

# Lesson 8 Monetary Policy

# Money and bank

# Why do we use money?

**What would happen if we didn't have money?**

**The Barter System: goods and services are traded directly. There is no money exchanged.**

**Problems:**

- 1. Before trade could occur, each trader had to have something the other wanted.**
- 2. Some goods cannot be split. If 1 goat is worth five chickens, how do you exchange if you only want 1 chicken?**

**Example: A heart surgeon might accept only certain goods but not others because he likes broccoli.**

**To get the surgery, a pineapple grower must find a broccoli farmer that likes pineapples.**

# What is Money?

Money is anything that is generally accepted in payment for goods and services

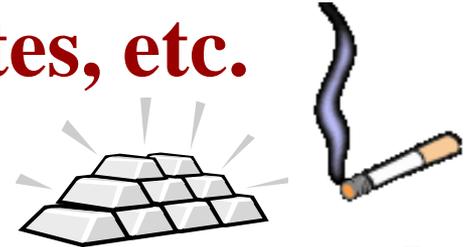
**Money is NOT the same as wealth or income**

Wealth is the total collection of assets that store value

Income is a flow of earnings per unit of time

**Commodity Money- Something that performs the function of money and has alternative uses.**

**– Examples: Gold, silver, cigarettes, etc.**



**Fiat Money- Something that serves as money but has no other important uses.**

**– Examples: Paper Money, Coins**



# 3 Functions of Money

## 1. A Medium of Exchange

- Money can easily be used to buy goods and services with no complications of barter system.

## 2. A Unit of Account

- Money measures the value of all goods and services. Money acts as a measurement of value.
- 1 goat = \$50 = 5 chickens OR 1 chicken = \$10

## 3. A Store of Value

- Money allows you to store purchasing power for the future.
- Money doesn't die or spoil.

# 2 Types of Money

**Liquidity-** how easily an asset can be converted to cash. (liquidized)

**M1 (High Liquidity)** - Coins, Currency, and Checkable deposits (personal and corporate checking accounts).

**M2 (Low Liquidity)** - M1 + savings deposits (money market accounts), time deposits (CDs = certificates of deposit), and Mutual Funds .

# More about money

**The Purchasing Power of money is the amount of goods and services a unit of money can buy.**

**Inflation (decreases) purchasing power.  
Rapid inflation (decreases) acceptability.**

**The Present Value and Future value of money.**

<b>PV 100</b>	<b>1 year</b>	<b>=</b>	<b><math>100 \cdot (1+r\%)</math></b>	<b>FV</b>
<b>PV 100</b>	<b>2 year</b>	<b>=</b>	<b><math>100 \cdot (1+r\%) \cdot (1+r\%)</math></b>	<b>FV</b>
<b>PV 100</b>	<b>3 year</b>	<b>=</b>	<b><math>100 \cdot (1+r\%) \cdot (1+r\%) \cdot (1+r\%)</math></b>	<b>FV</b>

# Credit vs. Debit Cards

**What is the difference between credit cards and debit cards?**

**Are credit cards money?**

**A credit card is NOT money. It is a short-term loan (usually with a higher-than-normal interest rate).**

**Ex: You buy a shirt with a credit card, VISA pays the store, you pay VISA the price of the shirt plus interest and fees.**



# Personal Finance

**Personal finance refers to the way individuals and families budget, save, and spend.**

**In a personal finance class, you learn about checking and savings accounts, credit cards, loans, the stock market, retirement plans, and how to manage your assets**

**Assets- Anything of monetary value owned by a person or business.**

**Investment refers to business spending.**

**Personal investment refers to the asset management of individuals**



# Bonds vs. Stocks

Pretend you are going to start a lemonade stand. You need some money to get your stand started. **What do you do?**

- You ask your grandmother to lend you \$100 and write this down on a piece of paper: "I owe you (IOU) \$100, and I will pay you back in a year plus 5% interest."
- Your grandmother just bought a **bond**.  
**Bonds are loans, or IOUs, that represent debt that the government or a corporation must repay to an investor. The bond holder has NO OWNERSHIP of the company.**  
**Ex: War Bonds During World War II**  
**But, now you need more money...**

- **To get more money, you sell half of your company for \$50 to your brother Tom.**
- **You put this transaction in writing: "Lemo will issue 100 shares of stock. Tom will buy 50 shares for \$50."**
- **Tom has just bought 50% of the business. He is allowed to make decisions and is entitled to a percent of the profits.**

### **Stockowners can earn a profit in two ways:**

**1. Dividends**, which are portions of a corporation's profits, are paid out to stockholders.

**The higher the corporate profit, the higher the dividend.**

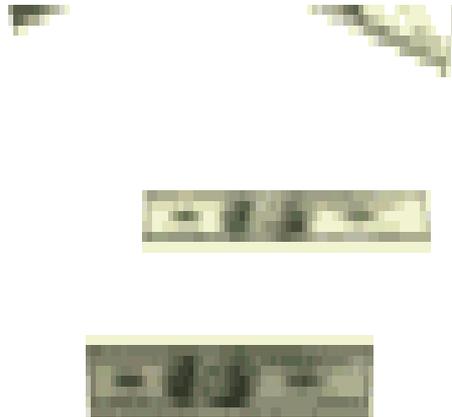
**2. A capital gain** is earned when a stockholder sells stock for more than he or she paid for it.

A stockholder that sells stock at a lower price than the purchase price suffers a **capital loss**.

# Money market

# The Money Market

(Supply and Demand for Money)



# The Demand for Money

## 1. Transaction Demand.

People demand money because it facilitates the purchase goods. As nominal GDP increases, consumers demand more money to buy goods and services.

## 2. Asset Demand

Money can be held as an asset at very little risk. The main disadvantage of putting this asset under your mattress is that it cannot earn any interest as it would were you to invest that money in bonds ,etc

# The Demand for Money

At any given time, people demand a certain amount of liquid assets (money) for everyday purchases.

**The Demand for money shows an inverse relationship between nominal interest rates and the quantity of money demanded.**

**1. What happens to the quantity demanded of money when interest rates increase?**

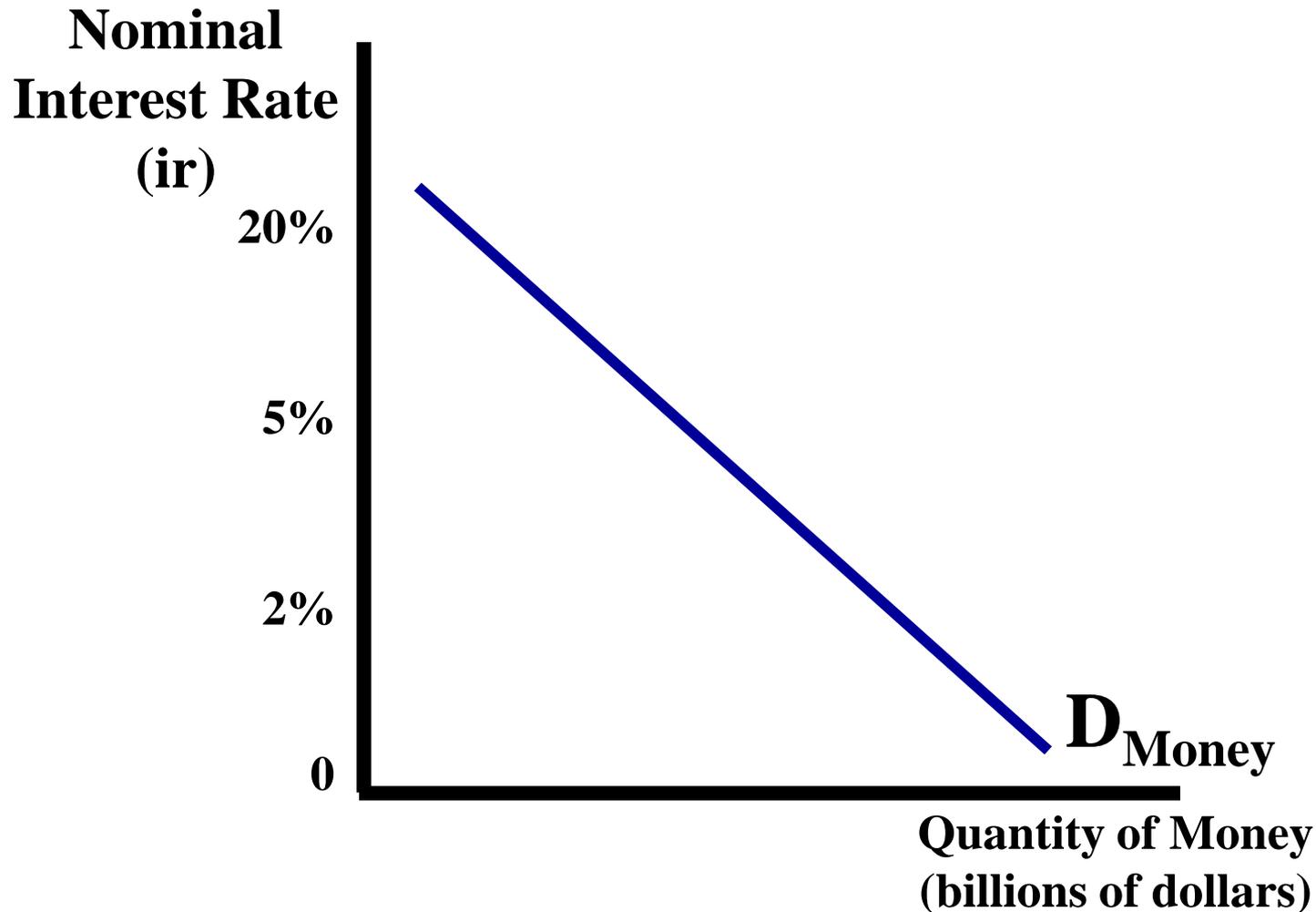
**Quantity demanded falls because individuals would prefer to have interest-earning assets instead**

