Macroeconomics 1 (A European Perspective)

Week 2

Utrecht School of Economics
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Meeting Expectations

Expectations

- Read the book/slides before coming to the work group sessions!

- Be bold to ask!

- Tuesdays: Recap and Q&A
  Thursdays: Exercises

- Not enough time to cover all questions; choose the most confusing ones for discussions!

Group Projects

Group projects

- CBS StatLine Open Data: CBS StatLine
  Proceed by clicking 'To themes' and select 'Macroeconomics' or other themes of interest.

- World Bank Open Data:
  DataBank;
  World Development Index; etc.

- OECD Data Main Site:
  OECD Better Life Index;
  OECD.Stat, etc.

- The European Central Bank (ECB): ECB Data Warehouse.

Recap

Blanchard, O., Amighini, A., Giavazzi, F. (2021). *Macroeconomics: A European Perspective*, 4th edition. Pearson: New York.

Carlin, W., Segal, P., Bowles, S. (2017). 'Banks, money, and the credit market'. Unit 10 in The CORE team, The Economy. Available at: *https://www.core-econ.org*.

The ECB Monetary Aggregates

The demand for money

- Suppose there are only two assets: money & bonds; Money (the currency) pays no interest, whereas bonds pay a positive interest rate (i).

- Determinants of money-bonds proportions:
  - ❖ The level of transactions: The higher the level, the more money you need;
  - ❖ The interest rate on bonds: The higher the rate, the more attractive the bonds become.

- Common usage error! **Investment** refers to the purchase of new capital goods, such as machines and plants. The purchase of shares or other financial assets, however, is referred to as **financial investment**.

The demand for money

- The demand for money M^d is the sum of all the individual demands for money by the people and firms in the economy.

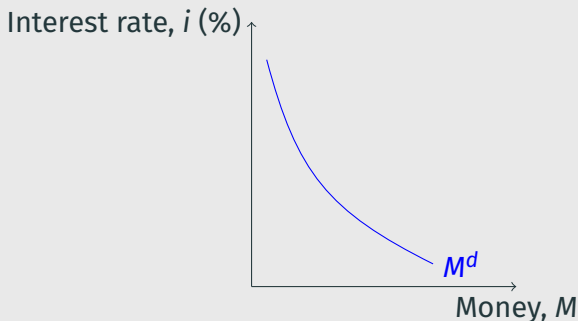- The relation between the demand for money, nominal income, and the interest rate:

$$M^d = \text{€}Y.L(i)$$
$$(-)$$

  The demand for money M^d is equal to nominal income €Y times a decreasing function of the interest rate, denoted by $L(i)$.

- The downward-sloping M^d curve depicts the relation between the demand for money, fixed nominal income, and the interest rate.

Figure 1: The demand for money.

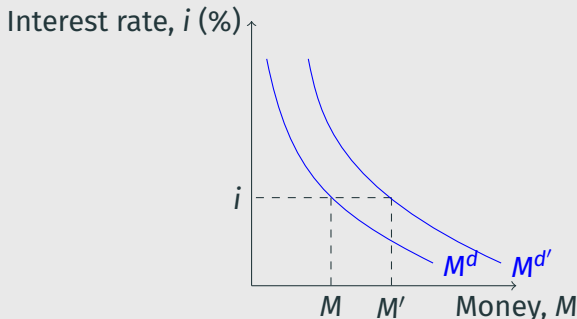For a given level of income, a lower interest rate increases the demand for money (moving along the curve).

The demand for money

What would happen to the M^d curve if the the nominal income increased?

The demand for money

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Figure 2: At a given interest rate, an increase in nominal income **shifts** the demand for money to the right.

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$$M = €Y\,L(i)$$

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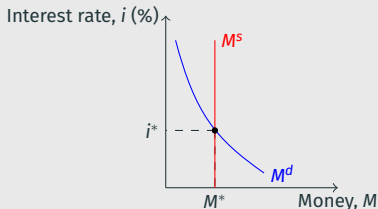
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Figure 3: Interest Rate Determination.

