Yfm\ ER, CP, \ldots)$$

★ Government policies affecting aggregate demand

→**Fiscal policy** and **monetary policy**

1) Fiscal policy

→ Definition: The set of a government's policies relating to its spending and taxation rates

→ Ex) Direct taxes (taxes on income) and indirect taxes 0taxes on goods and services)

→ Government use expansionary fiscal policy to increase aggregate demand and contractionary, or deflationary, fiscal policy to reduce aggregate demand

<Expansional fiscal policy>

- If a government would like to encourage greater consumption, then it can lower income taxes to increase disposable income. This is likely to increase AD.
- If a government would like to encourage greater investment, then it can lower corporate taxes so that firms enjoy higher after-tax profits that can be used for investment. This is likely to increase AD.
- Governments have major investment projects themselves and may increase their spending in order to improve or increase public services. This directly impacts upon AD.

2) Monetary policy

→ The set of official policies governing the supply of money in the economy and the level of interest rates in an economy

2.2 Aggregate demand and supply
- Aggregate supply (AS)

Syllabus item: 85 Weight: 3

1. The meaning of aggregate supply

IB Question

- Describe the term aggregate supply.
- Explain, using a diagram, why the short-run aggregate supply curve (SRAS curve) is upward sloping.

- Aggregate supply: total amount of goods and services that all industries in the economy will produce at every given price level (the sum of the supply curves of all industries in the economy)

<Short-run aggregate supply (SRAS)>

- Short-run in this case means: the period of time when the prices of the f.o.p do not change. Price of labour – the wage rate – is fixed.
- **Positive relationship** between the price level and the amount of output that a country's industries will supply which is shown below

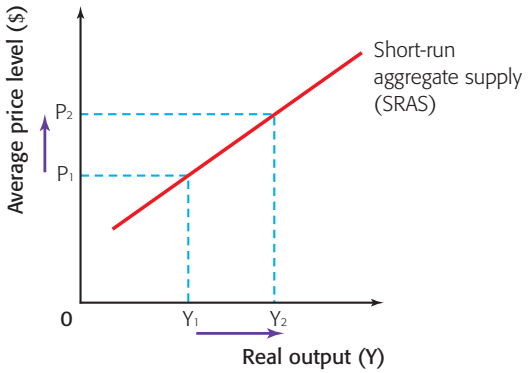


Figure 15.1 The SRAS curve

(Movement along the SRAC curve)

- In the short-run, recalling that the LDMR means that marginal and average costs will rise as output increases in short-run, an increase in output will be accompanied by an increase in average costs. Industries will pass on an increase in costs in the form of a higher price level → **SRAS curve is upward sloping**
- In short-run, firms respond to price increases by supplying more goods but in the long-run, supply may not always respond to an increase in price level.

IB Question

• Explain, using a diagram, how the AS curve in the short run (SRAS) can shift due to factors including changes in resource prices, changes in business taxes and subsidies and supply shocks.

<Shifts in Short Run Average Supply (SRAS)>

A change in any of the factors other than price level will result in a shift in the SRAS curve → **"Supply-side shock"**

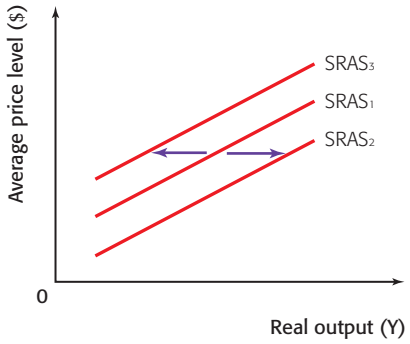


Figure 15.2 Shifts in the SRAS curve

- A decrease in costs results in an increase in aggregate supply, while an increase in costs results in a decrease in aggregate supply

1) Changes in resource prices

   Changes in the price of resources such as price of oil, equipment, capital goods etc. affect the SRAS curve. An increase in the price of resource shifts the SRAS curve to the left as it will increase production costs.

