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Topic 9. Monetary policy

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Introduction

- What is monetary policy about?

  Monetary policy concerns to decisions of the central bank intended to make prices stable.

- The main goal of the central bank is to ensure price stability:

  The primary objective of the ECB's monetary policy is to maintain price stability. This means making sure that inflation – the rate at which the prices for goods and services change over time – remains low, stable and predictable.

  → Price stability: low and stable inflation rate; there are not big ups and downs in prices.

  In most advance economies, central banks pursue an inflation rate around 2%.

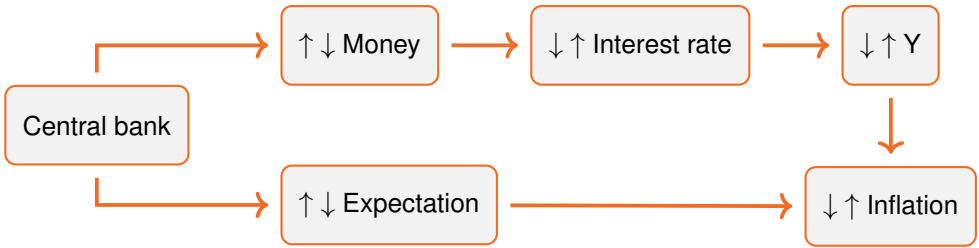
Introduction

- How does the central achieve this goal?

  To succeed, we seek to anchor inflation expectations and influence the “temperature” of the economy, making sure the conditions are just right – not too hot, and not too cold. We do this through our monetary policy.

- Two main instruments to achieve this goal:
  - Control inflation expectations $\rightarrow$ Communication, transparency, confidence
  - Modify the financial conditions of the economy $\rightarrow$ Money

Monetary policy in one slide



- Inflation depends on both economic activity (output) and expectations.
  - ↑ Y → ↓ Unemployment → ↑ Wages → ↑ Prices.
  - ↑ Expected inflation → ↑ Wages → ↑ Prices.

Outline

1. Money, interest rate and prices
2. Conventional monetary policy
3. Unconventional monetary policy

Outline

The interest rate

- Imagine Macarena lends €500 to Pablo, who will return the money in one year.
- Why would Macarena agree to lend the money instead of keeping it for herself?

  → Because Pablo promises to give back a bit more than he borrowed!
- Suppose they agree that Pablo will return €550 next year, €50 more than what he borrowed.
- The extra €50 serve as a reward to Macarena for using her money in one year instead of now.

  That's the interest! Expressed as % of the money borrowed, we say the interest rate is 10%.

The interest rate

Interest rate $=$ Very short-term rate Very short-term rate $+$ Risk premium Risk premium $+$ Liqu

- The interest rate is the sum of three factors:
  - Very short-term rate: the interest rate at a very short-term, that serves as a reference.
    - $\rightarrow$ The interest rate one would pay for a very short-term loan with no risk at all.
  - Risk premium: extra rate to compensate for the default risk.
    - $\rightarrow$ Default risk: probability of not getting back your money
  - Liquidity premium: extra rate to compensate for the liquidity risk.
    - $\rightarrow$ Liquidity risk: probability of needing the money before the debt is due.

The interest rate

- The very short-term rate rate is, in fact, the opportunity cost of holding money:
  - Without any risk, the interest rate compensates for my impatience.
  - How much interest I require to be willing to lend my money from one day to the next.
- This opportunity cost of money depends on how much money we have:
  - Imagine I want to borrow €10 from one of you and I promise to repay €11.
    - Would you be willing to lend me the money if you were to have €15 in your pocket?
    - And if you were to have €2,000?
- Then, the very short-term interest rate is an outcome of the market for money.

Note: for the moment, let's assume there is no risk in the economy.