The determination of the interest rate

- The today's price of a one-year bond paying €100 a year from today is given by

$$\text{€P}_B = \frac{100}{(1+i)}$$

  The price of the bond today is equal to the final payment divided by 1 plus the interest rate.

- Implication: The higher the interest rate, the lower the price today. Also, the lower the interest rate, the higher the price today.

- Please refer to Sections 4.2 and 4.3 of Blanchard for in-depth elaborations of this matter.

The determination of the interest rate

- **Open market operations (OMO)**: The conduct of buying or selling bonds in the bond market by the central bank (CB).

- **Expansionary OMO**: The CB *buys* bonds in the bond market and pays for them by creating money. Hence, the CB buys bonds → demand for bonds ⇑ → price of bonds ⇑ → the interest rates on bonds ⇓. In short, the CB increases the money supply by buying bonds in the bond market.

- **Contractionary OMO**: The CB *sells* bonds in the bond market and receives money from the economy. Hence, the CB sells bonds → demand for bonds ⇓ → price of bonds ⇓ → the interest rates on bonds ⇑. In short, the CB decreases the money supply by selling bonds in the bond market.

The ECB approach.

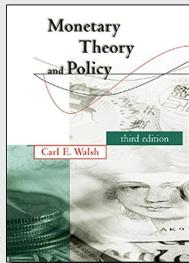- **M1** is the sum of currency in circulation and overnight deposits;

- **M2** is the sum of M1, deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months; and

- **M3** is the sum of M2, repurchase agreements, money market fund shares/units and debt securities with a maturity of up to two years.
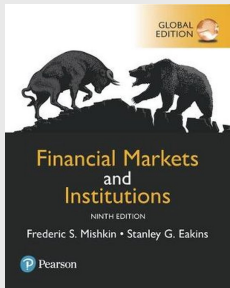
(a) Mishkin - FMI

(b) Walsh - MTP

Problem Set

Problem set

1. Suppose that a person's yearly income is €60,000. Also suppose that this person's money demand function is given by

$$M^d = €Y(0.35 - i)$$

   (a) What is this person's demand for money when the interest rate is 5%? 10%?
   (b) Explain how the interest rate affects money demand!
   (c) Suppose that the interest rate is 10%. In percentage terms, what happens to this person's demand for money if the yearly income is reduced by 50%?
   (d) Suppose that the interest rate is 5%. In percentage terms, what happens to this person's demand for money if the yearly income is reduced by 50%?
   (e) Summarise the effect of income on money demand. In percentage terms, how does this effect depend on the interest rate?

Extension to Question 1 (Question 5 of Blanchard page 91)
Suppose that a person's wealth is €50,000 and that her yearly
income is €60,000. Use the money demand from the previous
slide.

    (f) Derive the demand for bonds. Suppose the interest rate
        increases by 10%. What is the effect on her demand for bonds?

    (g) What are the effects of an increase in wealth on her demand for
        money and her demand for bonds? Motivate your answer!

    (h) What are the effects of an increase in income on her demand for
        money and her demand for bonds? Motivate your answer!

    (i) Consider the statement 'When people earn more money, they
        obviously will hold more bonds,' What is wrong with this
        statement?

Question 3 of Blanchard page 91.

2. Consider a bond that promises to pay €100 in one year.

  (a) What is the interest rate on the bond if its price today is €75? €85? €95?

  (b) What is the relation between the price of the bond and the interest rate?

  (c) If the interest rate is 8%, what is the price of the bond today?

Question 4 of Blanchard page 91

3. Suppose that money demand is given by

$$M^d = €Y(0.25 - i),$$

where €Y is €100. Also, suppose that the supply of money is €20.

(a) What is the equilibrium interest rate?

(b) If the central bank wants to increase the equilibrium interest rate i by 10% from its value in part (a), at what level should it set the supply of money?

Extension to Question 3 (Question 10 of Blanchard page 93)

(c) If the Federal Reserve Bank (the Fed) sets an interest rate target of 5%, what is the money supply the Federal Reserve must create?

(d) If the Fed wants to increase *i* from 5% to 10%, what is the new level of the money supply the Fed must set?

