

9. The macroeconomy

9.1 The circular flow of income

Syllabus 9.1 >

- The multiplier process (definition, calculations, and its relationship with the national income and AD).
- Components of Aggregate Demand (AD) and their determinants.
- Full employment level and equilibrium level of national income.

The multiplier process

- The **multiplier** shows the relationship between an initial change in spending and the final rise in GDP.

$$\text{Multiplier} = \frac{\text{change in income}}{\text{change in injection}} = \frac{\Delta Y}{\Delta J}$$

- The **multiplier effect** occurs because a rise in expenditure will create incomes, some of which will be spent further and create more incomes.
- Considering an economy where people spend 80% of their income. An income of \$1 will be spent \$0.8, then the \$0.8 will be spent \$0.64. This creates a **geometric sequence** where the **marginal propensity to spend** (portion of each extra dollar of a household's income that's spent) is the common ratio. Hence, the total change in income when an injection of \$1 is created (the multiplier index) can be deduced by:

$$\begin{aligned}\text{Multiplier} &= \frac{a}{1 - r} \\ &= \frac{1}{1 - \text{marginal propensity to spend}} \\ &= \frac{1}{\text{marginal propensity to withdraw}}\end{aligned}$$

- Here, the **marginal propensity to withdraw** is a portion of each extra dollar that's withdrawn from the domestic economy.

Closed economy

- A closed economy only has **households** and **firms**. There is only one withdrawal (**saving**) and one injection (**investment**).
- **Marginal propensity to save** (mps) is the portion of each extra dollar of a household's income that's saved. The multiplier is thus given as:

$$\text{Multiplier in a closed economy} = \frac{1}{\text{mps}} = \frac{1}{1 - \text{mpc}}$$

- Where mpc is the **marginal propensity to consume**, given as:

$$\text{mpc} = \frac{\text{change in consumption}}{\text{change in income}} = \frac{\Delta C}{\Delta Y}$$

- **Equilibrium income** occurs where $C + I = Y$ (spending = output) and $I = S$ (injections = withdrawals).

Closed economy with a government sector

- **Government spending** (G) is an extra injection, and **taxation** (T) is an extra withdrawal.
- The multiplier is thus given as:

$$\text{Multiplier in a closed economy with a govt sector} = \frac{1}{\text{mps} + \text{mrt}}$$

- Where **mrt** is the **marginal rate of tax** (the portion of each extra dollar of income that's taxed).
- **Equilibrium income** occurs where $C + I + G = Y$ and $I + G = S + T$.

Open economy with a government sector

- A **foreign trade sector** is included. **Export** (X) is an extra injection, and **import** (M) is an extra withdrawal.
- The multiplier is thus given as:

$$\text{Multiplier in an open economy with a govt sector} = \frac{1}{\text{mps} + \text{mrt} + \text{mpm}}$$

- Where **mpm** is the **marginal propensity to import** (the portion of each extra dollar of income that's spent on imports).
- **Equilibrium income** occurs where $C + I + G + (X - M) = Y$ and $I + G + X = S + T + M$.

Multiplier indices

The average and marginal propensities to save

- Saving is defined as disposable income - consumption, thus the average propensity to save is given as:

$$\text{aps} = \frac{\text{saving}}{\text{income}} = \frac{S}{Y}$$

- As income rises, saving tends to increase, and so does the **aps**.
- The marginal propensity to save is given as:

$$\text{mps} = \frac{\text{change in saving}}{\text{change in income}} = \frac{\Delta S}{\Delta Y}$$

- As income rises, **mps** tends to increase as well.

The average and marginal propensities to consume

- The average propensity to consume is given as:

$$\text{apc} = \frac{\text{consumption}}{\text{income}} = \frac{C}{Y}$$

- While total consumption rises with income, the proportion of disposable income that is spent **tends to fall** (**apc** tends to fall).
- The marginal propensity to consume is given as:

$$mpc = \frac{\text{change in consumption}}{\text{change in income}} = \frac{\Delta C}{\Delta Y}$$

- The richer an individual, the lower mpc they tend to have.

The average and marginal rates of tax

- The average rate of tax is the proportion of income paid in tax:

$$art = \frac{\text{tax}}{\text{income}} = \frac{T}{Y}$$

- The marginal rate of tax is the proportion of extra income paid in tax:

$$mrt = \frac{\text{change in tax}}{\text{change in income}} = \frac{\Delta T}{\Delta Y}$$

The average and marginal propensities to import

- The average propensity to import is the proportion of income spent on imports:

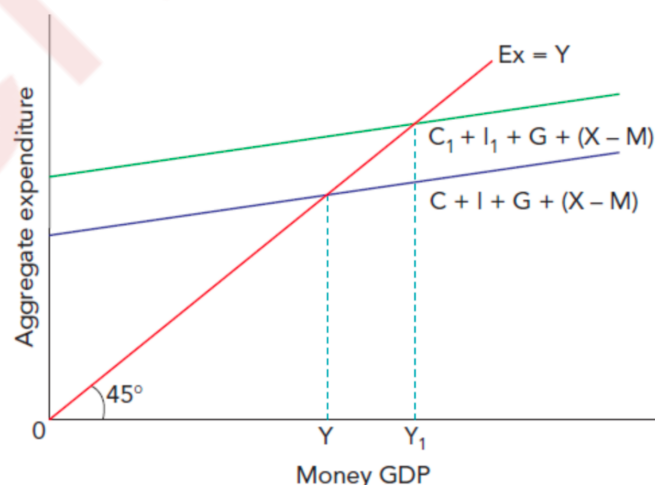
$$apm = \frac{\text{import}}{\text{income}} = \frac{M}{Y}$$

- The marginal propensity to import varies between countries and over time:

$$mpm = \frac{\text{change in import}}{\text{change in income}} = \frac{\Delta M}{\Delta Y}$$

National income determination

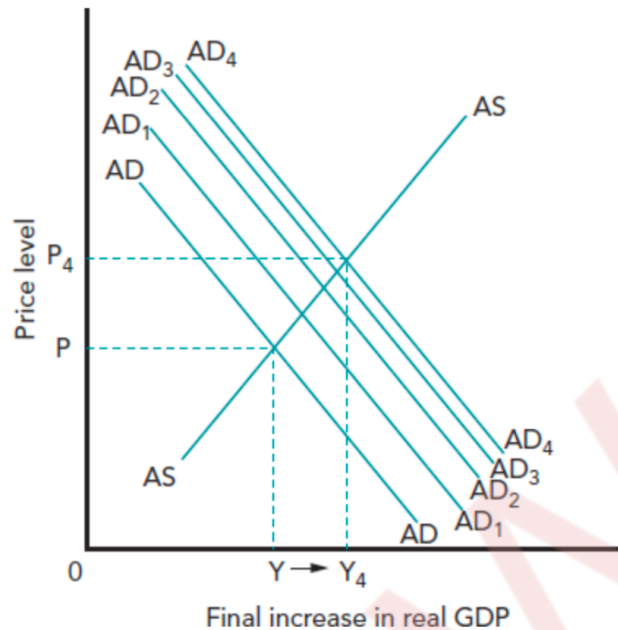
- The level of national income is the point where aggregate demand = aggregate supply. This is also where aggregate expenditure = output.
- A Keynesian 45° diagram is used. Its **aggregate expenditure** curve plots total spending against **different income levels**.
 - Whereas an aggregated demand (AD) curve plots total spending against **different price levels**.



- In the diagram above, an equilibrium output exists at Y . However, as consumption and investment increases, the output may increase due to greater optimism, moving Y to Y_1 .

Multiplier and national income

- $\Delta \text{Spending}$ will result in ΔY by the size of the **injection \times multiplier**.
- This occurs in stages and stops until leakages from the circular flow equal initial injection, resulting in a change from Y to Y_4 .



