ECON 202 - MACROECONOMIC PRINCIPLES

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Chapter 13 - Money and the Banking System

Money and the Banking System - Topics

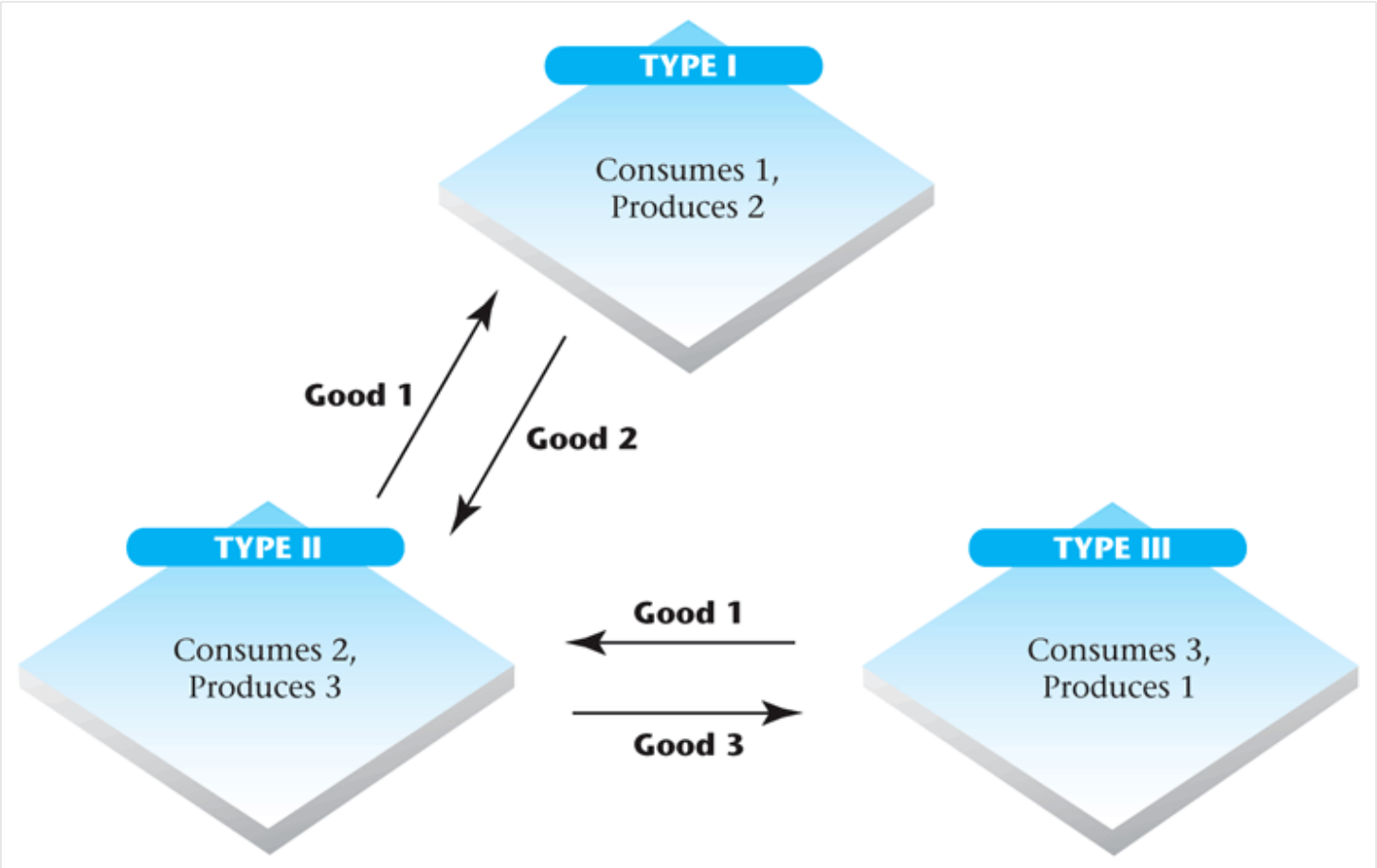
1. Identify the components of money in the U.S. economy
2. Explain the process of multiple expansion and contraction of deposits
3. Describe the structure of the Federal Reserve
4. Discuss examples of how the Federal Reserve acts during financial crises

What is Money?