The market for money

- What is the role of money in the economy? Money is an asset that satisfies three functions:
  - (A) Mean of payment: we use money to pay for our transactions.
  - (B) Store of value: we use money to save and consume in the future
  - (C) Unit of account: we use money to measure the relative price of different goods.
- Agents in the economy demand money both to (A) pay for their transactions and (B) to store value for the future.
  - Money is the only assets that can be used to pay for transactions.
  - But it is not the only asset we can use to save for the future!
    - Bonds and stocks are also useful for this

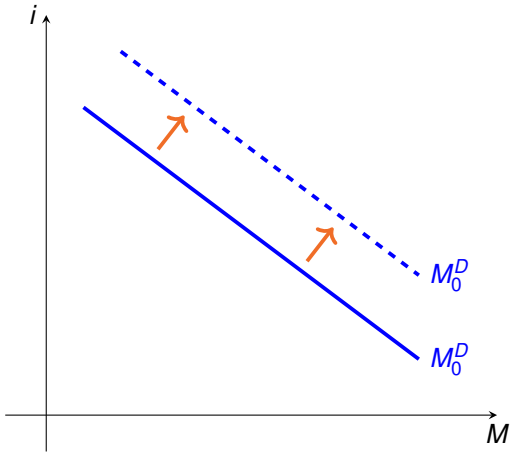
The market for money

- The demand for money depends on two things:
  - How much I want to buy (how much money I need to pay for my transaction)
  - How much I get from saving in bonds or stocks: interest rate.
- The interest rate measures how much more we receive from an asset per € invested:

  If a bond costs €100 and the interest rate is $i = 5\%$, I will receive €105 (5 more than what I invested); but if $i = 15\%$, then I will receive €115 (15 more than what I invested).
- Clearly, the higher the interest rate, the less attractive it will be to save using money: money does not pay any interest while the alternative (bonds, stocks) does!

  $\rightarrow$ The demand for money is decreasing in the interest rate

The market for money

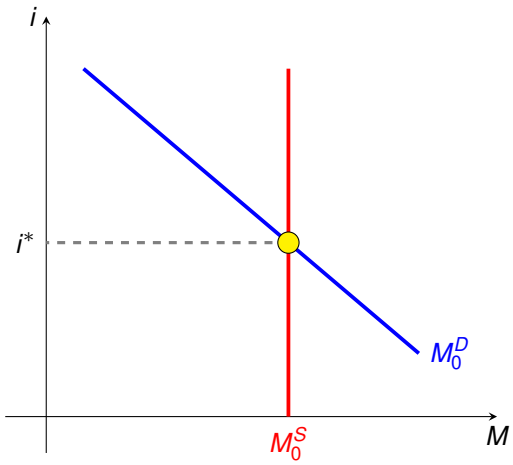


- The demand for money, M^D, is decreasing in the interest rate.

  If the interest rate is higher, I will demand less money because I prefer to use bonds/stocks to save for the future.

- If my income goes up, I will want to consume more, travel more, etc. . . I want more money to pay for more transactions.
  - The demand for money increases when my income goes up.

The market for money



- The supply of money, M^S, is independent of the interest rate.

  The central bank decides how much money to supply, independently of whether the interest rate is high or low.

- The equilibrium in the market for money is given by an amount of money that equals supply and demand...

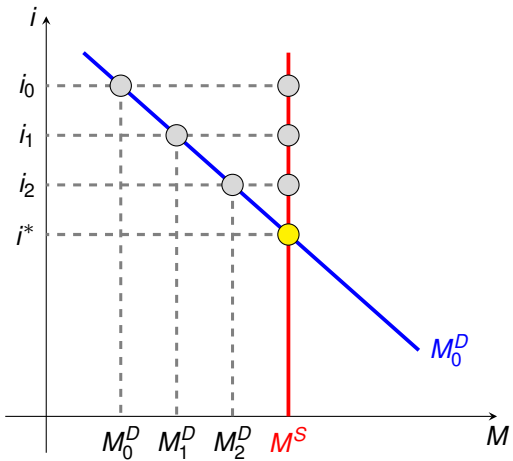
  but supply is what the central bank decides!

- The interest rate is the one making this equilibrium possible.

