



The Financial Sector

Saving, Investment, and the Financial System

- ◆ **Savings-investment spending identity:** savings and investment spending are always equal for the economy as a whole.
- ◆ **Important Identities**
 - Remember that GDP can be divided up into 4 components: consumption, investment, government purchases, and net exports
 - $Y = C + I + G + NX$
 - We will assume that we are dealing with a closed economy (an economy that does not engage in international trade or international borrowing and lending). This implies that GDP can now be divided into only 3 components.
 - $Y = C + I + G$

Important Identities (cont.)

- ◆ To isolate investment, we can subtract C and G from both sides
- ◆ $Y - C - G = I$
- ◆ The left side of this equation (Y-C-G) is the total income in the economy after paying for consumption and government purchases. This amount is called **national saving (saving)** – the total income in the economy that remains after paying for consumption and government purchases.

Important Identities (cont.)

- ◆ Substitute saving (S) into our identity gives us: $S=I$
- ◆ This equation tells us that saving equals investment
- ◆ Let's go back to our definition of national saving once again:
- ◆ $S = Y - C - G$

Important Identities (cont.)

- ◆ We can add taxes (T) and subtract taxes (T)
- ◆ $S = (Y - C - T) + (T - G)$
- ◆ The first part of this equation (Y-T-C) is called private saving; the second part (T-G) is called public saving.
 - **Private saving** – the income that households have left after paying for taxes and consumption
 - **Public saving** – the tax revenue that the government has left after paying for its spending
 - **Budget surplus** – an excess of tax revenue over government spending
 - **Budget deficit** – a shortfall of tax revenue from government spending

Important Identities (cont.)

- ◆ The fact that $S=I$ means that for the economy as a whole saving must be equal to investment
 - The bond market, stock market, banks, mutual funds, and other financial markets and institutions stand between the two sides of the $S=I$ equation
 - These markets and institutions take in the nation's saving and direct it to the nation's investment

Open Economy: Savings and Investments

- ◆ Savings of people in one country can be used to finance investment spending that occurs in another country.
- ◆ Capital inflow: the net inflow of funds into a country.
- ◆ Can be positive or negative
- ◆ Negative if more foreign funds come into country than leave the country.

The Meaning of Saving and Investment

- ◆ In macroeconomics, investment refers to the purchase of new capital, such as equipment or buildings
- ◆ If an individual spends less than he earns and uses the rest to buy stocks or mutual funds, economists call this saving.

The Meaning of Saving and Investment

- ◆ **Private saving** is the income remaining after households pay their taxes and pay for consumption.
- ◆ Examples of what households do with saving:
 - buy corporate bonds or equities
 - purchase a certificate of deposit at the bank
 - buy shares of a mutual fund
 - let accumulate in saving or checking accounts

Saving and Investment

- ◆ **Investment** is the purchase of new capital.
- ◆ Examples of investment:
 - General Motors spends \$250 million to build a new factory in Flint, Michigan.
 - You buy \$5000 worth of computer equipment for your business.
 - Your parents spend \$300,000 to have a new house built.

Remember: In economics, investment is NOT the purchase of stocks and bonds!

ACTIVE LEARNING 1:

Exercise

- ◆ Suppose GDP equals \$10 trillion, consumption equals \$6.5 trillion, the government spends \$2 trillion and has a budget deficit of \$300 billion.
- ◆ Find public saving, taxes, private saving, national saving, and investment.

ACTIVE LEARNING 1:

Answers

Given:

$$Y = 10.0, \quad C = 6.5, \quad G = 2.0, \quad G - T = 0.3$$

$$\text{Public saving} = T - G = -0.3$$

$$\text{Taxes: } T = G - 0.3 = 1.7$$

$$\text{Private saving} = Y - T - C = 10 - 1.7 - 6.5 = 1.8$$

$$\text{National saving} = Y - C - G = 10 - 6.5 = 3.5 = 1.5$$

$$\text{Investment} = \text{national saving} = 1.5$$

ACTIVE LEARNING 1B:

Exercise

- ◆ Now suppose the government cuts taxes by 200 billion.
- ◆ In each of the following two scenarios, determine what happens to public saving, private saving, national saving, and investment.
 - 1.** Consumers save the full proceeds of the tax cut.
 - 2.** Consumers save $\frac{1}{4}$ of the tax cut and spend the other $\frac{3}{4}$.

ACTIVE LEARNING 1B:

Answers

In both scenarios, public saving falls by \$200 billion, and the budget deficit rises from \$300 billion to \$500 billion.

- 1.** If consumers save the full \$200 billion, national saving is unchanged, so investment is unchanged.
- 2.** If consumers save \$50 billion and spend \$150 billion, then national saving and investment each fall by \$150 billion.

ACTIVE LEARNING 1C:

Discussion questions

The two scenarios are:

1. Consumers save the full proceeds of the tax cut.
 2. Consumers save $1/4$ of the tax cut and spend the other $3/4$.
- ◆ Which of these two scenarios do you think is the most realistic?
 - ◆ Why is this question important?

Financial System

- ◆ Financial System – the group of institutions in the economy that help to match one person's saving with another person's investment
- ◆ Where households invest their current savings and their accumulated savings (**wealth**)
- ◆ Financial institutions in the US economy
 - Financial markets – financial institutions through which savers can directly provide funds to borrowers
 - ◆ Stock Market
 - ◆ Bond Market
 - Financial intermediaries – financial institutions through which savers can indirectly provide funds to borrowers
 - ◆ Banks
 - ◆ Mutual funds

Three Tasks of a Financial System

- ◆ 3 Problems facing borrowers and lenders: transactions costs, risk, and the desire for liquidity.
- ◆ 1) Reducing Transaction Costs
 - Transaction costs – the expenses of negotiating and executing a deal
 - Company wants a \$1 billion loan, to get 1000 loans from 1000 different people of \$1 million dollars will have a high transaction cost.
 - Result: Go to a bank and get a loan or sell bonds

Three Tasks of a Financial System

- ◆ 2) Reducing Risk
- ◆ Financial risk – uncertainty about future outcomes that involve financial losses and gains.
- ◆ Diversification – investing in several different assets so that the possible losses are independent events.
- ◆ Most people are risk averse.

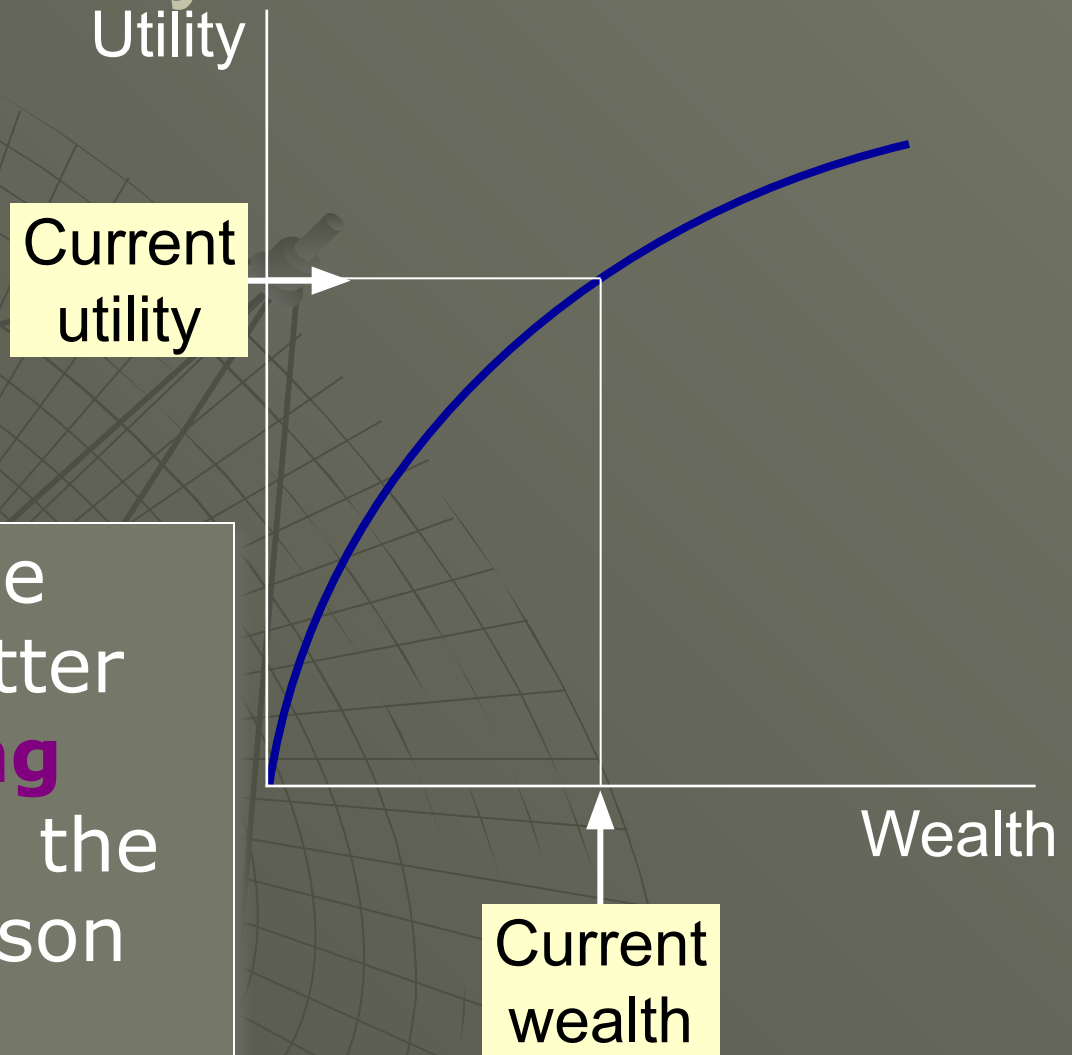
Risk Aversion

- ◆ Most people are **risk averse** – they dislike uncertainty.
- ◆ Example: You are offered the following gamble.
Toss a fair coin.
 - If heads, you win \$1000.
 - If tails, you lose \$1000.Should you take this gamble?
- ◆ If you are risk averse, the pain of losing \$1000 would exceed the pleasure of winning \$1000, so you should not take this gamble.

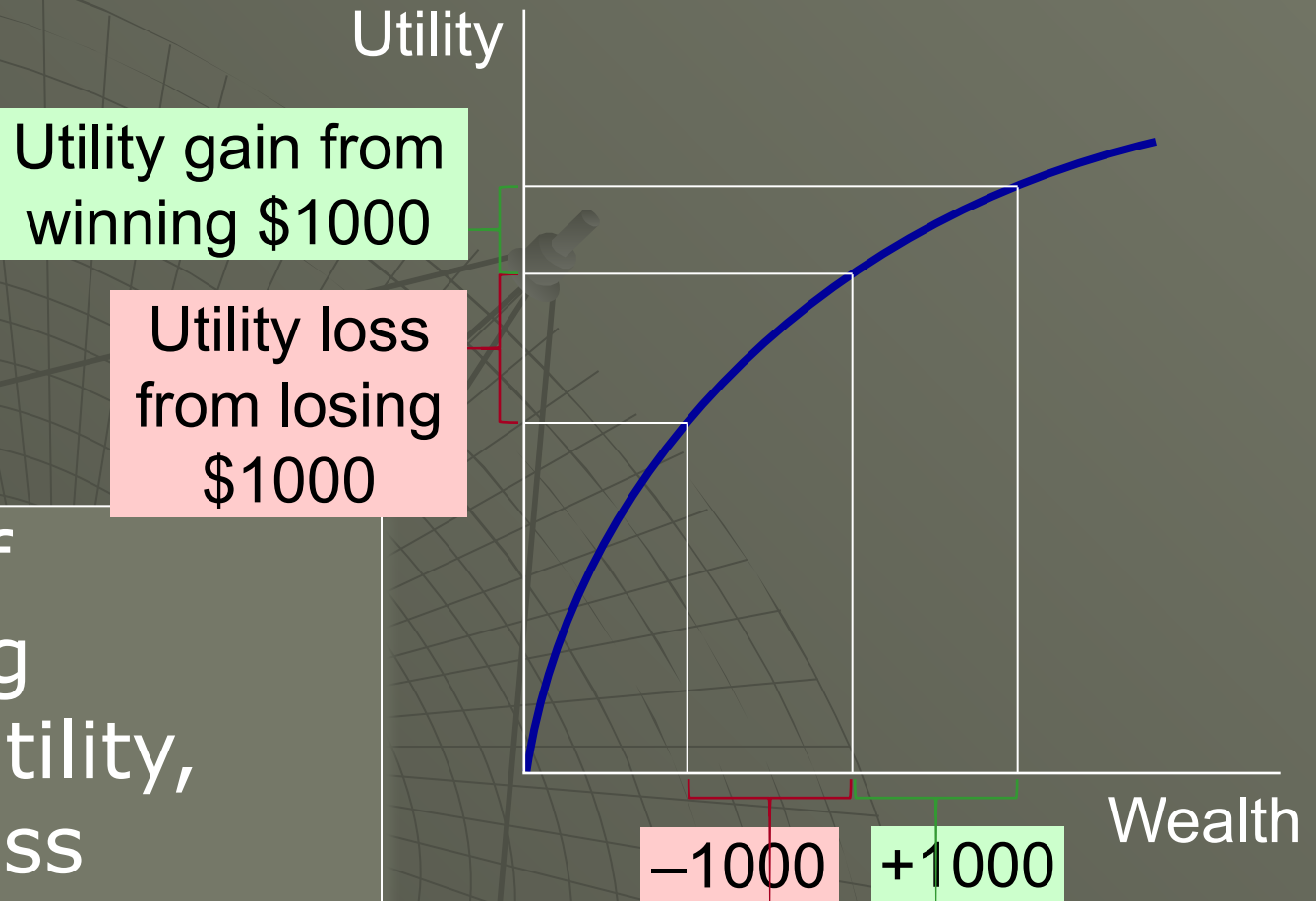
The Utility Function

Utility is a subjective measure of well-being that depends on wealth.

As wealth rises, the curve becomes flatter due to **diminishing marginal utility**: the more wealth a person has, the less extra utility he would get from an extra dollar.