**2. What happens to the quantity demanded when interest rates decrease?**

**Quantity demanded increases. There is no incentive to convert cash into interest-earning assets**

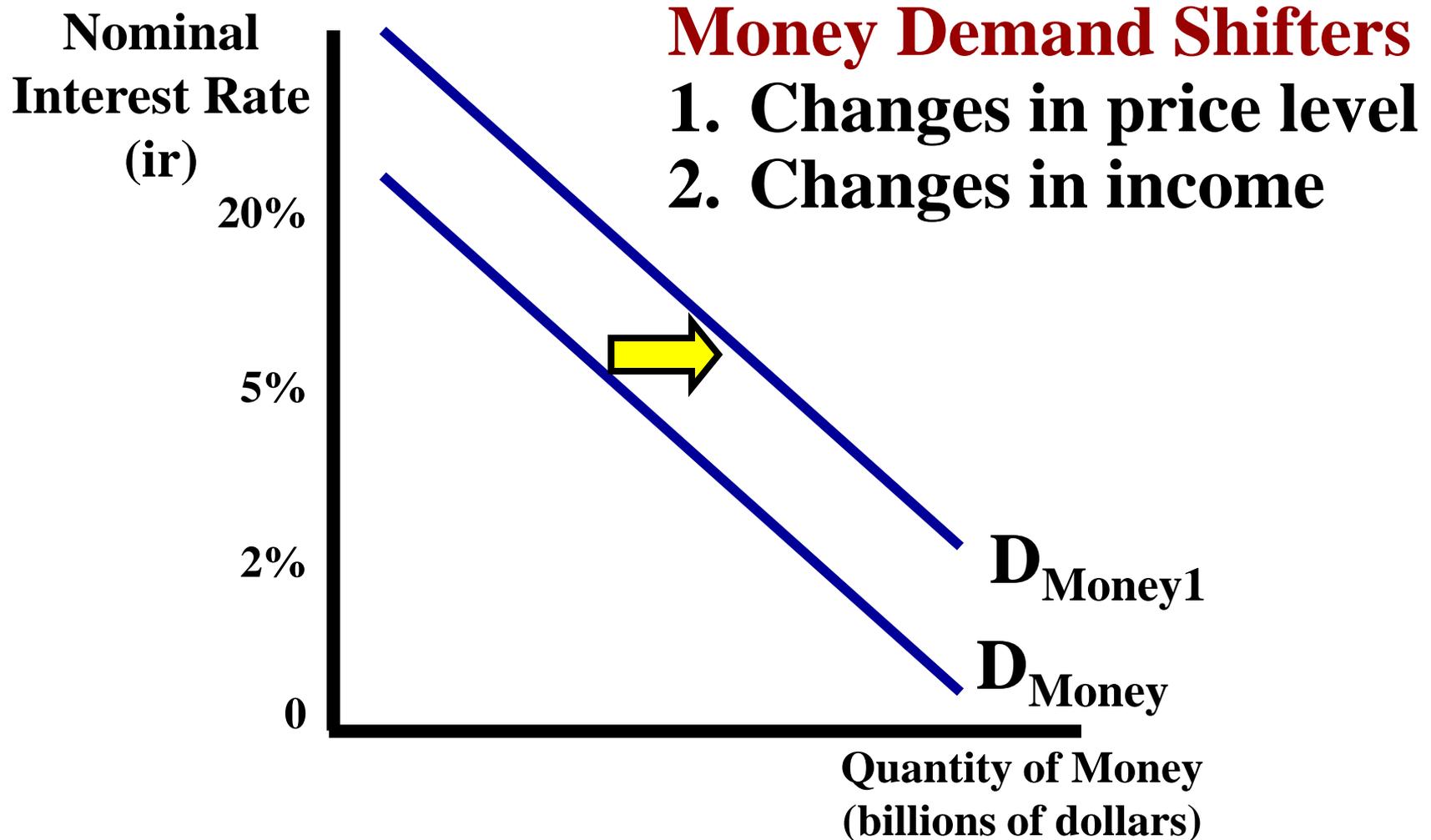
# The Demand for Money

**Inverse relationship between interest rates and the quantity of money demanded**



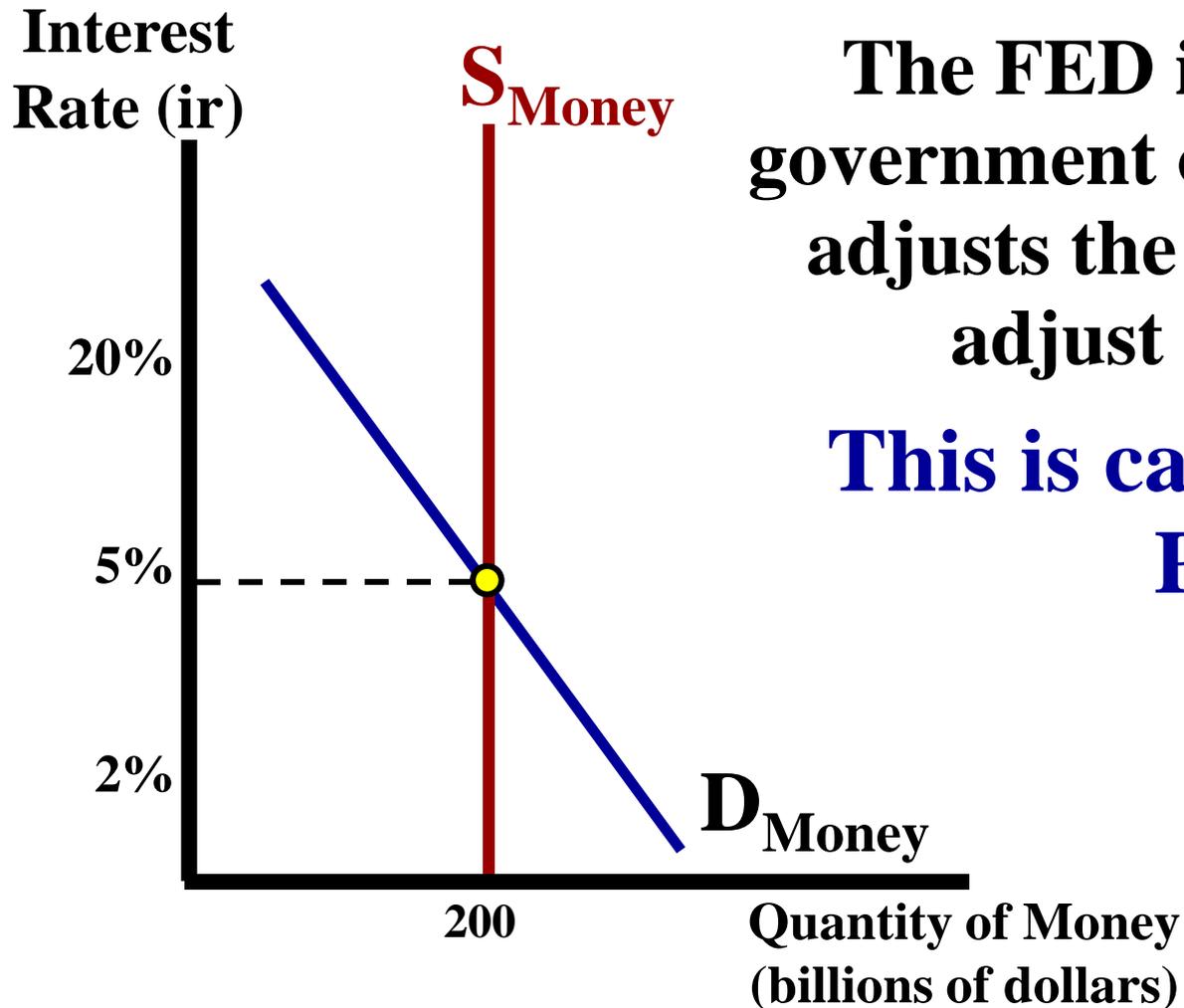
# The Demand for Money

What happens if price level increases?



