# Financial markets

EC 235 | Fall 2023

Required readings:

- Blanchard, ch. 4.

By studying the goods market, we have covered the *real* side of the economy.

However, only looking at the real side is *not sufficient* for a complete understanding of the macroeconomy.

For instance, if households want to *save* money, it is likely that they will need a *bank* account where they may put their money.

Furthermore, firms rarely purchase new machinery using their own funds. They usually need some *financing.*

Thus, the *financial* side of the economy is just as important as the real.

First, a bit of *semantics*:

- *Money* ($) is the medium we use to pay for transactions.
  - By *money*, we mean *currency* and *checkable deposits*.
- *Income* is what people earn from working (wages and salaries), as well as any other *flow* such as *interest* and *dividends.*
- *Wealth* is a *stock* variable, the value of one's financial *assets* minus financial *liabilities.*
- Finally, *saving* is the portion of disposable income one *does not* spend.

Given someone's *wealth*, they may decide to keep saving money *or* to further *increase* this wealth.

Then, they face a choice between the *two* most important financial *assets*:

- *Money*;
- *Bonds.*

The *fundamental difference* between money and bonds has to do with *two* points:

- Bonds *pay interest*; money does not;
- No one can *pay for transactions* using bonds, only with money.

So how can one balance *bond* ownership and *money* holding?

This boils down to *two* factors:

- One's *level of transactions*;
- The *interest rate* on bonds.

Given this *dilemma*, we may *model* this situation mathematically.

The *demand for money* ($M^d$) in the whole economy is the sum of all individual demands for money by households and firms, and can be represented by:

$$M^d = PY \cdot L(i) \qquad \frac{\partial M^d}{\partial PY} > 0 \; ; \; \frac{\partial M^d}{\partial i} > 0$$

where *PY* is *nominal* income and *L(i)* is a *liquidity* function.

While the demand for money increases *in proportion* to increases in nominal income ($Y$), people will hold less money in *liquid form* the higher the *interest rate* ($i$).

The equation $M^d = PY \cdot L(i)$ summarizes the *demand for money*.

But the analysis is not complete without the *supply of money*.

We will for now assume that the economy's *central bank* supplies an amount *M* of money to the entire economy:

$$M^s = M$$

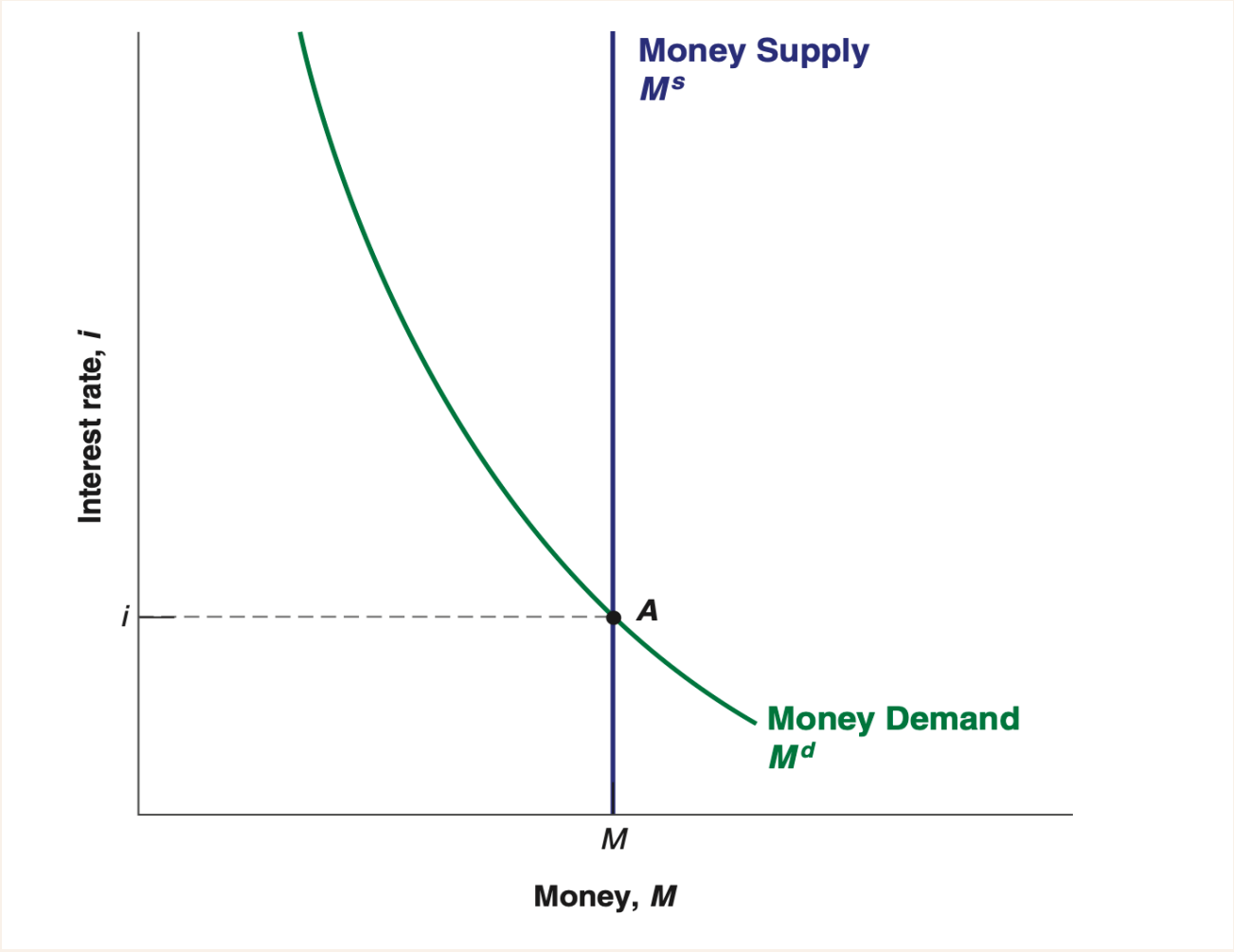
where the *s* superscript denotes *supply*.

