

# ECO 181 Lecture 07

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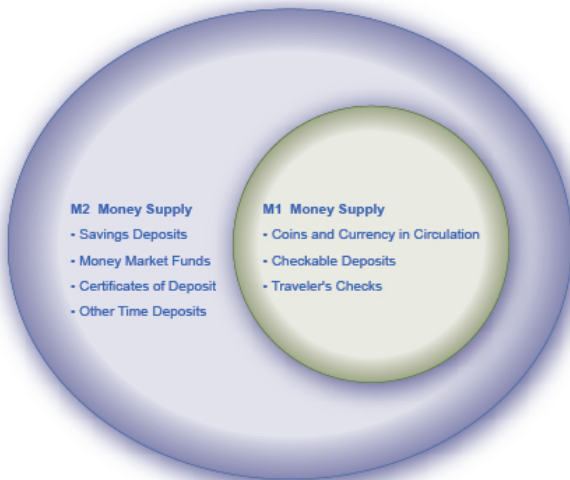
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# Measuring the Money Supply

- ▶ The Federal Reserve calculates the size of two monetary aggregates, overall measures of the money supply.
  - ▶ **M1:** M1, the narrowest definition, contains only currency in circulation (also known as cash), traveler's checks, and checkable bank deposits.
  - ▶ **M2:** M2 adds several other kinds of assets, often referred to as near-moneys—financial assets that aren't directly usable as a medium of exchange but can be readily converted into cash or checkable bank deposits, such as savings accounts.

# Measuring the Money Supply



# Measuring the Money Supply

- ▶ Are financial assets like stocks and bonds part of the money supply?
  - ▶ No, not under any definition because they're not liquid enough. Converting a stock or a bond into cash requires selling the stock or bond—something that usually takes some time and also involves paying a broker's fee. That makes these assets much less liquid than bank deposits. So stocks and bonds, unlike bank deposits, aren't considered money.

# The Opportunity Cost of Holding Money

## ► How much money to hold

**Short-term interest rates** are the interest rates on financial assets that mature within less than a year.

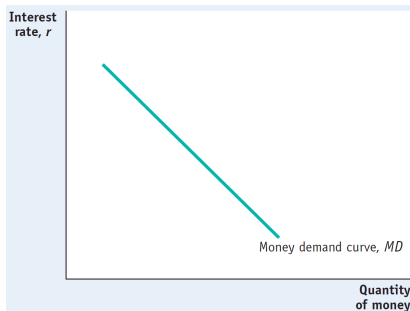
- The higher the short-term interest rate, the higher the the opportunity cost of holding money; the lower the short-term interest rate, the lower the opportunity cost of holding money.

**Long-term interest rates** are interest rates on financial assets that mature a number of years in the future.

# The Money Demand Curve

- ▶ The **money demand curve** shows the relationship between the interest rate and the quantity of money demanded.

The **money demand curve** slopes downward because, other things equal, a higher interest rate increases the opportunity cost of holding money, leading the public to reduce the quantity of money it demands.



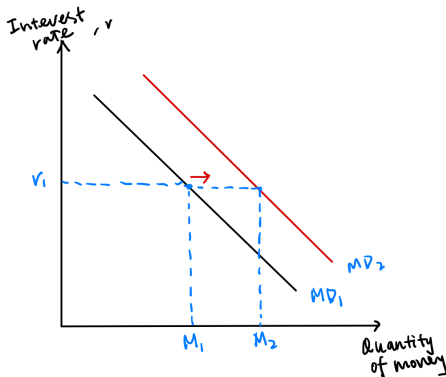
# Shifts of the Money Demand Curve

1. **Changes in the Aggregate Price Level**
2. **Changes in Real GDP**
3. **Changes in Credit Markets and Banking Technology**
4. **Changes in Institutions**

# Shifts of the Money Demand Curve

## 1. Changes in the Aggregate Price Level

- Because if the price of everything rises by 20%, it takes 20% more money to buy the same basket of goods and services.