2) Changes in business taxes and subsidies

   Business taxes are taxes on firms' profits, and are treated by firms like costs of production. Therefore, higher taxes on profits are like increases in production costs and so shift the SRAS curve to the left.

3) Changes in supply shocks

   Supply shocks are events that have a sudden and strong impact on short-run aggregate supply. Some supply shocks directly affect aggregate supply. For example, a war or violent conflict can result in destruction of physical capital and disruption of the economy, leading to lower output produced and a leftward shift in the SRAS curve.

Syllabus item: 86 Weight: 4

2. Alternative views of aggregate supply

IB Question

• Explain, using a diagram, that the monetarist/new classical model of the long-run aggregate supply curve (LRAS) is vertical at the level of potential output (full employment output) because aggregate supply in the long run is independent of the price level.

<LRAS>

New classical LRAS

- LRAS curve is perfectly inelastic at **"full employment level of output".**
  (there is some unemployment though, referred to as natural (or 'normal') unemployment
- It represents the **potential output that could be produced if the economy were operating at full capacity** and is annotated as Y1 below

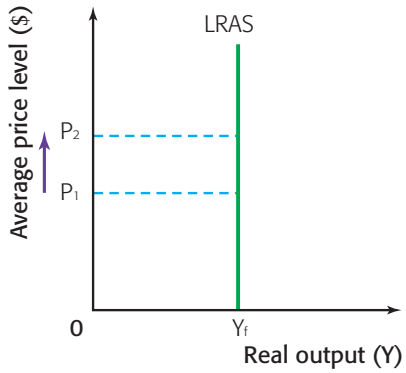


Figure 15.4 New classical LRAS curve

- **LRAS curve is vertical**
  → Because in the long-run, money wages will have adjusted and matched the increase in prices so firms' profitability will not have changed
  → It shows that in the long-run, when all adjustments have been made, an economy will produce whatever its resources and technology normally allow it to produce
- Potential output is based entirely on the quantity and quality of f.o.p
  → LRAS is independent of price level

IB Question

• Explain, using a diagram, that the Keynesian model of the aggregate supply curve has three sections because of "wage/price" downward inflexibility and different levels of spare capacity in the economy.

<Long-run aggregate supply>

Keynesian AS

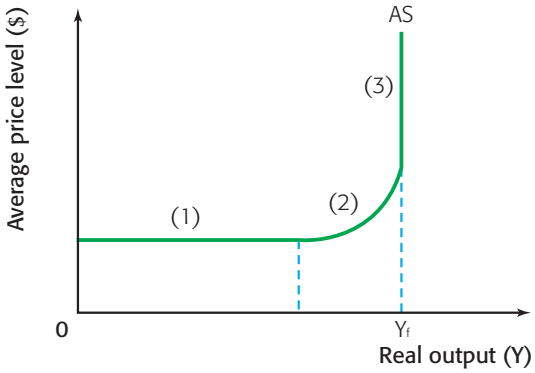


Figure 15.5 Keynesian LRAS curve

Three possible phases:

1. In region 1, the LRAS is perfectly elastic, implying that higher level of output can and will be produce without the average price level rising. Producers in the economy can raise their level of output without higher average costs, because of 'spare capacity' in the economy.

2. In region 2, as the economy approaches its potential output (Y_f), and the spare capacity is used up, the available factors in the economy become more scarce. As producers increase output, they bid for the increasingly scarce factors and prices begin to rise.

3. In region 3, when the economy is at full capacity, all factors are being used and so output cannot increase. Thus, LRAS is perfectly inelastic.

4. *Shifting the aggregate supply curve over the long-term*

IB Question

• Explain, using the two models above, how factors leading to changes in the quantity and/or quality of factors of production (including improvements in efficiency, new technology, reductions in unemployment, and institutional changes) can shift the aggregate supply curve over the long term.

- A Shift in LRAS can be shown below.