# The Supply of Money

The U.S. Money Supply is set by the Board of Governors of the Federal Reserve System (FED)



The FED is a nonpartisan government office that sets and adjusts the money supply to adjust the economy

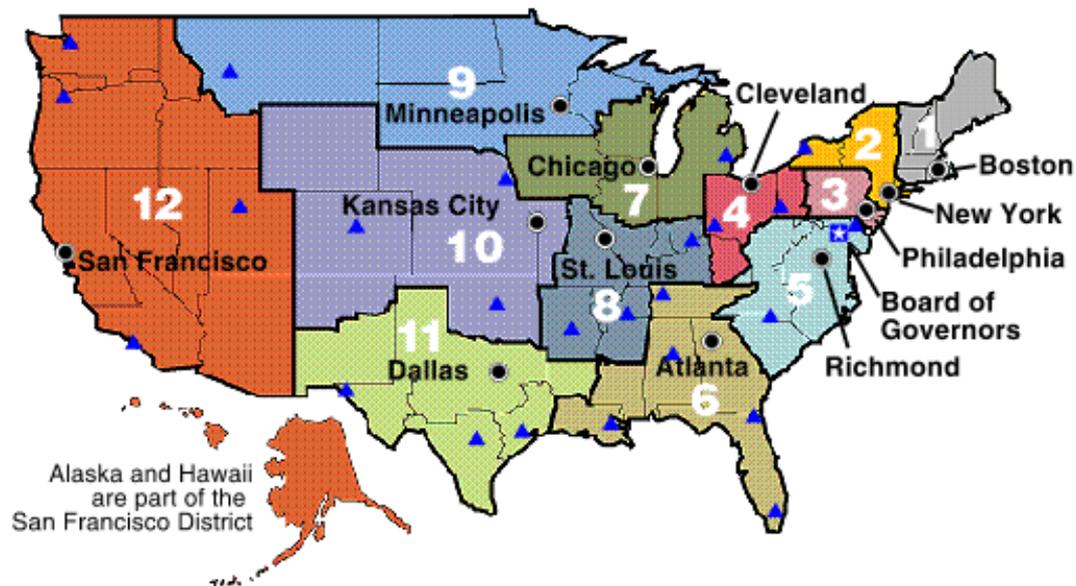
This is called Monetary Policy.



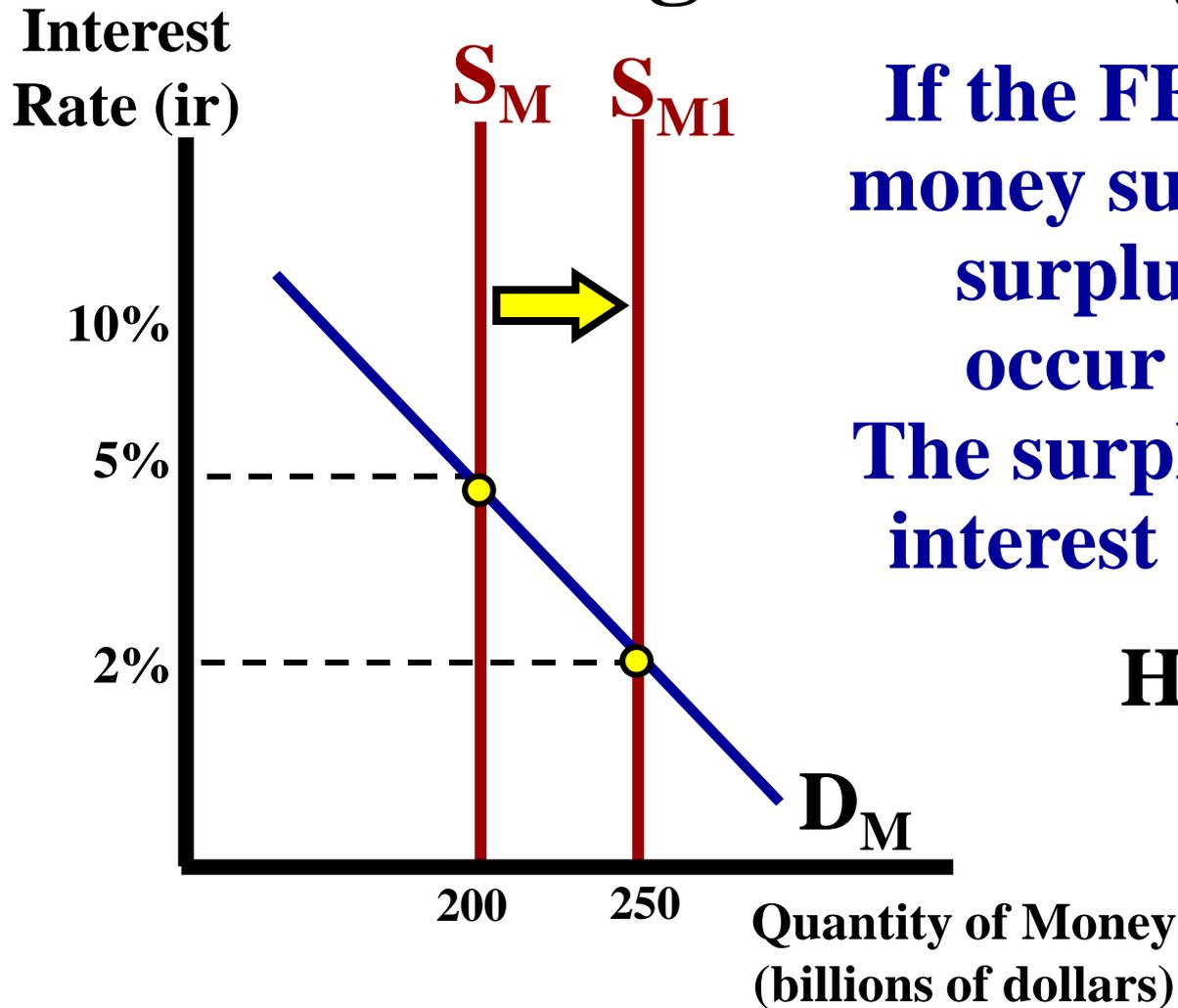
# Monetary policy

# Monetary Policy:

When the FED adjusts the money supply to achieve macroeconomic goals (the Big 3)