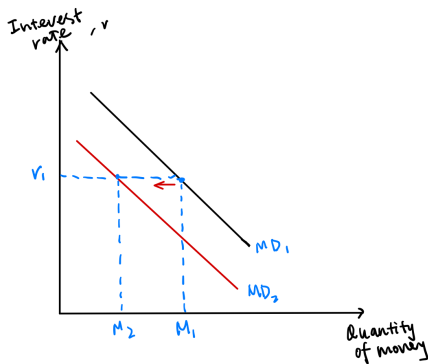




# Shifts of the Money Demand Curve

## 2. Changes in Real GDP

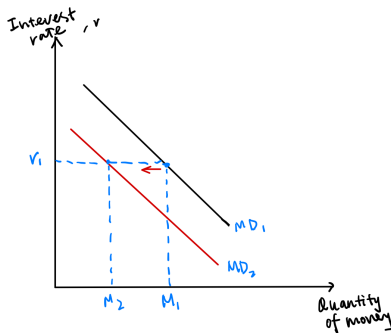
- Decrease in real GDP—the total quantity of goods and services produced and sold in the economy.



# Changes in Credit Markets and Banking Technology

## 3. Changes in Credit Markets and Banking Technology

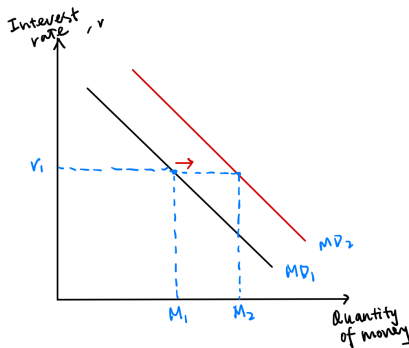
- Changes in banking technology that made credit cards widely available and widely accepted.



# Changes in Institutions

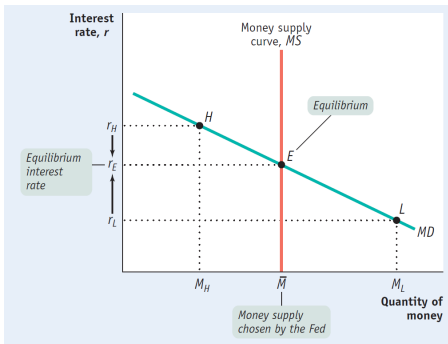
## 3. Changes in Credit Markets and Banking Technology

- ▶ When banking regulations changed, allowing banks to pay interest on checking account funds.



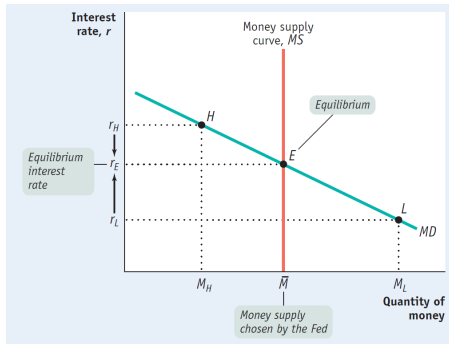
# The Money Supply Curve

- ▶ The **money supply curve** shows how the quantity of money supplied varies with the interest rate. The money supply curve,  $MS$ , is vertical at the money supply chosen by the Federal Reserve.



# The Equilibrium Interest Rate

- ▶ According to the **liquidity preference model of the interest rate**, the interest rate is determined by the supply and demand for money.



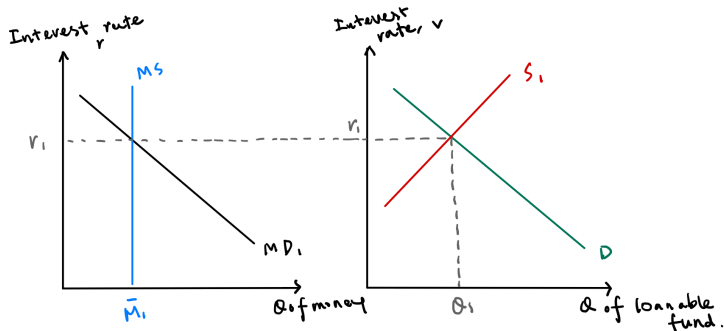
# Two Models of Interest Rates?

