Introduction to Macroeconomics
TOPIC 3: The Financial Market

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Financial markets

In Topic 2 The Goods Market, we assumed that investment was fixed, independent of the interest rate, so as to separate goods and financial markets. Now, lets have a look at the interest rate, determined on the financial market, before to go back to the goods market.

Road map:

- Demand for money
- Supply of money
- Equilibrium: interest rate
- How to change the interest rate?

1. Demand for money

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   - 1.1. What is money?
   - 1.2. Equation
   - 1.3. Increase in nominal income

1.1. Demand for money - What is money?

What is money?

Money is what can be readily used to pay for transactions (liquid). It is called M1:

- currency: coins and bills
- checkable deposits

Bonds are not money. They pay interest but are not useable immediately at no cost (often transaction fees).

1.1. Demand for money - What is money?

There is a **trade-off between money and bonds**.

- Money: convenient (no transaction fees each time you want to pay for something), but pays no interest.
- Bonds: inconvenient to use for everyday transactions but pays interest.

Individuals hold both money and bonds. They hold money for the transactions they need to make (like payment in a supermarket) and keep the rest in bonds. *The higher the interest rate, the higher the incentive to hold a large proportion of your wealth in bonds.*

1.2. Demand for money - Equation

The demand for money depends on:

- the level of transactions, which itself depends on **nominal income** (the higher the income, the more you spend, the more money you need for purchases)
- the **interest rate** (the higher the interest rate, the more you want to hold bonds, the less you want to hold money)

Demand for money: $M^d = \$Y \underbrace{L(i)}_{(-)}$

M^d is equal to nominal income $\$Y$ times a decreasing function of the interest rate denoted by $L(i)$.

