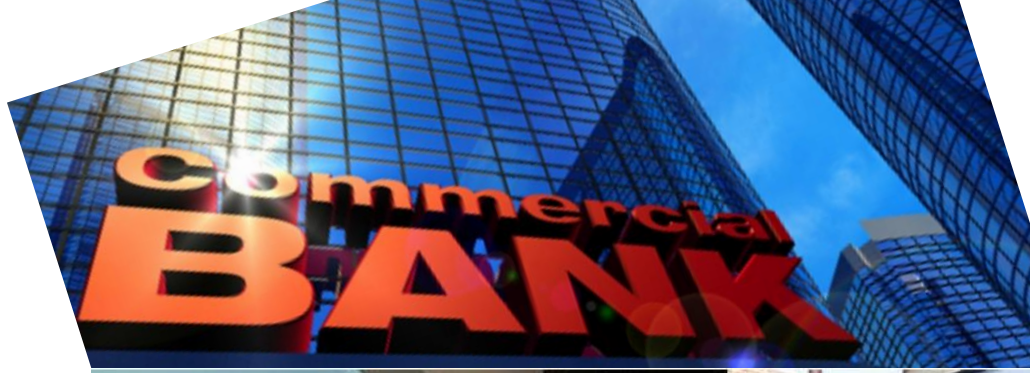
Monetary policy

Commercial banks

Commercial banks are financial institutions (private or public) whose main functions are:

- to hold deposits from their customers (consumers & firms)
- to make loans to their customers
- to transfer funds by cheque electronically from one bank to another
- to buy government bonds



Central bank

The **central bank** is usually a government financial institution with several important responsibilities:

- Banker to the government.
  - It holds the government's cash (as deposits), receives payments for the government and makes payments for the government, and manages the government's borrowing by selling bonds to commercial banks and the public.
- Banker to commercial banks.
  - It holds deposits for the commercial banks and make loans to them in times of need.
- Regulator of commercial banks
  - It regulates and supervises commercial banks, making sure they operate with appropriate levels of cash, according to rules that ensure the safety of the financial system.
- Conduct monetary policy, based on its control of the supply of money and interest rates.

It has a degree of independence from government interference in the pursuit of monetary policy.

Every country has a central bank.

In China → The People's Bank of China

In Europe:

- In Eurozone countries, each country has their own national central banks maintain many of their functions, but the responsibility for monetary policy has been transferred to a single organization, the **European Central Bank**.

In U.S.A:

- The central bank of the U.S is the FED. FED stands for **Federal Reserve System (Federal Reserve for short).** Although the FED is an independent government institution, the American central bank is owned by several large banks and therefore not by the state. The main governing body of the FED is the **Board of Governors** which consists of 7 members who are appointed by the President of the United States.

Monetary policy

- **Monetary policy**: Policy carried out by the central bank, aiming to change **interest rates** to influence the level of **aggregate demand** and economic activity.
- It is overseen by the nation's central bank or designated monetary authority.

The goals of monetary policy

1. **Low and stable rate of inflation**
   - It varies from country to country but is often aiming at around 2%
   - Inflation targeting, use monetary policy to either expand or contract economic activity.
2. **Low unemployment (cyclical unemployment)**
   - It is ultimately the role of the government, rather than a monetary authority to focus on achieving and maintaining full employment.
   - However, monetary policy like lower interest rate reduce borrowing costs for households and firms, thereby helping to boost consumption and investment, thus increase aggregate demand and stimulate economic activity.
   - Higher real output will lead to lower unemployment.

The goals of monetary policy

3. Reduce business cycle fluctuations

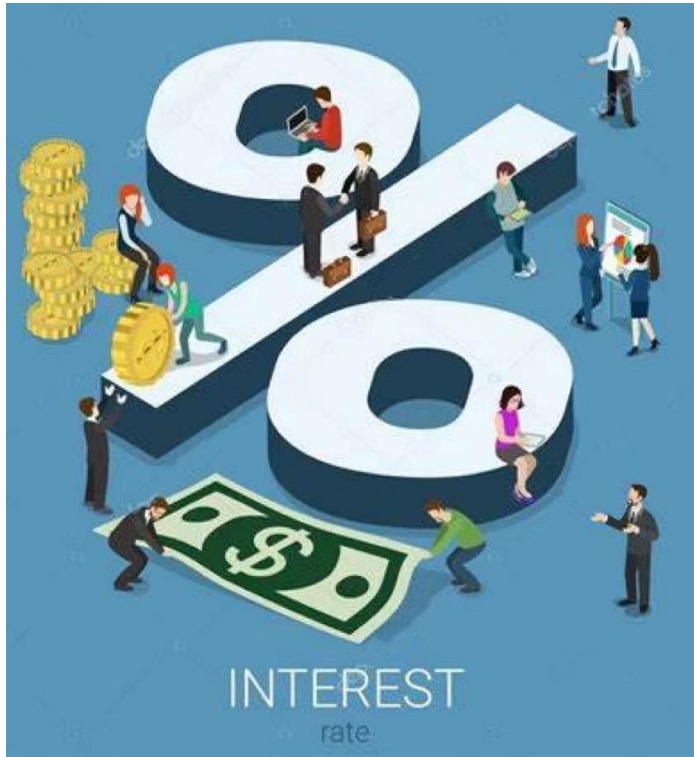
- Real GDP growth is uneven and irregular.
- Fluctuation around potential output are disruptive to the normal functioning of the economy, causing inflation when output is above potential output, and cyclical unemployment when it is below the potential.
- If the economy is in recession, lower interest rates can increase aggregate demand and stimulate economic activities. (shifting AD rightwards, real GDP↗, unemployment ↘)
- If the economy is booming, higher interest rates can be used to reduce the impact of inflationary pressures especially if the country is near to or at full employment. (shifting AD leftwards, price level ↘)

The goals of monetary policy

4. **Promote a stable economic environment for long-term growth**.
   - Consumers and firms, especially firms need economic stability to be able to plan, such as what capital goods to invest in, how much to invest, and whether, how and in what areas to pursue research and development and technological innovations.
   - By stabilizing fluctuations in the business cycle, effective use of monetary policy helps to encourage investments in physical and human resources for long-term growth of the economy.
5. **External balance: a situation where a country's revenues from exports are balanced by spending on imports over an extended period of time.**
   - Lower interest rates tend to make a currency less attractive for foreign buyers (as the rate of return is lower), thereby reducing the exchange rate. This will tend to increase the demand for exports.

Interest rate

- Interest rates are the **price of money**.
- It can refer to the **price of borrowing money** (the interest rate charged to borrowers) or the **return from saving money** (the interest rate paid to savers) at financial institutions, such as commercial banks.
- Monetary policy impacts indirectly on aggregate demand through the interest rate.
- The central bank will consider a range of factors before making any decision about changing interest rate in the economy. **By controlling the money supply, the central bank can control the level of economic activity.**



In real world, **interest rate can vary depends on**:

- The level of risk of a loan – the greater the risk, the higher the interest rate.
- The amount of time over which the loan must be paid, known as ‘maturity’, the longer the time period, the higher the interest rate.
- The size of the loan – the larger the loan, the lower the interest rate.
- The degree of market power of the lender – the greater the market power, the higher the interest loan.
- And so on…

→But for better analysis, economists simplify the analysis by adopting the common practice of referring to ‘**the rate of interest**’ as if there were only one.

Determination of the rate of interest

- **Money** is defined as anything that is acceptable as payment for goods and services; it includes currency (coins and paper money) and cheque account.
- A special market – **the money market**.
- In the money market, the **demand for money** and the **supply of money** determine the **equilibrium rate of interest**.
- The **money supply** refers to the entire quantity of money circulating in an economy, including notes and coins, loans and saving deposits at financial institutions and banks.