# Increasing the Money Supply

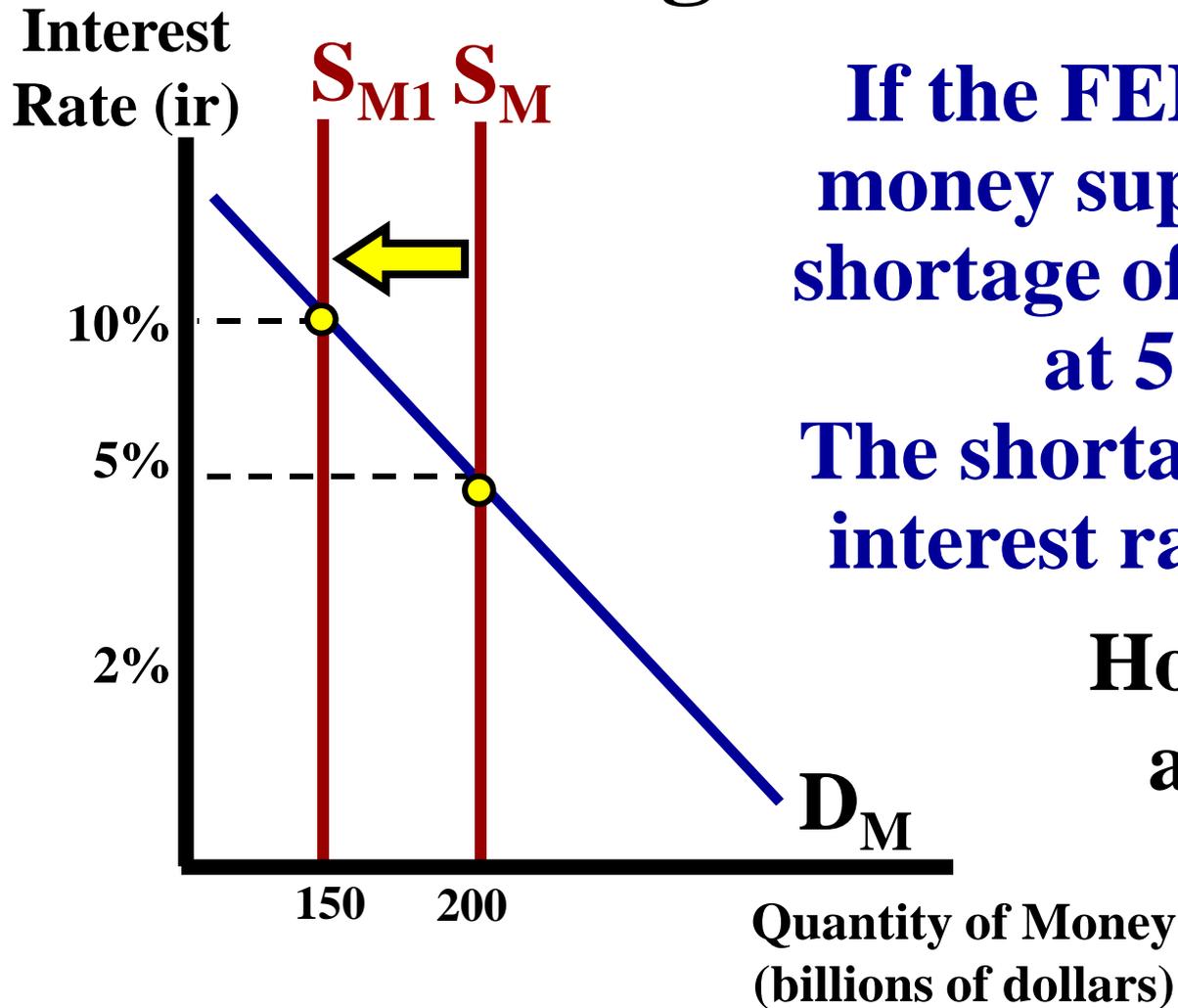


If the FED increases the money supply, a temporary surplus of money will occur at 5% interest. The surplus will cause the interest rate to fall to 2%

How does this affect AD?

Increase money supply → Decreases interest rate → Increases investment → Increases AD

# Decreasing the Money Supply



If the FED decreases the money supply, a temporary shortage of money will occur at 5% interest.

The shortage will cause the interest rate to rise to 10%

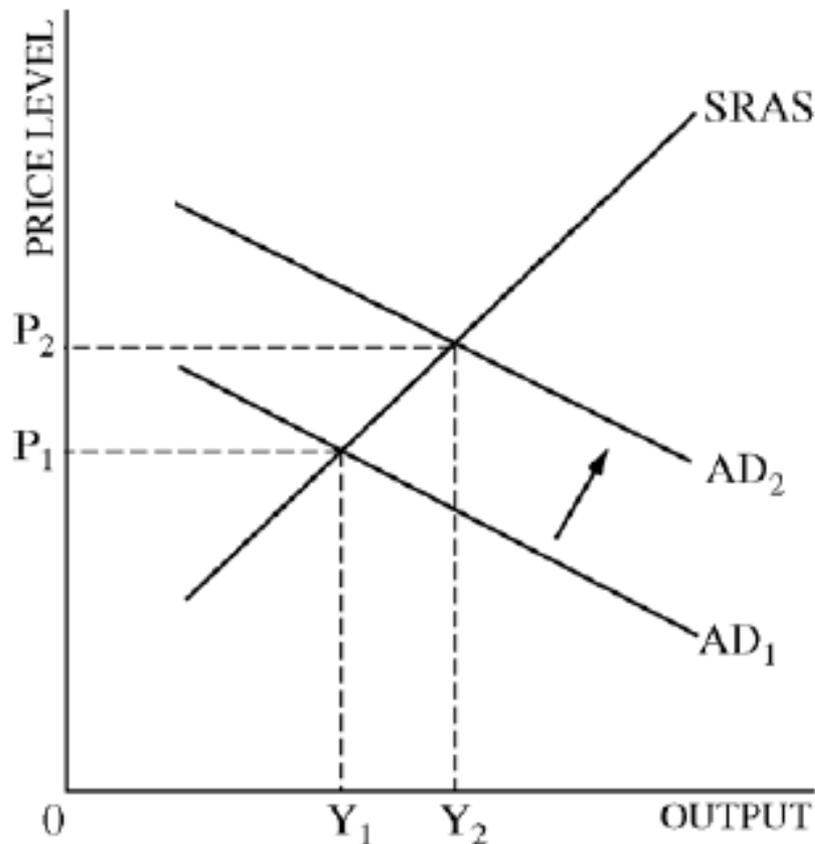
How does this affect AD?

Decrease money supply → Increase interest rate → Decrease investment → Decrease AD

# 2007B Practice FRQ

1. Assume that Australia and New Zealand are trading partners. Australia's economy is currently in recession.
  - (a) Now assume that Australia begins to recover from its recession. Using a correctly labeled graph of aggregate demand and aggregate supply for New Zealand, show the impact of Australia's rising income on each of the following in the short run.
    - (i) Aggregate demand in New Zealand. Explain.
    - (ii) Output in New Zealand
  - (b) Using a correctly labeled graph of the money market for New Zealand, show the effect of the output change in part (a)(ii) on the following.
    - (i) Demand for money. Explain.
    - (ii) The nominal interest rate

# 2007B Practice FRQ



(a) 4 points:

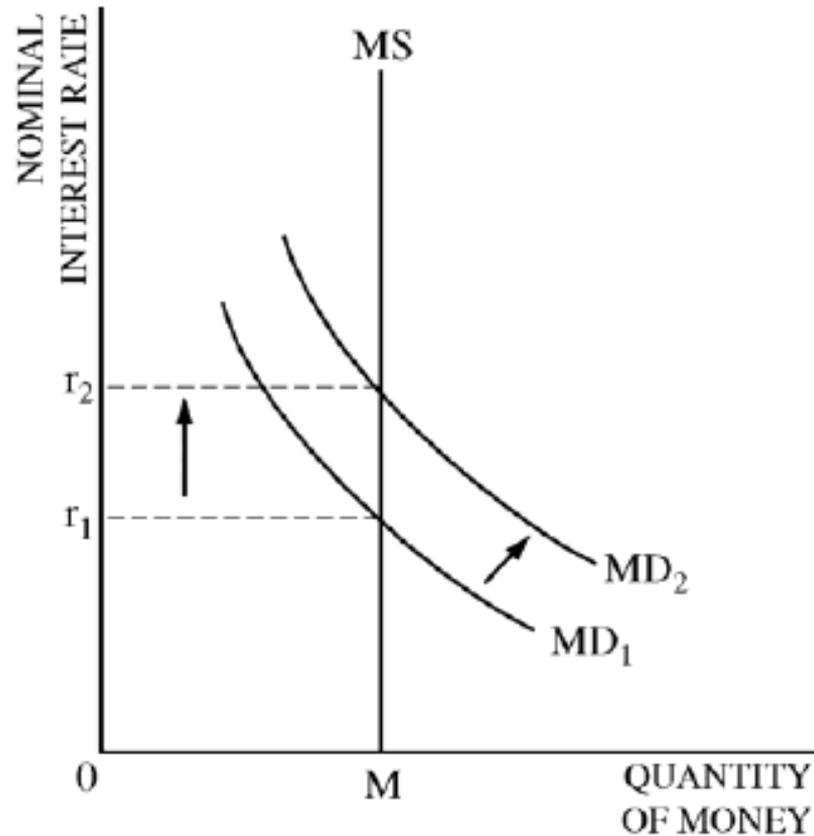
One point is earned for a correctly labeled graph.

One point is earned for showing a rightward shift in New Zealand's AD curve.

One point is earned for the explanation that New Zealand's exports to Australia increase.

One point is earned for concluding that New Zealand's output increases.

# 2007B Practice FRQ



(b) 4 points:

One point is earned for a correctly labeled graph of the money market.

One point is earned for showing a rightward shift of the money demand curve.

One point is earned for the explanation that higher income means more volume of transactions.

One point is earned for concluding that the nominal interest rate increases.

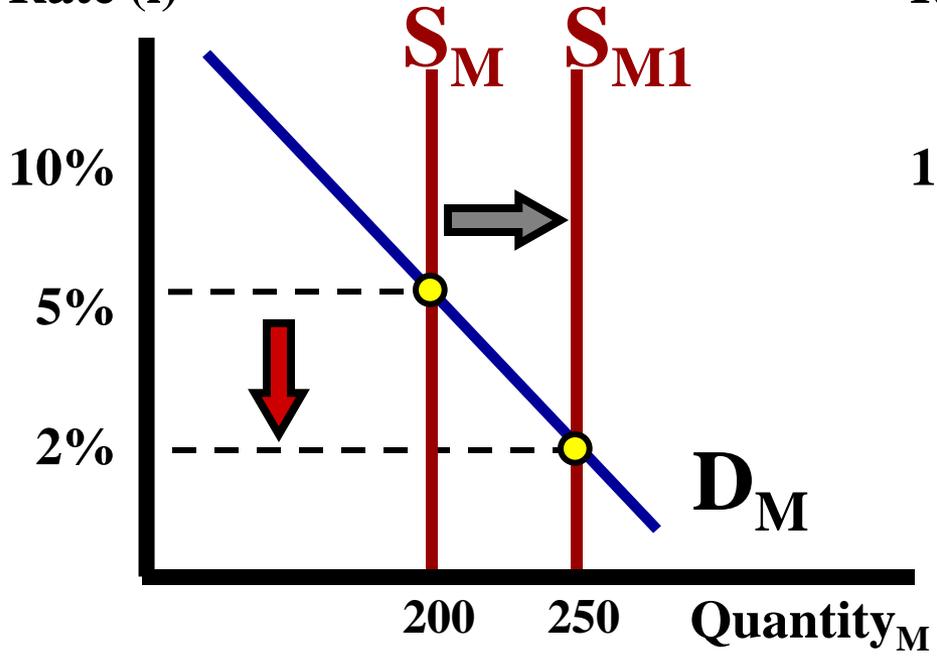
# Showing the Effects of Monetary Policy Graphically

## Three Related Graphs:

- Money Market
- Investment Demand
- AD/AS

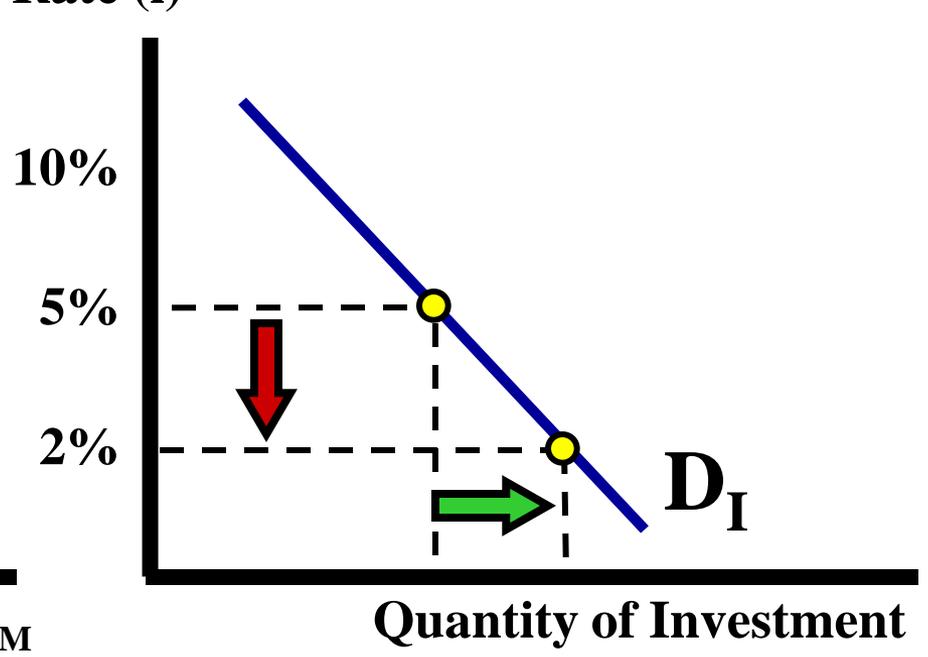
Interest Rate (i)

### S&D of Money



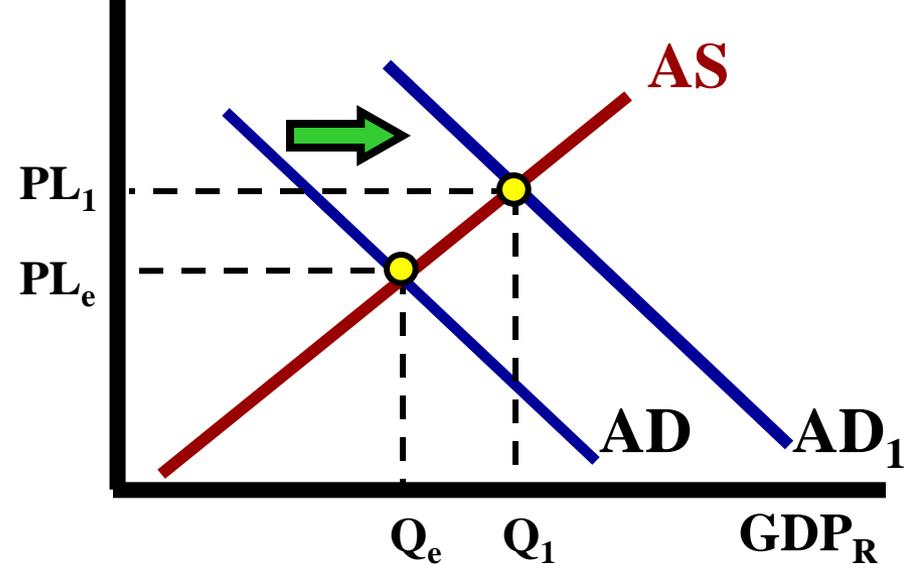
Interest Rate (i)