The Utility Function and Risk Aversion

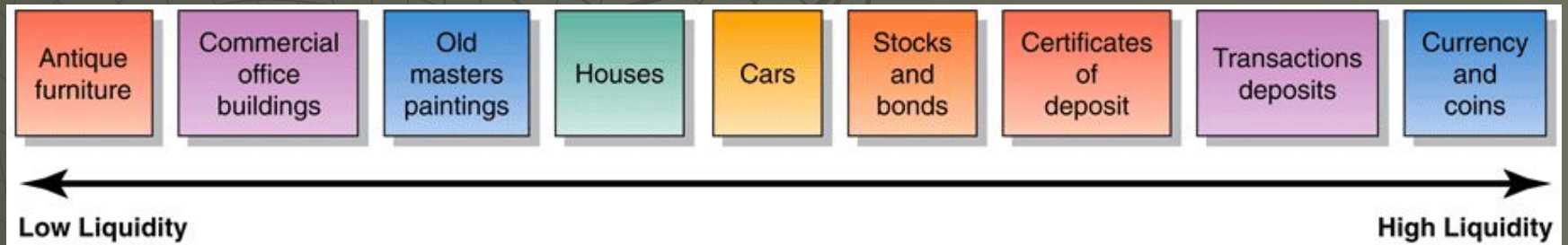


Because of diminishing marginal utility, a \$1000 loss reduces utility more than a \$1000 gain increases it.

Three Tasks of a Financial System

- ◆ 3) Providing Liquidity
- ◆ Liquid asset is an asset that can be quickly converted into cash without much loss of value
- ◆ Illiquid asset is an asset that cannot be quickly converted into cash without much loss of value.

Degrees of Liquidity



Liquidity

- ◆ Liquidity – the ease with which an asset can be converted into the economy's medium of exchange
- ◆ Money is the money liquid asset available
- ◆ Other assets (such as stocks, bonds, and real estate) vary in liquidity
- ◆ When people decide what forms to hold their wealth; they have to balance liquidity of each possible asset against the asset's usefulness as a store of value



Financial markets

- ◆ The Bond Market
- ◆ Bond – a certificate of indebtedness
- ◆ A bond identifies the date of maturity and the rate of interest that will be paid periodically until the loan matures

Characteristics of a Bond

- ◆ One characteristic that determines a bond's value is its term. The term is the length of time until the bond matures. All else equal, long-term bonds pay higher rates of interest than short-term bonds
- ◆ Another characteristic of a bond is its credit risk, which is the probability that the borrower will fail to pay some of the interest or principal. All else equal, the more risky a bond is, the higher its interest rate
- ◆ Tax treatment. For example, when state and local governments issue bonds, the interest income earned by the holders of these bonds is not taxed by the federal government. This makes these bonds more attractive; thus, lowering the interest rate needed to entice people to buy them.

Financial Markets

- ◆ **Stock Market**
 - Stock – a claim to partial ownership in a firm
 - The sale of stock is called equity finance, the sale of bonds to raise money is called debt finance
 - Stocks are sold on organized stock exchanges (such as the New York Stock Exchange or NASDAQ) and the prices of stocks are determined by supply and demand
 - The price of a stock generally reflects the perception of a company's future profitability
 - A *stock index* is computed as an average of a group of stock prices

Financial Assets

- ◆ Stock
- ◆ Bond
- ◆ Loan – a lending agreement between an individual lender and an individual borrower.
- ◆ Loan-backed securities – an asset created by pooling individual loans and selling shares in that pool.
 - Example: Mortgage backed securities (MBS)

Financial Intermediaries

◆ Banks

- The primary role of banks is to take in deposits from people who want to save and then lend them out to others who want to borrow
- Banks pay depositors interest on their deposits and charge borrowers a higher rate of interest to cover the costs of running the bank and provide the bank owners with some amount of profit
- Banks also play another important role in the economy by allowing individuals to use checking deposits as a medium of exchange

Financial Intermediaries

- ◆ Mutual funds – an institution that sells shares to the public and uses the proceeds to buy a portfolio of stocks and bonds
- ◆ The primary advantage of a mutual fund is that it allows individuals with small amounts of money to diversify
- ◆ Mutual funds called “index funds” buy all of the stocks of a given stock index. These funds have generally performed better than funds with active fund managers. This may be true because they trade stocks less frequently and they do not have to pay the salaries of fund managers

Financial Intermediaries

- ◆ Pension fund: a type of mutual fund that holds assets in order to provide retirement income to its members
 - 2009 pension funds in United States held more than \$9 trillion in assets.
- ◆ Life insurance company: sells policies that guarantee a payment to a policyholder's beneficiaries when the policyholder dies.

Definition and Measurement of Money

- ◆ Money: the set of assets in an economy that people regularly use to buy goods and services from other people.
- ◆ Money serves three functions in our economy



Types of Money

Iron	Boar tusk	Playing cards
Copper	Red woodpecker scalps	Leather
Brass	Feathers	Gold
Wine	Glass	Silver
Corn	Polished beads (wampum)	Knives
Salt	Rum	Pots
Horses	Molasses	Boats
Sheep	Tobacco	Pitch
Goats	Agricultural implements	Rice
Tortoise shells	Round stones with centers removed	Cows
Porpoise teeth	Crystal salt bars	Paper
Whale teeth	Snail shells	Cigarettes

Source: Roger LeRoy Miller and David D. VanHoose, *Money, Banking, and Financial Markets*, 3rd ed. (Cincinnati: South-Western, 2007), p. 7.

The Functions of Money

- ◆ Medium of exchange – an item that buyers give to sellers when they want to purchase goods and services
- ◆ Unit of account – the yardstick people use to post prices and record debts
- ◆ Store of value – an item that people can use to transfer purchasing power from the present to the future



Kinds of Money

Commodity money:

takes the form of a commodity with intrinsic value

Examples: gold coins, cigarettes in POW camps



Fiat money:

money without intrinsic value, used as money because of government decree

Example: the U.S. dollar



Money is the U.S. Economy

- ◆ The quantity of money circulating in the United States is sometimes called the money stock
- ◆ **Monetary aggregates** - an overall measure of the money supply
- ◆ Included in the measure of the money stock are currency, demand deposits and other monetary assets
 - **Currency** - the paper bills and coins in the hands of the public
 - **Demand deposits** - balances in bank accounts that depositors can access on demand by writing a check



Credit Cards, Debit Cards, and Money

- ◆ Credit cards are not a form of money; when a person uses a credit card, he or she is simply deferring payment for the item



Because using a debit card is like writing a check, the account balances that lie behind debit cards are included in the measures of money

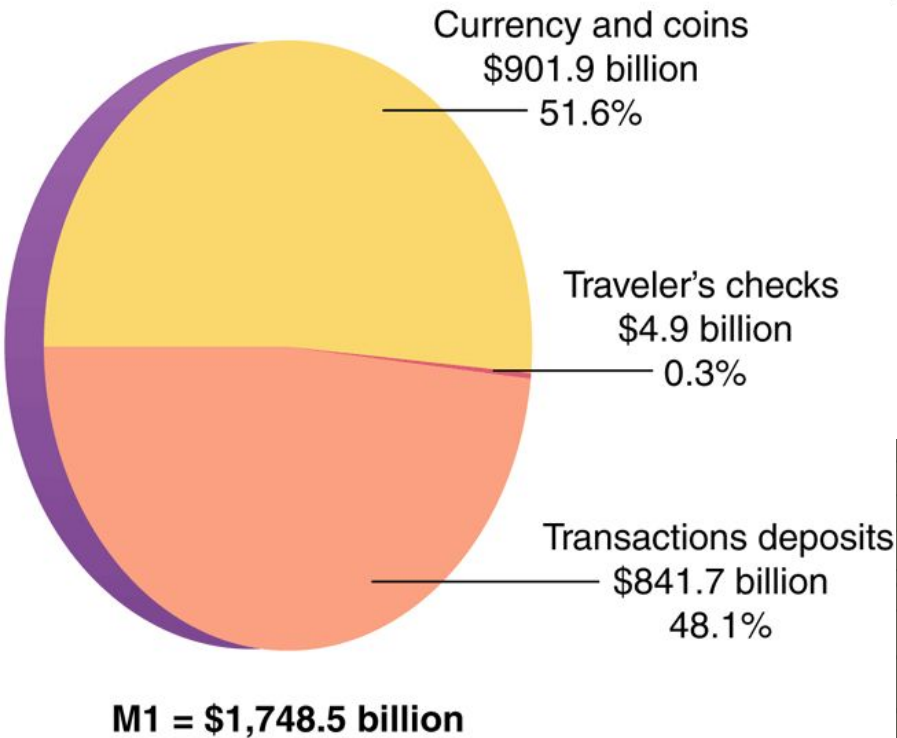
Measures of the U.S. Money Supply

- ◆ **M1**: currency, demand deposits, traveler's checks, and other checkable deposits.
- ◆ **M2**: everything in M1 plus near moneys (financial assets that can't be directly used as a medium of exchange but can be readily converted into cash or checkable bank deposits) savings deposits, small time deposits, money market mutual funds, and a few minor categories.

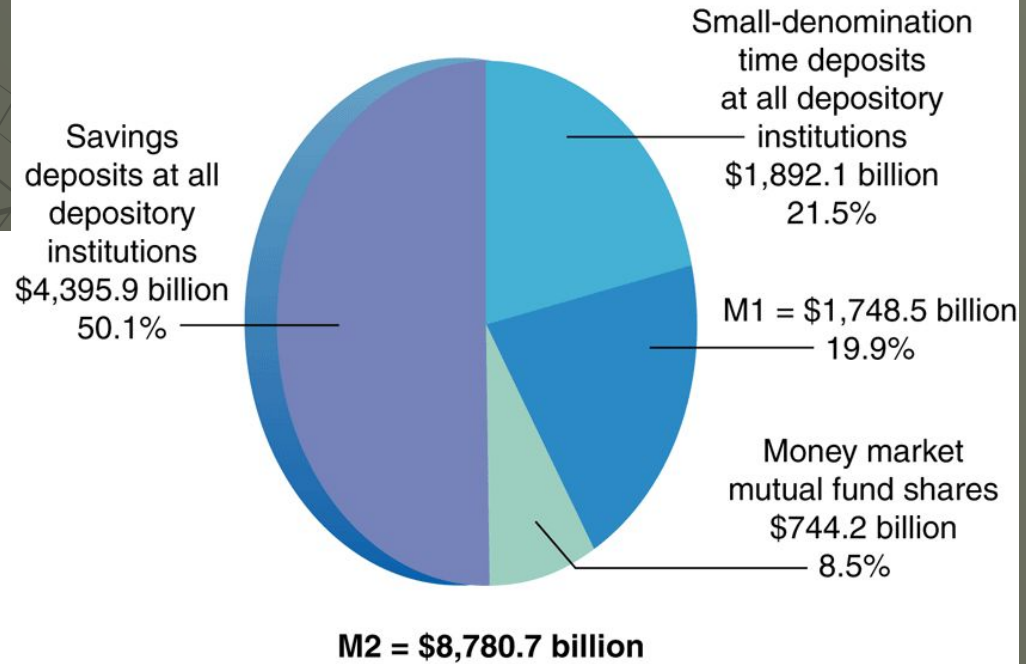
The distinction between M1 and M2 will usually not matter when we talk about “the money supply” in this course.

Composition of the U.S. M1 and M2 Money Supply, 2011

Panel (a)



Panel (b)



Sources: Federal Reserve Bulletin; Economic Indicators, various issues; author's estimates.

Financial markets coordinate saving and investment

- ◆ Financial decisions involve two elements – time and risk.
- ◆ For example, people and firms must make decisions today about saving and investment based on expectations of future earnings, but future returns are uncertain
- ◆ The field of finance studies how people make decisions regarding the allocation of resources over time and the handling of risk.

Present Value: Measuring the Time Value of Money

- ◆ The **present value** of any future value is the amount today that would be needed, at current interest rates, to produce that future sum.
- ◆ The **future value** is the amount of money in the future that an amount of money today will yield, given prevailing interest rates.

Present Value: Measuring the Time Value of Money

- ◆ r = the interest rate expressed in decimal form
- ◆ n = years to maturity
- ◆ PV = present value
- ◆ FV = future value
- ◆ $PV(1+r)^n = FV$ and
- ◆ $FV/(1+r)^n = PV$

EXAMPLE 1: A simple deposit

- ◆ Deposit \$100 in the bank at 5% interest. What is the future value (FV) of this amount?
- ◆ In N years, $FV = \$100(1 + 0.05)^N$
- ◆ In this example, \$100 is the present value (PV).
- ◆ In general, $FV = PV(1 + r)^N$ where r denotes the interest rate (in decimal form).
- ◆ Solve for PV to get:

$$PV = FV / (1 + r)^N$$

EXAMPLE 1: A Simple Deposit

- ◆ Deposit \$100 in the bank at 5% interest. What is the future value (FV) of this amount?
- ◆ In N years, $FV = \$100(1 + 0.05)^N$
- ◆ In three years, $FV = \$100(1 + 0.05)^3 = \115.76
- ◆ In two years, $FV = \$100(1 + 0.05)^2 = \110.25
- ◆ In one year, $FV = \$100(1 + 0.05) = \105.00

EXAMPLE 2: Investment Decision

Present value formula: $PV = FV/(1 + r)^N$

- ◆ Suppose $r = 0.06$.
Should General Motors spend \$100 million to build a factory that will yield \$200 million in ten years?

Solution:

Find present value of \$200 million in 10 years:

$$PV = (\$200 \text{ million}) / (1.06)^{10} = \text{\$112 million}$$

Since $PV >$ cost of factory, GM should build it.

EXAMPLE 2: Investment Decision

- ◆ Instead, suppose $r = 0.09$. Should General Motors spend \$100 million to build a factory that will yield \$200 million in ten years?

Solution:

Find present value of \$200 million in 10 years:

$$PV = (\$200 \text{ million}) / (1.09)^{10} = \text{\$84 million}$$

Since $PV < \text{cost of factory}$, GM should not build it.

ACTIVE LEARNING 1:

Present value

You are thinking of buying a six-acre lot for \$70,000. The lot will be worth \$100,000 in 5 years.

- A. Should you buy the lot if $r = 0.05$?
- B. Should you buy it if $r = 0.10$?

ACTIVE LEARNING 1:

Answers

You are thinking of buying a six-acre lot for \$70,000. The lot will be worth \$100,000 in 5 years.