Different measures of money supply
(supplementary information)

- **M0 and M1** - also called narrow money. normally include coins and notes in circulation and other money equivalents that are easily convertible into cash.

- **M2** - it includes M1 plus short-term time deposits in banks and 24-hour money market funds.

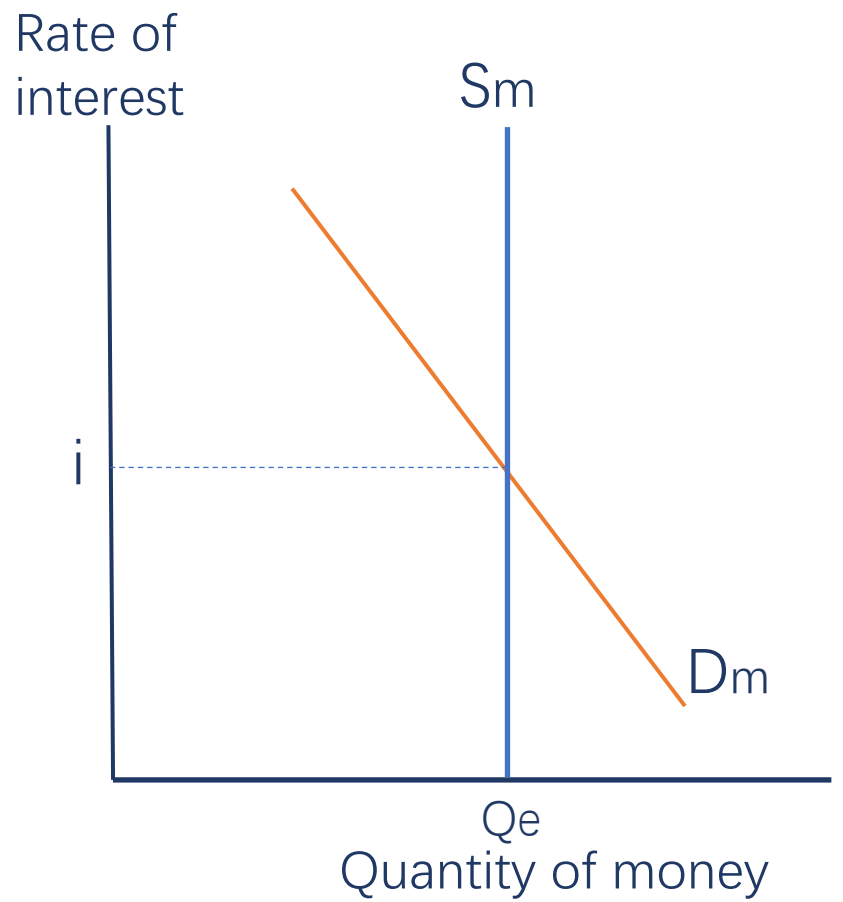
- **M3** - it includes M2 plus longer-term time deposits and money market funds with more than 24-hour maturity.

- The exact definitions of the three measures depend on the country.
- While different central banks have slightly different definitions of M2, all include money currently in circulation and the money most likely to come into circulation. Therefore, it is the most common measure in forecasting inflation.

Illustration of equilibrium rate of interest

Money does not earn interest, the rate of interest can be thought of as the **'price' of money service**.

- The **supply of money** is fixed at a level decided upon by the central bank → vertical **S_m**, it does not depend on the rate of interest.
- The **demand for money**, **D_m**, refers to the desire to hold money (rather than saving it) to finance consumption and current expenditure. It is downward-sloping, as the rate of interest falls, the quantity of money demanded by the public (consumers, firms, the government) increases.
- The point of intersection between D_m and S_m determines the equilibrium rate of interest, **i**.



Why D_m is downward sloping?

- **If you have ¥5,000, would you…?**

Put it in saving account in bank?

OR

Cash on hand?

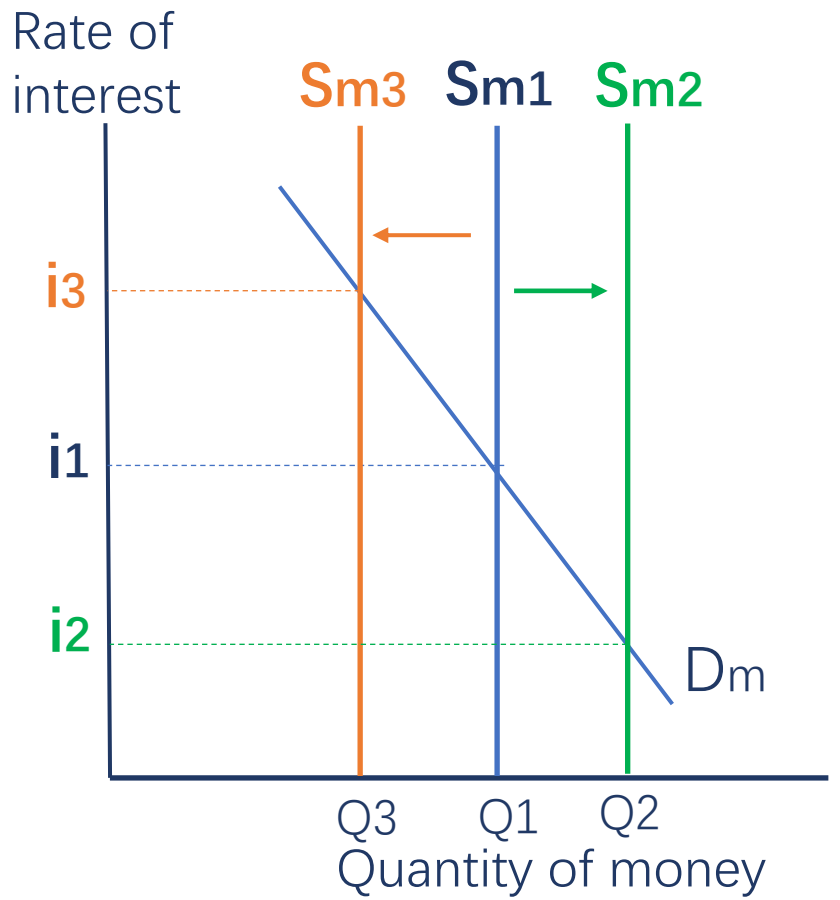
- Money itself does not earn interest, so if you have some **savings**, you have a choice between:
  - **Earning interest**: deposit in a bank or other investment methods.
  - **Not earning interest**: cash on hand, or a checking account in a bank that does not earn interest.
- In terms of **borrowing**, the higher the interest rate, the less demand for money (willingness of firms/households to borrow); the lower the interest rate, the more demand for money.

➢The higher the interest, the less attractive it is for you to hold money, and the lower the quantity of money you are likely to demand. Vice versa.