### Investment Demand



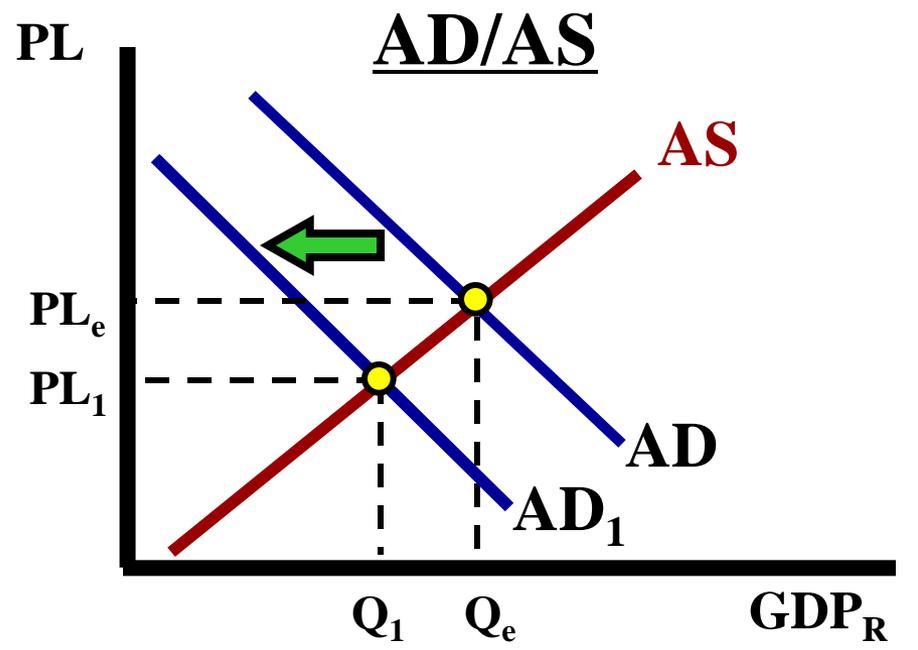
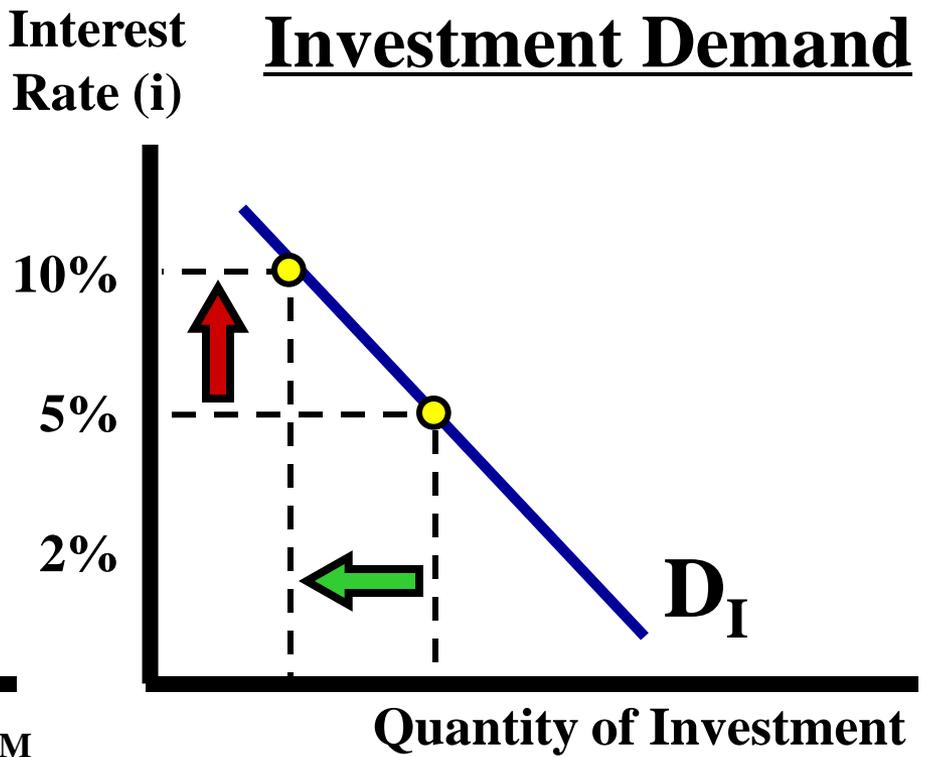
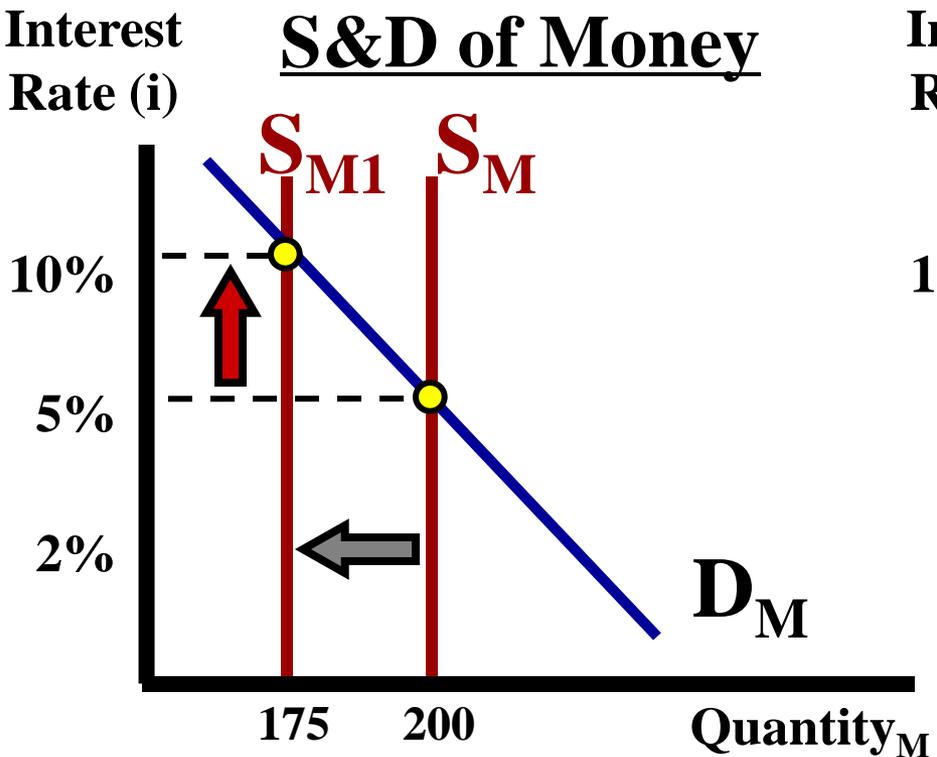
PL

### AD/AS



**The FED increases the money supply to stimulate the economy...**

- 1. Interest Rates Decreases**
- 2. Investment Increases**
- 3. AD, GDP and PL Increases**