(a) Keynesian perspective (b) The new classical perspective

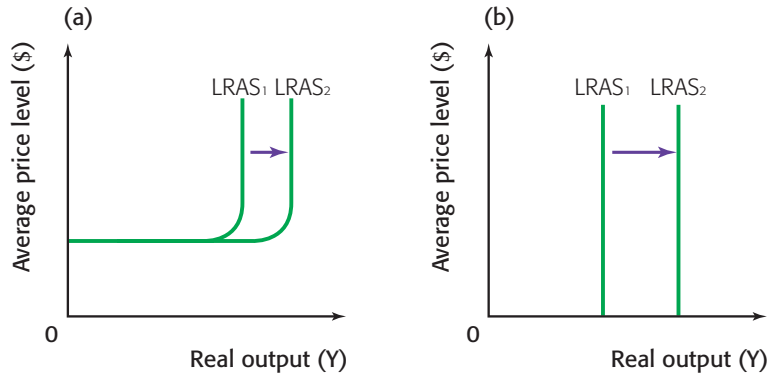


Figure 15.6 A shift in the LRAS curve (a) from the Keynesian perspective and (b) from the new classical perspective

(However, Keynes was not interested in the long-run in his analysis of the workings of an economy)

- An outward shift of a country's LRAS curve means that its productive potential has increased. (A shift in the LRAS can be likened to an outward shift of PPC)

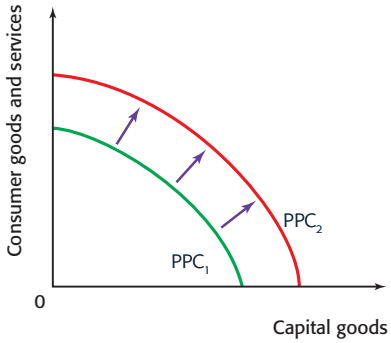


Figure 15.7 An increase in productive potential equivalent to an increase in the LRAS

- The LRAS curve will shift to the right if there is an **improvement in the quality** of f.o.p or **increase in the quantity** of the f.o.p.

F.o.p	Increase in quantity	Improvement in quality (increase in productivity)
Land (all natural resources)	• Land reclamation • Increased access to supply of resources • Discovery of new resources	• Technological advancements tat allow for increased access to resources or the discovery of new resources • Fertilisers • Irrigation
Labour + entrepreneurship	• Increase in birth rate • Immigration • Decrease in the natural rate of unemployment	• Education • Training • Re-training • Apprenticeship programmes
Capital	• Investment	• Technological advancements that contribute to more efficient capital • Research and development

4. Short-run equilibrium

IB Question

- Explain, using a diagram, the determination of short-run equilibrium, using the SRAS curve.
- Examine, using diagrams, the impacts of changes in shortrun equilibrium.

Short-run equilibrium

- The economy is in short-run equilibrium where **AD = SRAS**

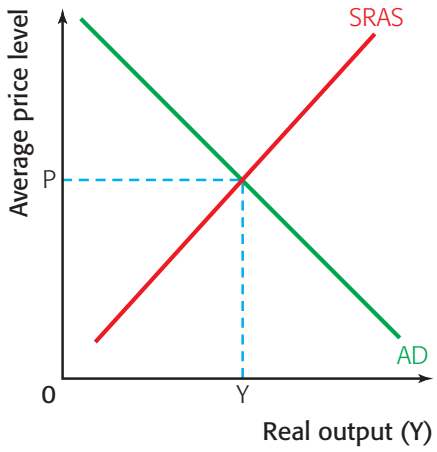


Figure 16.1 Short-run equilibrium output

- Short-run equilibrium: **output level of Y** at the **price level of P**
- The output produced by the economy = total demand in the economy

  (So there is no reason for producers to change their level of output)

- **Any shifts in AD** will induce a change in the equilibrium average price and output levels in **the same direction** as the change in AD
- **Any shifts in SRAS** will induce a change in the equilibrium average price and output levels in **the opposite direction** as the change in AD

5. Equilibrium in monetarist/new classical

IB Question

• Explain, using a diagram, the determination of long-run equilibrium, indicating that long-run equilibrium occurs at the full employment level of output.