Changes of money supply

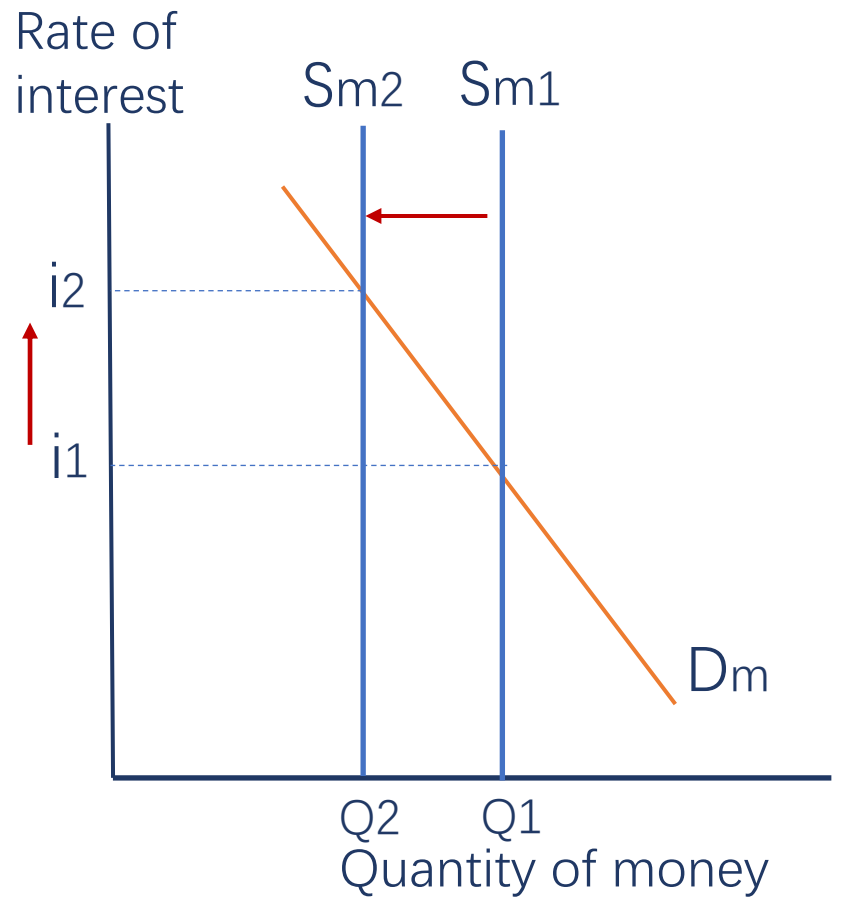
- If the central bank changes the money supply, the S_m curve shifts, determining a new rate of interest.
- Initial money supply at **S_{m1}**, with demand for money **D_m**, the equilibrium interest rate is **i_1**.
- If the central bank increases the money supply, S_{m1} shifts to **S_{m2}**, equilibrium interest rate falls to **i_2**.
- If the central bank decreases the money supply, S_{m1} shifts to **S_{m3}**, equilibrium interest rate rises to **i_3**.

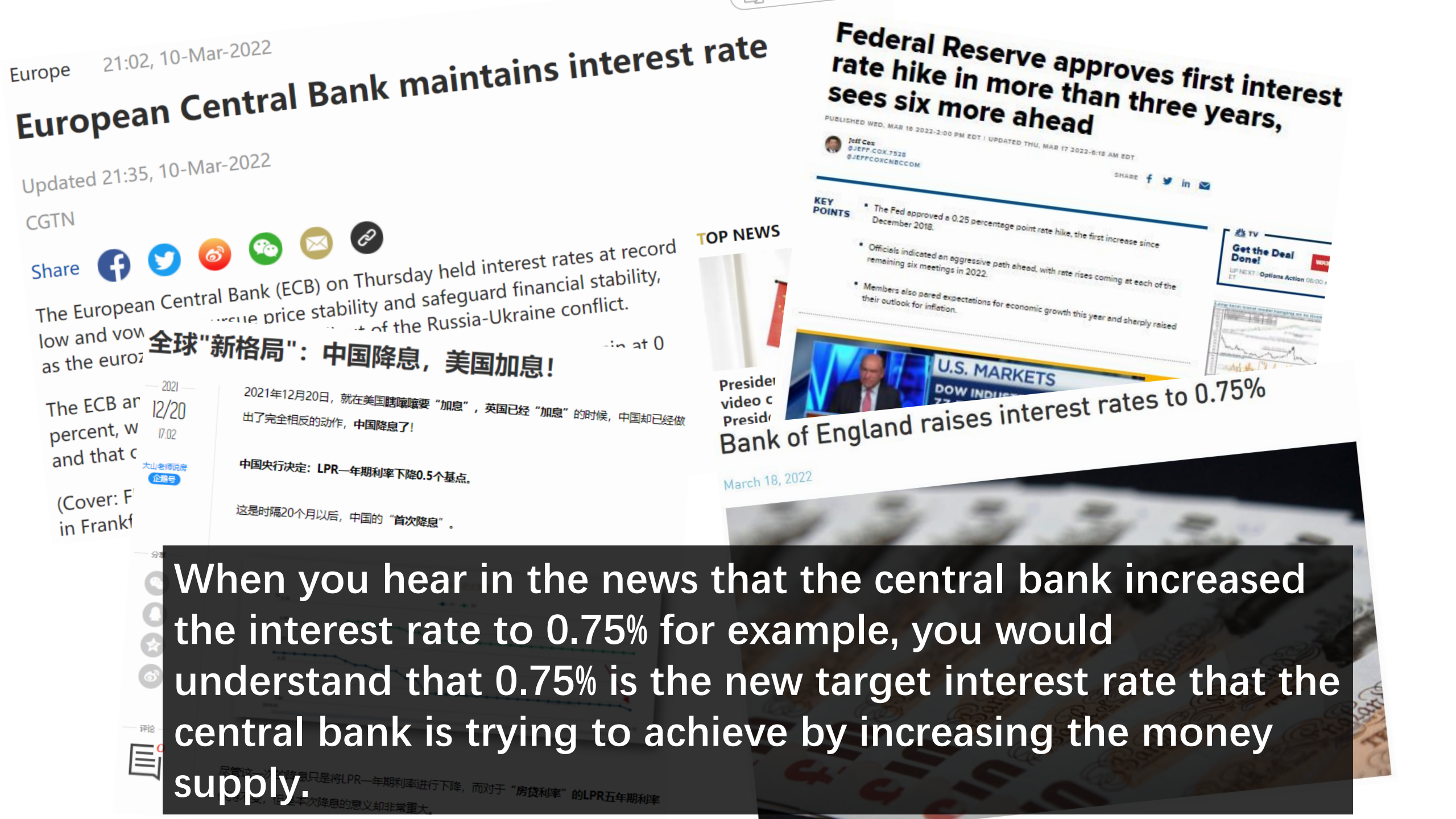
→An increase in the supply of money leads to a fall in the rate of interest; a decrease in the supply of money leads to an increase in the rate of interest.



Setting a target interest rate

- The central bank do not actually set or fix interest rate, but rather allow these to be determined by the market.
- it decides upon a target interest rate it wants to achieve, and then takes steps to adjust the money supply so that the actual equilibrium interest rate will become equal to the target interest rate.
- E.g. If central bank want to raise the interest rate from i1 to i2, it takes measures to reduce the supply of money until the interest rate increases to i2.
- If the actual market interest rate deviates from the target rate, it will continue to adjust the money supply to achieve to target rate.

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European Central Bank maintains interest rate
Updated 21:35, 10-Mar-2022
CGTN
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The European Central Bank (ECB) on Thursday held interest rates at record
low and vow
as the euro
of the Russia-Ukraine conflict.
The ECB ar
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全球"新格局"：中国降息，美国加息！
2021
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大山老师说房
企鹅号
2021年12月20日，就在美国瞎嚷嚷要“加息”，英国已经“加息”的时候，中国却已经做出了完全相反的动作，中国降息了！
中国央行决定：LPR一年期利率下降0.5个基点。
这是时隔20个月以后，中国的“首次降息”。
Federal Reserve approves first interest rate hike in more than three years, sees six more ahead
PUBLISHED WED, MAR 16 2022-2:00 PM EDT | UPDATED THU, MAR 17 2022-6:18 AM EDT
Jeff Cox
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KEY POINTS
The Fed approved a 0.25 percentage point rate hike, the first increase since December 2018.
Officials indicated an aggressive path ahead, with rate rises coming at each of the remaining six meetings in 2022.
Members also pared expectations for economic growth this year and sharply raised their outlook for inflation.
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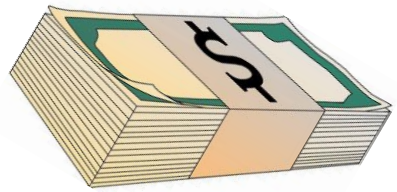
Bank of England raises interest rates to 0.75%
March 18, 2022
When you hear in the news that the central bank increased the interest rate to 0.75% for example, you would understand that 0.75% is the new target interest rate that the central bank is trying to achieve by increasing the money supply.