**The FED decreases the money supply to slow down the economy...**

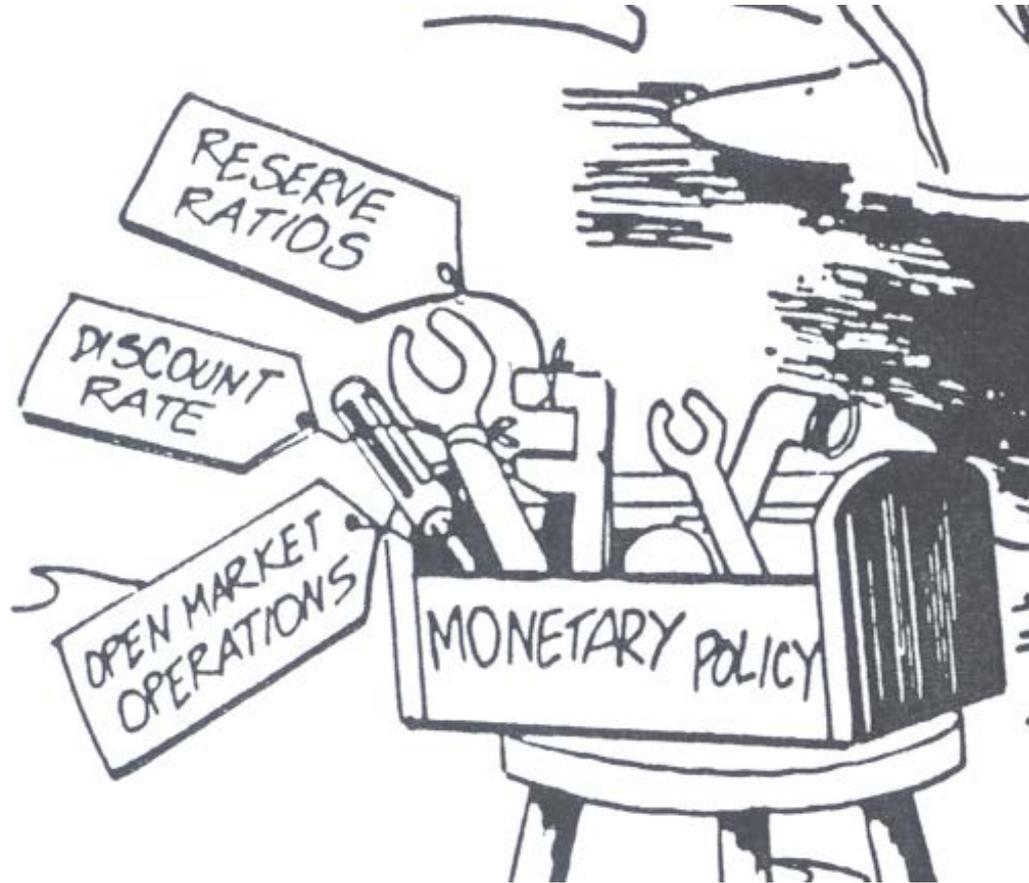
- 1. Interest Rates increase**
- 2. Investment decreases**
- 3. AD, GDP and PL decrease**

# How the Government Stabilizes the Economy



# How the FED Stabilizes the Economy

## These are the three Shifters of Money Supply



# 3 Shifters of Money Supply

The FED adjusting the money supply by changing any one of the following:

1. Setting **Reserve Requirements (Ratios)**

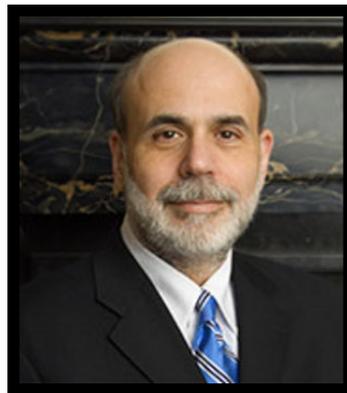
2. Lending Money to Banks & Thrifts

- **Discount Rate**

3. Open Market Operations

- **Buying and selling Bonds**

The FED is now chaired by **Ben Bernanke**.



# #1. The Reserve Requirement

**If you have a bank account, where is your money?**

**Only a small percentage of your money is in the safe.**

**The rest of your money has been loaned out.**

**This is called “Fractional Reserve Banking”**

**The FED sets the amount that banks must hold**

**The reserve requirement (reserve ratio) is the percent of deposits that banks must hold in reserve (the percent they can NOT loan out)**

- **When the FED increases the money supply, it increases the amount of money held in bank deposits.**
- **Banks keep some of the money in reserve and loan out their excess**
- **The loan eventually becomes deposits for another bank that will loan out its excess.**

# The Money Multiplier

**Example:** Assume the reserve ratio in the U.S. is 10%

**You deposit \$1,000 in the bank**

**The bank must hold \$100 (required reserves)**

**The bank lends \$900 out to Bob**

**Bob deposits the \$900 in his bank**

**Bob's bank must hold \$90. It loans out \$810 to Jill**

**Jill deposits \$810 in her bank**

**SO FAR, the initial deposit of \$1000 caused the CREATION of another \$1,710 (Bob's \$900 + Jill's \$810)**

$$\text{Money Multiplier} = \frac{1}{\text{Reserve Requirement (ratio)}}$$

**Example:**

- If the reserve ratio is .20 and reserves increase \$2 billion, how much will the money supply increase?**

# Using Reserve Requirement

**1. If there is a recession, what should the FED do to the reserve requirement? (Explain the steps.)**

## **Decrease the Reserve Ratio**

- 1. Banks hold less money and have more excess reserves**
- 2. Banks create more money by loaning out excess**
- 3. Money supply increases, interest rates fall, AD goes up**

**2. If there is inflation, what should the FED do to the reserve requirement? (Explain the steps.)**

## **Increase the Reserve Ratio**

- 1. Banks hold more money and have less excess reserves**
- 2. Banks create less money**
- 3. Money supply decreases, interest rates up, AD down**

## #2. The Discount Rate

**The Discount Rate is the interest rate that the FED charges commercial banks.**

**Example:**

- **If Bank of America needs \$10 million, it borrows it from the U.S. Treasury (which the FED controls) but BofA must pay it back with 3% interest.**

**To increase the Money supply, the FED should DECREASE the Discount Rate (Easy Money Policy).**

**To decrease the Money supply, the FED should INCREASE the Discount Rate (Tight Money Policy).**

# Federal Funds Rate

**The federal funds rate is the interest rate that banks charge one another for one-day loans of reserves.**

**The FED can't simply tell banks what interest rate to use. Banks decide on their own.**

**The FED influences them by setting a target rate.**

**If the discount rate **is lower** than the federal funds rate, banks will prefer to borrow from the Federal Reserve when they need loans. This puts downward pressure on the federal funds rate.**

**If the discount rate **is higher** than the federal funds rate, banks will probably borrow from each other rather than from the Federal Reserve. This puts upward pressure on the federal funds rate.**