Long-run equilibrium

- It is where **AD = vertical LRAS**

<New classical perspective>

- The impact of any changes in AD will be on the **price level only**
- The LRAS curve is vertical at the **full employment level of output**

  → The economy produces potential GDP in the LR
- The economy will always move 'automatically' (without government intervention) to its long-run equilibrium.

  (There may be a short-run increase in output if there is an increase in AD but it will always return to its long-run equilibrium.)

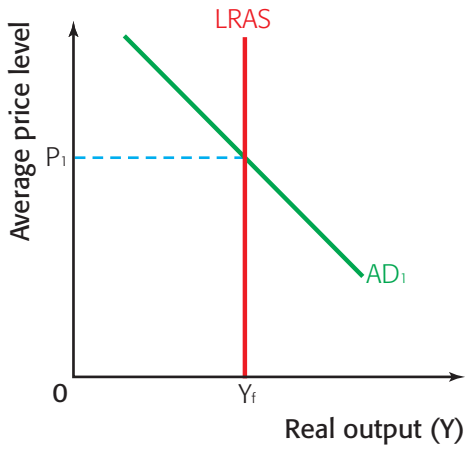


Figure 16.2 The new classical perspective of long-run equilibrium

IB Question

- Explain why, in the monetarist/new classical approach, while there may be short-term fluctuations in output, the economy will always return to the full employment level of output in the long run.
- Examine, using diagrams, the impacts of changes in the long-run equilibrium.

- The impact of any changes in AD will be on the price level only:

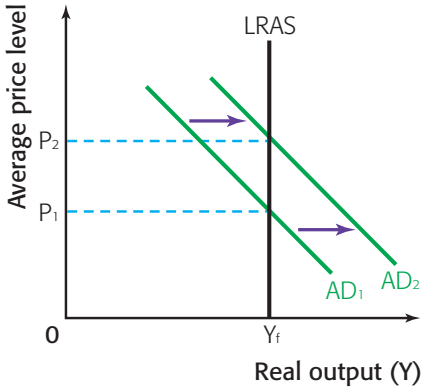


Figure 16.3 The new classical perspective of the impact of an increase in AD in the long run

- The economy will always move automatically ("without government intervention") to its long-run equilibrium.
- Only the price level changes, leaving the equilibrium level of real GDP unchanged at potential output, Yp.

6. Equilibrium in the Keynesian model

IB Question

• Explain, using the Keynesian AD/AS diagram, that the economy may be in equilibrium at any level of real output where AD intersects AS.

• Explain, using a diagram, that if the economy is in equilibrium at a level of real output below the full employment level of output, then there is a deflationary (recessionary) gap.

<Keynesian perspective>

- Equilibrium level of output: AD=AS

  However, in Keynesian perspective, they believe that the economy may be in long-run equilibrium of a level of output below the full employment level of national income (Yf)

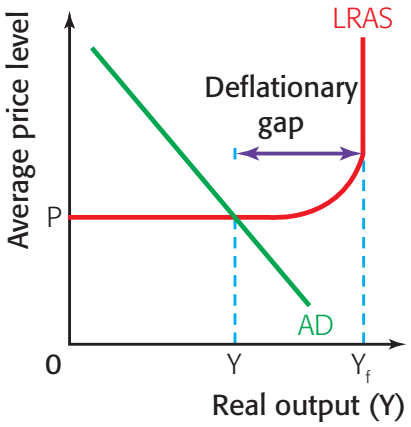


Figure 16.8 The Keynesian perspective of long-run equilibrium output below the full employment level of output

- In this case, the equilibrium level of output is below the full employment level of output

  → Deflationary gap (Output gap)

  → Whereby the level of AD in the economy is not sufficient to buy up the potential output that could be produced by the economy at the full employment level of output