(e) What is the effect on the Fed's balance sheet of the increase in the interest rate from 5% to 10%?

4. Money and the banking system. Assume the following:

    i. The public holds no currency;
   ii. The ratio of reserves to deposits is 0.1;
   iii. The demand for money is given by

$$M^d = €Y(0.8 - 4i)$$

    Initially, the supply of central bank money is €100 billion, and nominal income is €5 trillion.

   (a) What is the demand for central bank money?
   (b) Find the equilibrium interest rate by setting the demand for central bank money equal to the supply of central bank money.
   (c) What is the overall supply of money? Is it equal to the overall demand for money at the interest rate you found in part b?

(d) What is the effect on the interest rate if central bank money is increased to €300 billion?

(e) If the overall money supply increases to €3,000 billion, what will be the effect on *i*? (Hint: continue from part (c))

The banking system

5. (a) Take a look at CORE figure 10.15 (section 10.10); what is the value of the base money, bank money, broad money and the leverage ratio for this bank?

   (b) What is the difference between the policy rate and the bank lending rate?

   (c) What is the present value and what is the yield of a bond?

7. On the asset side of the balance sheet of a commercial bank are reserves (reserves in cash and reserves held at central bank), loans and, other financial assets. On the liabilities side of the balance sheet of commercial banks you can observe how the bank is funded. You see items like deposit accounts (checkable account and saving accounts), other short-term and long-term debt (like inter-banking borrowing), and bank's capital and reserves, which are mainly equity.

   (a) (Commercial) Banks will always attempt to hold their reserves as low as possible. Why?

   (b) Central Banks will force commercial banks to hold a certain amount of reserves (reserve requirement). Why?

Problem set

(c) Current reserve ratios in the Eurozone are between 1 and 2% depending on the specific type of deposit account. Assume that the reserve-deposit ratio is 2% and that you deposit € 1,000. What happens instantly to the reserves, loans and bonds? What happens on the long run if the bank would manage to achieve the optimal 'money creation'?

(d) In the traditional business model of banks, banks earn income on the interest margin; how does this work?

(e) Image that the ECB operates an open market operation in which it offers commercial banks loan facilities up to 1 billion euros (to a certain exchange of eligible collateral). What could ultimately happen to the volume of loans?

(f) Until 2021, interest rates have been extremely low for a few years. How would that influence the banking business model? And how would it influence the traditional expansionary open market operations by central banks?

8. This assignment focuses on the activities and the communication of the ECB. Let's start the search on their main site:
   https://www.ecb.europa.eu/home/html/index.en.html
   If you scroll a bit down, you'll find the communication on main instruments and target values: interest rates, inflation rates, reference rates, financial stability and market operations.

   (a) Inflation rates: this figures has been presented rather prominent. What would be the reason?

   (b) Interest rates: The site presents the key ECB 3 interest rates; explain the meaning of these 3 interest rates.

   (c) Search in 'Past key ECB interest rates' the value for these three interest rates in 2008 (July), 2019 and 2000.

(d) Which facilities are labelled as 'open market operations' and which as 'standing facility'? What is the maturity of these facilities?

(e) Explain why the ECB states that 'Thus it is difficult to predict the precise effect of monetary policy actions on the economy and price level.'

(f) Explain that open market operations and the standing facilities influence the money market (short term maturity) and not (directly) the capital market (long term maturity).

Problem set

9. The following items are listed in a simplified commercial bank balance sheet (in million euro's): Cash and Reserves (8), Loans to firms and households (160), Bonds (47), Deposits (200) and Equity (15).

   (a) Commercial banks are able to 'create money'. Explain how the 'creation of money' works, using the information in the balance sheet.

   (b) What is the leverage ratio for this bank?

   (c) Explain why highly leveraged banks are a risk to the financial system. (Note: the global financial crisis and the role of – highly leveraged banks - will be discussed in CORE Unit 16, week 7)

   (d) The current low interest rates undermine commercial bank's business model, their profits are under pressure. Explain the relation between the zero lower bound and diminishing profits for banks.

Questions?