- A rise in saving may result in **less savings** \rightarrow higher saving can reduce income and hence the ability of households to save.

Components of aggregate demand

Consumption Function

- The **consumption function** indicates how much will be spent at different levels of income. It is given by:

$$C = a + bY$$

- Here, a is the **autonomous consumption** (the amount spent when income is zero which doesn't vary with income) and b is the **marginal propensity to consume**.
- bY is referred to as the **induced spending** because it's dependent on income.

Savings Function

- The **saving function** is the reverse of the consumption function, given by:

$$S = -a + sY$$

- Here, s is the **marginal propensity to save**, sY is **induced saving**, and $-a$ is the **autonomous dissaving** (people consuming more than their income).

Investment

- Investment can be influenced by:
 - **Interest rate** \rightarrow A higher interest rate makes investment more expensive.

- **Consumer demand** → Investment flows to where goods and services need to be produced, i.e., where there's demand and profits can be made.
- **Technology** → More productive technology may encourage investment on it.
- **Cost of capital goods** → More expensive ones discourage investment.
- **Expectations** → People invest because they expect future profit earnings.
- **Government Policy** → Corporate tax, subsidies, income tax, etc.
- **Autonomous investment** is the investment **independent of changes in income**.
 - An increase in autonomous investment **shifts the expenditure curve**.
 - E.g., a firm may purchase more capital goods because the interest rate falls.
- **Induced investment** is the investment **dependent on changes in income**.
 - Induced investment is illustrated by **movement along the expenditure curve**.

Accelerator Theory

- It states that:
 1. Investment depends on the rate of changes in income.
 2. A change in GDP will cause a **greater proportionate** change in investment.
- An **accelerator coefficient** is calculated as:

$$\text{accelerator coefficient} = \frac{\text{change in induced investment}}{\text{change in GDP}}$$

- It assumes that the demand for capital goods is a **derived demand**.
- The **multiplier effect** exists for the accelerator theory:
 - GDP increase → Higher-percentage investment increase → more GDP increase → more investment...
- Scenarios when the accelerator theory will fail:
 1. The firm has **excessive capacity**.
 2. The firm expects that the GDP increase will not last.
 3. The advances in technology increase the **capital-output ratio**, so less machines are needed to meet the increased capacity need.

Government Spending

- Government spending occurs to:
 1. Prevent the economy from experiencing a recession.
 2. Achieve sufficient level of employment and output.
 3. Protect growing and strategic industries.
 4. Prevent **market failures** (e.g., provision of public goods).
 5. Anything that the government cares about but has to do themselves.

Net Exports

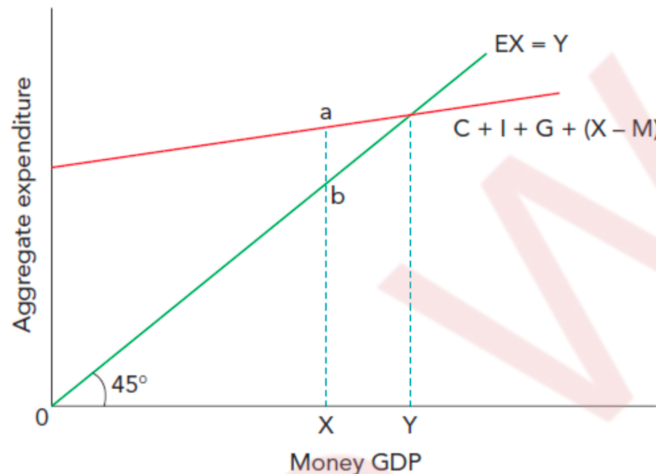
- Net exports are influenced by **relative price and quality competitiveness**.
 - Which are, in turn, influenced by **relative productivity, relative inflation rate, exchange rate, resource availability, etc.**

Levels of national income

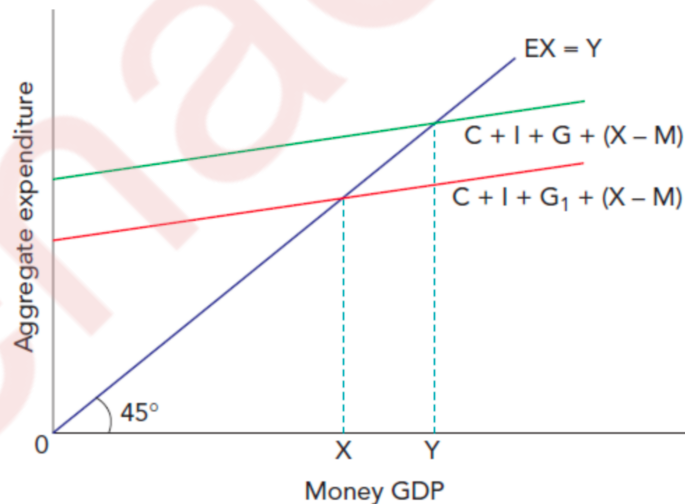
- In the short run, and Keynesians argue also possibly in the long run, an economy **may not achieve full employment**.

Inflationary Gap

- When full employment is met, excess demand will drive up the price level.
 - **Inflationary gap** occurs when the full employment level of output (potential GDP) is below the actual employment level of output (actual GDP).
 - Hence, there needs to be a **price rise** (an inflation) to meet the equilibrium.
- As shows in the diagram, when the economy is operating at X, ab is the **inflationary gap**. It is the excess demand that is not met.



- A government may seek to reduce inflationary gap by cutting its own spending or raising taxation to reduce aggregate expenditure, as shown below:

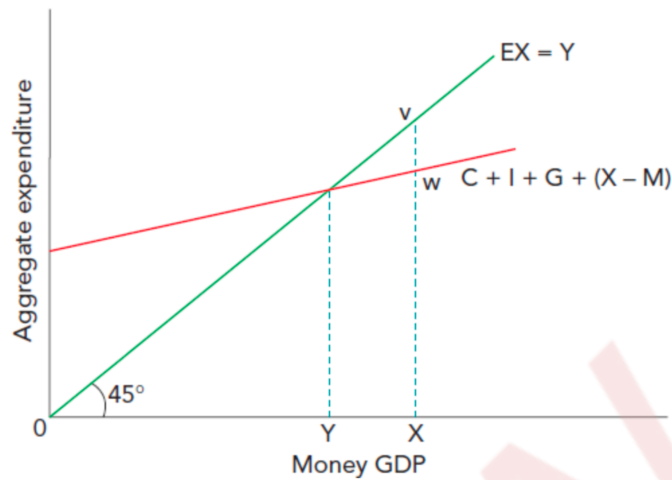


Deflationary Gap

- An economy may produce more than it needs due to reasons like:
 1. **Overestimation of demand.**
 2. **Involuntary inventory build-up**, when a sudden recession cuts spending and makes the inventories unsold.
 3. **Rigid prices**, when prices don't adjust downward quickly due to contracts, wage stickiness or menu costs and hence the output isn't decreased to a sensible amount.

4. **Policy failure**, when the government policy doesn't stimulate demand fast enough to match the productivity increase.

- These create **deflationary gaps** denoted by the distance vw .
 - Deflationary gap means that full employment level of output (potential GDP) is greater than the equilibrium level of output (actual GDP).



- A classical Keynesian solution is to increase government spending by borrowing.