1.3. Demand for money - Increase in nominal income

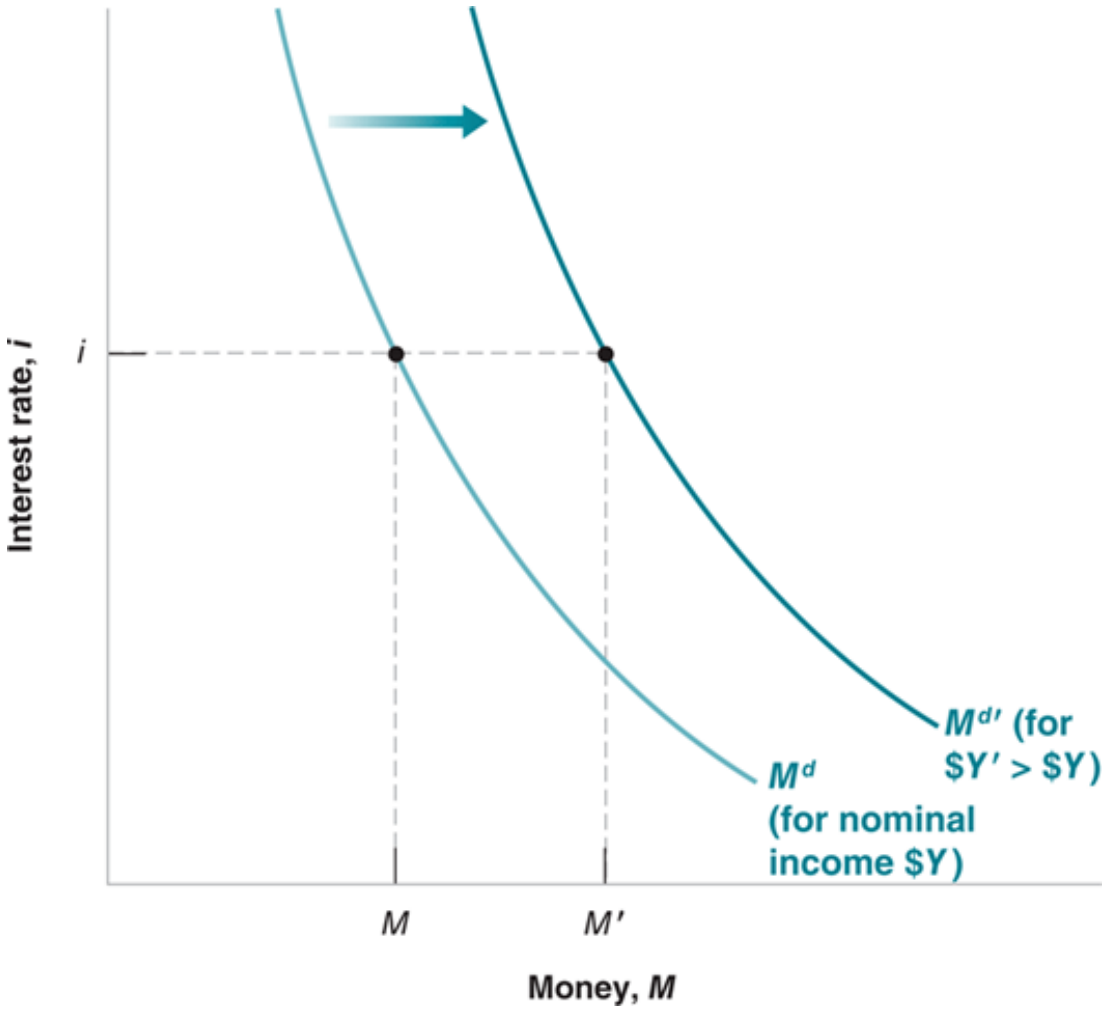

Figure: Effect on the demand for money of an increase in nominal income

2. Supply of money

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2. Supply of money
   - 2.1. What do banks and the central bank do?
   - 2.2. Central bank money and money

Central bank:

- Buys and sells bonds
- To buy bonds, the CB creates money (currency) and uses reserves (accounts that banks have at the CB)

Central Bank

Assets	Liabilities
Bonds	Central Bank Money = Reserves + Currency

Figure: Balance sheet of the central bank

Banks:

- Receive funds from people and firms: **deposits**
- Keep as **reserve** some of the funds received (percentage θ of the deposits)
- Buy financial assets (bonds)
- make loans to other people and firms

Banks

Assets	Liabilities
Reserves Loans Bonds	Checkable deposits

Figure: Balance sheet of the banks

2.2. Supply of money - Central bank money and money

The central bank has no direct control on the total supply of money (currency and deposits) but has direct control on currency and reserves (central bank money).

What is the link between central bank money and money?

Central bank money$=H^s=$

- Currency
  - proportion c of the money hold by people
- Reserves
  - proportion θ of the deposits
    - deposits represent a proportion $1-c$ of the money hold by people

Supply of money$=$ $M^s = \frac{1}{c+\theta(1-c)} H^s$

2.2. Supply of money - Central bank money and money

In changing the amount of bonds it holds (**open market operations**), the central bank affects the supply of central bank money and hence the supply of money.

- Expansionary open market operations: purchase of bonds, increase in the amount of central bank money as well as money in the economy.
- Expansionary open market operations: sale of bonds, decrease of the amount of central bank money as well as money in the economy.

2.2. Supply of money - Central bank money and money

$\frac{1}{c+\theta(1-c)}$ is called the **money multiplier**.

The money multiplier is larger than 1, meaning that increases in central bank money leads to more than one-to-one increases in money supply.

2.2. Supply of money - Central bank money and money

Intuition of the money multiplier:

- Purchase of a 100$ bond by the CB from person A
- Person A keeps $(1-c)*100$ on his account in bank A and $c*100$ in currency
- Bank A keeps $\theta*(1-c)*100$ in reserves and buys bonds for $(1-\theta)(1-c)*100$ from person B
- Person B keeps $(1-c)*(1-\theta)(1-c)*100$ on his account in bank B and $c*(1-\theta)(1-c)*100$ in currency
- Bank B keeps ... in reserves and buys bonds for ... from person C
- Person C keeps ... on his account in bank C and ... in currency
- Bank C keeps ... in reserves and buys bonds for ... from person D

2.2. Supply of money - Central bank money and money

The ultimate increase in the money supply is not only the result of the initial purchase of bonds by the central bank but of the successive rounds of purchases of bonds (by the CB and by banks).

3. Equilibrium: Interest rate

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- Demand for money: $M^d = \$YL(i)$

  The demand for money is decreasing in the interest rate.