What interest rate do central banks target?

- It varies country to country, depending on the nature of the monetary system.
- In **UK**, the central bank targets the '**base rate**', which is the interest rate at which the bank of England lends to commercial banks.
- In **U.S**, the FED targets the '**federal funds rate**', which is the rate used by commercial banks to borrow and lend from and to each other over a 24-hour period.
- In **Euro zone countries**, the European Central bank targets the '**minimum refinancing rate**', which is the interest rate paid by commercial banks when they borrow from their respective national central bank to refinance their accounts.

How commercial banks create money?

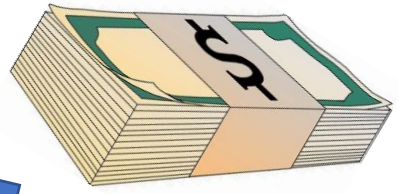
- Savers will deposit money in banks and gain a rate of interest from the bank. Banks will then create loans from the saving deposited and lend some of this money to borrowers and charge an interest rate accordingly. This interest rate charged to borrowers will be greater than the return paid to savers.
- But banks cannot lend out all of the deposited money because there are a legally determined fraction of total deposits, called the **minimum reserve requirement** or **required reserve ratio**. The rest are called **excess reserves** and can be lend out.



$1000 deposit

10% reserves
$100

90% lend out
$900

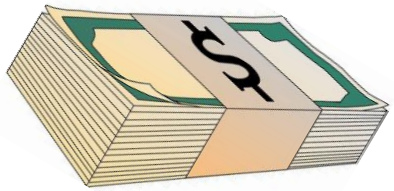


$900

deposit

10% reserves
$90

90% lend out
$810



$810

deposit

10% reserves
$81

90% lend out
$729

Continuously...

Money Multiplier Process

Minimum reserve requirement: 10%

Initial excess reserves

	Depositor	Deposits	Loans	Reserves
Initial deposit	1st	$1,000	$900	$100
Derivative deposit	2nd	$900	$810	$90
Derivative deposit	3rd	$810	$729	$81
Derivative deposit	4th	$729	$656.10	$72.9
⋮	⋮	⋮	⋮	⋮
Derivative deposit	∞	0	0	0
Total		$10,000	$9,000	$1,000

The amount of new loans that have been created

The initial excess reserves of $900 are multiplied by a monetary multiplier, equal to ' $\frac{1}{\text{Required reserve ratio}}$ '

In this case: 1/0.1 = 10

Monetary multiplier

- Monetary multiplier = $\frac{1}{\text{Required reserve ratio}}$
- In previous examples, the amount of new loans that have been created = 1/0.1 * $900 = $9,000
- These new loans are none other than new money created, since all the borrowers from the bank were able to use their loans to carry out their transactions by use of money.
- It is the maximum amount of 'new money' that can be created by a commercial bank given the initial deposit.
- If the minimum reserve requirement had been adjusted to 20%, the new loans created would be 1/0.2 * ($1000- $200) = $4000

The fractional reserve system

- Fundamental idea: only a fraction of deposits need to be kept in the bank's vaults.

→ When banks **make loans**, they are actually **creating new money**. The **lower the minimum reserve requirement**, the greater the excess reserves, the more loans can be made by commercial banks, and **the more new money can be created**. The minimum reserve requirement determines the **maximum amount of new money** that can be created.

Tools of monetary policy

1. Open market operations

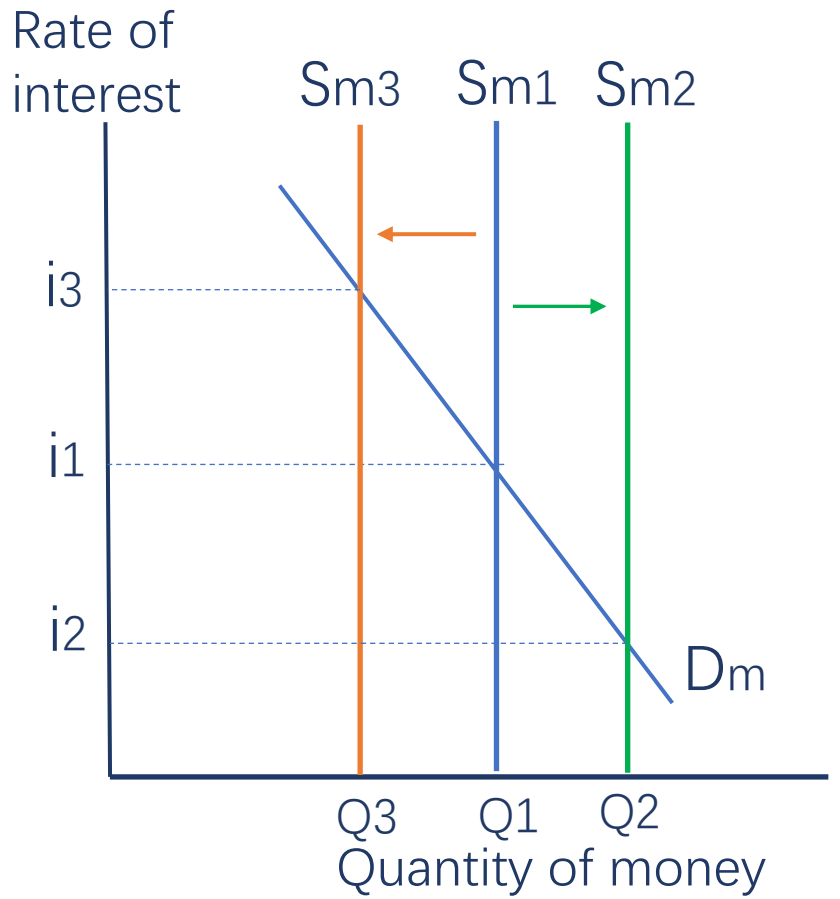
- **Bond**: The borrower issues a certificate called a bond that promises to pay interest at various intervals until a certain date when the money is repaid to the bond holder(lender).
- Open market operations work through the **buying and selling of pre-existing government bonds** in the bond market.

  *The bond market is simply a market where holders of bonds can buy and sell pre-existing bonds.

Illustration of open market operations

- If a central bank wishes to **lower the interest rate**, it will **buy government bonds from commercial banks**. It pays the commercial banks for the bonds.
- This process increases the commercial banks excess reserves, which they can use to make more loans, and therefore the **money supply increase** from **S_{m1} to S_{m2}** to lower interest rates from **i_1 to i_2**.

- If a central bank wishes to **raise the interest rate**, it **sells bonds to commercial banks**; as the banks must pay the central bank for these, their excess reserves and therefore their lending ability are reduced. **Money supply decrease** from **S_{m1} to S_{m3}** to raise the interest rate from **i_1 to i_3**.



Tools of monetary policy

2. Minimum reserve requirements

- The central bank requires commercial banks to keep a certain percentage of their deposits at the central bank

  → **minimum reserve ratio** or **minimum reserve requirement (MRR).**

- It ensures that there is enough liquidity or money in the economy to cover the daily operations of commercial banks.

- The central bank changes the minimum reserve requirements to change the money supply. There is an inverse relationship between the MRR and the money multiplier. → **The higher the MRR, the lower the money multiplier and therefore the lower the amount of money that is created by the banking system.**
- If the reserve requirements decrease, the commercial banks excess reserves increase, therefore their lending ability increases, so too their ability to create money, hence the money supply increases → lower interest rate. Verse versa.