9.2 Economic growth and sustainability

Syllabus 9.2 >

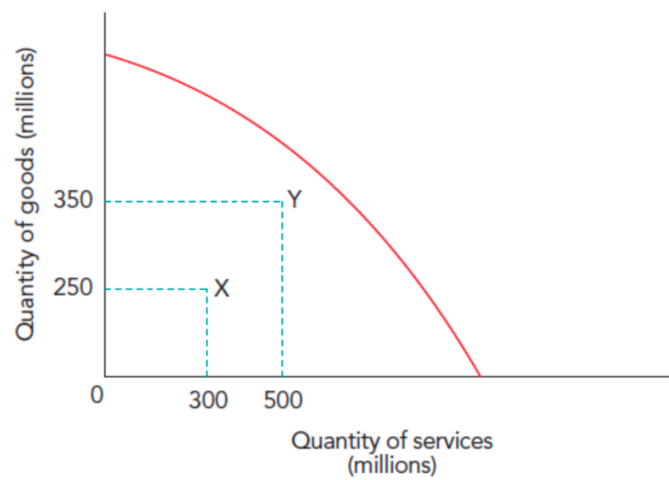
- Actual and potential economic growth.
- Positive and negative output gaps.
- Business cycle: phases, causes, automatic stabilizers.
- Policies to promote economic growth and their effectiveness.
- Inclusive economic growth.
- Sustainable economic growth.

Concepts of economic growth

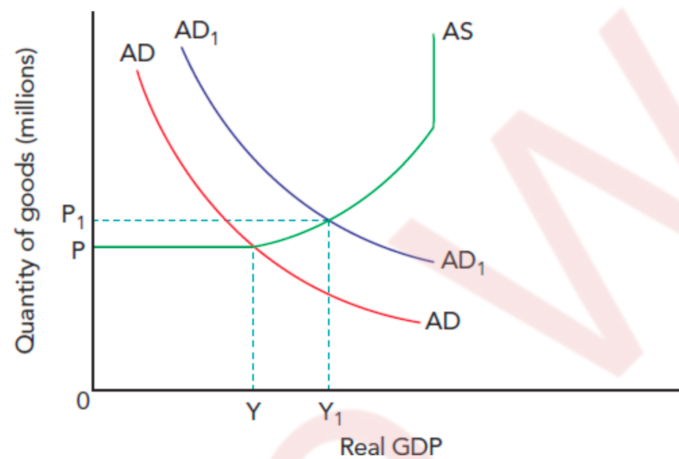
- Including **actual economic growth**, **potential economic growth**, ****

Actual Economic Growth

- **Actual economic growth** occurs when **output increases**.
 - It is the result of (i) greater utilization of existing resources or (ii) the utilization of more resources.
- Actual economic growth can be shown by the shift from X to Y in the PPC below:

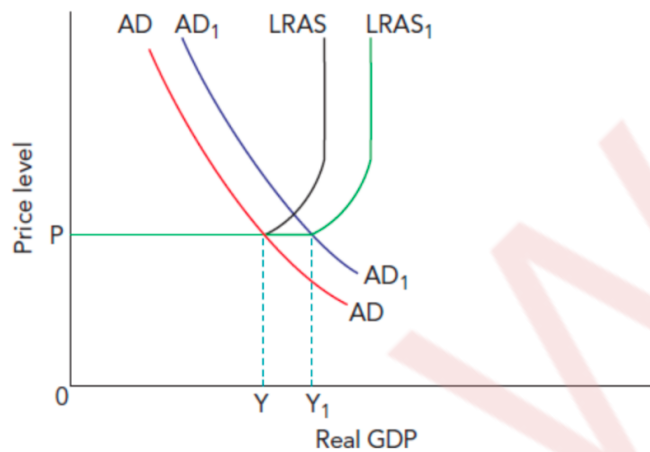
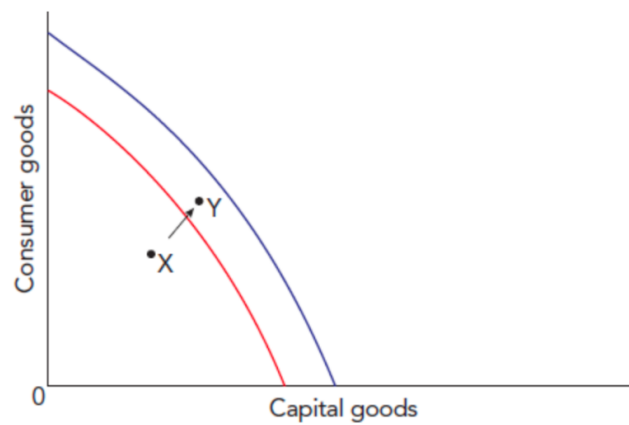


- Actual economic growth can also be represented by a shift in the AD curve.



Potential Economic Growth

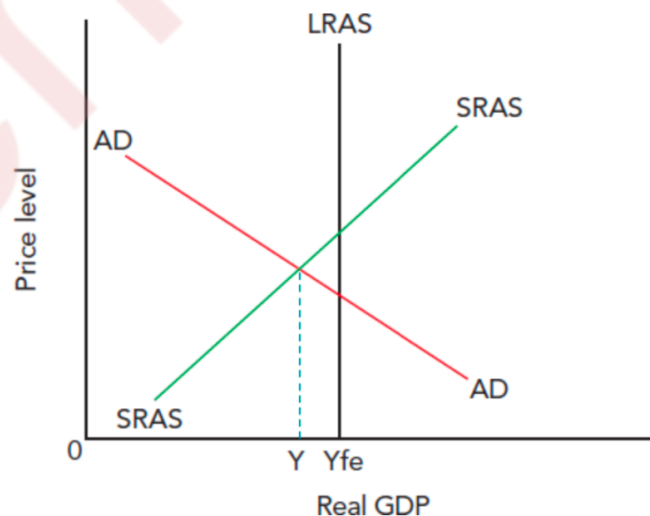
- **Potential economic growth** (a.k.a. long run economic growth) means an increase in the maximum output the economic is capable of **producing**.
- The blue curves signify the economic after the potential economic growth.



- For potential economic growth to lead to higher output, the rise in productive potential must be utilized.
 - This is shown by the movement from X to Y and the shift of the AD curve.

Negative Output Gaps

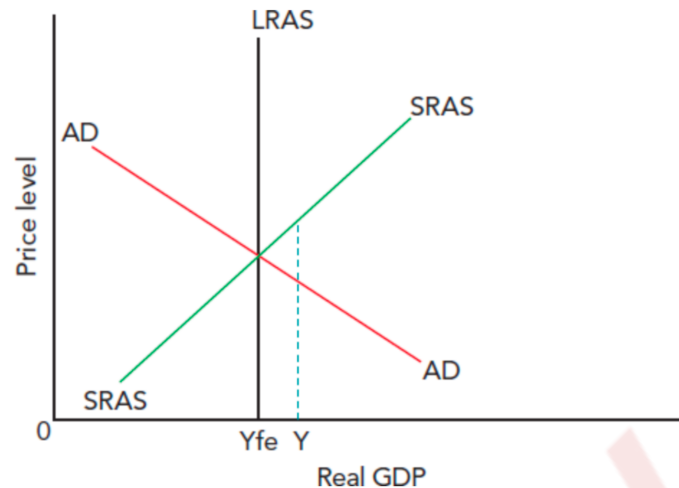
- **Negative output gaps** occur when the economy is not producing the full amount it is capable of producing (Y_{fe} in the graph).
 - They are caused by a lack of aggregate demand.



Positive Output Gaps

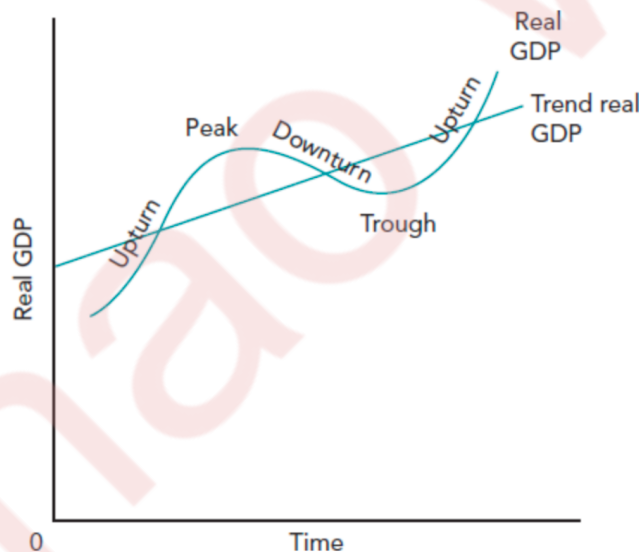
- **Positive output gaps** occur when the economy is producing more than its maximum potential.