- Supply of money: $M^s = \frac{1}{c+\theta(1-c)} H^s$

  The supply of money is independent of the interest rate.

$\Rightarrow$ At the intersection: **equilibrium interest rate**

3. Equilibrium: Interest rate

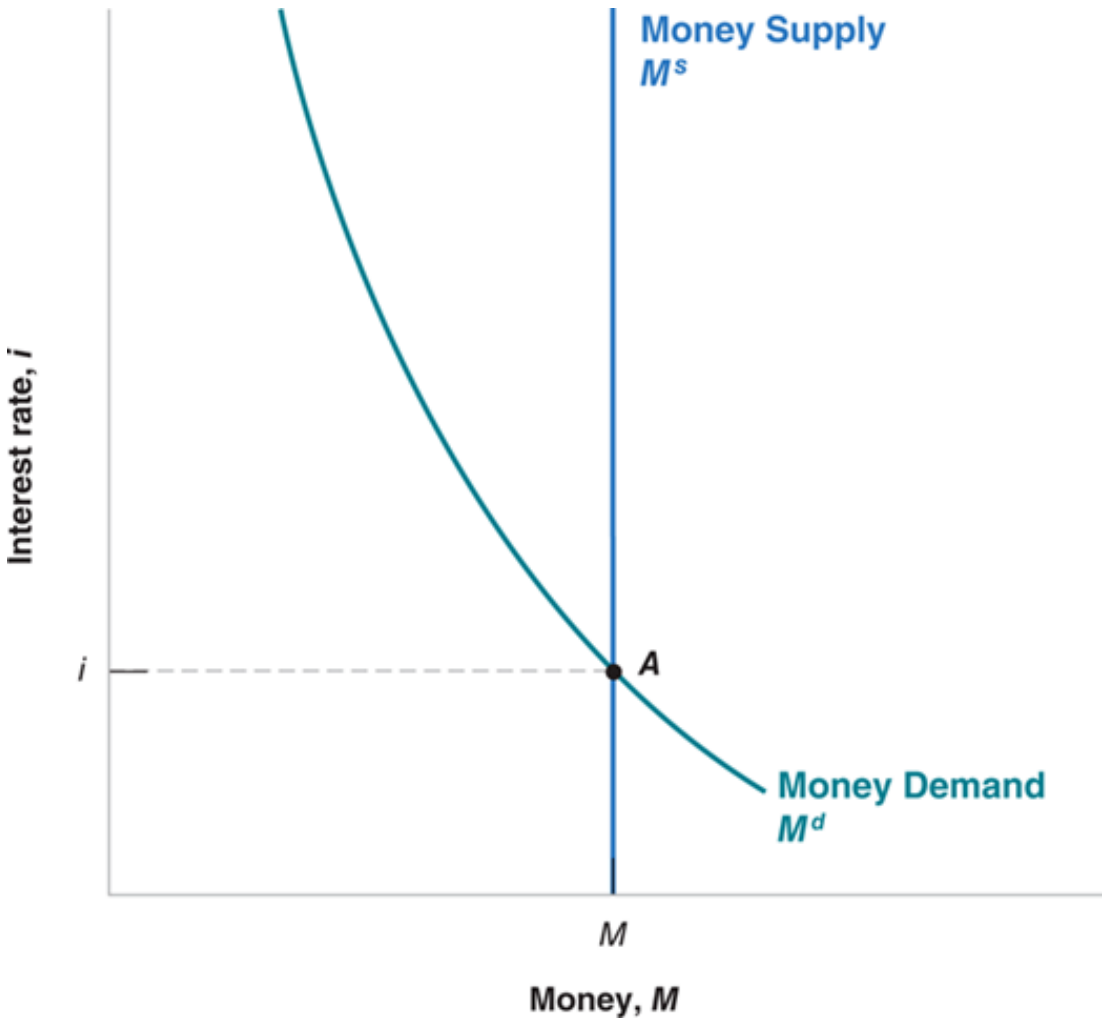

Figure: Determination of the interest rate

4. How to change the interest rate?