As we once again have *supply* and *demand* equations, we can reach an *equilibrium* relation:

$$M^s = M^d$$

$$M^s = PY \cdot L(i)$$

The variable responsible for bringing the *equilibrium* between money demand and money supply is the *interest rate* ($i$).


Money Supply
$M^s$
Interest rate, $i$
$i$
A
Money Demand
$M^d$
$M$
Money, $M$

Using the previous figure as a reference, what happens when:

- The central bank increases the money supply ($M^S$)?

- There is an increase in nominal income ($PY$)?

To model money supply, we assumed that the *central bank* decides on a quantity of money to be made available in the economy, denoted by $M^S$.

However, this process is more complicated in real life than just a decision made by a "central bank entity."

Central banks change the supply of money in an economy by either *buying* or *selling* in bonds in financial markets.

These actions are called *open market operations* (*OMO*).

If the central bank wants to *decrease* the amount of money in the economy, it *sells* bonds and *removes* liquid money from circulation, as it receives in money exchange for the bonds.

If it wants to *increase* the amount of money in the economy, it *buys* bonds and pays for them by *creating* money.

Whenever either of these actions take place, the central bank is engaging in *monetary policy*.

- A monetary policy is labeled *expansionary* when it *expands* the supply of money ($M^s$) by *buying* bonds from the public.
- A monetary policy is labeled *contractionary* when it *decreases* the supply of money ($M^s$) by *selling* bonds to the public.

Let us investigate these two situations *graphically.*

Since the supply of money is changed through *bond markets*, let us investigate these further.

How are bond *prices* related to the *interest rate* in the economy?

If one buys a bond today and it promises to pay, say \$100 in a year, the *rate of return* (i.e., the *interest rate*) on this bond is given by

$$i = \frac{\$100 - P_B}{P_B}$$

where $P_B$ is the price of the bond.

Given the previous formula, what is the interest rate ($i$) when:

- The price of the bond ($P_B$) is \$95?
- The price of the bond ($P_B$) is \$110?
- The price of the bond ($P_B$) is \$150?

Can we derive a *relationship* between bond *prices* and the *interest rate*?

Now we can fully understand how Open Market Operations work.

Suppose the central bank engages in an *expansionary* operation, *buying* bonds in the bond market and paying for them by *creating money*.

As the central bank buys bonds, the demand for bonds *goes up*, *increasing* their price.

Conversely, the interest rate on bonds goes *down*.

This way, the central bank has *increased* the money supply.

This way, *monetary policy* affects *interest rates*.

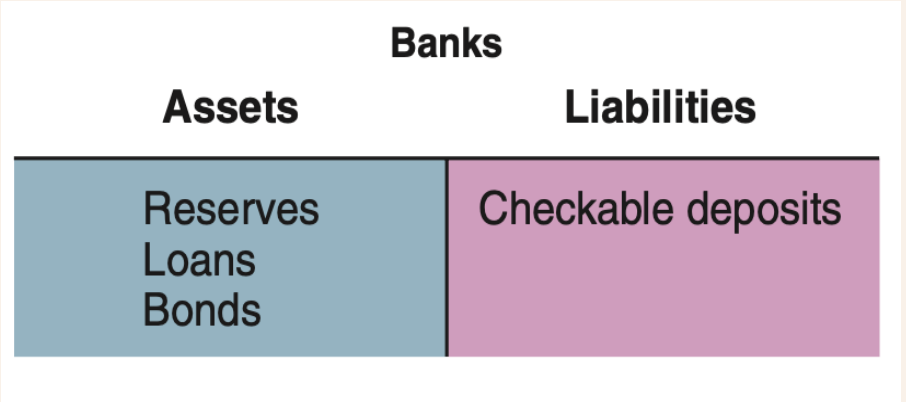
By buying or selling bonds in exchange for money, the central bank affects the price of bonds, and by implication, the interest rate on bonds.

# intermediaries

In the *real world*, money includes not only currency but also *checkable deposits*.

And checkable deposits are supplied not by the central bank but by *(private) banks*.

Modern economies are characterized by the existence of many types of *financial intermediaries*—institutions that receive funds from people and firms and use these funds to *buy* financial assets or to make *loans* to other people and firms.


Banks
Assets
Liabilities
Reserves
Loans
Bonds
Checkable deposits