A. Should you buy the lot if $r = 0.05$?

$$PV = \$100,000 / (1.05)^5 = \$78,350.$$

PV of lot > price of lot.

Yes, buy it.

B. Should you buy it if $r = 0.10$?

$$PV = \$100,000 / (1.1)^5 = \$62,090.$$

PV of lot < price of lot.

No, do not buy it.

Compounding

- ◆ **Compounding**: the accumulation of a sum of money where the interest earned on the sum earns additional interest
- ◆ Because of compounding, small differences in interest rates lead to big differences over time.
- ◆ Example: Buy \$1000 worth of Microsoft stock, hold for 30 years.
 - If rate of return = 0.08, FV = \$10,063
 - If rate of return = 0.10, FV = \$17,450

The Rule of 70

- ◆ The Rule of 70:
If a variable grows at a rate of x percent per year, that variable will double in about $70/x$ years.
- ◆ Example:
 - If interest rate is 5%, a deposit will double in about 14 years.
 - If interest rate is 7%, a deposit will double in about 10 years.

Banks and the Money Supply

- ◆ The simple case of 100 percent reserve banking
- ◆ A bank is created as a safe place to store currency; all deposits are kept in the vault until the depositor withdraws them.
- ◆ **Bank Reserves** – deposits that banks have received but have not loaned out
- ◆ **T-account** – a tool for analyzing a business's financial position by showing, in a single table, the business's assets and liabilities.
- ◆ Ex: Suppose that currency is the only form of money and the total amount of currency is \$100.

First National
Bank

Assets	Liabilities
Reserves \$100.00	Deposits \$100.00

Banks and the Money Supply

- ◆ The money supply in this economy is unchanged by the creation of a bank
 - Before the bank was created, the money supply consisted of \$100 worth of currency
 - Now, with the bank, the money supply consists of \$100 worth of deposits
- ◆ This means that, if banks hold all deposits in reserve, banks do not influence the supply of money.



Money Creation with Fractional-Reserve Banking

- ◆ Fractional-reserve banking – a banking system in which banks hold only a fraction of deposits as reserves.
- ◆ **Reserve ratio** – the fraction of deposits that banks hold as reserves
- ◆ Reserve ratio can be the required reserves plus the **excess reserves** – a bank's reserves over and above its required reserves.
- ◆ Example: Same as before, but First National decides to set its reserve ratio equal to 10 percent and lend the remainder of the deposits.

First National
Bank

Assets		Liabilities
Reserves	\$10.00	Deposits \$100
Loans	\$90.00	

Required reserve ratio: the smallest fraction of deposits that the Federal Reserve allows banks to hold.

Money Creation with Fractional-Reserve Banking

- ◆ When the bank makes these loans, the money supply changes.
 - Before the bank made any loans, the money supply was equal to the \$100 worth of deposits
 - Now, after the loans, deposits are still equal to \$100, but borrowers now also hold \$90 worth of currency from the loans
 - Therefore, when banks hold only a fraction of deposits in reserve, banks create money
- ◆ Note that, while new money has been created, so has debt. There is now new wealth created by this process.

The Money Multiplier

- ◆ The creation of money does not stop at this point.
- ◆ Borrowers usually borrow money to purchase something and then the money likely becomes redeposited at a bank.
- ◆ Suppose a person borrowed the \$90 to purchase something and the funds then get redeposited in Second National Bank. Here is this bank's T-account (reserve ratio is 10%)
- ◆ If the \$81 in loans becomes redeposited in another bank, this process will go on and on.

Second National Bank

Assets		Liabilities	
Reserves	\$9.00	Deposits	\$90.00
Loans	\$81.00		

The Money Multiplier

- ◆ Each time the money is deposited and a bank loan is created, more money is created.
- ◆ **Money multiplier** – the amount of money the banking system generates with each dollar of reserves
- ◆ Money multiplier = $1/\text{reserve ratio}$
- ◆ If we started with a deposit of \$100 and a reserve ratio of 10%, our money multiplier would be 10. We then multiply the money multiplier 10 by the initial deposit of \$100 and our money supply increased from \$100 to \$1000 after the establishment of fractional reserve banking.
- ◆ **Monetary base** – the sum of currency in circulation and bank reserves.



ACTIVE LEARNING 1:

Exercise

While cleaning your apartment, you look under the sofa cushion find a \$50 bill (and a half-eaten taco). You deposit the bill in your checking account. The Fed's reserve requirement is 20% of deposits.

- A. What is the maximum amount that the money supply could increase?
- B. What is the minimum amount that the money supply could increase?

ACTIVE LEARNING 1:

Answers

You deposit \$50 in your checking account.

A. What is the maximum amount that the money supply could increase?

If banks hold no excess reserves, then

$$\text{money multiplier} = 1/R = 1/0.2 = 5$$

The maximum possible increase in deposits is

$$5 \times \$50 = \$250$$

But money supply also includes currency, which falls by \$50.

Hence, max increase in money supply = **\$200.**

ACTIVE LEARNING 1:

Answers

You deposit \$50 in your checking account.

A. What is the maximum amount that the money supply could increase?

Answer: \$200

B. What is the minimum amount that the money supply could increase?

Answer: \$0

If your bank makes no loans from your deposit, currency falls by \$50, deposits increase by \$50, money supply remains unchanged.

Bank Runs and the Money Supply

- ◆ Bank run – a phenomenon in which many of a bank's depositors try to withdraw their funds due to fears of a bank failure.
- ◆ Bank runs create a large problem under fractional-reserve banking.
- ◆ Since the bank only holds a fraction of its deposits in reserve, it will not have the funds to satisfy all of the withdrawal requests from its depositors.



Bank Regulation

- ◆ Today depositors are guaranteed through the Federal Depository Insurance Corporation (FDIC).
- ◆ Deposit Insurance – a guarantee that a bank's depositors will be paid even if the bank can't come up with the funds, up to a maximum amount per account
- ◆ Currently, the FDIC insures accounts up to the first \$250,000 and can be changed in 2014.

Bank Regulation

- ◆ **Capital Requirement:** regulators require that the owners of banks hold substantially more assets than the value of bank deposits.
- ◆ **Reserve requirements:** rules set by the Federal Reserve that determine the required reserve ratio for banks
- ◆ Fed can also lend money to banks through the **discount window** – an arrangement in which the Federal Reserve stands ready to lend money to the banks.

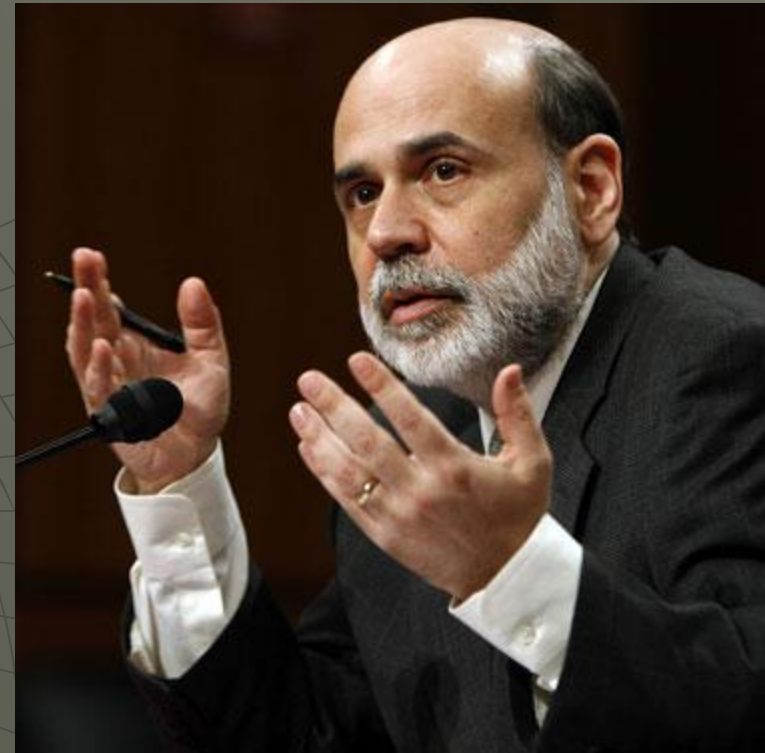
The Federal Reserve System



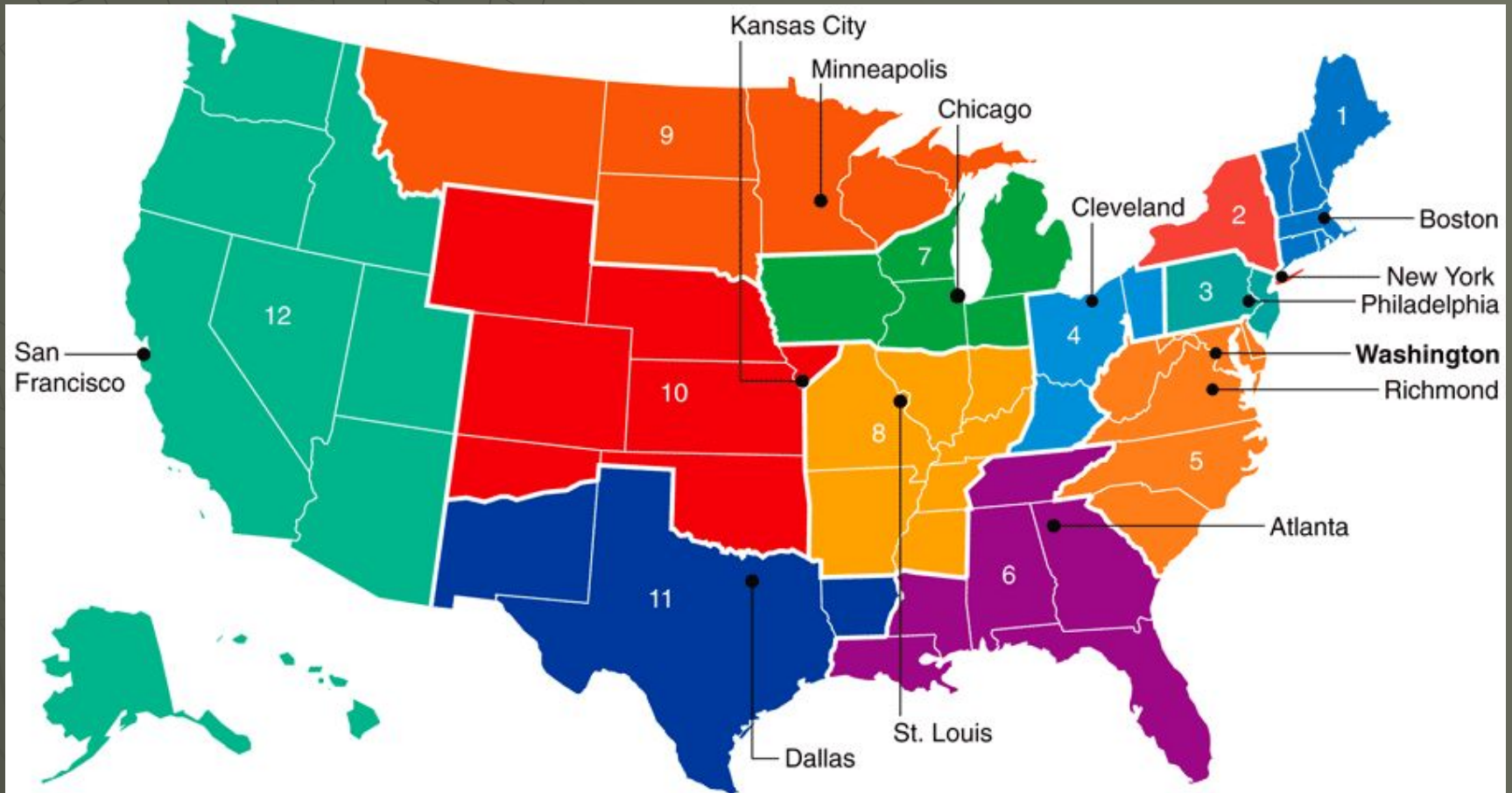
- ◆ Federal Reserve (Fed) – the central bank of the United States
- ◆ Central bank – an institution designed to oversee the banking system and regulate the quantity of money in the economy
- ◆ Created in response to the Panic of 1907

The Fed's Organization

- ◆ Not part of the U.S. government, but not a private institution either. Strange
- ◆ The Fed has a Board of Governors with seven members who serve 14-year terms
 - The Board of Governors has a chairman who is appointed for a four-year term
 - The current chairman is Ben Bernanke
- ◆ The Federal Reserve System is made up of 12 regional Federal Reserve Banks located in major cities around the country



The Federal Reserve System



Source: Board of Governors of the Federal Reserve System.

The Federal Open Market Committee

- ◆ The Federal Open Market Committee (FOMC) consists of the 7 members of the Board of Governors and 5 of the 12 regional Federal Reserve District Bank presidents
- ◆ President of the Federal Reserve Bank of NY is always on the FOMC
- ◆ The FOMC meets about every six weeks in order to discuss the condition of the economy and consider changes in monetary policy



The Federal Open Market Committee

- The primary way in which the Fed increases or decreases the supply of money is through **open market operations** (which involve the purchase or sale of U.S. government bonds)
 - If the Fed wants to increase the supply of money, it creates dollars and uses them to purchase government bonds from the public through the nation's bond markets
 - If the Fed wants to lower the supply of money, it sells government bonds from its portfolio to the public. Money is then taken out of the hands of the public and the supply of money falls.



Open-Market Operations

(a) An Open-Market Purchase of \$100 Million

	Assets		Liabilities	
Federal Reserve	Treasury bills	+\$100 million	Monetary base	+\$100 million

(b) An Open-Market Sale of \$100 Million

	Assets		Liabilities	
Federal Reserve	Treasury bills	-\$100 million	Monetary base	-\$100 million

	Assets		Liabilities
Commercial banks	Treasury bills	-\$100 million	No change
	Reserves	+\$100 million	

	Assets		Liabilities
Commercial banks	Treasury bills	+\$100 million	No change
	Reserves	-\$100 million	

Glass-Steagall Act of 1933

- ◆ Glass-Steagall Act of 1933 – separated banks into two categories commercial banks and investment banks.
- ◆ Commercial banks – accepts deposits and is covered by deposit insurance.
- ◆ Investment bank – trades in financial assets (stocks and bonds) and is not covered by deposit insurance.
- ◆ Glass-Steagall Act has been repealed

Savings and Loan Crisis of the 1980s

- ◆ **Savings and loan (thrift)** – type of deposit-taking bank, usually specialized in issuing home loans.
- ◆ Covered by deposit insurance and tightly regulated.
- ◆ High inflation in 1970s caused the S&Ls to take losses due to people taking their money out of their low interest rate accounts plus the value of assets decreasing
- ◆ Congress deregulates so they can get higher returns, but they take greater risks without regulation.
- ◆ S&Ls fail and from 1986 to 1995 federal government closes over 1000 and costing taxpayers over \$124 billion.