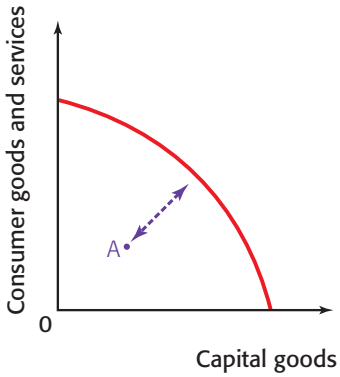


Figure 16.9 Output gap illustrating the difference between an economy's actual output and its potential output

IB Question

- Discuss why, in contrast to the monetarist/new classical model, the economy can remain stuck in a deflationary (recessionary) gap in the Keynesian model.
- Explain, using a diagram, that if AD increases in the vertical section of the AS curve, then there is an inflationary gap.
- Discuss why, in contrast to the monetarist/new classical model, increases in aggregate demand in the Keynesian AD/AS model need not be inflationary, unless the economy is operating close to, or at, the level of full employment.

- AD can increase such that there is an increase in the level of real output, without any consequent increase in the price level (Because of the existence of spare capacity in the economy)

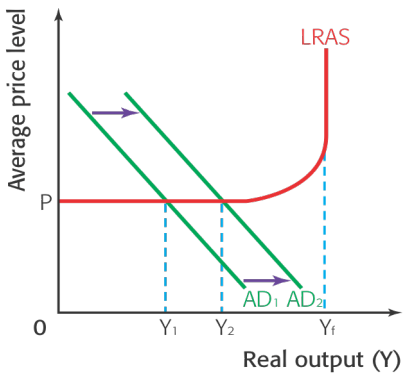


Figure 16.10 The Keynesian perspective of the impact of an increase in AD when the economy is operating below full employment

- If AD increases further to AD3, then the economy starts to experience inflationary pressure as available f.o.p becomes scarcer and their prices bid up.

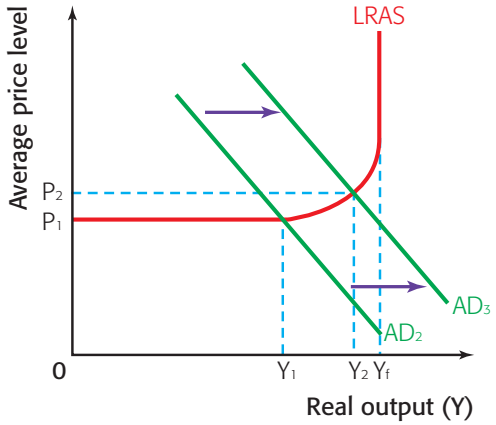


Figure 16.11 The Keynesian perspective of the impact of an increase in AD when the economy is close to full employment

- This happens when the economy is operating at full employment and there is an increase in AD ("Purely inflationary") There is only an increase in price level
- "Inflationary gap", whereby the level of AD cannot be satisfies given the existing resources. As a result, the price rises to allocate the scarce resources among the competing components of AD, i.e. consumers, producers, producers, the government, and the foreign sector

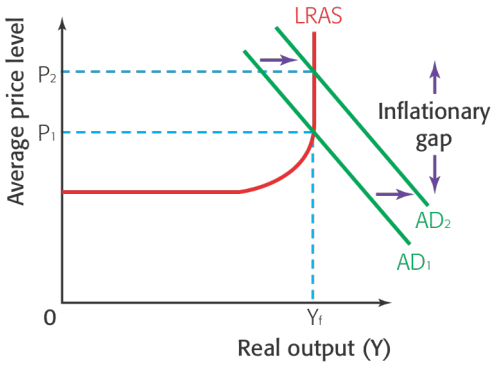


Figure 16.12 The Keynesian perspective of the impact of an increase in AD when the economy is at full employment

7. The Keynesian multiplier

IB Question

- Explain, with reference to the concepts of leakages (withdrawals) and injections, the nature and importance of the Keynesian multiplier.
- Calculate the multiplier using either of the following formulae.
- Use the multiplier to calculate the effect on GDP of a change in an injection in investment, government spending or exports.
- Draw a Keynesian AD/AS diagram to show the impact of the multiplier.