- They may happen **temporarily** in scenarios such as:
 - Machines working continuously without maintenance.
 - Workers persuaded to work long hours of overtime.



The business cycle (the trade or economic cycle)

- The **business cycle** depicts the trend of economic growth with **fluctuations**.
- It is the **fluctuations** in the growth of **actual output** around the **trend growth** in **productive potential**.



Phases of the business cycle

1. **Upturn** (expansion): the economy is growing at a **faster rate**.
 - Households and firms are optimistic: consumption grows with households expecting their income to rise, etc.
2. **Peak**: the **top** of a business cycle and a turning point.
 - A **positive output gap** occurs, causing **inflation** and **BOP** difficulties.
3. **Downturn**: the economy growth rate decreases and **negative economic growth** may occur.
4. **Trough**: the **bottom** of a business cycle and a turning point.
 - A **negative output gap** occurs; the economy is experiencing a recession or even a depression.

- **Notice:** an expansion is not necessarily economic growth. When an economy is recovering from a recession,

Causes of the business cycle

- Fluctuations in **aggregate demand**.
 - Changes in business confidence → optimism will cause the multiplier and accelerator effect; pessimism will lead to a **downward spiral**.
 - Change in money supply → if the money supply grows faster than the country's output, investment and consumption are likely to rise.
 - Political cycles → before an election, a government may increase spending; after an election, a government may introduce contractionary policies to reduce demand-pull inflation.
- Fluctuations in **aggregate supply**.
 - Positive supply shocks → advancement in technology increases productivity.
 - Negative supply shocks → natural disaster increases the resource price.

Automatic Stabilizers

- **Automatic stabilizers** offset fluctuations in economic activity.
- They reduce growth in AD during an upturn.
 - E.g., progressive income and corporate tax rates reduce rising consumption and investment.
- They promote growth in AD during a downturn.
 - E.g., government spending on welfare will increase as more households fall into poverty.
- The rise in tax revenue during a boom and the rise in government spending during a recession flatten out the business cycle.

Policies on economic growth

- To promote **actual** economic growth → Increase aggregate demand:
 1. Expansionary fiscal policy (more spending, less tax).
 2. Expansionary monetary policy (more money supply, lower interest rate).
 - This can be done when the economy has **spare capacity**.
 - However, **demand-pull inflation** may occur, or the policies may not work because people are pessimistic about the future.
- To promote **potential** economic growth → Increase aggregate supply:
 - Done with supply-side policies like subsidies, trade union reforms, education and training, etc.
 - Government spending in education may trigger actual growth as well.

Inclusive economic growth

- **Inclusive** economic growth is economic growth which:
 1. **is distributed fairly.**

- Focuses on **outcome** → *who gets the benefits of growth?* (sharing the cake equally).

2. creates opportunities for all.

- Focuses on **access and agency** → *who can participate in and benefit from the growth?* (ensuring everyone has a seat at the table and can help bake the next cake).
- E.g., an underprivileged child will have the same chance in education.

Economic growth, equity, and equality

- Economic growth involves **change** → new industries appear while others die.
 1. Workers geographically or occupationally immobile may be unemployed.
 2. **Pay gaps** may be created due to structural change.

Policies on inclusive economic growth

- **Redistribution of income** using progressive taxes and transfer payments.
- **Improved access to education** will raise employment opportunities and pay.
- **High minimum wage** to ensure those in work can enjoy a good quality of life.
- **Anti-discrimination legislation** to balance access.
- More **communication infrastructure** to reduce geographic immobility and regional different in income.
- **Trade union legislation** to give workers more bargaining power.
- Legislation against slavery and child labor to ensure that vulnerable groups are not exploited.

Sustainable economic growth

- **Sustainable growth** is growth that can **continue over time**.
- Sustainability requires balancing economic, social, and environmental objectives.
- Economic growth can impact the environment:
 - **Negatively:** e.g., more greenhouse gases emitted, more scarce resources used, or habitats are destroyed.
 - **Positively:** e.g., development of clean energy resources or more resources and money to put into planting trees.

Using or conserving resources

- Using natural resources can increase economic growth, e.g., gas extraction.
- However, whether to use or conserve these resources depends on factors like:
 1. Whether demand for the resource-produced product will rise in the future.
 - If the resource is non-renewable, the revenue earned shall be invested in developing other industries for sustainability.
 2. Whether the country has a comparative advantage in producing the related product now.

Policies on sustainable economic growth

- **Subsidize** cleaner sources of energy and the planting of trees.
 - Involves opportunity costs and the risk of ineffectiveness.
- **Provide information** (propaganda) on the damage of certain activities.
 - Only nudging, not enforcement.
- **Pass legislation** to restrict the consumption/production of certain products.
 - Black market exists, there are costs enforcing it, and risks tax revenue.
- **Tax** firms that create pollution.
 - Hard to determine the amount of tax, reduce the competitiveness of the industry with foreign competitors, burden on consumers.
- **Pollution permits.**
 - May give large firms the ability to block small firms from entering the market (market manipulation), high administrative cost (e.g., how to count the amount of CO₂ produced).

9.3 Employment and unemployment

Syllabus 9.3 >

- Full employment, equilibrium and disequilibrium unemployment, voluntary and involuntary unemployment.
- Natural rate of unemployment: definition, determinants, policy implications.
- Patterns and trends in unemployment.
- Mobility of labor: forms and factors.
- Policies to reduce unemployment and their effectiveness.

Full employment

- **Full employment** is the **highest level** of employment possible.
- It's commonly considered to be achieved when the unemployment rate falls to **3%** → not 0%.
 - Due to **frictional unemployment**: people moving from one job to another.

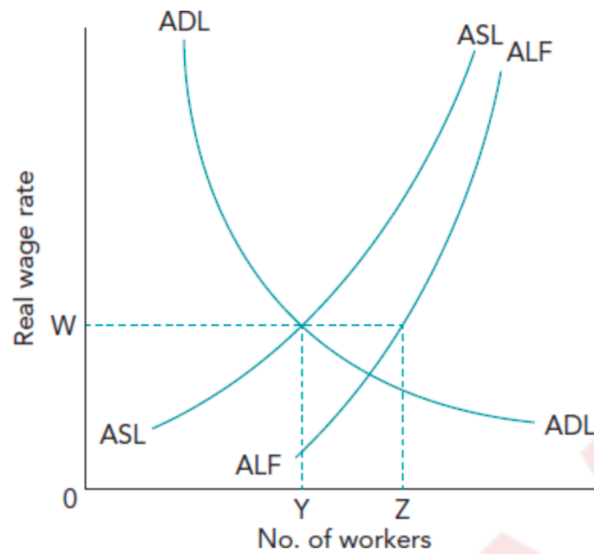
Types of unemployment

- Include **equilibrium**, **disequilibrium**, **voluntary**, and **involuntary** unemployment.

Equilibrium Unemployment

- **Equilibrium unemployment** is the unemployment exists when **AD for labor** equals **AS of labor**.
- There will be no pressure for the **real wage rate** to change.
 - Those willing and able to work at the current rate will have a job.
- Those unemployed are due to:
 - Not willing to accept jobs at the current wage rate.
 - Lack information about job vacancies.
 - Do not have necessary skills and qualifications.
- The diagram below illustrates equilibrium unemployment. There's an unemployment of YZ labors.