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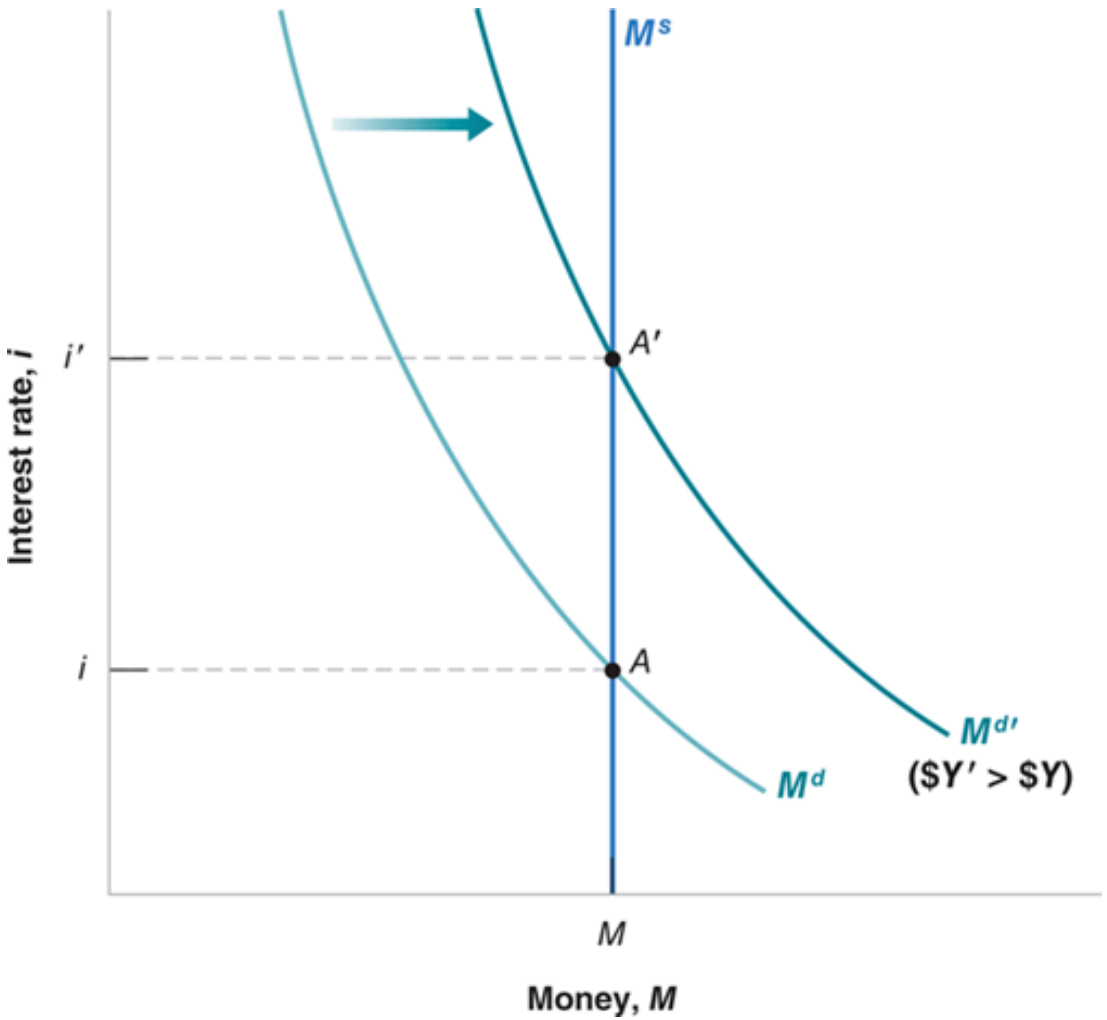

Figure: Effect of an increase in nominal income on the interest rate

4. How to change the interest rate?

An increase in nominal income leads to an increase in the demand for money. Given that the supply of money does not change, the interest rate has to increase so as to reduce the demand for money and reestablish equilibrium.