- ▶ Loanable funds model of the interest rate  
according to that model, the interest rate is determined by the equalization of the supply of funds from lenders and the demand for funds by borrowers in **the market for loanable funds**.
- ▶ This chapter introduces a model determined by the equalization of the supply and demand for money in **the money market**.

# Two Models of Interest Rates?

## ► The Interest Rate in the Short Run

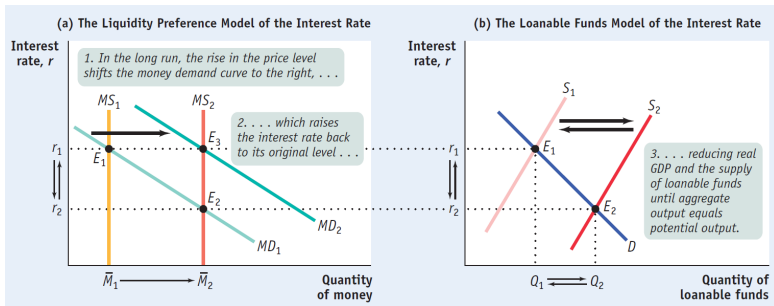
In the short run, the interest rate is determined in the money market. Assume there is an increase in the money supply.



# Two Models of Interest Rates?

## ► The Interest Rate in the Long Run

In the long-run the interest rate is determined in the market for loanable funds. The interest rate will adjust until national saving = investment.

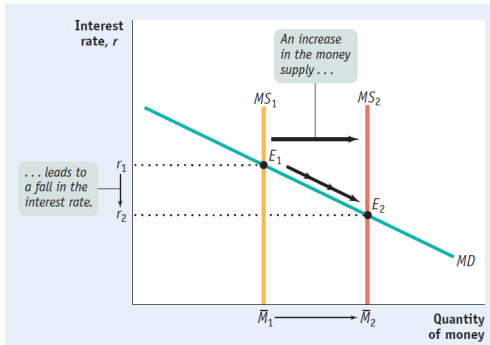




# Monetary Policy and the Interest Rate

- The Federal Reserve can use changes in the money supply to change the interest rate

The Federal Reserve can lower the interest rate by increasing the money supply.



# Monetary Policy and the Interest Rate

- ▶ By adjusting the money supply up or down, the Fed can set the interest rate.
- ▶ In practice, at each meeting the Federal Open Market Committee decides on the interest rate to prevail for the next six weeks, until its next meeting. The Fed sets a **target federal funds rate**, a desired level for the federal funds rate.

# Monetary Policy and Aggregate Demand

- ▶ Shift AD:

$$Y = C + I + G + (X - IM)$$

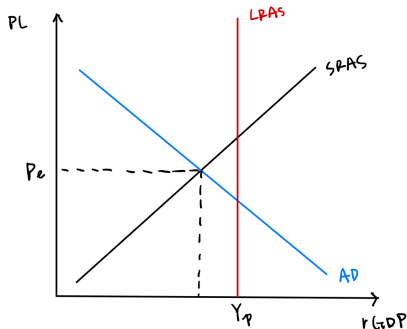
- ▶ When the central bank increases the quantity of money in circulation, households and firms have more money, which they are willing to lend out. The effect is to drive the interest rate down at any given aggregate price level, leading to higher investment spending and higher consumer spending.
  - ▶ Increasing the quantity of money shifts the aggregate demand curve to the right.

# Monetary Policy

- ▶ **Monetary policy** is a set of tools used by a nation's central bank to control the overall money supply and promote economic growth and employ strategies such as revising interest rates and changing bank reserve requirements.
  - ▶ Contractionary Monetary Policy
  - ▶ Expansionary Monetary Policy

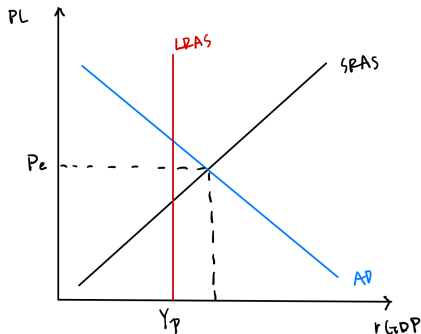
# Expansionary monetary policy

- **Expansionary monetary policy** is monetary policy that increases aggregate demand.