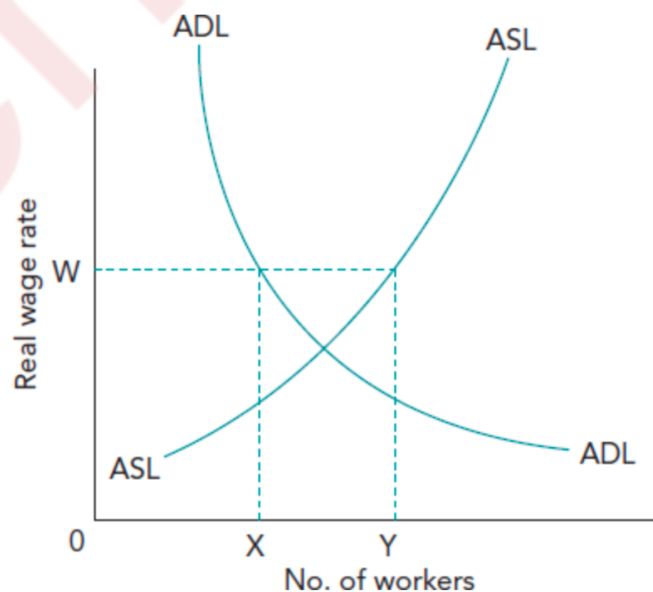
- ADL: aggregate demand for labor.
- ASL: aggregate supply of labor.
- ALF: aggregate labor force.



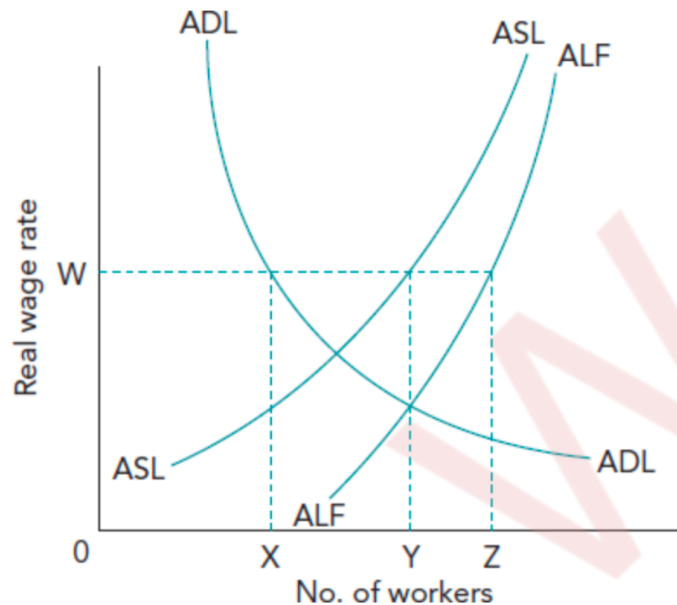
- There are two important insights about the curves:
 - The ALF curve isn't a fixed number because the **labor participation rate** rises as wage rate rises.
 - Some people only join the labor force if wages are high enough (e.g., students, retirees, secondary earners).
 - The ASL curve moves closer to the ALF curve as the real wage rate rises, because a higher proportion of labor force will be willing to accept the rate.

Disequilibrium Unemployment

- **Disequilibrium unemployment** is the unemployment exists when **AD for labor** is unequal to **AS of labor**.
- The diagram below illustrates disequilibrium unemployment. It is equal to **cyclical unemployment**, creating an unemployment of XY workers.



- Sometimes, an "**equilibrium**" wage rate may **stay above** the market clearing rate, due to reasons like:
 - Union agreements.
 - Contracts.
 - Minimum wages.
- In the diagram below, W effectively becomes the equilibrium wage rate because its sticky, even though it's not where $ADL = ASL$. Hence, equilibrium (YZ) and disequilibrium (XY) unemployment occur at the same time.



Voluntary Unemployment

- **Voluntary unemployment** occurs when workers **choose not to accept** jobs at the **current wage rate**.
- Includes *frictional employment*, especially *search employment*.

Involuntary Unemployment

- **Voluntary unemployment** occurs when workers are willing to work at the current wage rate, but **cannot find a job**.
- Includes most *structural unemployment* and *cyclical unemployment*.
- Hard to determine whether an employment is voluntary or involuntary.
 - Those receiving unemployment benefits are not likely to admit that they could get a job.
 - Whether a top scientist who has just lost their job shall be classified as unemployment if there's a job as a street cleaner available.

The natural rate of unemployment

- The **natural rate** of unemployment (NRU) exists where the labor market is **in equilibrium** ($ASL = ADL$), when **expectations are fully realized** and **cyclical fluctuations have dissipated**.
- It is the rate at which
 - (the new classical economists think) will **move back in the long run**.

- If unemployment decreases → inflation increases → unemployment decreases back to the natural rate.
- If unemployment increases → inflation decreases → unemployment increases back to the natural rate.
- puts **no upward or downward pressure** on inflation.
- It reflects
 - **efficiency of matching** between workers and jobs.
 - the **institutional framework** (e.g., labor laws, taxes).
 - the **demographical or technological characteristics** of the economy.

Determinants

- The natural rate of unemployment reflects the **structural characteristics** of a labor market, not short-term demand.
- Hence, the factors determining the natural rate are **supply-side factors** (factors that affect **aggregate labor force**).
 - The value of unemployment benefits relative to the value of low pay.
 - National minimum wage legislation.
 - The quality of education and training.
 - How workers are affected by period of unemployment.
 - The quantity and quality of information about job vacancies and workers' skills and qualifications.
 - The degree of labor mobility.
 - The flexibility of workers and firms.

Policy implications

- To reduce the natural rate of unemployment (so more can be employed), the government shall focus on increasing **aggregate labor force** through:
 - Widen the gap between low pay and unemployment benefit.
 - Remove any restrictions on the amount firms can pay their workers (e.g., minimum wages).
 - Improve **occupational mobility** through education and training.
 - Improve quantity and quality of information about the job market.
 - Increase the **flexibility** in the labor force.
 - New classical economists favor reducing the power of trade unions because (i) it pushes the wage rate above the equilibrium level and (ii) it restricts the tasks workers are prepared to do.

Patterns and trend in unemployment

- Unemployment can **vary between regions** because of the differences in transport links, infrastructure, and housing costs.
- Unemployment is higher in
 - **declining industries** and **declining occupations**.
 - **young workers** (∴ lack in experience).
 - certain **gender** and **minority** groups (∴ discrimination or impairments).

- The government shall be concerned about:
 - An **upward trend** in unemployment → security problems, budget deficit, etc.
 - Unemployed stay out of work for a long time → **hysteresis**.
 - **Hysteresis** is when temporary unemployment leads to a **permanent increase** in the **natural rate of unemployment** due to reasons like the workers' skills get obsolete.

Patterns and trend in employment

- Employment vary between economies, though its general trend can be examined:
 - **Industrial structure**: more employment in higher sectors (manufacturing and service) in developed countries.
 - **Proportion of women**: more women are participating in employment globally.
 - **Employed and self-employed**: more people are self-employed globally.
 - **Full-time and part-time**: the proportion working full-time and part-time varies over time (e.g., some may work part-time temporarily to raise children); but generally more part-time employment in economic downturns.
 - **Formal and informal economy**: more formal employment in developed countries, and they are protected by **employment legislation**.
 - **Secure and insecure**: in some countries more people are in **insecure employment** (they don't know how many hours they'll work next week).
 - **Private and public sector**: in some countries, working for the government has **high prestige and pay**. This depends on a country's economic system.

The forms of labor mobility

1. **Occupational mobility**: the ability of workers to move from one occupation to another occupation.
2. **Geographical mobility**: the ability of workers to move from one location to another location.