- Changes in any of the components of AD (e.g. investment) may have a larger effect on GDP than just the value of the change. This is known as the multiplier effect. This is because an injection of extra income leads to more spending, which creates more income, and so on.

The Keynesian multiplier

It states that the change in income s a multiple of the change in any injection:

It follows that if any two terms are given you can solve for the third one.

In addition,

MPC is the additional spending on domestic goods from additional income. So, if you are told that from an extra dollar (which has 100 cents) people spend 80 cents it follows that

It also follows that the remain in 20 cents were paid in tax saved and/ or spent but on imports. The multiplier may therefore be written as:

MRT is the marginal tax rate (the extra tax paid out of an extra dollar earned), MPS is the additional savings out of an additional dollar earned and MPM is the additional spending on

imports out of an additional dollar earned:

And MPW is the marginal propensity to withdraw, or

Continuing the previous example, if people are taxed 12 cents, save 3 cents and spend on imports 5 cents out of each additional dollar earned then:

So that MPW = 0.20 (their sum).
The multiplier k is thus equal to:

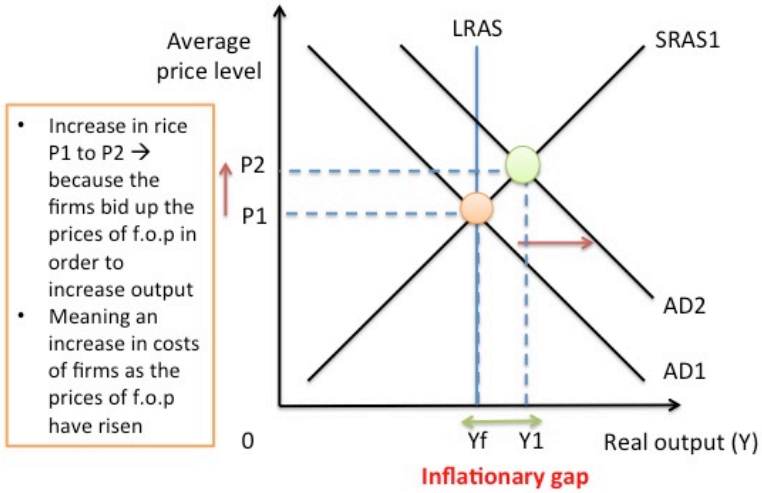
Or using the MPW figure directly:

If the government increases spending by 150 billion, then national income will increase by (5×150) =750 billion. Or if, for example, the government wants national income increase by 1.2 trillion then government expenditures should rise by

Key points----------

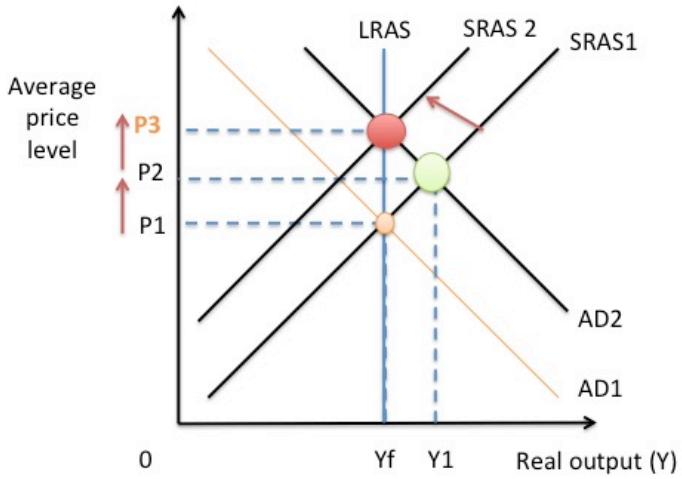
➢ The new classical perspective

1) When aggregate demand rises



- Increase in rice P1 to P2 → because the firms bid up the prices of f.o.p in order to increase output
- Meaning an increase in costs of firms as the prices of f.o.p have risen