Financial Crisis of 2008

- ◆ Declining asset prices from 2000 to 2002 and the economy going into a recession.
- ◆ Fed lowers interest rates to historic lows and China buying a lot of U.S. drives down the interest rates.
- ◆ Sparking a housing boom.
- ◆ Banks start to use subprime lending – lending to home buyers who don't meet the usual criteria for being able to afford their payments.

Financial Crisis of 2008

- ◆ Subprime lending explodes by loan originators, which then sell these loans as a security.
- ◆ Securitization – pool of loans is assembled and shares of that pool are sold to investors.
- ◆ Considered safe because no one believed the whole housing market would collapse across the entire country at the same time.

Financial Crisis of 2008

- ◆ Housing prices start to fall in 2006
- ◆ The people with subprime mortgages have trouble paying the mortgage and foreclose causing the prices to drop further
- ◆ Causing the MBS to fall in value and the banks to lose money
- ◆ Banks start to deleverage.
- ◆ Leverage – it finances its investments with borrowed funds.

Financial Crisis of 2008

- ◆ Vicious cycle of deleveraging – takes place when asset sales to cover losses produce negative balance sheet effects on other firms and force creditors to call in their loans, forcing sales of more assets and causing further declines in asset prices.
- ◆ Firms and households find it hard to borrow money.
- ◆ Fed provides funds for banks and saves some firms from failures AIG and Bear Stearns.

Functions of the Fed

- ◆ One function performed by the Fed is the regulation of banks to ensure the health of the nation's banking system

- The Fed monitors each bank's financial condition and facilitates bank transactions by clearing checks
- The Fed also makes loans to banks when they want (or need) to borrow



Functions of the Fed

- ◆ The second function of the Fed is to control the quantity of money available in the economy
 - Money supply – the quantity of money available in the economy
 - Monetary policy – the setting of the money supply by policymakers in the central bank

The Federal Reserve System: The U.S. Central Bank (cont'd)

- ◆ Functions of the Fed
 1. Supplies the economy with fiduciary currency
 2. Provides a payment-clearing system among banks
 - ◆ Using the Fedwire
 3. Holds depository institutions' reserves
 4. Acts as the government's fiscal agent
 - ◆ Fed acts as the government's banker
 5. Supervises depository institutions
 6. Regulates the money supply
 - ◆ Most important task
 7. Intervenes in foreign currency markets (tries to keep the value of the dollar constant – buys/sells dollars)
 8. Acts as the “lender of last resort”

The Way Fed Policy is Currently Implemented

- ◆ At present the Fed announces an interest rate target
- ◆ If the Fed wants to raise “the” interest rate, it engages in contractionary open market operations
 - Fed sells more Treasury securities than it buys, thereby reducing the money supply
 - ◆ This tends to boost “the” rate of interest

The Way Fed Policy is Currently Implemented

- ◆ Conversely, if the Fed wants to decrease “the” rate of interest, it engages in expansionary open market operations
 - Fed buys more Treasury securities, increasing the money supply
 - ◆ This tends to lower “the” rate of interest

The Way Fed Policy is Currently Implemented

- ◆ In reality, “the” interest rates that are relevant to Fed policymaking:
 - Federal funds rate
 - Discount rate
 - Interest rate on reserves

The Way Fed Policy is Currently Implemented

- ◆ **Federal Funds Rate**
 - The interest rate that depository institutions pay to borrow reserves in the interbank federal funds market
- ◆ **Federal Funds Market**
 - A private market (made up mostly of banks) in which banks can borrow reserves from other banks that want to lend them
 - Federal funds are usually lent for overnight use

The Way Fed Policy is Currently Implemented

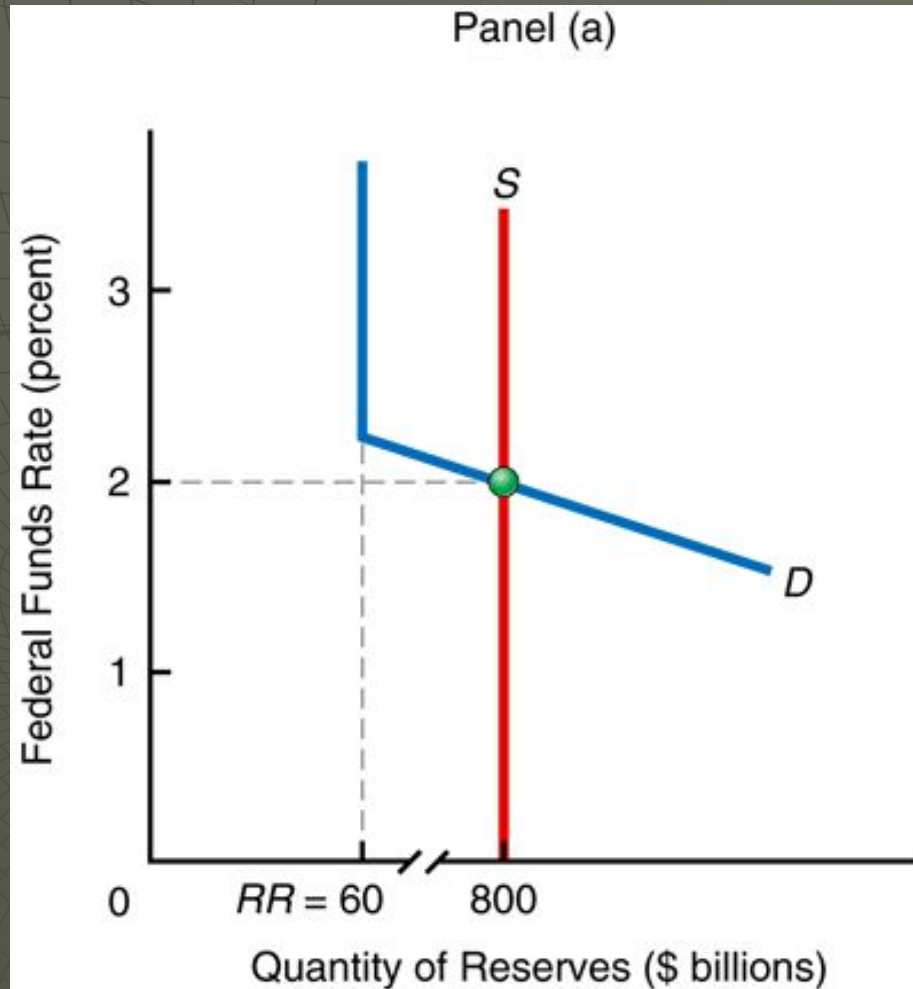
◆ Discount Rate

- The interest rate that the Federal Reserve charges for reserves that it lends to depository institutions (through the “discount window”)
- Altering the discount rate is a signal to banking system on the change of policy of the Fed
 - ◆ Performed first
- It is sometimes referred to as the *rediscount rate* or, in Canada and England, as the *bank rate*

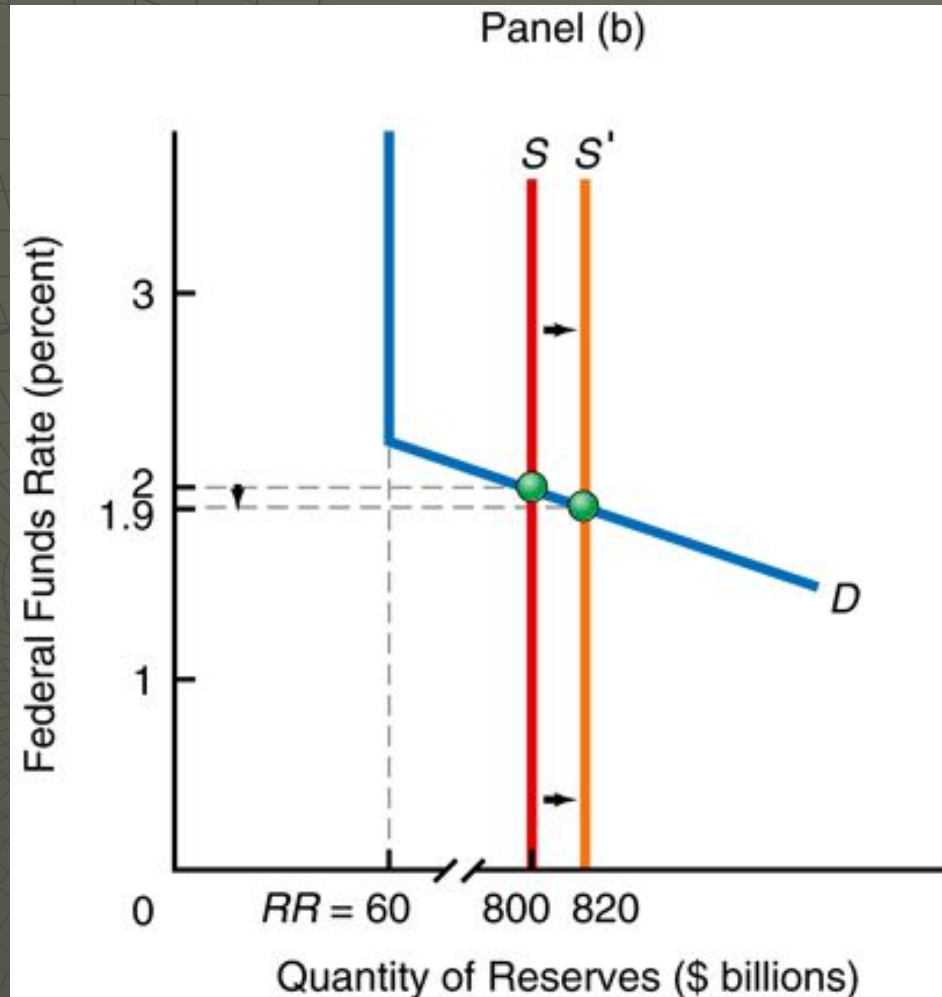
The Way Fed Policy is Currently Implemented

- ◆ The interest rate on reserves
 - In October 2008, Congress granted the Fed authority to pay interest on both required reserves and excess reserves of depository institutions
 - If the Fed raises the interest rate on reserves and thereby reduces the differential between the federal funds rate and the interest rate on reserves, banks have less incentive to lend reserves in the federal funds market
 - Raise (Higher) interest rates on reserves, Less lending, decrease in the money supply
 - Lower interest rates on reserves, more lending, increase in money supply

The Market for Bank Reserves and the Federal Funds Rate, Panel (a)



The Market for Bank Reserves and the Federal Funds Rate, Panel (b)



An open market purchase increases the supply of reserves, and thus lowers the equilibrium federal funds rate

Theory of Liquidity Preference

- ◆ **Theory of liquidity preference** – Keynes's theory that the interest rate adjusts to bring money supply and money demand into balance.
- ◆ This theory is an explanation of the supply and demand for money and how they relate to the interest rate.
- ◆ Opportunity cost of holding money is the interest rate.
- ◆ **Short-term interest rates** – interest rates on financial assets that mature within less than a year.
- ◆ **Long-term interest rates** – interest rates on financial assets that mature a number of years in the future.

Money Demand

- ◆ **Money demand curve** – shows the relationship between the quantity of money demanded and the interest rate.
- ◆ Any asset's liquidity refers to the ease with that asset can be converted into a medium of exchange. Thus, money is the most liquid asset in the economy.
- ◆ The liquidity of money explains why people choose to hold it instead of other assets that could earn them a higher return
- ◆ However, the return on other assets (the interest rate) is the opportunity cost of holding money. All else equal, as the interest rate rises, the quantity of money demanded will fall. Therefore, the demand for money will be downward sloping.

Three Main Motives behind the Demand for Money

- ◆ Transactions Motive
- ◆ Speculative Motive
- ◆ Precautionary Motive

Transactions Motive

- ◆ Money demand can be transactions demand for money, money needed for transactions
- ◆ Depend on interest rate and level of RDGP
- ◆ Interest rate goes up, less money on hand because more to gain by converting to a different interest-bearing asset.
- ◆ Transactions motive: the desire to hold onto money for cash-based transactions.

Speculative Motive

- ◆ People choose to hold cash because they want to be prepared for cash-based investment opportunities
- ◆ Rests on the theory that market value of most interest-bearing bonds is inversely related to interest rates
- ◆ When market interest rates fall, bond values rise; when market interest rates rise, bond values fall
- ◆ Speculative and Transaction motives make the quantity of money demanded a function of interest rates.

Precautionary Motive

- ◆ Describes people's inclination to hold onto money for unexpected cash expenses, such as medical bills and car repairs.
- ◆ Kinds of expenses often need to be paid immediately, and less liquid assets are not much help

Money Demand

- ◆ Suppose real income (Y) rises. Other things equal, what happens to money demand?
- ◆ If Y rises:
 - Households want to buy more g&s, so they need more money.
 - To get this money, they attempt to sell some of their bonds.
- ◆ *I.e., an increase in Y causes an increase in money demand, other things equal.*

The Downward Slope of the Aggregate-Demand Curve

- ◆ When the price level increases, the quantity of money that people need to hold becomes larger. Thus, an increase in the price level leads to an increase in the demand for money, shifting the money demand curve to the right.
- ◆ For a fixed money supply, the interest rate must rise to balance the supply and demand for money.
- ◆ At a higher interest rate, the cost of borrowing increases and the return on saving increases. Thus, consumers will choose to spend less likely to borrow funds for new equipment or structures. In short, the quantity of goods and services purchased in the economy will fall.
- ◆ This implies that as the price level increases, the quantity of goods and services demanded falls. This is Keynes' interest-rate effect.