Factors of occupational mobility

- **Information available**.
- **Quality of education and training**.
- **Barriers to entry and exit**.
 - Professional bodies and trade unions may restrict supply to an occupation to drive up wage rates.
 - Workers may have signed long-term contracts that restrict their movements.
- **Time**.
 - The longer the time, the more chances a worker can gain necessary training and information for an occupation.

Factors of geographical mobility

- **Information available**.
- **Price and availability of housing**.
- **Personal ties**: family, friends, properties, etc.

- **Cross-country barriers.**
 - *Immigration controls, Language barriers, Cultural differences, Differences in pay and the cost of living.*

Policies to reduce unemployment

- Always identify the **causes** of unemployment before conjecturing solutions.
- To reduce **cyclical unemployment**: use **expansionary demand-side policies**.
 - **Evaluation**: employment may not increase if firms expand their output capacity by buying machines to replace humans.
- To reduce **frictional** and **structural unemployment**: use **supply-side policies**.
 - **Frictional** → increase information, reduce unemployment benefits.
 - **Structural** → trade union reforms (increase industrial efficiency), education and training.
 - **Evaluation**: Supply-side policies can take a long time to effect, and workers may not respond as expected (e.g., a cut in income tax doesn't guarantee a higher incentive to seek jobs).

9.4 Money and banking

Syllabus 9.4 >

- Definition, functions, characteristics of money.
- Definition of money supply.
- Quantity theory of money.
- Functions of commercial banks: providing deposit accounts, lending money, holding or providing financial products, maintaining reserve and capital ratio, objectives of commercial banks (liquidity, security, profitability).
- Causes of changes in the money supply in an open economy: commercial banks, central bank, government deficit financing, quantitative easing, changes in BOP.
- Policies to reduce inflation and their effectiveness.
- Demand for money: liquidity preference theory.
- Interest rate determination: loanable funds theory and Keynesian theory.

Money

- **Money** is an item which people use to **buy and sell goods and services**.

Functions of money

1. **Medium of exchange**: facilitates transactions; helps overcome **double coincidence of wants**.
2. **Store of value**: retains value overtime; allows **saving**.
3. **Unit of account** (measure of value): provides a common measure for valuing goods and services.
4. **Standard of deferred payment**: used to settle debts payable in the future; allows **contracts, loans, and credit systems**.

Characteristics of money

- **Generally acceptable.**
 - People must trust and be willing to accept in exchange for G&S.
- **Recognizable.**
 - Money must be easily identified and **verified as genuine** by the public.
- **Portable.**
 - Money must be easy to carry and transfer between people or locations.
- **Divisible.**
 - Money must be easily divided into smaller units to allow for exact pricing and **flexible transactions**.
- **Homogeneous.**
 - Each unit of money must be identical, ensuring consistent in value.
- **Limited in supply.**
 - An unlimited supply of money would have no value.
- **Stability in value.**
 - Its purchasing power should remain relatively stable over time.

Money supply

- **Money supply** is the total amount of money in an economy.
 - It consists of **currency in circulation** and **relevant deposits**.
- Measuring money supply is **difficult** → hard to decide what are viewed as money.
 - The extent to which items carry out the functions of money **varies over time**.

Measures of money supply

- **Narrow money** (monetary base).
 - Consists of money used as **medium of exchange**.
 - Includes notes in circulation, cash in banks, and balances of commercial banks at the central bank.
- **Broad money.**
 - Consists of **narrow money** + items used as **store of value**.

Quantity theory of money

- The **quantity theory of money** explains the relationship between the **money supply** and the **overall price level** in an economy:

$$MV = PY$$

- Where:
 - M is the **money supply**.
 - V is the **velocity of money** (how often a currency is used in a given time).
 - P is the **price level**.
 - Y is the **real output** (real GDP).
- Classical economists assume that
 - V is **constant**; people spend money at a stable rate.

- Y is at **full employment (constant)**; output is determined by resources and technology, not by money.
- Since V and Y are assumed to be constant, hence:
 - If the money supply increases, **prices will rise proportionally**.
- However, modern Keynesian critiques argue that:
 - In the short run, V and Y can change, so the relationship isn't direct.
 - In recessions, increases in M may not raise P due to low demand.

Commercial bank

- **Commercial banks** are banks that serve the **general public** by accepting deposits, providing loans, and offering other financial services for profit.
- Commercial banks have several key functions as outlined below.

Providing deposit accounts

- There are three types of deposit account:
 - **Demand deposit account.**
 - Money can be withdrawn **at any time**.
 - Usually no or very low interest.
 - Provides **payment tools**: checks, debit cards, online transfers.
 - E.g., every day spending accounts.
 - **Savings Deposit Account.**
 - Withdrawals are limited.
 - May require a **minimum balance**.
 - Offers **interest**.
 - E.g., an account for storing emergency funds or monthly savings.
 - **Time Deposit Account.**
 - Money is locked in for a **specified term** (e.g., 6 months, 1 year).
 - Offers **high interest**.
 - Early withdrawal leads to penalties.

Lending money

- Commercial banks offer **loans, overdrafts, and mortgages**.
 - **Loans**: Planned borrowing with structured repayments.
 - **Overdrafts**: Emergency buffer on the demand deposit account.
 - **Mortgage**: Specialized long-term funds for buying property, secured by the property (e.g., a house) itself.
- These financial products help
 - **consumers** finance major purchases.
 - **businesses** invest and expand.
 - **bank** earn interests → a major source of their profits.

Holding and providing financial products

- Banks offer **investment and insurance** services, including:

- Bonds, mutual funds (基金), retirement accounts.
- Life, health, and property insurance.
- Financial planning services.

Maintaining reserve ratios

- **Reserve ratio** is defined as:

$$\text{Reserve Ratio} = \frac{\text{Reserves held by the bank}}{\text{Total customer deposits}} \times 100\%$$

- Banks are required to **hold a portion of their deposits in reserve**,
 - either as cash in vaults or deposits with the central bank.
- This ensures **liquidity** and **system stability**, and prevents bank runs.
- This is regulated by a **minimum reserve requirement**.

Maintaining capital ratios

- **Capital ratio** is defined as:

$$\text{Capital Ratio} = \frac{\text{Bank's capital}}{\text{Risk-weighted assets}} \times 100\%$$

- Banks are required to hold a portion of **equity capital** to their **riskier assets**.
 - **Equity capital** includes the bank's issued shares, retained earnings, etc.
- A higher capital ratio means the bank is better able to absorb losses.
- This helps prevent **insolvency** and promotes **long-term stability**.

Objectives of commercial banks

1. Liquidity.

- Banks shall ensure they have **enough readily available cash or assets** to meet short-term obligations (e.g., withdrawals by depositors).
- This requires a **balance** → holding too much liquid cash lowers profitability.

2. Security.

- Banks shall **protect depositors' funds** by:
 - Lending only to creditworthy borrowers.
 - Managing risks through diversification.
 - Complying with regulations and internal controls.
- Security builds **trust** → essential for banks reputation.
 - If consumers anticipate that the bank will lose their deposits, they'll withdraw, and the bank may not operate.

3. Profitability.

- Banks aim to **generate profit** by:
 - Interest rate spreads (borrow at low rates, lend at higher ones).
 - Fee-based income (account fees, card services, advisory).
 - Investment returns.

Central bank

- A **central bank** is the national monetary authority responsible for
 - managing a country's **currency, money supply, and interest rates**.
 - maintaining **price stability, full employment** and a **healthy banking system**.
- It is **not profit-driven**, and typically operates independently of the government.