- This is only possible for the short-run, by paying existing workers overtime wages as a short-term solution
- There is no unemployed resources

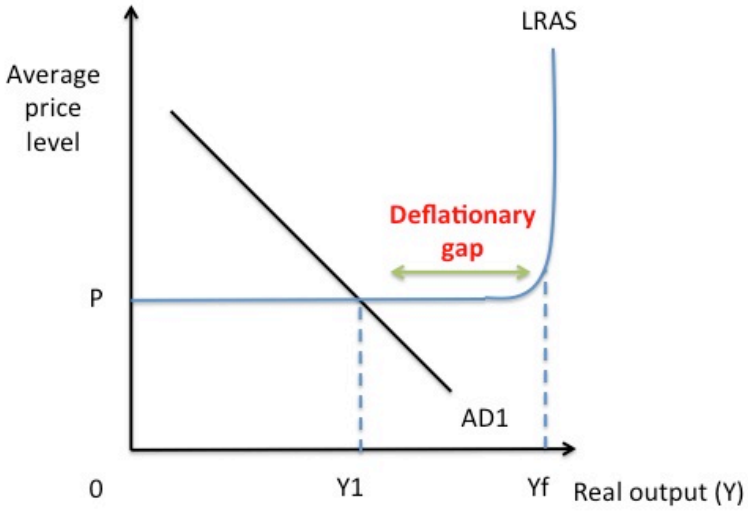


- This results in a shift in SRAS
- Their higher costs of production result in **no gain**, so they reduce back to Yf

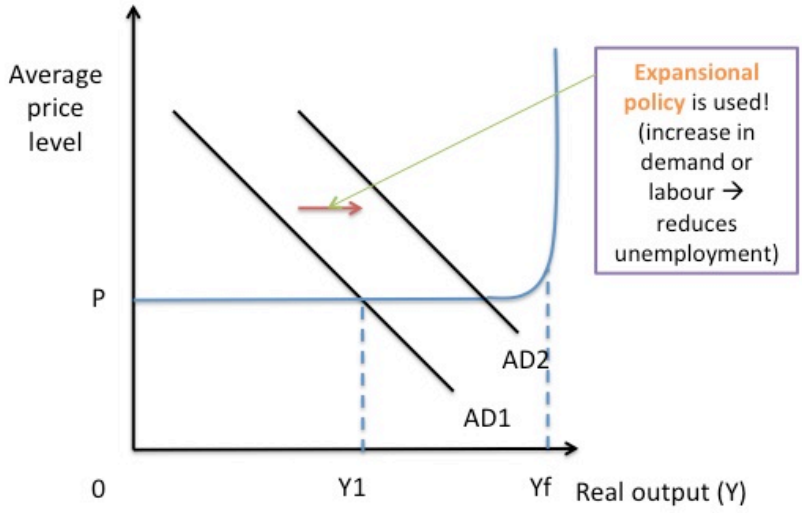
→ The final result is that output returns to its full employment level, but at a higher price