Tools of monetary policy

3. Changes in the central bank's minimum lending rate

- One of the function of a central bank is lending to commercial banks and charging them an interest rate, known as a **minimum lending rate**. (different countries has different names)
  - EU: refinancing rate
  - U.S: discount rate
  - U.K: base rate
- If commercial banks want reserves to increase their lending, they can borrow from the central bank. → the minimum lending rate reflects the **cost to commercial banks of acquiring more reserves**. it influences the interest rates charged on credit transactions, bank loans and mortgages.

Tools of monetary policy

3. Changes in the central bank's minimum lending rate

- When central bank **increases** minimum lending rate, which tends to cause commercial banks to also increase their interest rates.
- When central bank **decreases** minimum lending rate, it becomes less costly for commercial banks to borrow from the central bank, and so they can increase their borrowing, increase their reserves, therefore increasing the money supply, charging lower interest rate

Tools of monetary policy

4. Quantitative easing

- In some countries, the interest rate are approaching zero and could not really go any lower, thereby making traditional expansionary monetary policy ineffective. This is because despite the low interest rates, banks are reluctant to lend and/or consumers/firms are reluctant to borrow due to the lack of confidence in the economy.

→ An **unconventional monetary policy**: **Quantitative easing**, a form of monetary policy that **injects money (increasing the money supply) directly into the economy via the central bank purchasing more types of financial assets with larger quantities.**

- E.g.
  - The implementation of QE by the bank of Japan since 2001.
  - The implementation of QE by Federal Reserve in 2008.
  - The implementation of QE by the bank of England in 2009.
  - And so on.

How does QE works

- Central bank buys financial assets from financial institutions
- Financial institutions have ‘new money’ in their accounts (cash reserves)

→ Interest rates fall (it reduces the value of real debts of households and firms with existing debts)

→ QE increase consumer and business confidence

→ C & I increase → AD increases and boosts the economy

→Lower interest rates will cause exchange rates to fall, thereby making exports less expensive and imports relatively more expensive

→Net export increase → AD increases and boosts the economy

	To lower the interest rate the central bank will	To increase the interest rate the central bank will
Open market operations	Buy bonds increasing commercial bank reserves thus increasing the money supply	Sell bonds decreasing commercial bank reserves thus decreasing the money supply
Minimum reserve requirements	Lower reserve requirements increasing commercial bank reserves thus increasing the money supply	Increase reserve requirements decreasing commercial bank reserves thus decreasing the money supply
Central bank minimum lending rate	Lower minimum lending rate increasing commercial bank reserves thus increasing the money supply	Increase minimum lending rate decreasing commercial bank reserves thus decreasing the money supply

Quantitative easing	Create new reserves electronically used by the central bank to buy a huge variety and quantity of assets thus directly increasing the money supply	

Real vs. nominal interest rates

- The **nominal rate of interest** is simply the market rate that prevails at any moment in time.
- The **real rate of interest** is the interest rate that has been corrected for inflation.

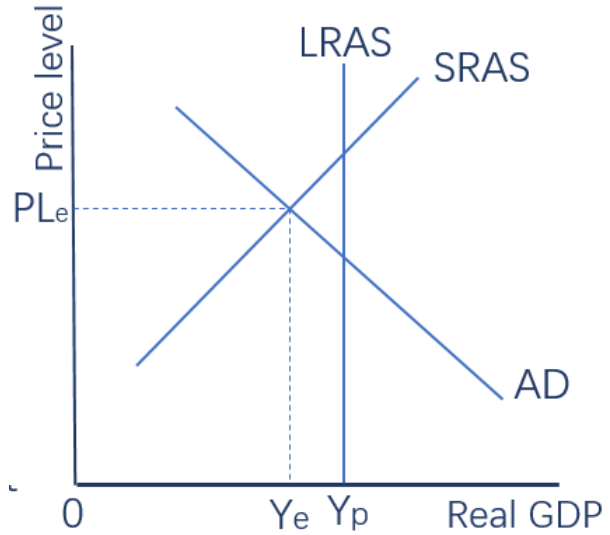
Real interest rate = nominal interest rate – rate of inflation

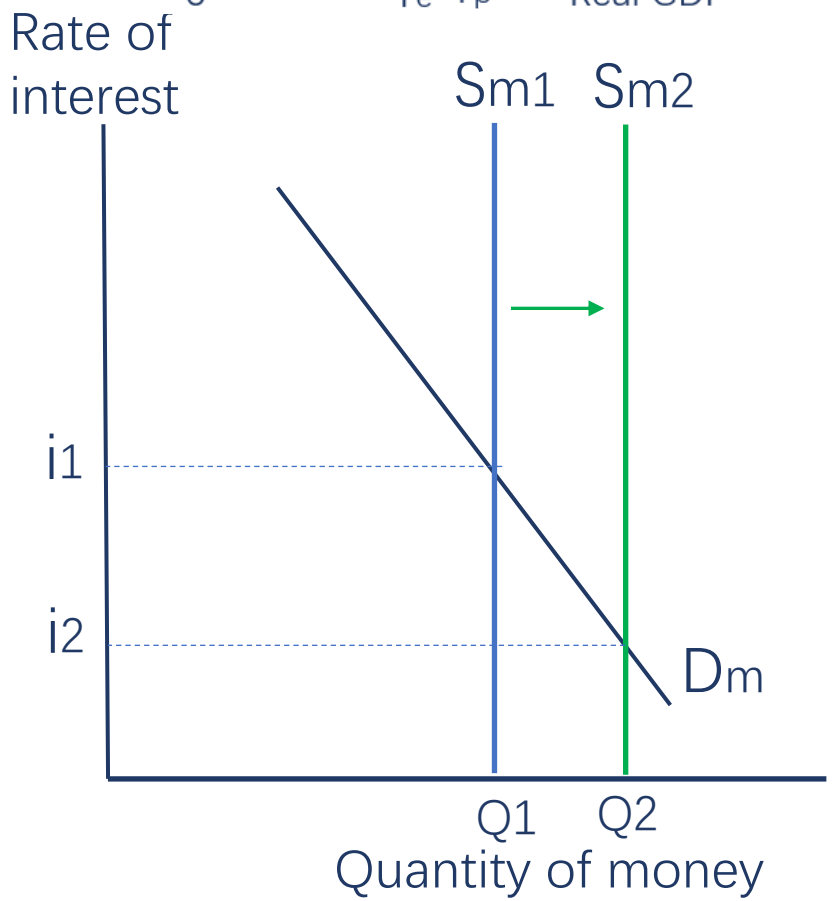
The relationship between interest rates and aggregate demand

- Changes in interest rates affect three of the four components of aggregate demand: **investment, I, consumption, C**, and **net export X-M**, since some consumer and firm spending is paid for by borrowing.
- Effects of **higher interest rates**:
  - **Higher borrowing cost** - Households and firms are likely to be discouraged from borrowing money → reduce consumption C and investment I → shift the AD to the **left**
  - **Higher return for saving** - Households may choose to deposit their money into the bank rather than spend. → reduce consumption C → shift the AD to the **left**.
  - **Appreciation of local currency**- The higher interest rates will lead to appreciation of local currency → export ↘, import ↗ → AD shift to the **left**.
- Effects on **lower interest rate:**
  - **Lower borrowing cost -** increase consumer and business borrowing and hence spending (higher C and I), and therefore shift AD to the **right**.
  - Lower return for saving – less saving → less consumption spending → AD shift to the **right**.
  - **Depreciation of local currency** → export ↗, import ↘ → AD shift to the **right**.