4. How to change the interest rate?

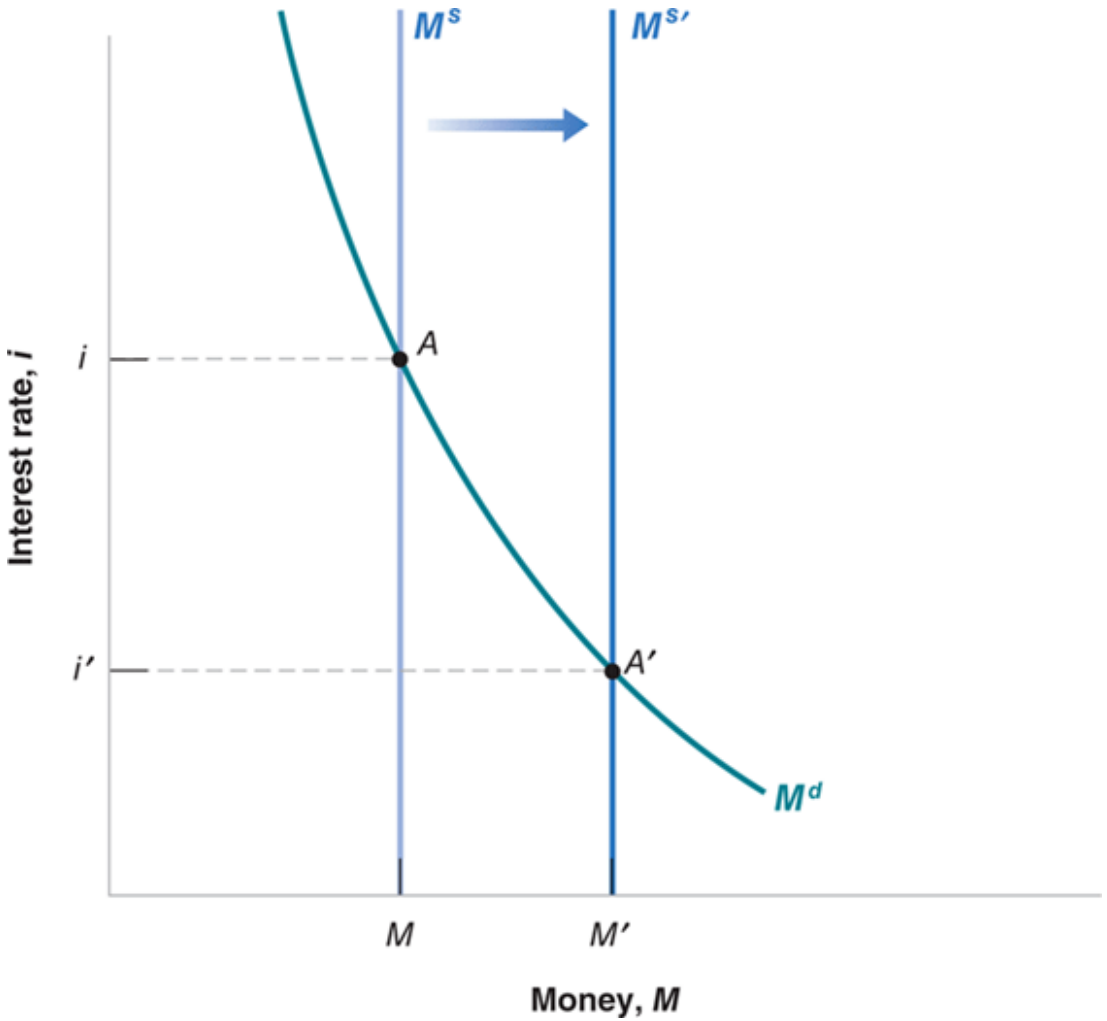

Figure: Effect of an increase in money supply on the interest rate

4. How to change the interest rate?

When the money supply increases, the demand for money must increase too to maintain equilibrium. Which means that the interest rate has to drop to lower the incentive to hold bonds, which means to increase the demand for money.

Conclusion

In topic 2 The Goods Market, we isolated the goods market from the financial one by assuming that investment was fixed, not function of the interest rate.

Now that we know what is the interest rate and how it is determined on the financial market, lets go back to the goods market and see what changes with the new assumption that investment is a function of the interest rate.

Lets study the goods and the financial market together.