# Discount Rate vs Federal Funds Rate

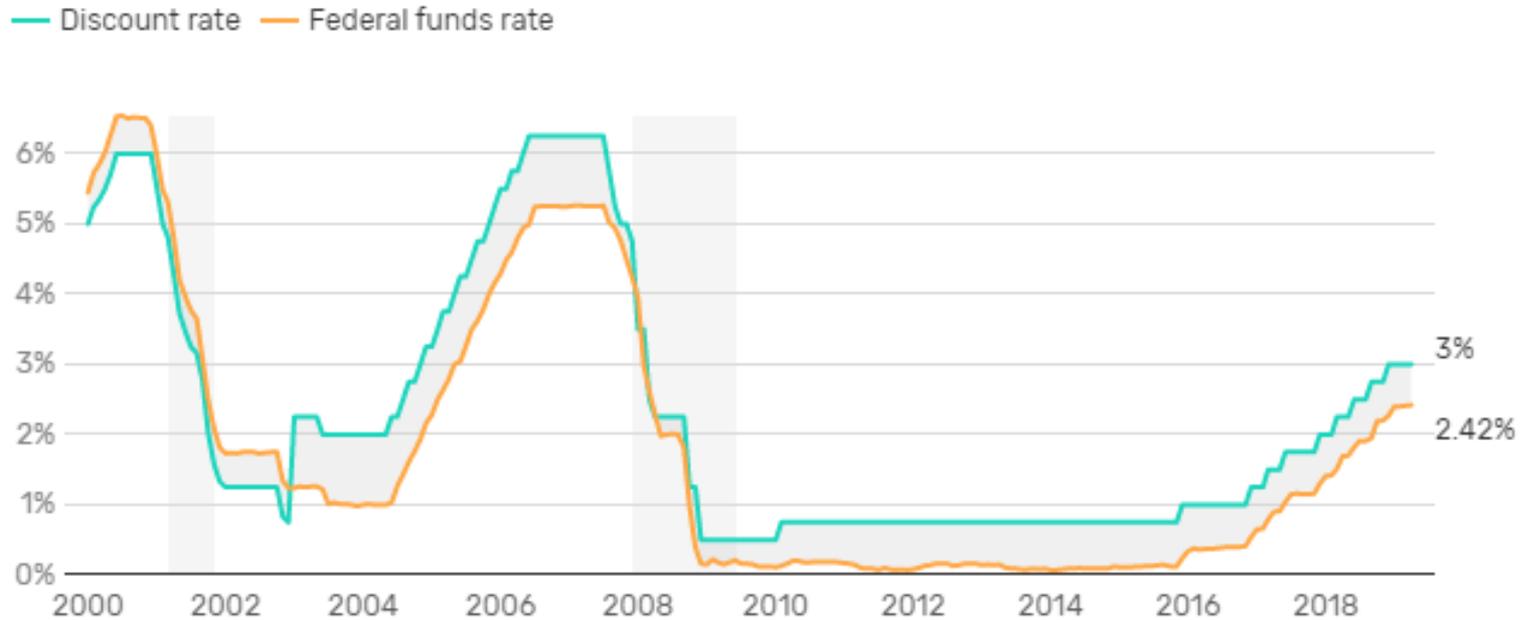


Chart: The Balance • Source: St. Louis Fed

# #3. Open Market Operations

- **Open Market Operations is when the FED buys or sells government bonds (securities).**
- **This is the most important and widely used monetary policy**

**To increase the Money supply, the FED should BUY government securities.**

**To decrease the Money supply, the FED should SELL government securities.**

**How are you going to remember?**

**Buy-BIG- Buying bonds increases money supply**

**Sell-SMALL- Selling bonds decreases money supply**

# Practice

**Don't forget the Monetary Multiplier!!!!**

- 1. If the reserve requirement is  $.5$  and the FED sells \$10 million of bonds, what will happen to the money supply?**
- 2. If the reserve requirement is  $.1$  and the FED buys \$10 million bonds, what will happen to the money supply?**
- 3. If the FED decreases the reserve requirement from  $.50$  to  $.20$  what will happen to the money multiplier?**

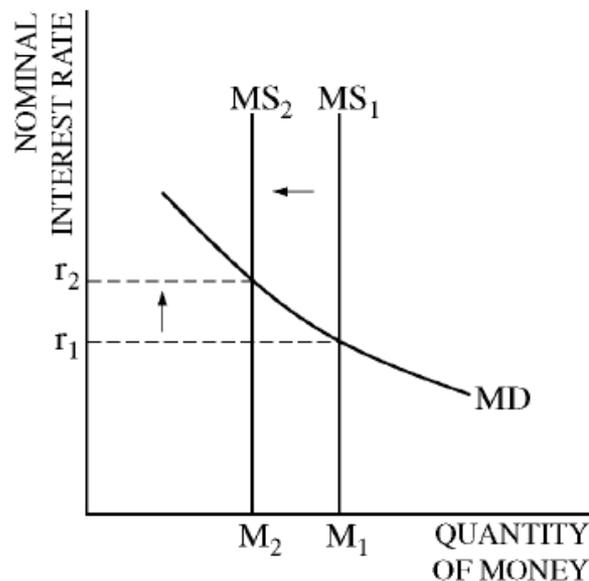
# 2009B Practice FRQ

In Country Z, the required reserve ratio is 10 percent. Assume that the central bank sells \$50 million in government securities on the open market.

- (a) Calculate each of the following.
  - (i) The total change in reserves in the banking system
  - (ii) The maximum possible change in the money supply
- (b) Using a correctly labeled graph of the money market, show the impact of the central bank's bond sale on the nominal interest rate.
- (c) What is the impact of the central bank's bond sale on the equilibrium price level in the short run?
- (d) As a result of the price level change in part (c), are people with fixed incomes better off, worse off, or unaffected? Explain.

(a) 2 points:

- One point is earned for determining the total change in reserves: \$50 million.
- One point is earned for calculating the maximum possible change in the money supply:  $10 \times \$50 = \$500$  million.



(b) 2 points:

- One point is earned for a correctly labeled graph of the money market.
- One point is earned for showing a leftward shift of the money supply curve and an increase in the nominal interest rate.

(c) 1 point:

- One point is earned for concluding that the equilibrium price level will fall.

(d) 2 points:

- One point is earned for concluding that people with a fixed income would be better off.
- One point is earned for explaining that the lower price level raises real income or increases the purchasing power of the fixed income.

# Balance sheet of commercial banks

# **T-account or balance sheet**

**Asset. Anything owned by the bank or owed to the bank is an asset of the bank. Cash on reserve is an asset, and so are loans made to citizens.**

**Liability. Anything owned by depositors or lenders to the bank is a liability. Checking deposits of citizens or loans made to the bank are liabilities to the bank.**

**Owner's equity represents the owner's investment in the business. is viewed as a residual claim on the business assets because liabilities have a higher claim.**

# T-account or balance sheet

## Asset

- required reserves
- excess reserves
- loans
- bonds

## Liability

- demand deposits/ deposits

Assets		Liabilities	
Required reserves	\$10,000	Demand deposits	\$100,000
Excess reserves	\$5,000		
Loans	\$85,000	Owner's equity	\$ 0

Assets		Liabilities	
Required reserves	\$2,000	Demand deposits	\$10,000
Excess reserves	\$0	Owner's equity	\$10,000
Customer loans	\$8,000		
Government securities (bonds)	\$7,000		
Building and fixtures	\$3,000		

# 2012 FRQ #2

2. The following is a simplified balance sheet for Mi Tierra Bank in the United States.

Assets		Liabilities	
Required reserves	\$10,000	Demand deposits	\$100,000
Excess reserves	\$5,000		
Loans	\$85,000	Owner's equity	\$ 0

- (a) What is the reserve requirement?
- (b) Assume that Luis withdraws \$5,000 in cash from his checking account at Mi Tierra Bank.
  - (i) By how much will Mi Tierra Bank's reserves change based on Luis' withdrawal?
  - (ii) What is the initial effect of the withdrawal on the M1 measure of money supply? Explain.
  - (iii) As a result of the withdrawal, what is the new value of excess reserves on the balance sheet of Mi Tierra Bank based on the reserve requirement from part (a) ?
- (c) Assume that the next day John withdraws from Mi Tierra Bank an amount that exceeds the bank's excess reserves. Assuming that no loans are called in, how can Mi Tierra Bank cover its required reserves?

# Quantity theory of money

# Quantity Theory of Money

**We can analyze the relationship between money, inflation, and output with the equation:**

$$M \times V = P \times Q(\text{or } Y)$$

**M = money supply**

**P = price level**

**V = velocity**

**Q = quantity of output.**

**The velocity of money is the rate at which money changes hands.**

- In the long run, velocity is relatively constant because people's spending habits are not quick to change.**
- The quantity of output, Q, is not affected by the money supply because it is based on the amount of production, not the value of the stuff produced.**
- The point is that an increase in the money supply, with no change in velocity, leads to increased prices.**

$$M \times V = P \times Q$$

**(Notice that  $P \times Q$  is the nominal GDP)**

**This equation can be rearranged as:**

$$V = (\text{Nominal GDP}) / M$$

- **Assume the Nominal GDP is stays at \$100 and the money supply is \$100.**
- **Velocity is 1**
- **If the money supply decreases to \$50**
- **Velocity becomes 2**
- **The rate in which money changes hands must increase to facilitate the same amount of purchases**
- **A lower money supply means a higher velocity**
- **A higher money supply means a lower velocity**

# 2014 FRQ #2

2. The Federal Reserve can influence the supply of money.
  - (a) Assume that the Federal Reserve targets a lower federal funds rate.
    - (i) What open market operation can the Federal Reserve use to achieve the lower target?
    - (ii) Given your answer to part (a)(i), what will happen to the price of government bonds?
  - (b) Using a correctly labeled graph of the money market, show the effect of the open market operation from part (a)(i) on the nominal interest rate.
  - (c) Assume that the Federal Reserve buys government bonds from commercial banks. Based only on this transaction, will the level of required reserves in the commercial banks increase, decrease, or remain the same?
  - (d) Another monetary policy action involves changing the discount rate. Define the discount rate.