Expansionary (easy) monetary policy

- Initially, the economy is experiencing a deflationary gap due to insufficient aggregate demand.
- Objectives of the policy: expand aggregate demand and the level of economic activity.
- The central bank decides to increase the money supply, causing a rightward shift in the supply of money curve from **S_{m1} to S_{m2}**. with the **demand for money constant**, the interest rate falls from **i_1 to i_2**.



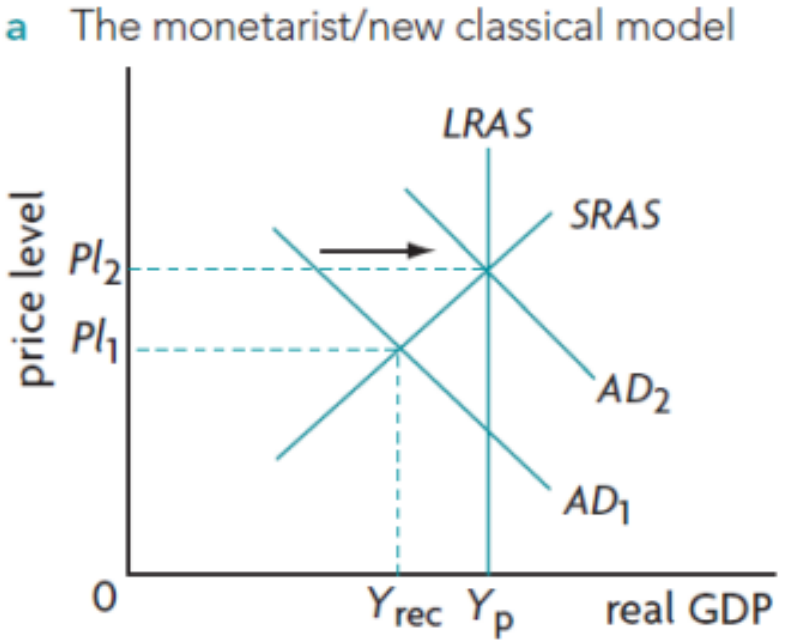


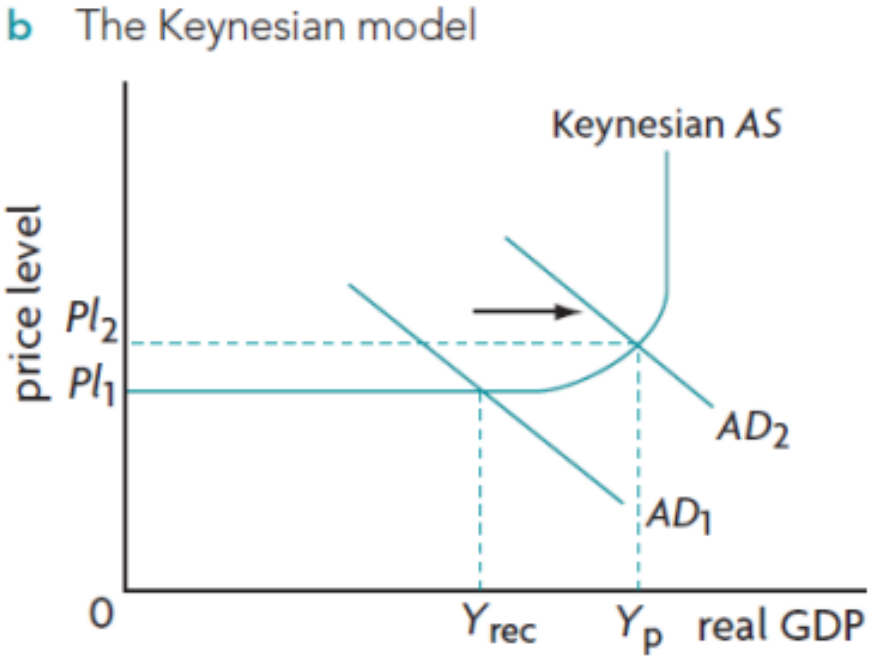
Expansionary (easy) monetary policy

- The drop in the interest rate means a lower cost of borrowing/lower return from saving, therefore,
  - **consumers** are likely to save less (borrow more) and spend more,
  - **firms** are likely to borrow more and spend more, So consumption spending (C) and investment spending (I) increase.
  - **Depreciation of local currency** → domestic goods/services will become cheaper to foreign consumers thus Export ↗, foreign goods/services will become more expensive to domestic consumers, thus Imports ↘ → AD ↗

→AD increases, shifting from **AD1 to AD2**. as shown in the new classical model and Keynesian AS model, the deflationary gap has been closed through the shift of AD curve.

- ✓**R↓→borrowing↑→ C↑I↑**
- ✓**R↓→savings↓→C spending↑**
- ✓**R↓→ exchange rate↓→ Export↑, import↓→AD↑**

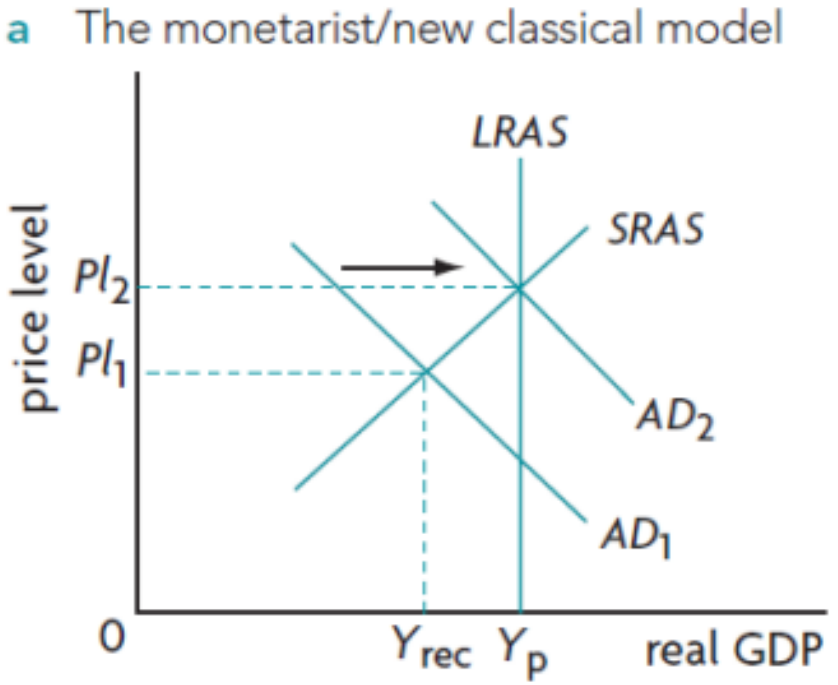


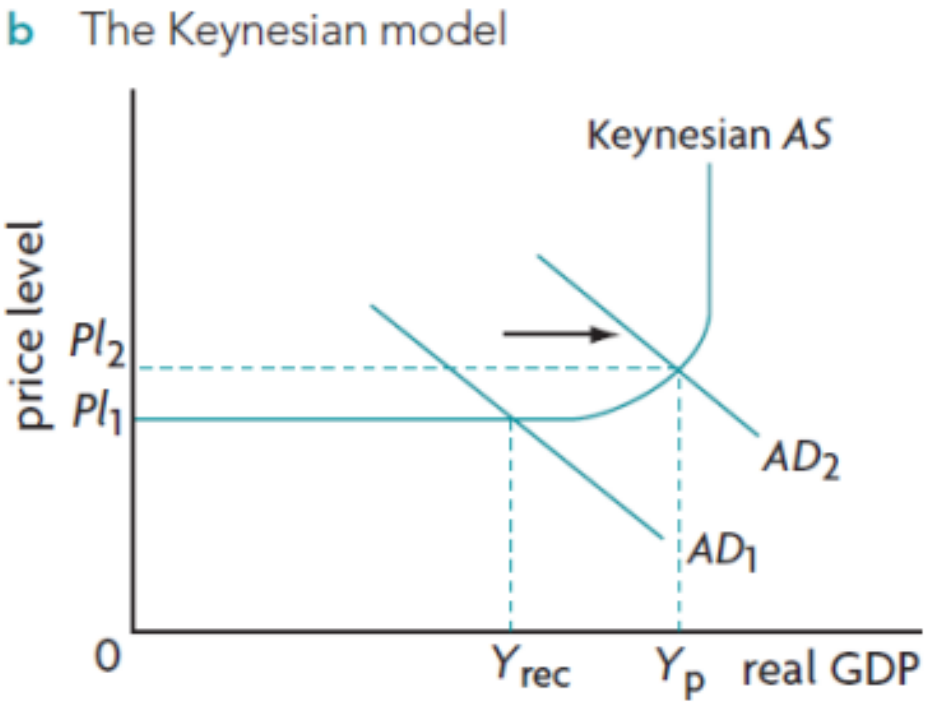


Expansionary (easy) monetary policy

Differences between new classical and Keynesian model:

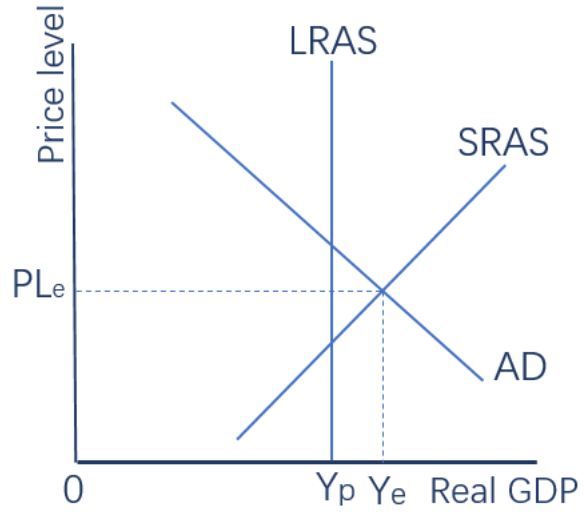
1. **Real GDP**: the size of the increase in real GDP will be smaller in the new classical model than in the Keynesian one, because of the upward-sloping SRAS curve.
2. **Price level**:
   a) In new classical model, increased AD will always results in a rise in the price level.
   b) In Keynesian model, whether the price level will increase will depends on the located section.
      - In horizontal section: an increase in AD may result in no increase in the price level at all.
      - In upward-sloping section: smaller increase in the price level.

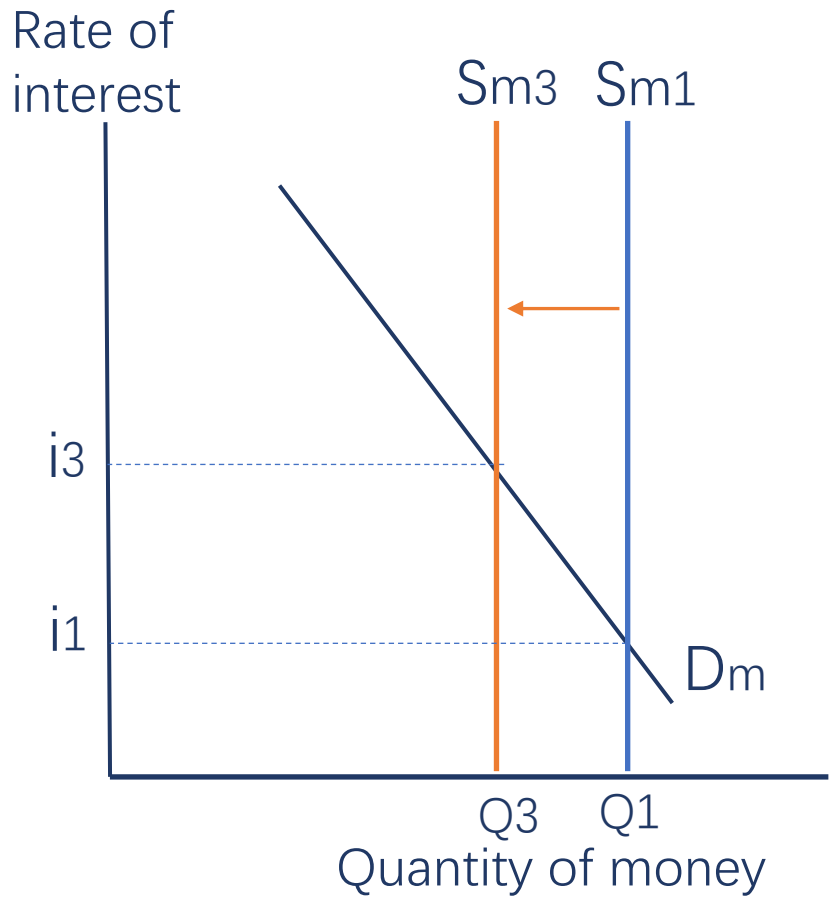




Contractionary (tight) monetary policy

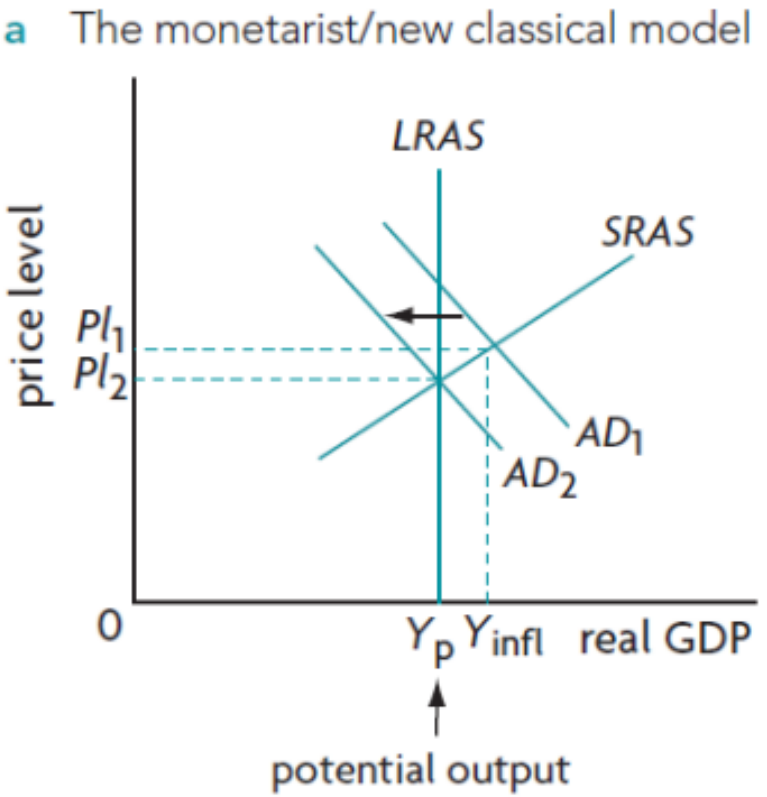
- Originally, the economy is experiencing a inflationary gap caused by excess aggregate demand.
- The central bank reduce the money supply, causing a leftward shift in the supply of money curve from **S_{m1} to S_{m3}**.
- With the **demand for money constant**, the interest rate increased from **i_1 to i_3** (higher cost of borrowing, thus less borrowing by consumers and firms)