➢ The Keynesian perspective

1) When aggregate demand rises

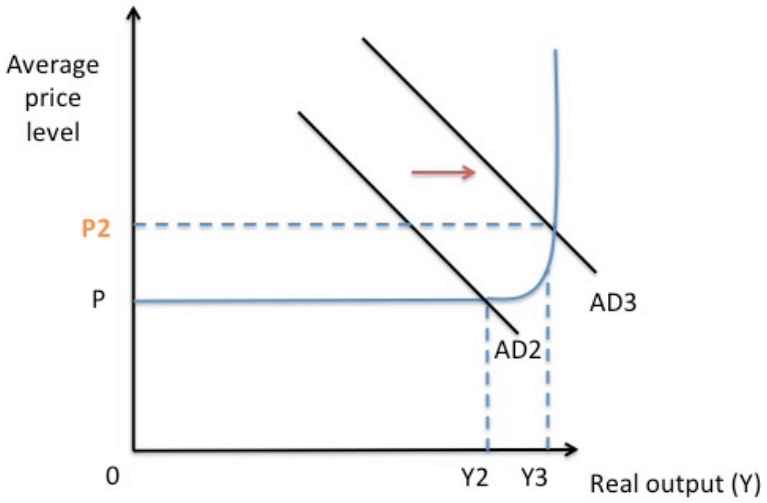


- Keynesian economists believe that the economy may be in long-run equilibrium at a level of output **below the full employment level** of national income (Yf)
  → 'Spare capacity'

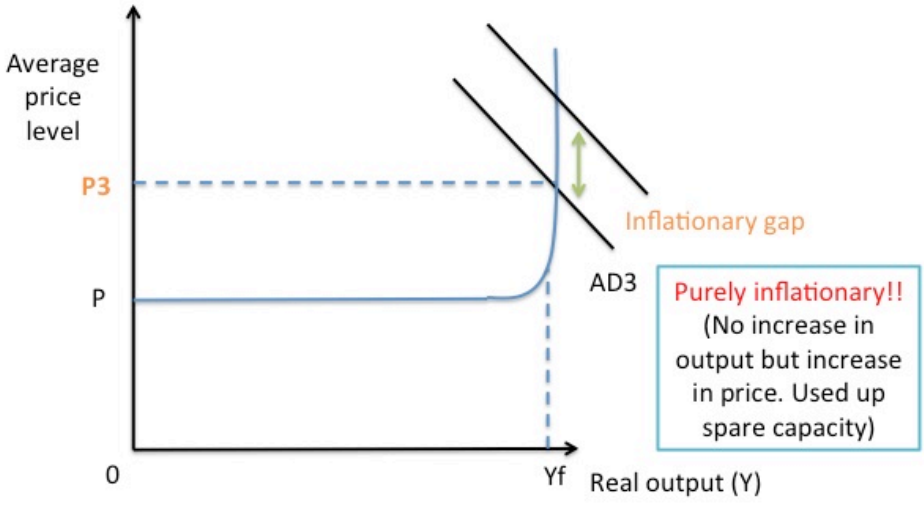


- No increase in P
- Spare capacity → meaning that producers can employ the unused f.o.p to increase output with no increase in costs

→ No inflationary pressure!!



- Starts to experience inflationary pressure as available f.o.p become scarcer and their price bid up.
- P1 → P2 because producers compensate for their higher costs



Purely inflationary!! (No increase in output but increase in price. Used up spare capacity)

- As a result, the price level rises to allocate the scarce resources

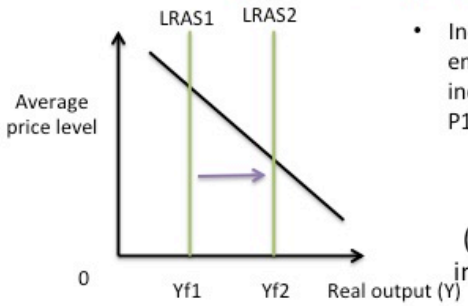
❖ Demand-side policies

→ Keynesian perspective

- Long-run equilibrium level of output does not necessarily equal to the full employment level of income (to operate below Yf is possible)
- Governments intervene to steer the economy towards full employment → use demand-side policies (ex. Fiscal and monetary)
- Expansional policy ←→ Contractionary policy (used to decrease aggregate demand to reduce the inflationary pressure)

❖ Supply -side policies

→ New classical/monetarist perspective



- Increase in the full employment level of income Yf1 to Yf2 and P1 declining to P2

→ **Achieving economic growth!** ☺

(Increasing the quantity or improve the quality of f.o.p)