Functions of a central bank

- **Issuing currency.**
 - The central bank has the **sole authority** to **print and issue** national currency.
- **Lender of last resort.**
 - It offers **emergency liquidity to commercial banks** facing short-term crises.
- **Controlling money supply and inflation.**
 - Through tools like **reserve requirement** and **policy interest rates**.
- **Setting interest rates (monetary policy).**
 - The central bank sets the **base interest rate**.
- **Managing foreign reserves and exchange rates.**
 - It may intervene in foreign exchange markets to stabilize the currency.
- **Supervising and regulating commercial banks.**
 - It sets regulations, conducts inspections, and issues licenses.

Causes of changes in money supply

- There are five main causes of an increase in money supply in an **open economy**:
 - An increase in **commercial bank lending**.
 - An increase in **govt spending** financed by borrowing from commercial banks.
 - An increase in **govt spending** financed by borrowing from the central bank.
 - The sale of **government bonds** to private sector financial institutions (**quantitative easing**).
 - More money entering than leaving the country.
- Always remember the **bank credit multiplier** when answering questions.

Commercial bank lending

- When commercial banks lend, they **create money**.
 - Banks can generate **more deposits than they hold in liquid assets**, because most payments are made through non-cash means (e.g. transfers, cards), which only involve **accounting entries**, not physical cash.
- This ability to create money is constrained by the need to maintain **liquidity**.
 - Banks must hold a portion of their deposits as **reserves** (e.g. vault cash or deposits with the central bank) to meet withdrawals.
 - A high reserve ratio hinders profitability; a low reserve ratio is risky.
- The extent to which the **whole banking system** can **expand credit** from their reserves is captured by the **bank credit multiplier**:

$$\text{Bank Credit Multiplier} = \frac{\text{Value of new assets created}}{\text{Value of change in liquid assets}}$$

- It can also be calculated with the reserve ratio:

$$\text{Bank Credit Multiplier} = \frac{1}{\text{Reserve Ratio}}$$

- The **bank credit multiplier** is an important tool for **central** and **commercial banks**:
 - For **central banks**, it helps understand how changing the **amount of base money** (like printing more money) will affect the **total amount of money** created in the economy through bank lending.
 - For **commercial banks**, it helps plan how much they can **safely lend** based on the reserves they have, while also managing risks.
- In practice, banks often lend **less than** the theoretical multiplier allows due to:
 - A lack of **borrowers** or **creditworthy clients**.
 - **Regulatory limits** and risk management policies.
 - **Public demand for cash** withdrawals.

Government deficit financing (government spending)

- **Government deficit financing** happens when the government have to borrow from (financed by) the banking system to support its deficit spending.
- The government can borrow by selling **securities** through the **central bank**.
 - This will cause no change to the money supply.
- The government can borrow from **commercial banks** or the **central bank itself**.
 - This will increase the money supply.
 - When the government borrows from the central bank:
 - Its spending will increase deposits in the commercial banks, increasing the banks' liquid assets, and so they can lend more.
 - When the government borrows from the commercial bank:
 - It provides **short-term government securities**, which can be counted as liquid assets and so can be used as the basis for loans.

Quantitative easing (QE)

- **Quantitative easing** is a **monetary policy tool** used by the **central bank** when interest rates are already near zero but **aggregate demand** remains weak.
- It involves the **central bank purchasing government bonds and private-sector financial assets** from financial institutions like commercial banks.
 - Hence, QE doesn't cancel debt (bonds), it changes who hold the debt.
- QE increases the reserves of commercial banks, encouraging them to lend more.

Changes in the balance of payments

- The **total currency flow** is calculated as the **total net outflow or inflow of money from international transactions**.
- If there's a net inflow, exporters will deposit the money into the country's commercial banks, leading to multiple increase in the money supply (multiplier).

The effectiveness of inflation policies

- **Monetary, fiscal, and supply-side policies** are used to control inflation.
- Before choosing any policy, it is important to **identify the type of inflation**.
 - However, demand-pull and cost-push inflation often happen **simultaneously**.
 - E.g., wage-price spirals, imported inflation (e.g., imported oil price rise).
 - In an economic boom, increased spending causes demand-pull inflation, while rising derived demand causes cost-push inflation.

Anti-inflation monetary policy

- **Tools:** Raise interest rates, tighten money supply.
- **Mechanism:** ↓ borrowing/spending → ↓ AD.
- **Effectiveness:**
 - ✓ Effective for **demand-pull inflation**.
 - ✗ May worsen cost-push inflation (e.g. firms don't have money to invest).
 - ✗ Lagged effect (12–18 months typical).

Anti-inflation fiscal policy

- **Tools:** Higher taxes, reduced government spending
- **Mechanism:** ↓ AD through lower disposable income & G
- **Effectiveness:**
 - ✓ Effective for **demand-pull inflation**.
 - ✗ Time lags and political resistance (increasing tax disfavors election).
 - ✗ May conflict with equity goals (e.g. cutting welfare).

Anti-inflation supply-side policy

- **Examples:** Infrastructure investment, labor market reforms, deregulation
- **Mechanism:** ↑ productivity → ↑ LRAS → ↓ cost pressures
- **Effectiveness:**
 - ✓ Long-term solution to **cost-push inflation**.
 - ✗ Minimal short-term impact.
 - ✗ High cost, uncertain outcomes.
 - ✗ May cost demand-pull inflation from increased government spending.

The liquidity preference theory

- The **liquidity preference** is a **Keynesian concept** that explains **why people demand liquid assets**, like cash, instead of other less liquid assets.
- Keynes identified **three motives** for money demand: transactions, precautionary, and speculative.
 - Money held for transactions and precautionary motives are referred as **active balances** as they are likely to be spent in the near future.
 - Money held when households believe that the returns from holding financial assets are low are referred as **idle balances**.

Transactions Motive

- Money held for **everyday purchases** (food, bills, wages).
- Increases with **income** and **output**.

Precautionary Motive

- Money held for **unexpected expenses** (emergencies, delays in income).
- Increases with **income** and **uncertainty**.

Speculative Motive

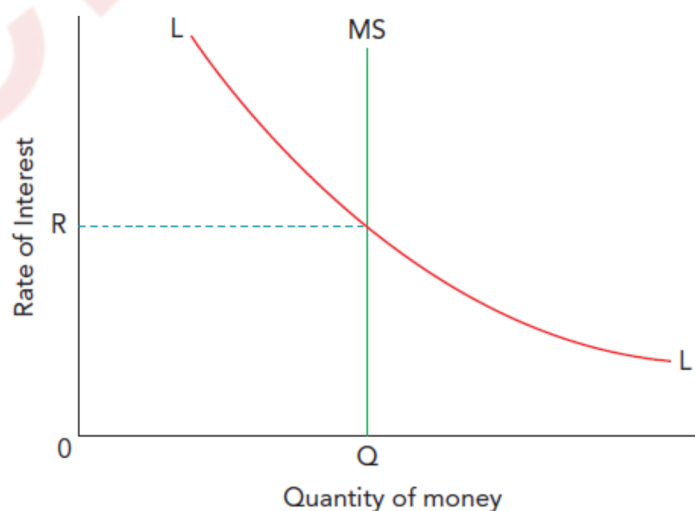
- Money held instead of buying bonds or assets due to **expectation of rising interest rates** (falling bond prices).
- Inversely related to the current interest rate.
 - **Low interest rate** → **high demand** for liquid money (expecting rates to rise).
 - **High interest rate** → **low demand** (people prefer bonds).

Interest rate determination

- Both the **liquidity preference theory** and the **loanable funds theory** explain how interest rates are determined.