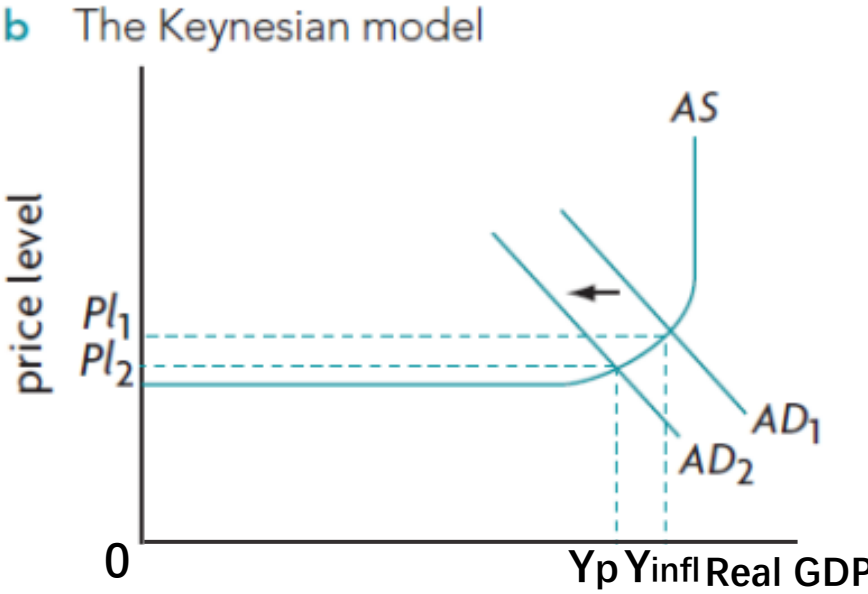




Contractionary (tight) monetary policy

- The aggregate demand curve AD_1 intersects the SRAS curve and the Keynesian AS curve at a level of real GDP, $Y_{infl} > Y_p$.
- In **monetarist/new classical model**:
  - Decreasing aggregate demand AD_1 shift to AD_2, real GDP decrease from Yinfl to Y_p, Price level decrease from PL_1 to PL_2.
- In **Keynesian Model**:
  - In upward sloping section: similar effect as the monetarist/new classical model
  - In horizontal section: if the AD were to decrease into the horizontal part, there would be a larger fall in real GDP and smaller fall in the price level, or none at all.



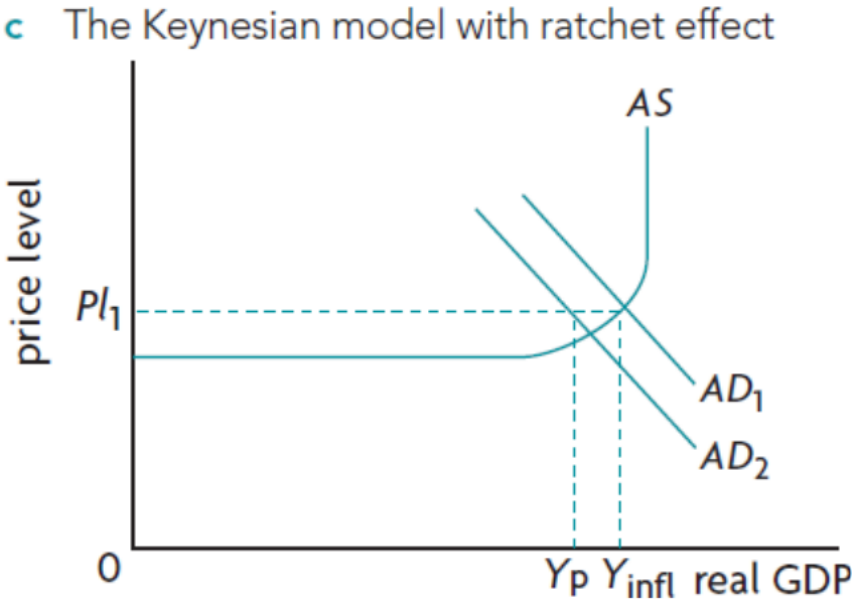


Contractionary (tight) monetary policy

- The Keynesian model with the ratchet effect
  - One of the important concept of Keynesian: downward inflexibility of wage → downward inflexibility of price level.

  →**Ratchet effect**: the price level moves up when there is an increase in AD, and then remains at the same level until there is a further increase in AD.

  →When there is a AD leftward shift, real GDP fall to Yp, but the price level remains constant at PL1.



Inflation targeting

- **Inflation targeting**: A type of monetary policy carried out by some central banks that focuses on achieving a particular inflation target, rather than focusing on the goals of low and stable rate of inflation and low unemployment.
- More and more central banks are using inflation targeting, most of them set the target **between 1.5% and 2.5%,** with 1% above and below as a 'tolerance' margin.
- It is set in terms of the CPI, which also takes into account prices of imported goods (included in the CPI basket). Inflation targeting is usually based on forecasts of future inflation based on the CPI.
- An inflation target is used to provide a transparent goal in order to help control inflation to enable sustainable economic growth and employment. The **price stability will enhance consumer and business confidence in the economy**.

Advantages of inflation targeting

- Achievement of a **low and stable rate of inflation**.
- **Improved ability of economic decision-makers** (firms & consumers) to anticipate the future rate of inflation and therefore plan their economic activities.
- **Greater co-ordination between monetary and fiscal policy** since knowledge about inflation targets allow the government to plan its fiscal policy to complement the central bank's monetary policy.

Disadvantages of inflation targeting

- Reduce ability of the central bank to pursue **other macroeconomic objectives**, particularly the goal of full employment.
- Reduce ability of the central bank to **respond to supply-side shocks**
  - In the event of a supply-side shock, such as a sudden increase in oil prices leading to cost-pull inflation and stagflation, the central bank may need flexibility to pursue an expansionary policy to bring the economy out of recession.
- An inflation target that is **too low** may lead to higher unemployment; if it is **too high**, it could lead to the problems resulting from high inflation.

Evaluating monetary policy

Strengths on monetary policy (AO3)

1. **Interest rate changes can be incremental.**
   - Interest rate can be adjusted in very small steps, “fine tuning” of the economy.
2. **Interest rates changes are reversible if necessary.**
   - An expansionary policy can easily be reversed into a contractionary policy and vice versa.
3. **Monetary policy is flexible.** It can be changed often according to needs.
4. **Relatively short time lags** (time delays)
   - It could be implemented relatively quickly, it is subject to time lags as it takes time for interest rate changes to affect the economy.

Evaluating monetary policy

Strengths on monetary policy

5. **Central bank independence.**
   - Central bank is independence from the government, it can take decisions that are in the best longer-term interests of the economy (maybe politically unpopular such as higher interest rates)
6. **Limited political constraints.**
   - It does not involve making changes in the government budget, so it does not face political pressures as fiscal policy does.
7. **No budget deficits or debt.**
   - It does not lead to budget deficits or increased levels of debt as fiscal policy does in expansionary policy.
8. **No crowding out** (weakness of expansionary fiscal policy)

Evaluating monetary policy

Constraints on monetary policy

1. **Possible ineffectiveness in recession**
   - Interest rates cannot fall when approaching zero.
   - Low consumer and producer confidence. – if firms and consumers are pessimistic about future economic conditions, they may avoid taking out new loans, even reduce their investment and consumers spending. → AD decrease
   - Banks may be fearful of lending, because they may fear that borrowers might be unable to repay the loans.
   - E.g. The Great Depression of the 1930s, Japan in late 1990s and early 2000s, the global recession in 2009.

Evaluating monetary policy

Constraints on monetary policy

2. **Conflict between government objectives**
   - Manipulation of interest rates affects not only the domestic economy but also the foreign sector of the economy, such as exchange rate.
   - There might be conflict between domestic objectives and external balance in the foreign sector.
3. **If it lasts too long it may be inflationary, if aggregate demand increases beyond what is necessary to eliminate a deflationary gap**.
4. Monetary policy is demand-side policy, so it's **unable to deal with stagflation or cost-push inflation**. (supply-side causes of instability)