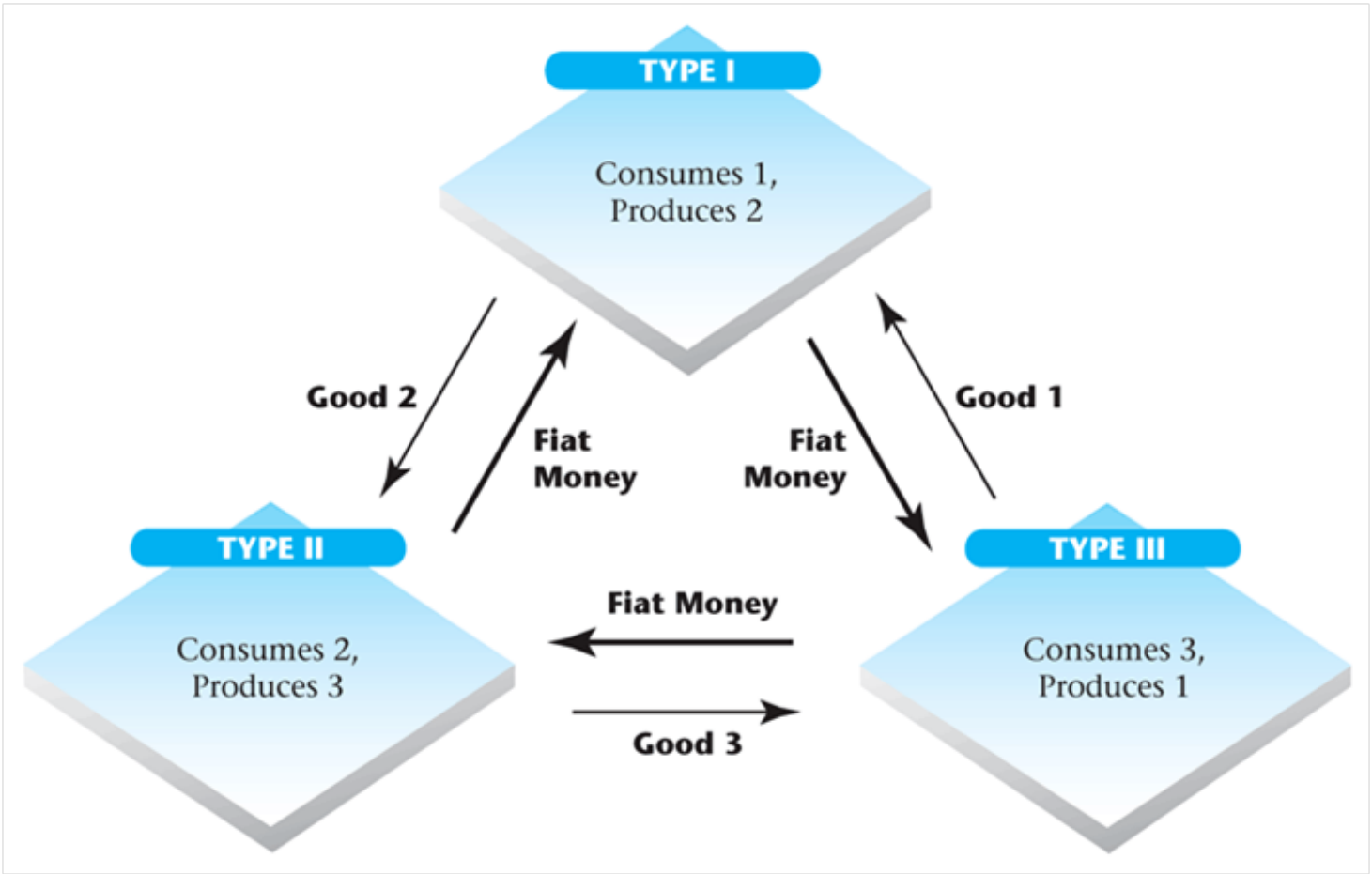
Three properties of money

1. Medium of exchange
2. Unit of account
3. Store of value (as long as inflation is low)

Commodity Money in the Absence-of-Double-Coincidence Economy



Fiat Money in the Absence-of-Double-Coincidence Economy



Different Types of Monetary Systems

- Commodity money
- Gold standard
- Fiat money

Yap Stone

Paying the Bill with a Yap Stone

What is Money

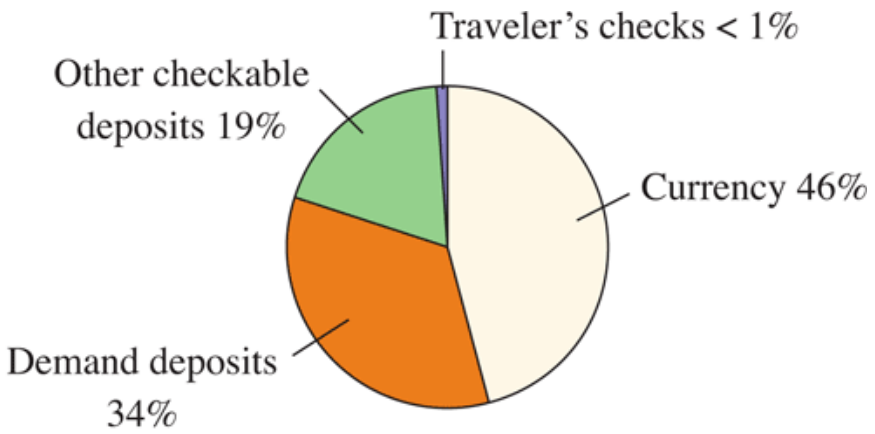
Measuring Money in the U.S. Economy: M1

TABLE 13.1 Components of M1, March 2012	
Currency held by the public	$ 1,028 billion
Demand deposits	763 billion
Other checkable deposits	424 billion
Traveler's checks	4 billion
Total of M1	2,220 billion

SOURCE: Board of Governors of the Federal Reserve.