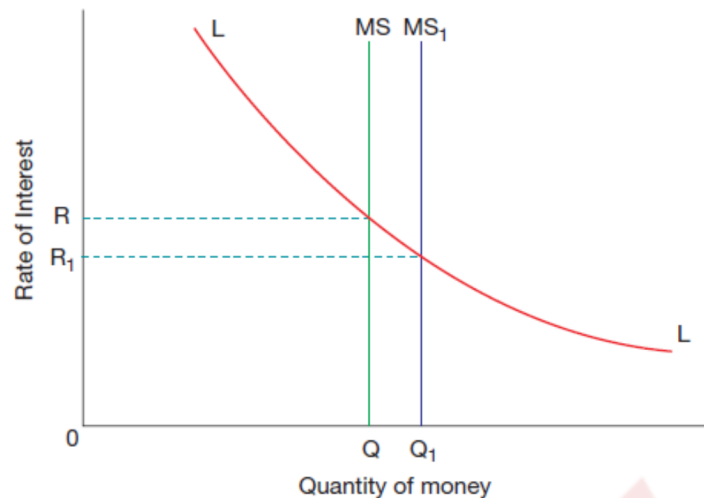
Liquidity preference theory of interest rate determination

- Note that the interest rate here isn't the central bank's **policy interest rate**. It is the **market interest rate** (a.k.a. bond yield) approximated by $\frac{\text{coupon payment}}{\text{bond price}}$.
 - **Market interest rate**: the general return on holding financial assets like bonds instead of liquid money.
- In the figure below:
 - L is the **liquidity preference curve**.
 - Which denotes the **speculative demand for money** as the transactions and precautionary demands are often modeled as **interest-inelastic**.
 - MS is the **money supply**.
 - R and Q are the **equilibrium** rate of interest and quantity of money.

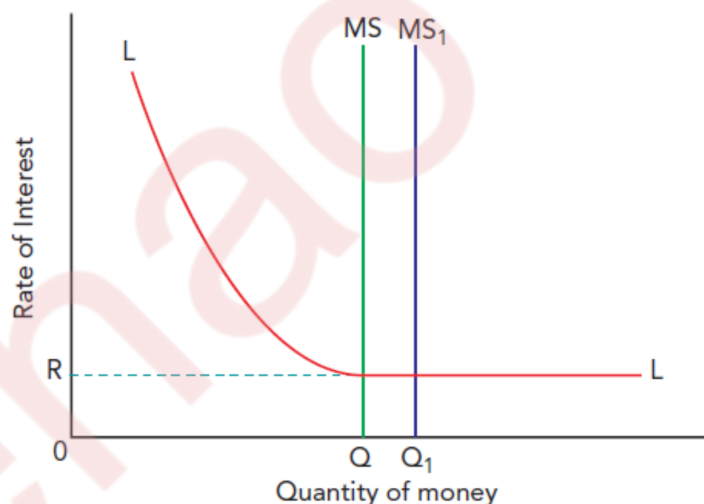


- An increase in money supply will cause a fall in the interest rate.

- Because \uparrow money supply \rightarrow more active balances than they want $\rightarrow \uparrow$ financial assets $\rightarrow \uparrow$ price of bonds $\rightarrow \downarrow$ interest rates.

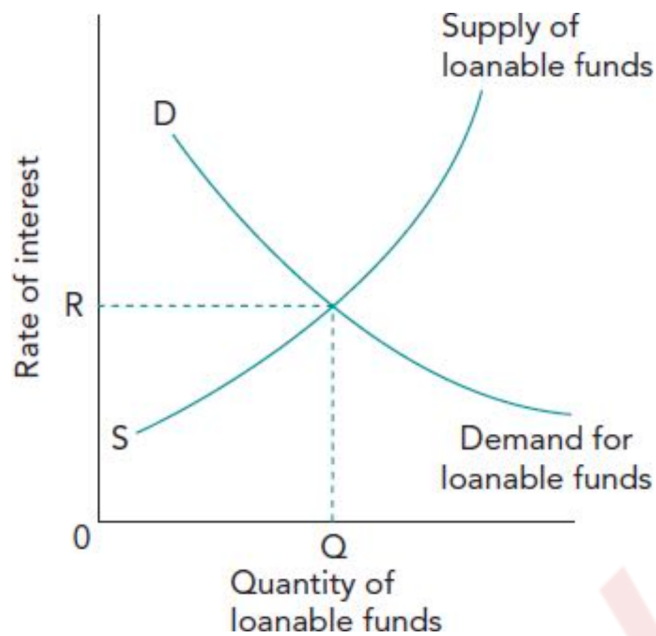


- The **liquidity trap** occurs when the interest rate doesn't go down when the money supply is increases.
- This is when the **interest rate is very low** and the **price of bonds is very high**.
 - Speculators would expect the price of bonds to fall in the future \rightarrow they'll hold the extra money for the fear of **capital loss**.
- In the figure below, at R , the demand for money is perfectly elastic and an increase in money supply leads to no change in the market interest rate.

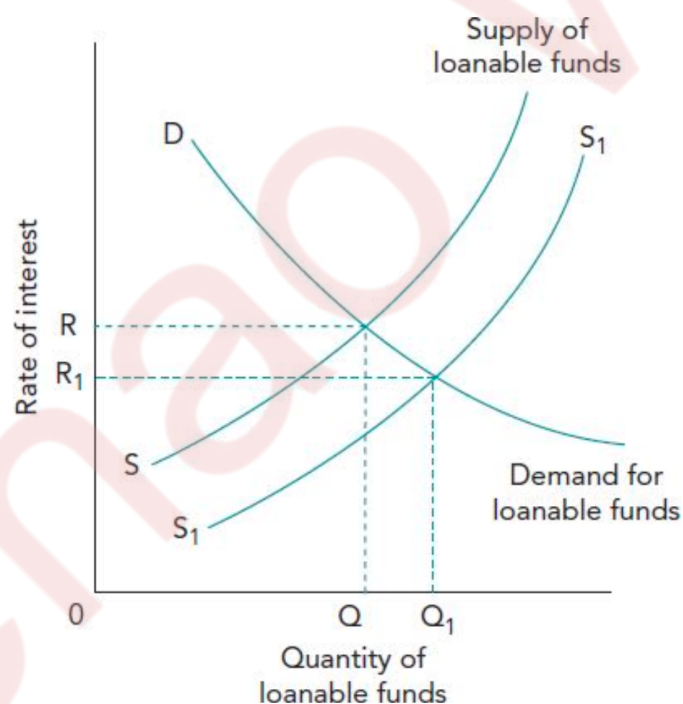


Loanable funds theory

- **Loanable funds** are money that can be borrowed.
- The **loanable funds theory** suggests that the interest rate is determined by the demand for and supply of loanable funds.
 - **Supply of funds** comes from **savers** (households, foreign investors).
 - The more money that is saved, the more loanable funds will be supplied.
 - **Demand for funds** comes from **borrowers/investors** (firms, governments).
- The interest here reflects the **actual cost of borrowing and reward for saving**.



- Thus, following the general market trend, an increase in the supply of loanable funds (an increase in savings) will decrease the interest rates.
 - Because more savers want to lend their funds out.



Monetary transmission mechanism

- Monetary policy decisions causes a **chain of effects** which influences **AD, output and inflation**.

QE pathway

- **Quantitative easing** (central bank buying bonds from commercial banks).
- **Higher bonds prices** (due to increasing demand for the bond).
- **Lower yield rate** (thus, lower interest rate).
- **Less saving**.
- **More borrowing** because:

- Commercial banks use bond yields to benchmark loans because they can raise cheaper capitals, and this is passed on to consumers.
- **More consumption and investment** (and inflation, current account deficit, etc).
 - Note the interesting **self-fixing mechanism** of the current account and the exchange rate.

Policy interest rate pathway

- **Lower policy interest rate.**
- **Lower short-term borrowing costs.**
 - Because commercial banks can borrow from (and lend to) each other overnight at a lower cost.
 - The policy interest rate is also the rate at which commercial banks borrow from the central bank.
- **More direct borrowing** and hence consumption.