Shifts of the Money Demand Curve

- ◆ Changes in the Aggregate Price Level
 - Price level rises, MD increases shifts right
- ◆ Changes in Real GDP
 - Rise in RGDP, increases MD, shifts right
- ◆ Changes in Technology
 - Introduction of ATM caused MD to decrease, shifting left
- ◆ Changes in Institutions
 - Banks pay interest on checking accounts, MD increased and shifted right

ACTIVE LEARNING 1:

The determinants of money demand

- A.** Suppose r rises, but Y and P are unchanged. What happens to money demand?
- B.** Suppose P rises, but Y and r are unchanged. What happens to money demand?

ACTIVE LEARNING 1:

Answers

A. Suppose r rises, but Y and P are unchanged. What happens to money demand?

r is the opportunity cost of holding money.

An increase in r reduces money demand: Households attempt to buy bonds to take advantage of the higher interest rate.

Hence, an increase in r causes a decrease in money demand, other things equal.

ACTIVE LEARNING 1:

Answers

B. Suppose P rises, but Y and r are unchanged. What happens to money demand?

If Y is unchanged, people will want to buy the same amount of g&s.

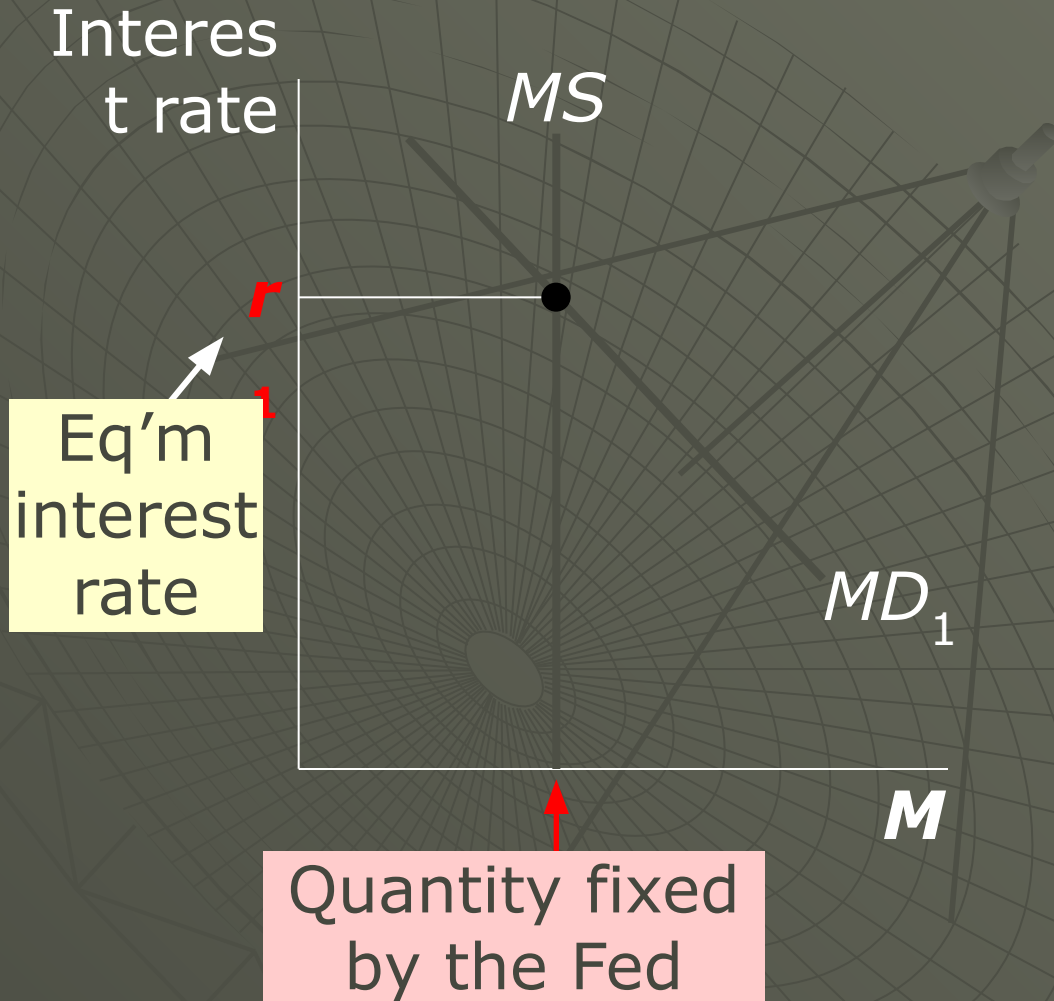
Since P is higher, they will need more money to do so.

Hence, an increase in P causes an increase in money demand, other things equal.

Money Supply

- ◆ The money supply in the economy is controlled by the Federal Reserve.
- ◆ The Fed can alter the supply of money using open market operations, changes in the discount rate, and changes in reserve requirements.
- ◆ Because the Fed can control the size of the money supply directly, the quantity of money supplied does not depend on any other variables, including the interest rate. Thus, the supply of money is represented by a vertical supply curve.

How r Is Determined



MS curve is vertical:

Changes in r do not affect MS , which is fixed by the Fed.

MD curve is downward sloping:

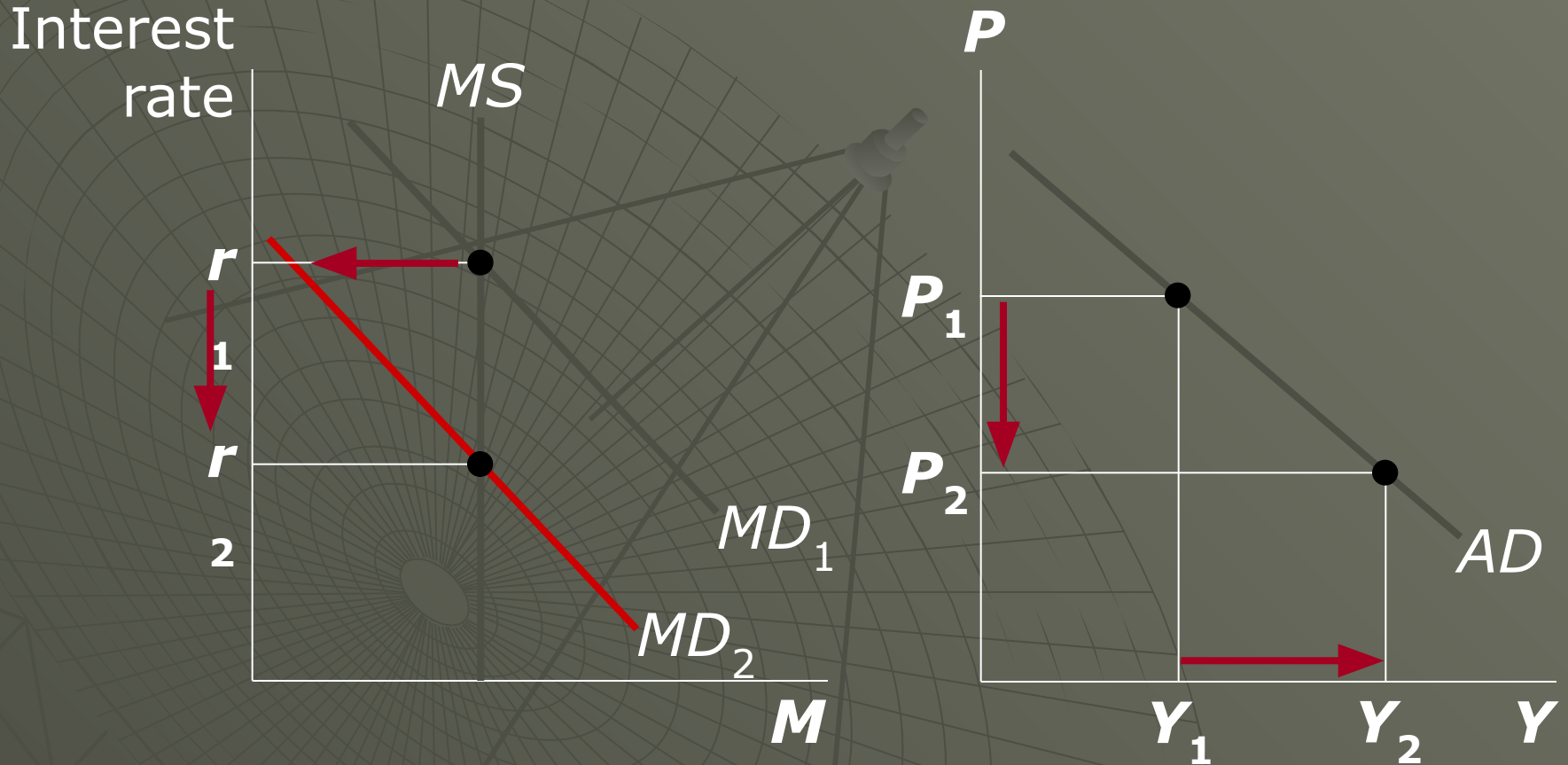
a fall in r increases money demand.

Equilibrium in the Money Market

- ◆ The interest rate adjusts to bring money demand and money supply into balance.
- ◆ If the interest rate is higher than the equilibrium interest rate, the quantity of money that people want to hold is less than the quantity that the Fed has supplied. Thus, people will try to buy bonds or deposit funds in an interest bearing account. This increases the funds available for lending, pushing interest rates down.
- ◆ If interest rate is lower than the equilibrium interest rate, the quantity of money that people want to hold is greater than the quantity that the Fed has supplied. Thus, people will try to sell bonds or withdraw funds from an interest bearing account. This decreases the funds available for lending, pulling interest rates up.
- ◆ Taking into account the nominal interest rate.

How the Interest-Rate Effect Works

A fall in P reduces money demand, which lowers r .



A fall in r increases I and the quantity of g&s demanded.

Monetary Policy and Aggregate Demand

- ◆ To achieve macroeconomic goals, the Fed can use monetary policy to shift the *AD* curve.
- ◆ The Fed's policy instrument is the money supply.
- ◆ The news often reports that the Fed targets the interest rate.
 - more precisely, the **federal funds rate** – which banks charge each other on short-term loans
- ◆ To change the interest rate and shift the *AD* curve, the Fed conducts open market operations to change the money supply.

Changes in the Money Supply

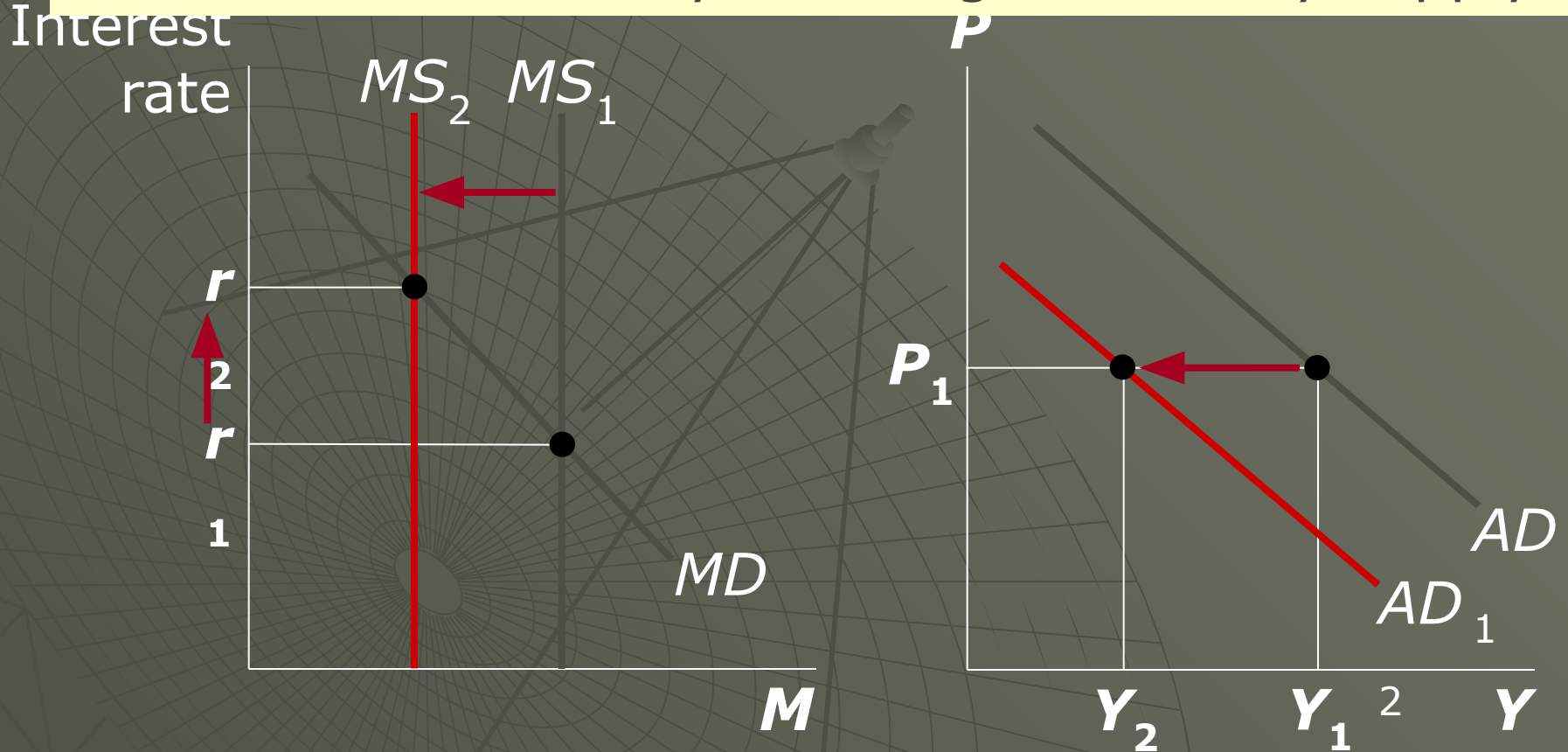
- ◆ Example: The Fed buys government bonds in open-market operations.
- ◆ This will increase the supply of money, shifting the money supply curve to the right. The equilibrium interest rate will fall.
- ◆ The lower interest rate reduces the cost of borrowing and the return to saving. This encourages households to increase their consumption and desire to invest in new housing. Firms will also increase investment, building new factories and purchasing new equipment.
- ◆ The quantity of goods and services demanded will rise at every price level, shifting the aggregate-demand curve to the right.
- ◆ Thus, a monetary injection by the Fed increases the money supply, leading to a lower interest rate, and a larger quantity of goods and services demanded.