The market for money

- The central bank decides (we'll see why) to supply €M_0^S to the economy.
- What if people demand less than €M_0^S?
  - The value of money falls (there is a lot) so many people will invest in bonds and stocks.
  - The interest rate will fall as there are too many investors.
  - As the interest rate starts falling, the demand for money starts increasing.
  - The interest rate keeps decreasing until it reaches the level of i_0, then $M_0^D = M_0^S$.

The market for money

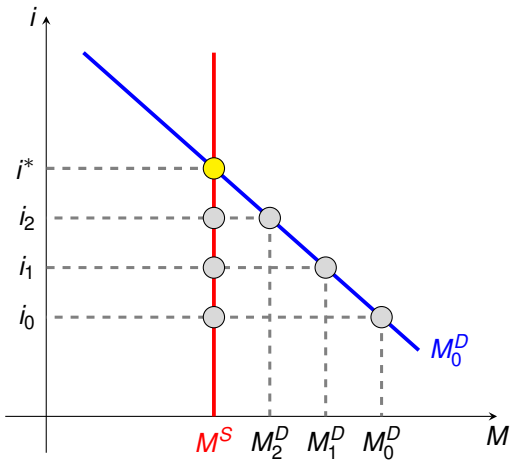


- If the interest rate is i_0, $M_0^D < M^S$:
  $\rightarrow$ the interest rate must fall.
- When the interest rate is i_1, still $M_1^D < M^S$:
  $\rightarrow$ the interest rate must fall again
- When the interest rate is i_2, still $M_1^D < M^S$:
  $\rightarrow$ the interest rate must fall again
- When the interest rate reaches i^*, the demand for money equals the supply:
  $\rightarrow$ equilibrium!

The market for money

- The central bank decides (we'll see why) to supply €M_0^S to the economy.
- What if people demand more than €M_0^S?
  - Money becomes very valuable and only few people will invest in bonds and stocks.
  - The interest rate will need to increase in order to attract investors.
  - As the interest rate starts increasing, the demand for money starts falling.
  - The interest rate keeps increasing until it reaches the level of i^*, then $M_0^D = M_0^S$.

The market for money



- If the interest rate is i_0, $M_0^D > M^S$:
  $\rightarrow$ the interest rate must rise.
- When the interest rate is i_1, still $M_1^D > M^S$:
  $\rightarrow$ the interest rate must rise again
- When the interest rate is i_2, still $M_1^D > M^S$:
  $\rightarrow$ the interest rate must rise again
- When the interest rate reaches i^*, the demand for money equals the supply:
  $\rightarrow$ equilibrium!

The market for money

- Overall...
  - When the supply of money falls short the demand, the interest rate increases.
  - When the supply of money exceeds the demand, the interest rate decreases.
- This what monetary policy about!

  The central bank modifies the amount of money in the economy to rise or fall the interest rate.
- Why would the central bank want to increase/decrease the interest rate?

  Because it affects aggregate demand and therefore, prices!

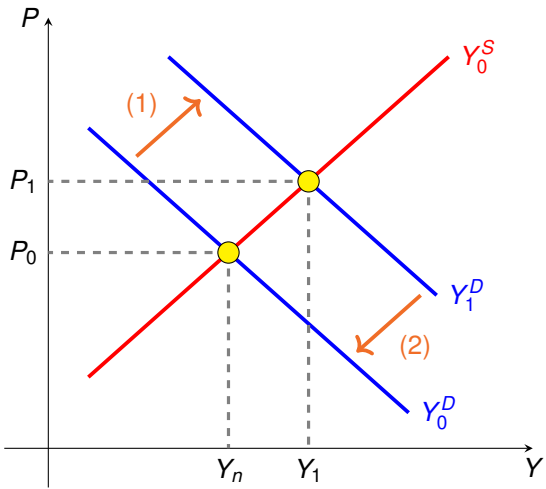
The interest rate and aggregate demand

- When the interest rate increases...
  - Loans are more expensive, so consumption and investment fall.
  - Saving is more attractive (we make higher gains from investing our income in bonds), so consumption falls again.