# Expansionary monetary policy

- **Contractionary monetary policy** is monetary policy that decreases aggregate demand.



# Monetary Policy Tools

- ▶ The Federal Reserve has a variety of policy tools that it uses in order to implement monetary policy.
- ▶ **Traditional tools**
  1. Reserve requirements
  2. Discount window lending rate
  3. Open market operations (OMOs)

# Monetary Policy Tools

## ► Traditional tools

### 1. Reserve requirements

Change required reserve ratio - regulates what % of deposits banks hold as reserves. By moving reserve requirements, the Fed could influence the amount of bank lending

- $\uparrow$  reserve ratio  $\rightarrow$  lending  $\downarrow \rightarrow$  AD  $\downarrow$  (contractionary)
- $\downarrow$  reserve ratio  $\rightarrow$  lending  $\uparrow \rightarrow$  AD  $\uparrow$  (expansionary)



# Monetary Policy Tools

## ► Traditional tools

### 2. Discount window lending rate

The discount rate is the interest rate a Reserve Bank charges eligible financial institutions to borrow funds on a short-term basis.

- $\uparrow$  discount rate  $\rightarrow$  lending  $\downarrow \rightarrow$  AD  $\downarrow$  (contractionary)
- $\downarrow$  discount rate  $\rightarrow$  lending  $\uparrow \rightarrow$  AD  $\uparrow$  (expansionary)

# Monetary Policy Tools

## ► Traditional tools

### 3. Open market operations (OMOs)

**An open-market operation** is a purchase or sale of government debt by the Fed. In an open-market operation the Federal Reserve buys or sells U.S. Treasury bills, normally through a transaction with commercial banks—banks that mainly make business loans, as opposed to home loans. The Fed never buys U.S. Treasury bills directly from the federal government.

- central bank sells government debt → commercial banks have less \$ → lending ↓ → AD ↓ (**contractionary**)
- central bank buys government debt → commercial banks have more \$ → lending ↑ → AD ↑ (**expansionary**)

# Monetary Policy Tools

## ► Unconventional tools

1. **The Fed's forward guidance:** Forward guidance is a tool that central banks use to provide communication to the public about the likely future course of monetary policy.
2. **Quantitative easing:** A QE strategy is often employed during a crisis and when open market operations have failed. For example, the interest rate may already be at zero, but there is still a slowdown in lending and economic activity. In such situations, the central bank might buy a variety of securities to revive them: long-term treasuries, private securities, or securities in a particular area of the market.

# Monetary Policy Tools

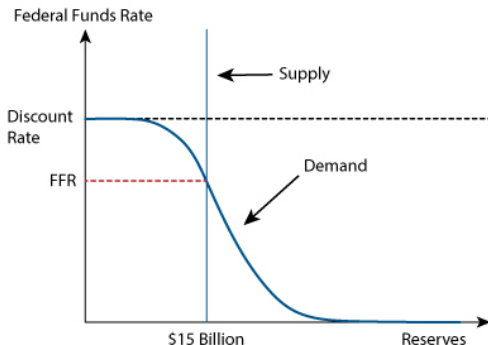
## ► **New monetary policy tools**

1. Interest on reserve balances: The interest rate on reserve balances (IORB rate) is the rate of interest that the Federal Reserve pays on balances maintained by or on behalf of eligible institutions in master accounts at Federal Reserve Banks. (upper bound on fed funds rate)
2. Overnight reverse repurchase rate: Fed borrows overnight, pays back the next day without interest. (lower bound on fed funds rate)