The Role of Interest-Rate Targets in Fed Policy

- ◆ In recent years, the Fed has conducted policy by setting a target for the federal funds rate (the interest rate that banks charge on another for short-term loans)
 - The target is reevaluated every six weeks when the Federal Open Market Committee meets
 - The Fed has chosen to use this interest rate as a target in part because the money supply is difficult to measure with sufficient precision.
- ◆ Because changes in the money supply lead to changes in interest rates, monetary policy can be described either in terms of the money supply or in terms of the interest rate.

The Effects of Reducing the Money Supply

The Fed can raise r by reducing the money supply.



An increase in r reduces the quantity of g&s demanded.

ACTIVE LEARNING 2:

Exercise

For each of the events below,

- determine the short-run effects on output
- determine how the Fed should adjust the money supply and interest rates to stabilize output

A. Congress tries to balance the budget by cutting govt spending.

B. A stock market boom increases household wealth.

C. War breaks out in the Middle East, causing oil prices to soar.

ACTIVE LEARNING 2:

Answers

A. Congress tries to balance the budget by cutting govt spending.

This event would reduce agg demand and output.

To offset this event, the Fed should increase MS and reduce r to increase agg demand.

ACTIVE LEARNING 2:

Answers

B. A stock market boom increases household wealth.

This event would increase aggregate demand, raising output above its natural rate.

To offset this event, the Fed should reduce MS and increase r to reduce aggregate demand.

ACTIVE LEARNING 2:

Answers

C. War breaks out in the Middle East, causing oil prices to soar.

This event would reduce aggregate supply, causing output to fall.

To offset this event, the Fed should increase MS and reduce r to increase aggregate demand.

Interest Rates and Bond Prices

- ◆ Inverse Relationship
- ◆ Bond prices increase the interest rate decreases
- ◆ If the bond is \$1000 and the price is \$950 the interest rate is 5-6%
- ◆ If the bond is \$1000 and the price is \$900 the interest rate is 11%
- ◆ So as the interest rate goes up the price goes down, as the price goes up the interest rate goes down.

The Market for Loanable Funds

- ◆ **Market for loanable funds** – the market in which those who want to save supply funds and those who want to borrow to invest demand funds
- ◆ Helps us understand
 - how the financial system coordinates saving & investment
 - how govt policies and other factors affect saving, investment, the interest rate

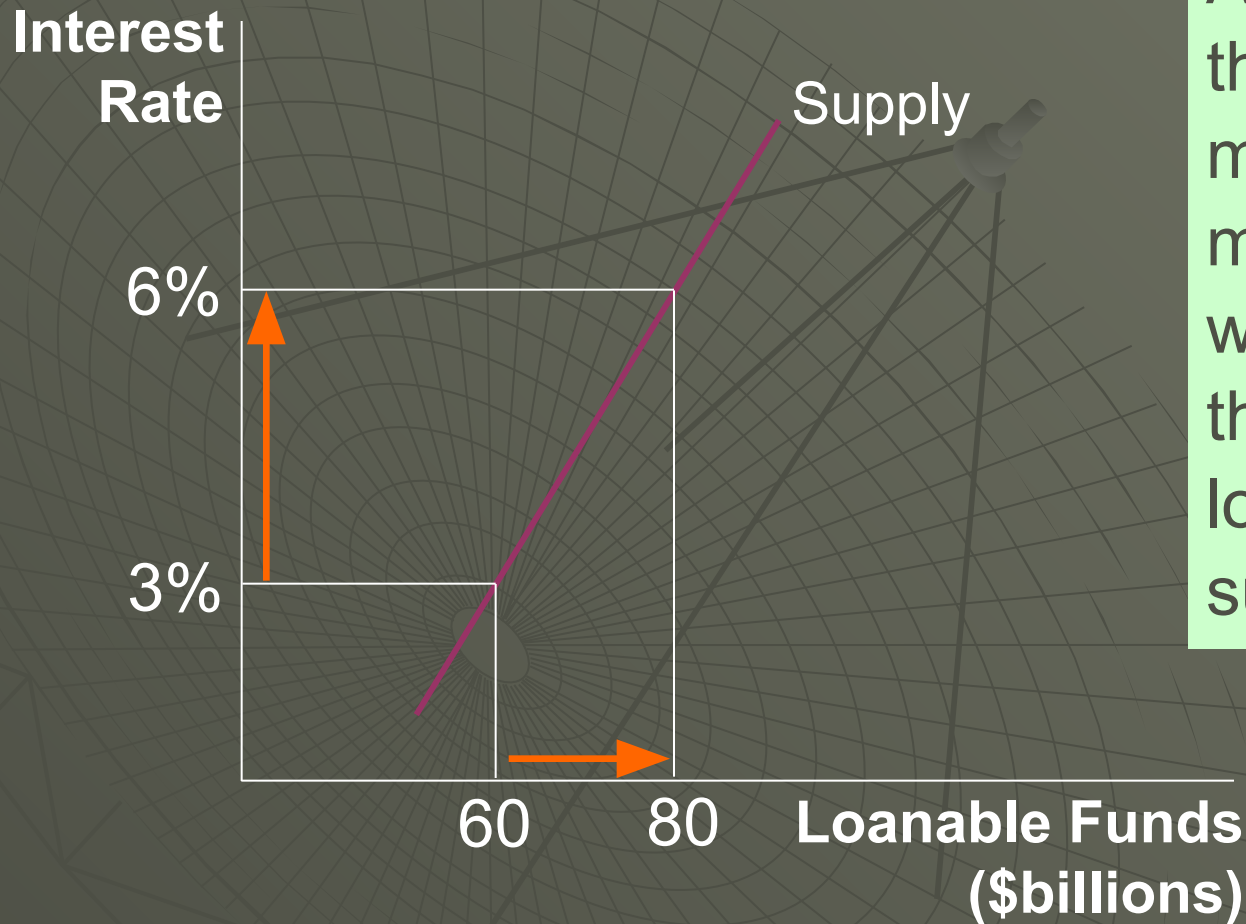
Assume: only one financial market.

- All savers deposit their saving in this market.
- All borrowers take out loans from this market.
- There is one interest rate, which is both the return to saving and the cost of borrowing.

Supply and Demand for Loanable Funds

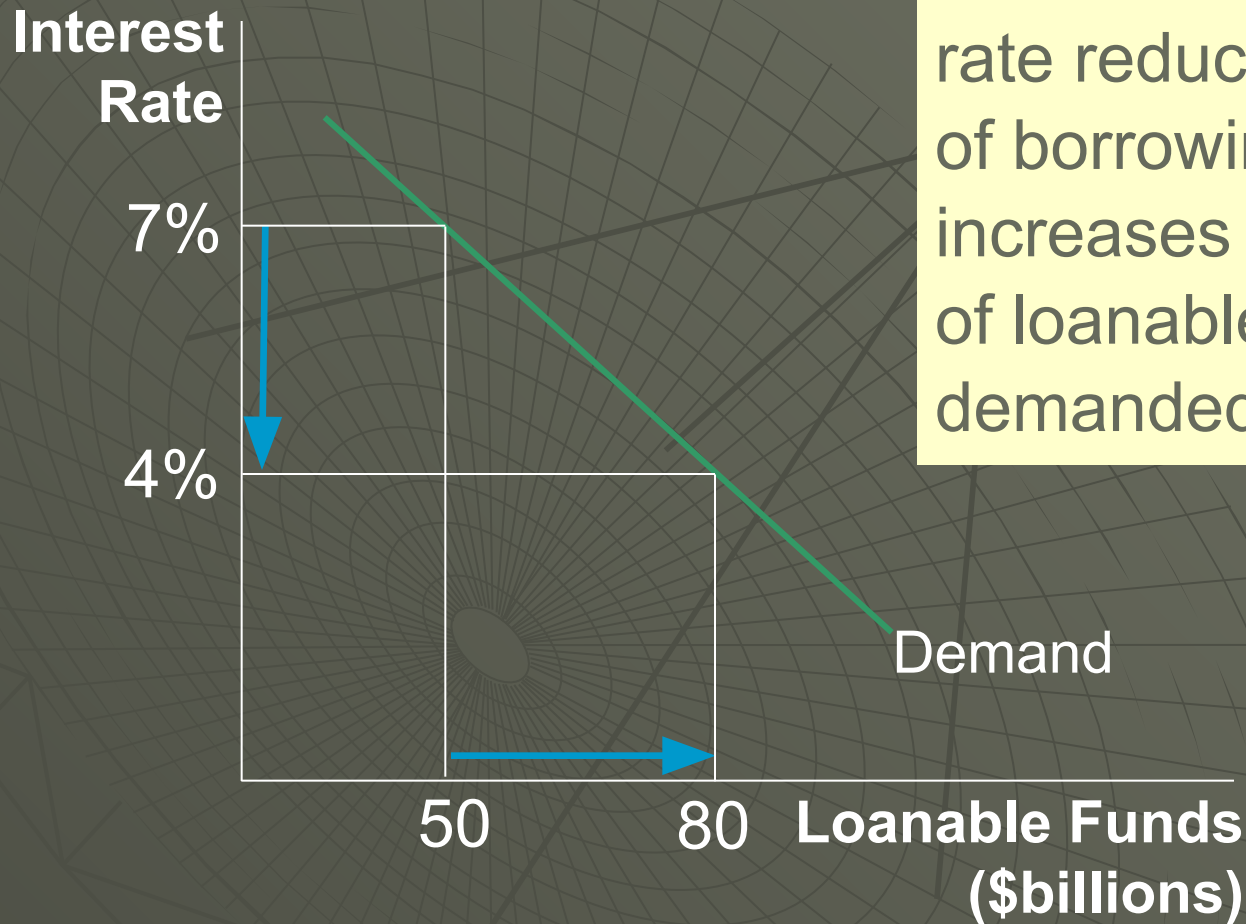
- ◆ The supply of loanable funds comes from those who spend less than they earn. The supply can occur directly through the purchase of some stock or bonds or indirectly through a financial intermediary
- ◆ The demand for loans comes from households and firms who wish to borrow funds to make investments. Families generally invest in new homes while firms may borrow to purchase new equipment or to build factories.

The Slope of the Supply Curve



An increase in the interest rate makes saving more attractive, which increases the quantity of loanable funds supplied.

The Slope of the Demand Curve



A fall in the interest rate reduces the cost of borrowing, which increases the quantity of loanable funds demanded.

Supply and Demand for Loanable Funds

- ◆ The price of a loan is the interest rate
 - All else equal, as the interest rate rises, the quantity of loanable funds supplied will increase
 - All else equal, as the interest rate rises, the quantity of loanable funds demanded will fall
 - The supply and demand for loanable funds depends on the real (rather than nominal) interest rate because the real rate reflects the true return to saving and the true cost of borrowing.

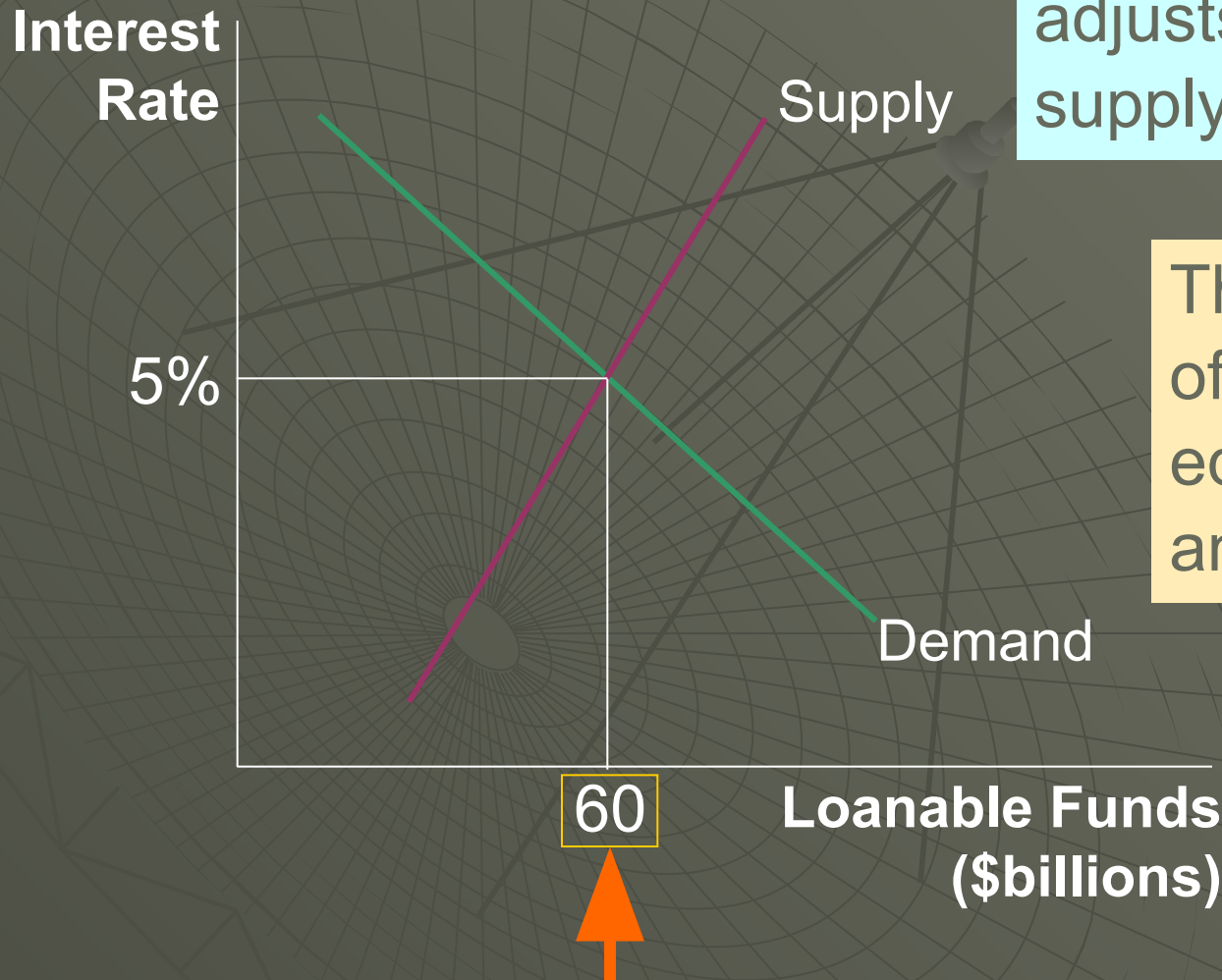
Supply and Demand for Loanable Funds

- ◆ At the equilibrium, the quantity of funds demanded is equal to the quantity of funds supplied
 - If the interest rate in the market is greater than the equilibrium rate, the quantity of funds demanded would be smaller than the quantity of funds supplied. Lenders would compete for borrowers, driving the interest rate down
 - If the interest rate in the market is less than the equilibrium rate, the quantity of funds demanded would be greater than the quantity of funds supplied. The shortage of loanable funds would encourage lenders to raise the interest rate they charge.