... aggregate demand falls! $\rightarrow$ Higher interest rate $\equiv$ Negative demand shock

- As any other negative demand shock, reduces output and prices in the economy.
- Conclusion: increasing the interest rate reduces prices.
  - If prices are too high (inflation), the central banks reduces the amount of money in the economy to increase the interest rate and depresses aggregate demand.

The interest rate and aggregate demand



- Imagine the economy experiences a positive demand shock.

  Aggregate demand shifts to the right.

- As a result, output and prices increase.

  That's inflation!

- The central bank wants to controls inflation by decreasing the amount of money so that the interest rate rises.

- Aggregate demand and prices fall to its initial level.

Conclusion

- The goal of the central bank is to keep inflation under control and, to this end, the central bank tries to modify economic conditions through interest rates:

$$\text{Interest rate} = \text{Very short-term rate} + \text{Risk premium} + \text{Liquidity premium}$$

  - Normally, the central bank tries to increase/decrease interest rates in the economy by increasing/decreasing the very short-term interest rate $\rightarrow$ conventional monetary policy

    $\rightarrow$ Limitation: the very short-term interest rate cannot fall below zero.

  - Sometimes, when the short-term interest rate is 0%, interest rates in the economy are still too high: very high risk and/or liquidity premium $\rightarrow$ unconventional monetary policy

Outline

1. Money, interest rate and prices
2. Conventional monetary policy
3. Unconventional monetary policy

Introduction

- In the previous section, we implicit assumed that the CB directly interact with us.
- In reality, those participating in the market for money are banks.
- Banks demand money and the central bank decides how much money they get.
- If the CB supplies little money, the interest banks need to pay will be higher.
- By increasing the cost of financing for banks...
  - The cost of credit for households and firms increases: less investment & consumption.
  - The interest banks pay for their deposits increases: higher savings, lower consumption

  ... economic activity falls and so do prices $\rightarrow$ Lower inflation

Introduction

- The CB has two main instruments to increase the cost of funds for banks:
  1. Open market operations

     Operations to provide/restrict liquidity in the banking market.

     $\rightarrow$ This is the real-world case of our market for money.
  2. Marginal lending and deposit facilities

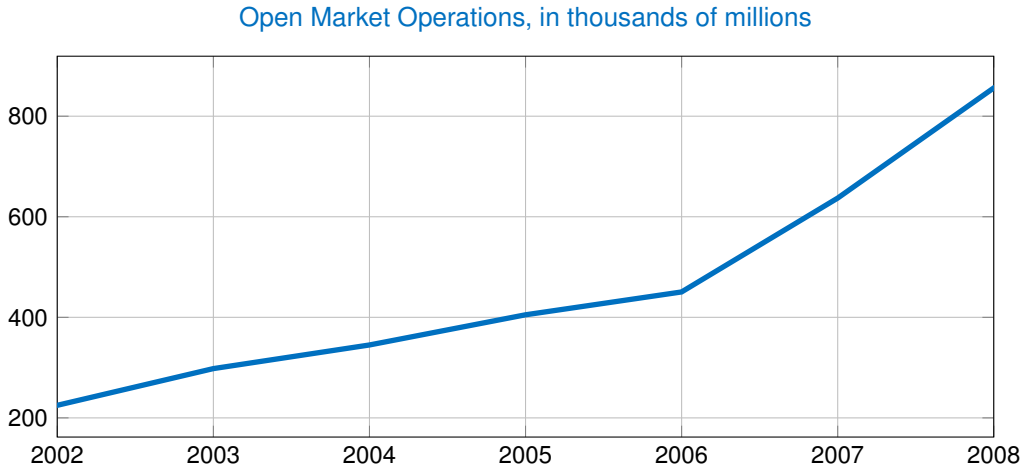
     Channels for banks to deposit/obtain overnight funds.
- The interest rates on these tools are called reference interest rates and are set to modify the very short-term interest rate at which banks borrow and lend to/from each other.