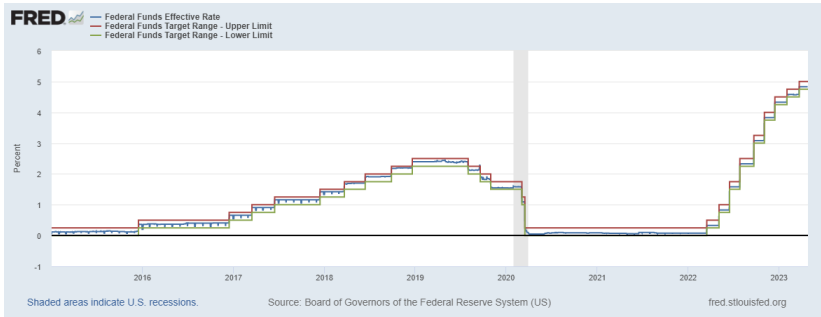
# Monetary Policy Tools

## ► Traditional monetary policy tools

Figure 2  
Monetary Policy with Scarce Reserves



# Monetary Policy Tools



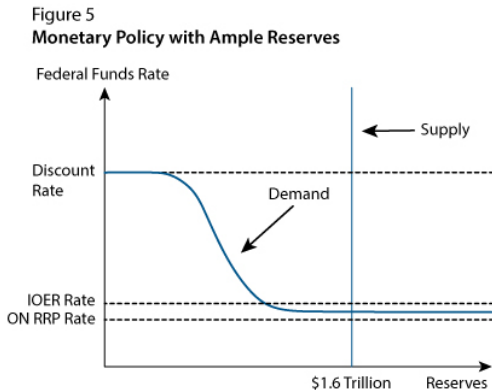
# Monetary Policy Tools

Figure 2  
Transmission of Monetary Policy



# Monetary Policy Tools

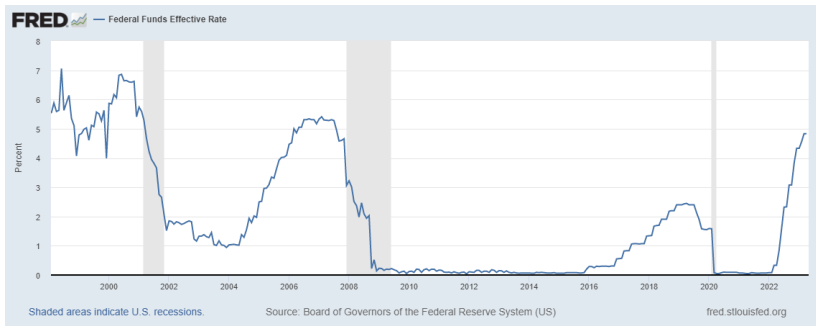
## ► New monetary policy tools





# Monetary Policy Tools

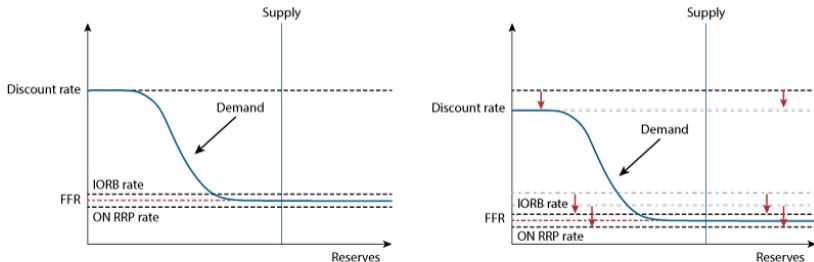
## ► New monetary policy tools



# Monetary Policy Tools

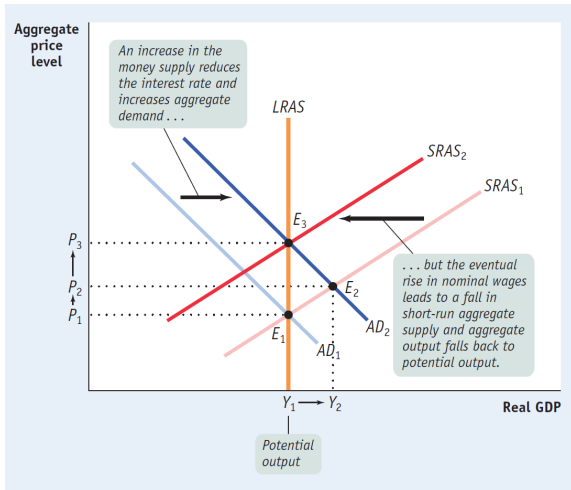
## ► New monetary policy tools

Figure 5  
Expansionary Policy with Ample Reserves



NOTE: FFR, federal funds rate; IORB rate, interest on reserve balances rate; ON RRP rate, overnight reverse repurchase agreement rate.