Equilibrium

The interest rate adjusts to equate supply and demand.

The eq'm quantity of L.F. equals eq'm investment and eq'm saving.



Shifts of the Demand for Loanable Funds

- ◆ Changes in Perceived Business Opportunities
 - If business believes they can make a lot of money in the future with an investment, investment will increase shifting the demand curve to the right
- ◆ Changes in the government's borrowing
 - Government deficits increase the government borrows more money which causes the demand curve to shift right.

The Crowding-Out Effect

- ◆ The crowding out effect works in the opposite direction.
- ◆ **Crowding out effect** – the offset in aggregate demand that results when expansionary fiscal policy raises the interest rate and thereby reduces investment spending
- ◆ As we discussed earlier, when the government buys a product from a company, the immediate impact of the purchase is to raise profits and employment at that firm. As a result, owners and workers at this firm will see an increase in income, and will therefore likely increase their own consumption.
- ◆ If consumers want to purchase more goods and services, they will need to increase their holdings of money. This shifts the demand for money to the right, pushing up the interest rate.

The Crowding-Out Effect

- ◆ The higher interest rate raises the cost of borrowing and the return to saving. This discourages households from spending their incomes for new consumption or investing in new housing. Firms will also decrease investment, choosing not to build new factories or purchase new equipment.
- ◆ Thus, even though the increase in government purchases shifts the aggregate demand curve to the right, this fall in consumption and investment will pull aggregate demand back toward the left. Thus, aggregate demand increases by less than the increase in government purchases.
- ◆ Therefore, when the government increases its purchases by $\$X$, the aggregate demand for goods and services could rise by more or less than $\$X$, depending on whether the multiplier effect or the crowding out effect is larger.
 - If the multiplier effect is greater than the crowding-out effect, aggregate demand will rise by more than $\$X$.
 - If the multiplier effect is less than the crowding-out effect, aggregate demand will rise by less than $\$X$.

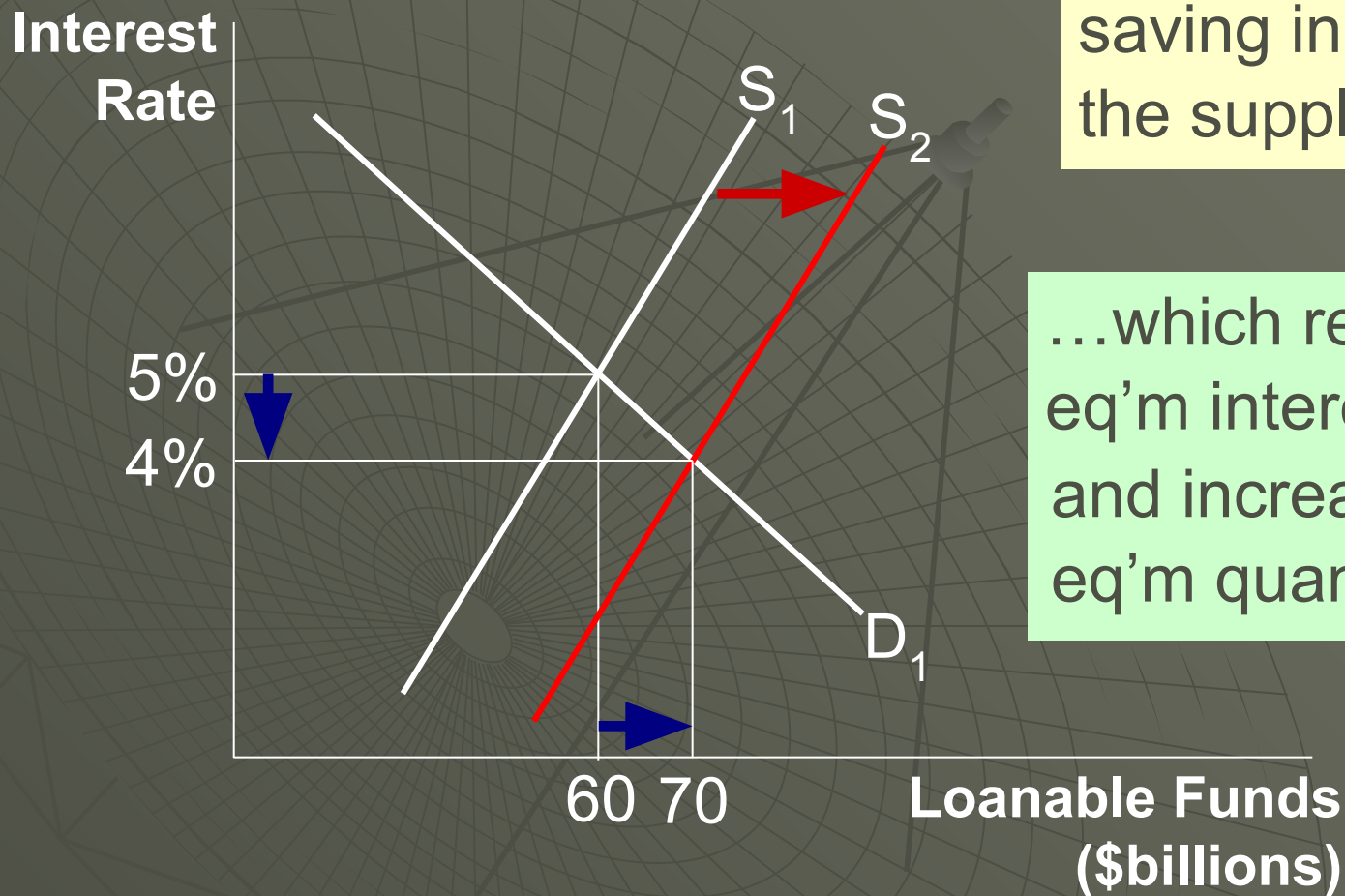
Shifts of the Supply of Loanable Funds

- ◆ Changes in private savings behavior
 - Save less supply shifts left
 - Save more supply shifts right
- ◆ Changes in capital inflows
 - More funds flow into the country savings increase, supply shifts right
 - Funds leave a country, savings decrease, supply shifts left

Policy 1: Saving Incentives

- ◆ Savings rates in the United States are relatively low when compared with other countries such as Japan and Germany
- ◆ Suppose that the government changes the tax code to encourage greater saving
 - This will cause an increase in saving, shifting the supply of loanable funds to the right
 - The equilibrium interest rate will fall and the equilibrium quantity of funds will rise
- ◆ Thus, the result of the new tax laws would be a decrease in the equilibrium interest rate and greater saving and investment

Policy 1: Saving Incentives



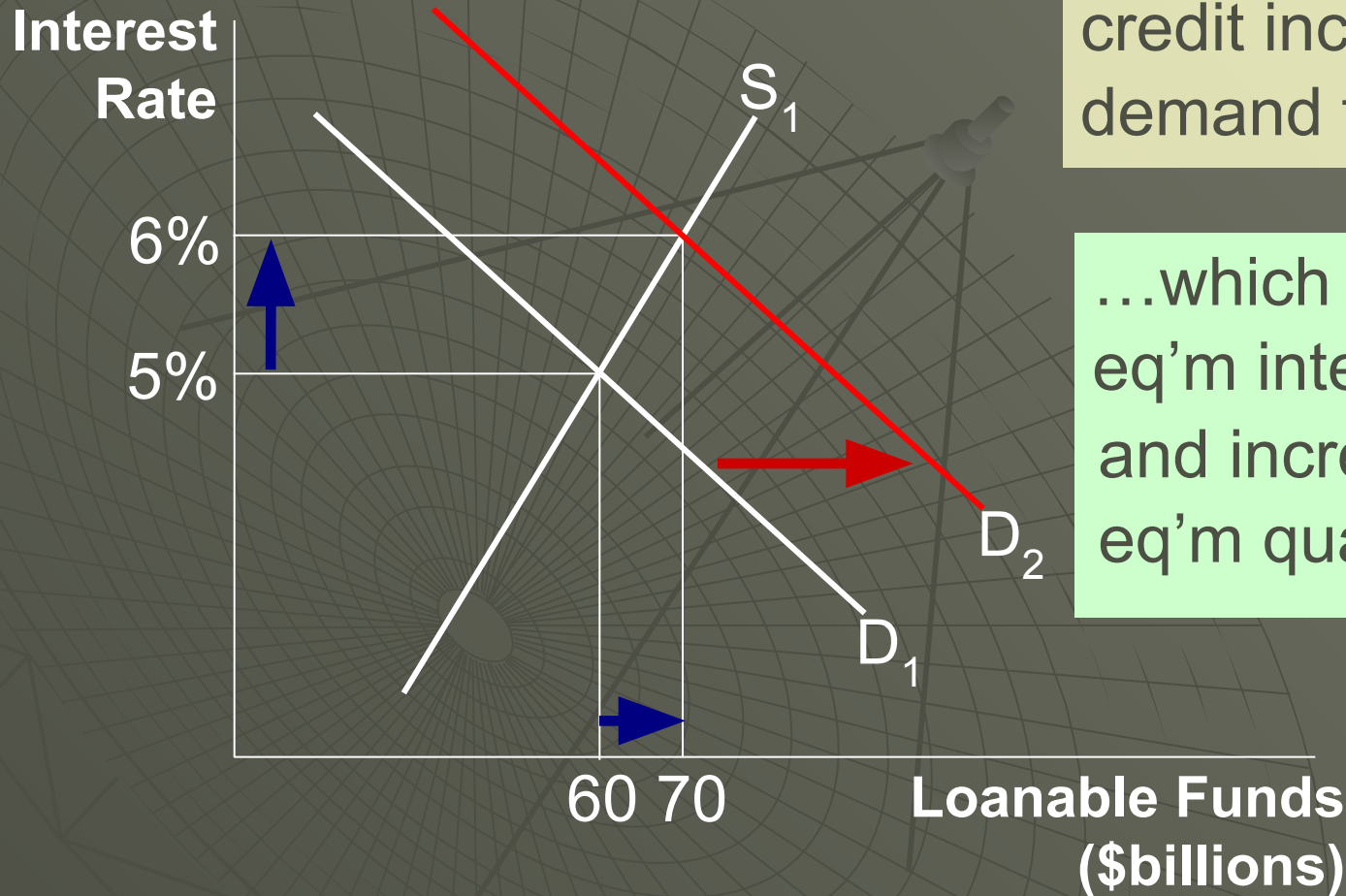
Tax incentives for saving increase the supply of L.F.

...which reduces the eq'm interest rate and increases the eq'm quantity of L.F.

Policy 2: Investment Incentive

- ◆ Suppose instead that the government passed a new law lowering taxes for any firm building a new factory or buying a new piece of equipment (through the use of an investment tax credit)
 - This will cause an increase in investment, causing the demand for loanable funds to shift to the right
 - The equilibrium interest rate will rise, and the equilibrium quantity of funds will increase as well
- ◆ Thus, the result of the new tax laws would be an increase in the equilibrium interest rate and greater saving and investment

Policy 2: Investment Incentives



An investment tax credit increases the demand for L.F.

...which raises the eq'm interest rate and increases the eq'm quantity of L.F.

ACTIVE LEARNING 2:

Exercise

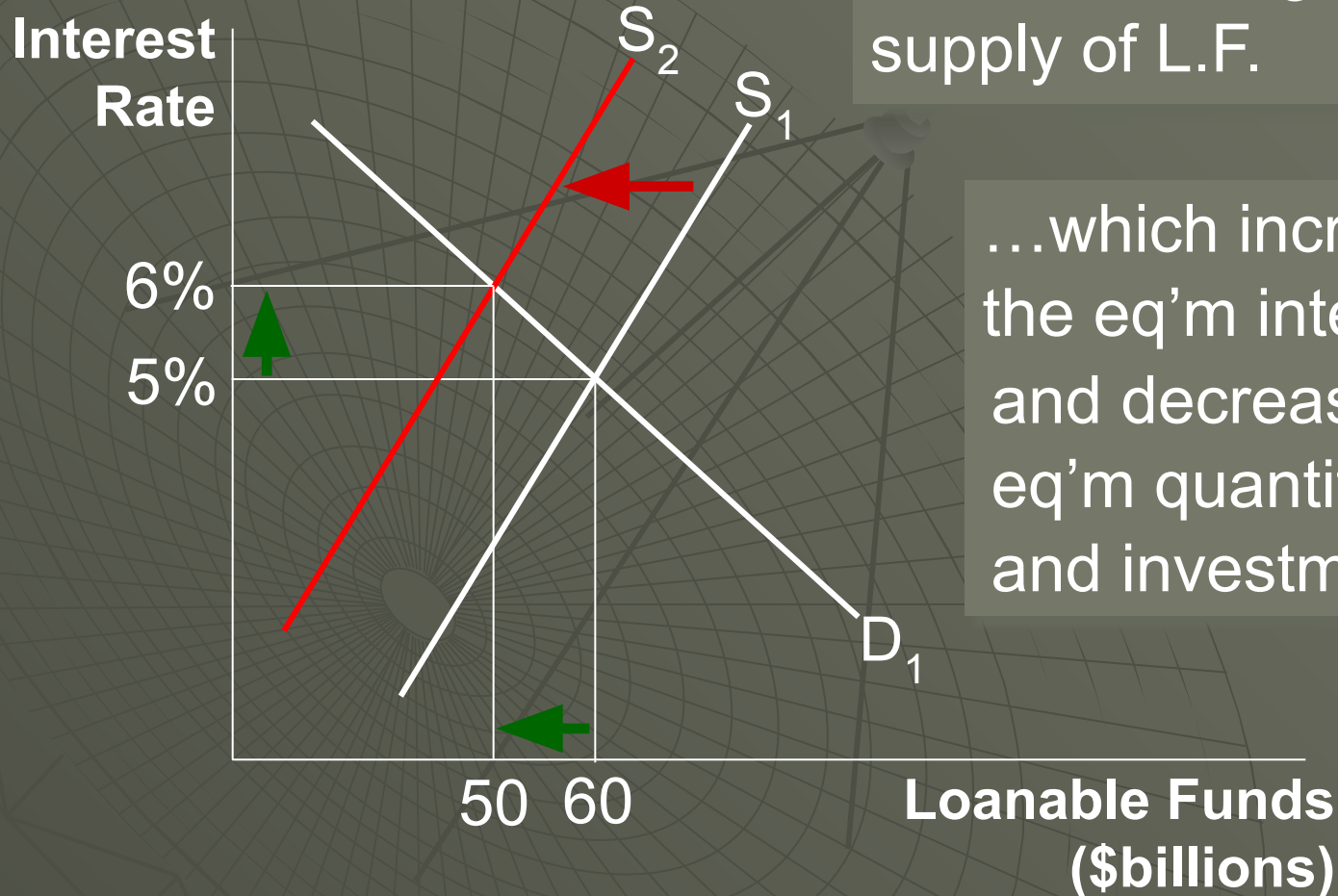
Use the loanable funds model to analyze the effects of a government budget deficit:

- Draw the diagram showing the initial equilibrium.
- Determine which curve shifts when the government runs a budget deficit.
- Draw the new curve on your diagram.
- What happens to the equilibrium values of the interest rate and investment?