  The interest rate banks charges us is this short-term rate plus a premium that is increasing in your default risk (risk premium) and on the maturity of the loan (liquidity premium)

Open market operations

- Open market operations consist of auctions in which banks bid for the liquidity offered by the central bank who places the funds to the highest bidder, establishing a minimum interest rate.
- Three are mainly two types of OMO depending on the term and frequency:
  - Main Refinancing Operations (MRO): weekly auctiorns and with 1 week maturity.
  - Longer-term MRO (LTMRO): similar to MRO but monthly and with 3 months maturity.
- These operations take the form of RePos: the CB buys assets from banks (they get money in exchange) and, at maturity, banks RePurchase these assets at a higher price.
  - If I sell an asset for €100 and promise to buy it back for €110, the interest rate is 10%.
- If little money is auctioned, bids will need to be higher: higher interest rate.

Open market operations



Source: Balance sheet of the European Central Bank.

Marginal facilities

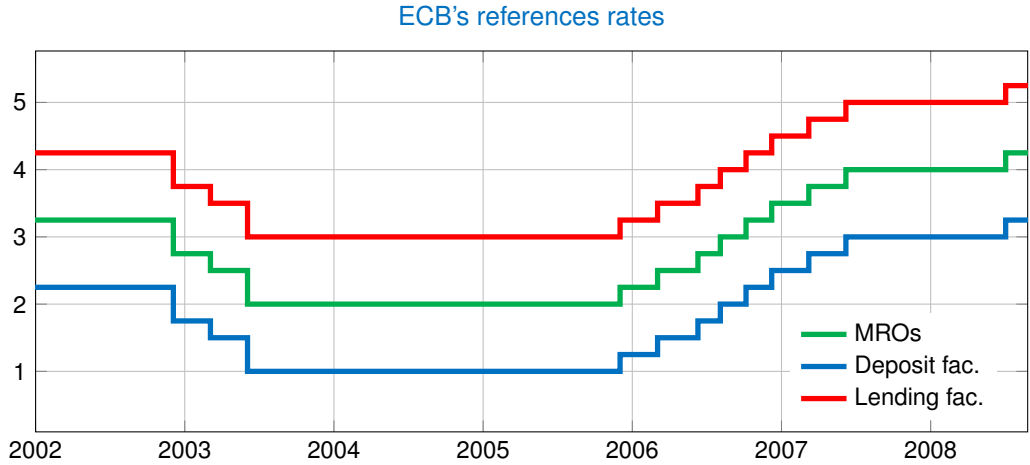
- Commercial banks obtain liquidity through open market operations, but between one operation and another, some banks may have an excess or need for liquidity.
- To this end, the central bank establishes two facilities:
  - Marginal lending facility: banks can get overnight loans in exchange for an interest rate.
    - If the CB increase this interest rate, the opportunity cost of loans and the cost of funds for banks increase: higher interest rate.

      If running short of money is more expensive, I will think twice before giving you a loan.
  - Marginal deposit facility: banks with "unused" money "unused" can deposit it in their accounts at the central bank, receiving an interest rate in exchange.
    - If the CB increase this interest rate, the incentives of banks not to lend the money increase so they will ask for higher interest on their loans: higher interest rate.

Key interest rates

- The European Central Bank (ECB) has monetary policy meetings meets every 6 weeks.
- In these meetings, they make decisions on these three key interest rates.
  - The interest rates on the marginal facilities are just a decisions of the central bank.
  - The interest rate on MRO is the result of the auction... but the ECB decides what interest rate they want, and then auction as much money as needed so that the resulting interest rate is equal to the one they want.
- The difference between the interests rate on the lending facility and on the deposit facility is called the interest rates corridor, and the interest rate on MRO lies in between.