# Short-Run and Long-Run Effects of an Increase in the Money Supply



# Short-Run and Long-Run Effects of an Increase in the Money Supply

- ▶ In the short-run an increase in the money supply would increase AD which would result in higher PL and rGDP. (since wages are sticky)
- ▶ However in the long-run a change in MS cannot increase  $Y_p$  or push  $Y$  greater than  $Y_p$  permanently. The only effect is higher prices since wages increase as much as prices.
- ▶ Thus in the long-run money is "neutral": No real effect

# Monetary Neutrality

- ▶ According to the concept of **monetary neutrality**, changes in the money supply have no real effects on the economy.
- ▶ All Economic Variables can be broken down into two types of variables: nominal and real.
- ▶ Any change in money supply(a nominal variable) will only affect other nominal variables but not real variables since it does not change resources or technology.

# Monetary Neutrality

- ▶ Money is neutral in the long run.
- ▶ If the Fed doubles the Money Supply: all nominal variables including prices will double. All real variables including relative prices will not change.
- ▶ However, it does cause the **value of money** to change.

# Monetary Neutrality

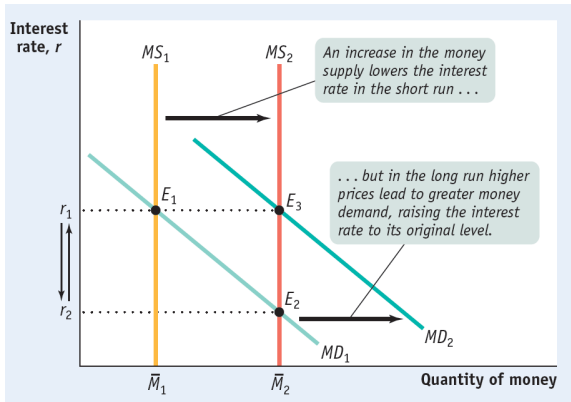
- ▶ Money is neutral in the long run.
- ▶ If the Fed doubles the Money Supply: all nominal variables including prices will double. All real variables including relative prices will not change.
- ▶ However, it does cause the **value of money** to change.

# Changes in the Money Supply and the Interest Rate in the Long Run

- ▶ In the short run, an increase in the money supply leads to a fall in the interest rate, and a decrease in the money supply leads to a rise in the interest rate.
- ▶ In the long run, however, changes in the money supply don't affect the interest rate.



# Changes in the Money Supply and the Interest Rate in the Long Run



# Monetary Policy - Real World Example

**Background.** The US confirmed the first case of COVID-19 in January. Following a widening outbreak in March and April, the number of new cases declined after a range of containment measures were put in place. Infections rose again in early summer as economic activity and traveling resumed, but gradually declined over the summer following stricter prevention measures. However, new cases picked up again in September and continued on an upward trend until early January. Since mid-January, new cases began declining and Covid-19 vaccinations sped up. The U.S. economy contracted by 31.4 percent in the second quarter of 2020, but have rebounded strongly since then. The unemployment rate stayed at 5.8 percent in May 2021.

**Reopening of the economy.** The containment measures in place vary by state and geographical area. As of early June, many states had lifted or eased mask mandates and eased restrictions on business and activities following the progress in the vaccination program. Nevertheless, some states still require mask wearing in indoor environment (especially in K-12 schools). Schools have reopened with options for in-person instruction, virtual learning or a hybrid model.

**Key Policy Responses as of June 3, 2021**

# Monetary Policy - Real World Example

- Federal funds rate were lowered by 150bp in March to 0-0.25bp. Purchase of Treasury and agency securities in the amount as needed. Expanded overnight and term repos. Lowered cost of discount window lending. Reduced existing cost of swap lines with major central banks and extended the maturity of FX operations; broadened U.S. dollar swap lines to more central banks; offered temporary repo facility for foreign and international monetary authorities.