ACTIVE LEARNING 2:

Answers

A budget deficit reduces national saving and the supply of L.F.

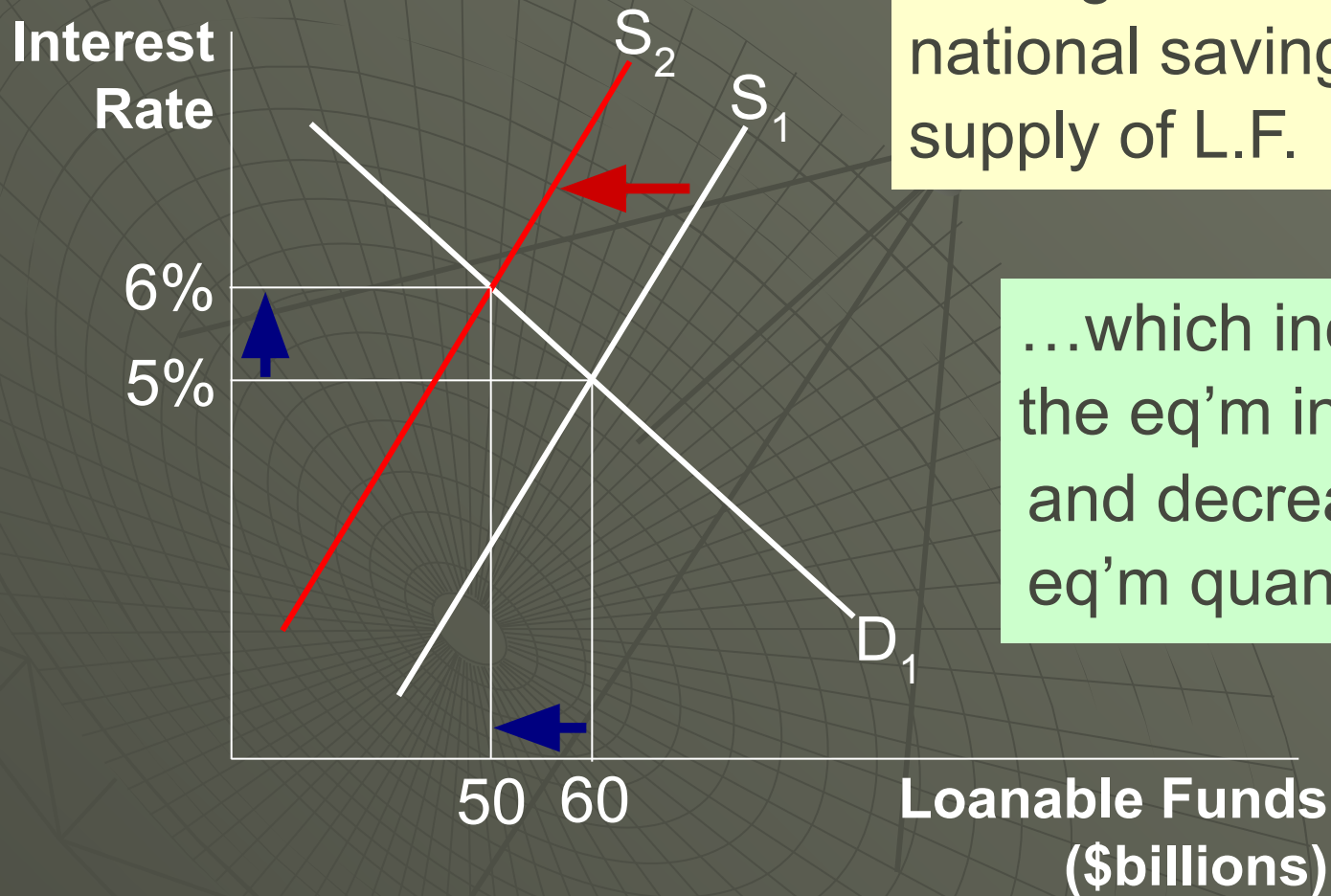


...which increases the eq'm interest rate and decreases the eq'm quantity of L.F. and investment.

Policy 3: Government Budget Deficits and Surpluses

- ◆ A budget deficit occurs if the government spends more than it receives in tax revenue
- ◆ This implies that public saving ($T-G$) falls which will lower national saving.
 - The supply of loanable funds will shift to the left
 - The equilibrium interest rate will rise, and the equilibrium quantity of funds will decrease.

Policy 3: Govt Budget Deficits



A budget deficit reduces national saving and the supply of L.F.

...which increases the eq'm interest rate and decreases the eq'm quantity of L.F.

Policy 3: Government Budget Deficits and Surpluses

- ◆ When the interest rate rises, the quantity of funds demanded for investment purposes falls
- ◆ Crowding out – a decrease in investment that results from government borrowing
- ◆ When the government reduces national saving by running a budget deficit, the interest rate rises and investment falls.
- ◆ Recall from the preceding chapter: Investment is important for long-run economic growth. Hence, budget deficits reduce the economy's growth rate and future standard of living.
- ◆ Government budget surpluses work in the opposite way. The supply of loanable funds increases, the equilibrium interest rate falls, and investment rises.

The U.S. Government Debt

- ◆ The government finances deficits by borrowing (selling government bonds).
- ◆ Persistent deficits lead to a rising govt debt.
- ◆ The ratio of govt debt to GDP is a useful measure of the government's indebtedness relative to its ability to raise tax revenue.
- ◆ Historically, the debt-GDP ratio usually rises during wartime and falls during peacetime – until the early 1980s.

The Fisher Effect

- ◆ Real interest rate is equal to the nominal interest rate minus inflation rate.
- ◆ This, of course, means that:
- ◆ $NIR = RIR + \text{inflation rate}$
 - The supply and demand for loanable funds determines the real interest rate
 - Growth in the money supply determines the inflation rate
- ◆ When the Fed increases the rate of growth of the money supply, the inflation rate increases. This in turn will lead to an increase in the nominal interest rate.

The Fisher Effect

- ◆ **Fisher Effect** – the one-for-one adjustment of the nominal interest rate to the inflation rate.
 - The Fisher effect does not hold in the short run to the extent that inflation is unanticipated.
 - If inflation catches borrowers and lenders by surprise, the nominal interest rate they set will fail to reflect the rise in prices.

Interest Rates in the Long Run and the Short Run

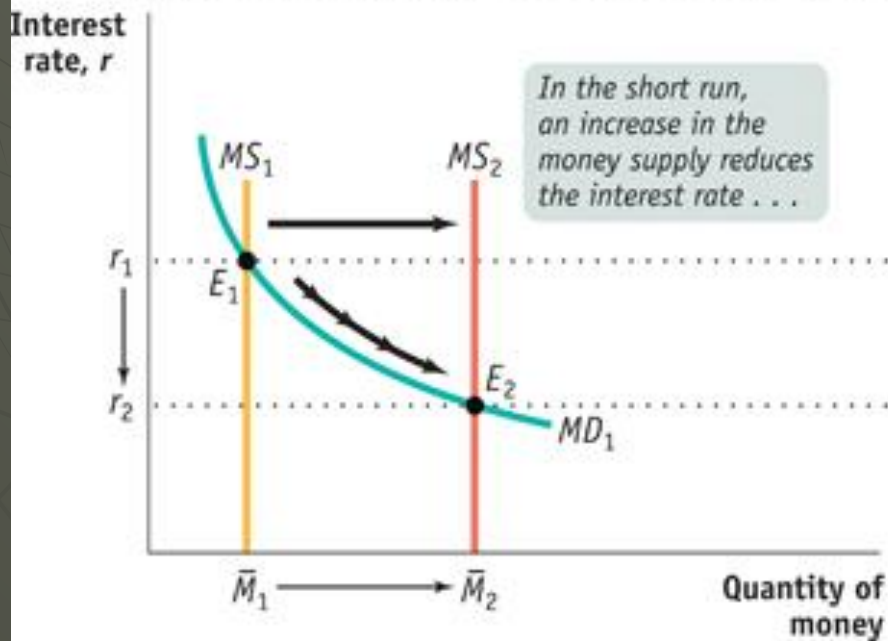
- ◆ It may appear we have two theories of how interest rates are determined.
- ◆ We said that the interest rate adjusts to balance the supply and demand for loanable funds.
- ◆ Then we proposed that the interest rate adjusts to balance the supply and demand for money.
- ◆ To understand how these two statements can both be true, we must discuss the difference between the short run and the long run.

Interest Rates in the Long Run and the Short Run

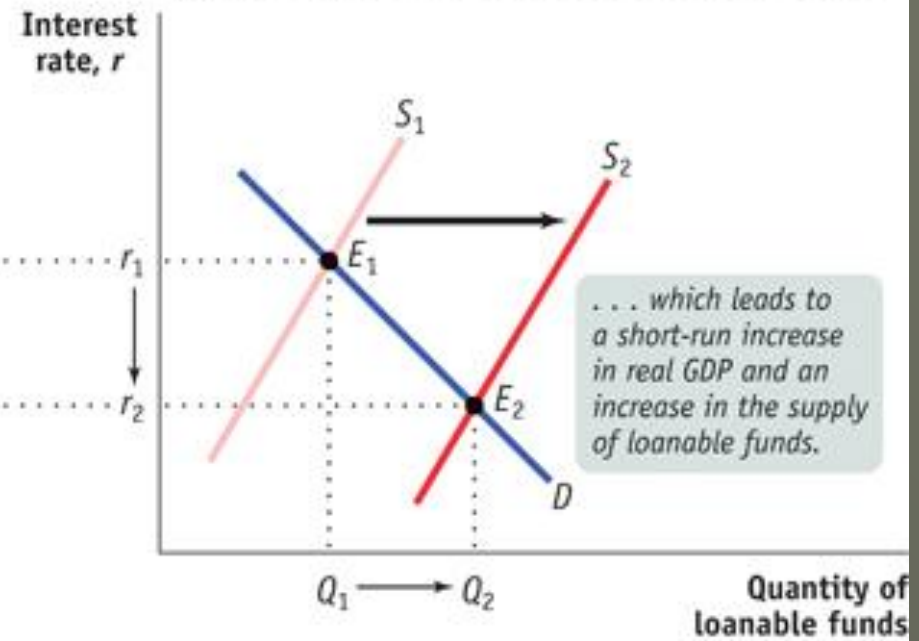
- ◆ In the long run, the economy's level of output, the interest rate, and the price level are determined by in the following manner:
 - Output is determined by the levels of resources and technology available.
 - For any given level of output, the interest rate adjusts to balance the supply and demand for loanable funds
 - The price level adjusts to balance the supply and demand for money. Changes in the supply of money lead to proportionate changes in the price level.

Reconciling the Two Interest Rate Models: The Interest Rate in the Short Run

(a) The Liquidity Preference Model of the Interest Rate

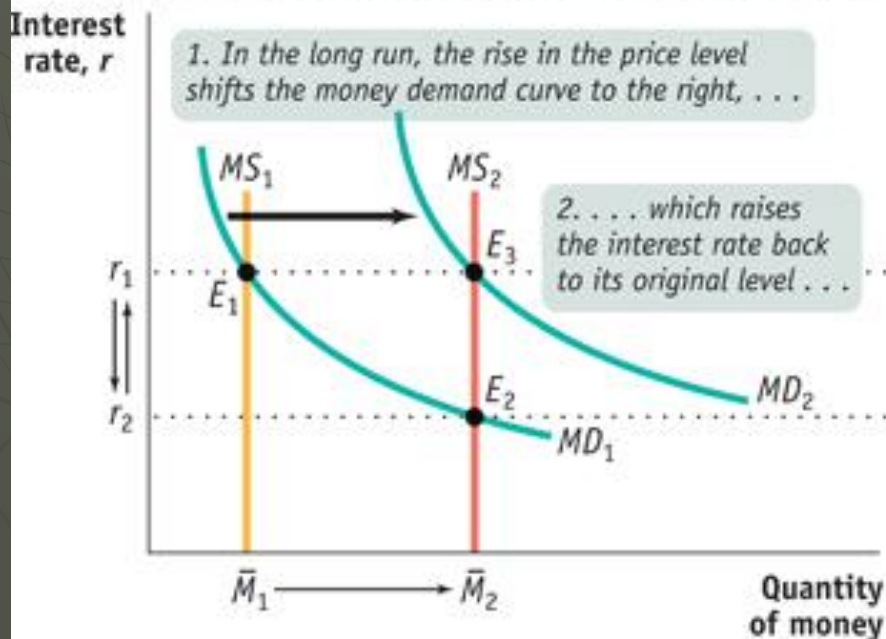


(b) The Loanable Funds Model of the Interest Rate



Reconciling the Two Interest Rate Models: The Interest Rate in the Long Run

(a) The Liquidity Preference Model of the Interest Rate



(b) The Loanable Funds Model of the Interest Rate