Key interest rates



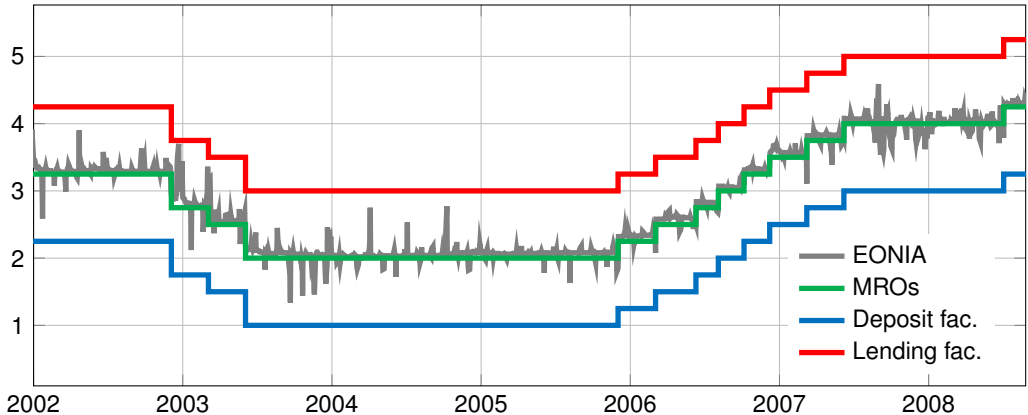
Source: ECB website

Key interest rates

- We have said that these the ECB modifies these interest rates in order to modify the very short-term interest rate at which banks borrow/lend from/to each other.
  - The interest rate on the MRO establishes the average very short-term interest rate:
    - Through the MRO, the ECB sets the overall amount of funds available in the market.
    - Thus, the rate on MRO is the “fundamental” price on money.
  - The interest rates on the deposit facilities serves as a floor: no bank would lend money for a interest rate below the one they can get from putting their money at the ECB.
  - The interest rates on the lending facilities serves as a ceiling: no bank would borrow money for a interest rate above the one that the ECB charges.

Key interest rates

ECB's references rates and short-term rates



Source: ECB website

Outline

1. Money, interest rate and prices
2. Conventional monetary policy
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Introduction

- The CB modifies the interest rates by increasing/decreasing the very short-term interest rate through the MRO and the marginal facilities: that's conventional monetary policy.

  ...but the financial crisis has proven that conventional monetary policy has limitations.

- Imagine that there is a negative shock: prices go down (negative inflation, deflation).

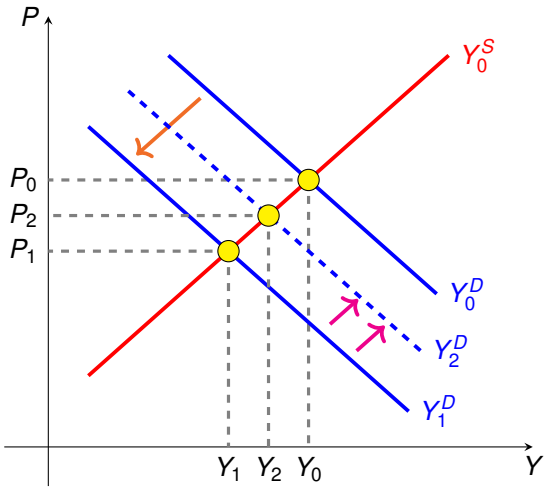
  Solution: The CB decreases the interest rates to increase aggregate demand.

- But, what if the negative shock is so large, that a 0% short-term interest rate is not enough?
- Let's set a short-term interest rate below 0% then...

  ... would you lend (not borrow!) money if you have to pay for it? NO!!

  $\rightarrow$ The short term interest rate has a natural limit on 0%: the zero-lower bound.

Introduction



- Imagine we experience a negative demand shock: output and prices fall.
- Conventional monetary policy:

  Decrease very short-term interest rate to increase demand.
- Problem: if, even when the very short-term interest rate is 0, there is still deflation, the CB cannot do more.
- Or can they?

Introduction

$$\text{Interest rate} = \underbrace{\text{Short-term rate (0\%)}}_{\text{Conventional MP}} + \underbrace{\text{Risk premium} + \text{Liquidity premium}}_{\text{Unconventional MP}}$$

- The CB has no more room to decrease interest rates by lowering short-term rates.
- Unconventional monetary policy: decrease interest rate by lowering the risk & liquidity premia.
  - Risk premium: extra rate to compensate for the default risk.
    - → Default risk: probability of not getting back your money
  - Liquidity premium: extra rate to compensate for the liquidity risk.
    - → Liquidity risk: probability of needing the money before the debt is due.

Too high risk premium

- Interest rate may be " too" large because of a very large risk premium:
  A. Very high default risk of economic agents
  B. Very pessimistic evaluation of risk $\rightarrow$ Lack of financial confidence

  While A is efficient (higher default risk should be "priced"), B is not!
- If B is prevalent, the CB may want to reduce the (inefficiently) large risk premium. How?
  1. Set negative rates on the deposit facility.
  2. Purchase public debt (*quantitative easing*).

Too high risk premium

1. Set negative rates on the deposit facility
   - A bank with €100 has two options: (i) grant a loan to a household/firm, (ii) place the money at the central bank and get the interest rate on the deposit facility.
   - During a crisis, bank may be afraid of (i) and prefer (ii) instead.
   - The CB sets a negative interest rate on the deposit facility so that (ii) is costly for the bank!

     $\rightarrow$ Higher incentives to grant loans
   - Result: banks lower the interest rate they charge to households and firms to be able to grant loans and avoid the cost of the deposit facility $\rightarrow$ Interest rates in the economy fall.

Too high risk premium

2. Purchase public debt (*quantitative easing*)
   - The interest rate on public debt acts as a reference for the rest of interest rates in the economy; the idea is that the default risk of the government is the lowest of all the economy.

     My risk premium is the risk premium of the Spanish public debt plus an extra that captures the differential default risk.

   - A second way the CB can reduce the risk premium is by lowering the interest rate on public debt: this way, all the other interest rates in the economy will follow.

$$\text{Purchase of public debt} \rightarrow \downarrow \text{Int. rate on public debt} \rightarrow \downarrow \text{Other int. rates}$$

Too high liquidity premium

- Sometimes, shorter-term interest rates are low (very short-term rates are 0% and the risk premium is not too high) but still, longer-term rates are too high.

  Those are the most relevant for the economy; none of use asks for 1 week loans...

- This may happen because of a high degree of uncertainty about the future.
- In this case, the CB may want to reduce the (inefficiently) large liquidity premium. How?

  1. Longer-term open market operations.
  2. Purchase private debt (*credit easing*).
  3. Forward guidance.

Too high liquidity premium

1. Longer-term open market operations
   - One source of uncertainty for banks is regarding the future cost of funds: if a bank doesn't know what the the very short-term interest rate in the future will be, grating a long-term loan today is much more risky.
   - One way the CB bank can reduce this uncertainty is by offering more resources to banks at a longer maturity:
     - Most of the liquidity provided to banks is channeled though LTMRO instead of the standard MRO (one-week auctions).
     - By doing so, the central bank signals the market that their intention is to keep interest rates low for a long time.

Too high liquidity premium

2. Purchase private debt (*credit easing*)
   - If a bank gives you a 10-year loan and needs the money earlier, they can sell the loan to a different bank and get back (part of) the money you borrowed back.
   - If the bank thinks doing this will be very costly (they will need to sell the loan for much less than what you borrowed), they will charge you a higher rate: high liquidity premium.
   - The central bank can reduce this liquidity premium by buying long-term public debt:

     Banks know that, if they need to get their money back, there will be enough demand for their loans so they are not that uch afraid of grating lon-term loans.

Too high liquidity premium

3. Forward guidance
   - The last way in which the central bank can reduce the liquidity premium is by adopting a forward-looking communication policy.
   - This measure consists of the central bank being explicit about the future path of the key interest rates so that banks can foreseen the cost of funds they will face in the future.
   - This is not so much about whether interest rates will be low or high, but about reducing the uncertainty about the future levels of the interest rates.

Questions?