- M1 is the sum of currency in the hands of the public, demand deposits, other checkable deposits, and traveler's checks

Measuring Money in the U.S. Economy: M1 (cont.)



- M1 is the most narrowly constructed aggregate.
- Principally, M1 consists of cash and its very close substitutes: Demand deposits Checking deposits Travelers checks

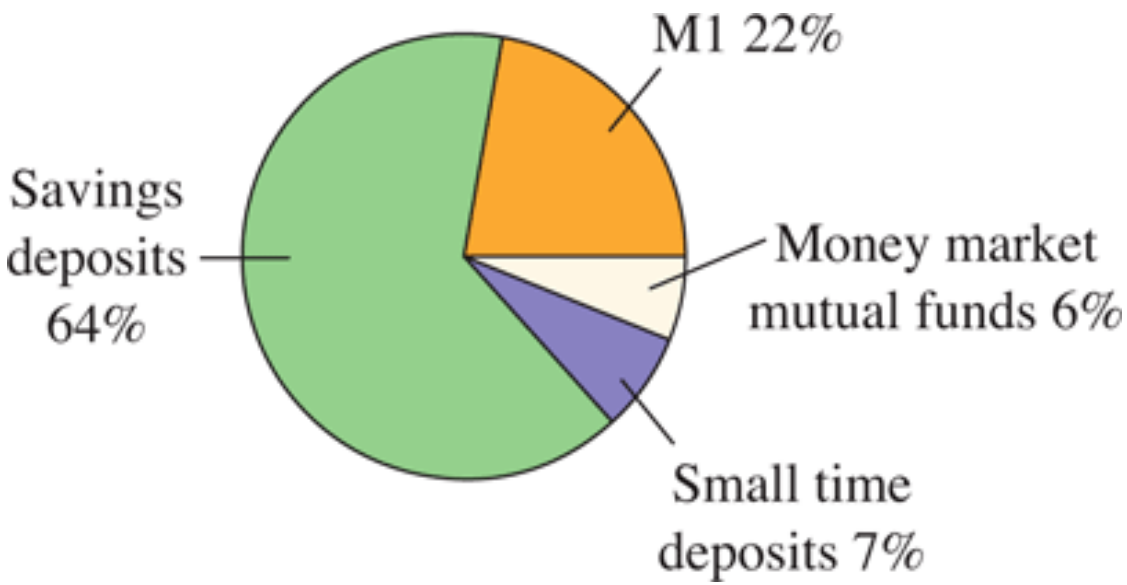
M2

- M2 = M1 +

1. savings accounts
2. retail money market mutual fund balances
3. small denomination time deposits
4. overnight repurchase agreements below $100,000.

- Cashing out these additional assets may involve small penalties, but households typically treat these assets as very good substitutes for cash.

M2 (cont.)

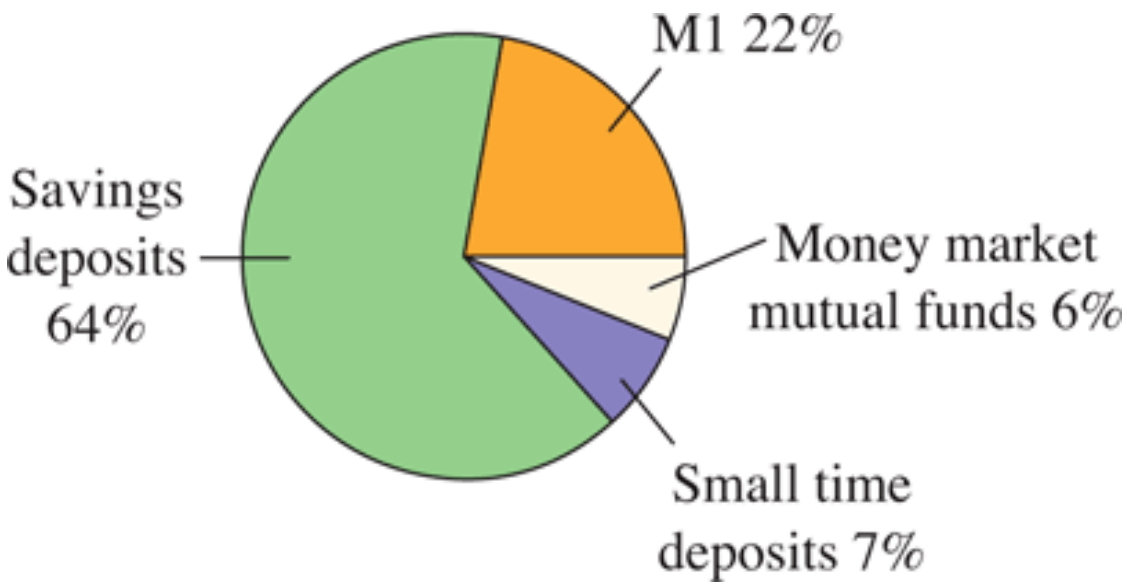


Savings deposits are the largest component of M2, followed by M1, small time deposits, and money market mutual funds

M3

- M3 = M2 +
  - time deposits and RPs over $100,000
  - money market deposits owned by firms
  - Eurodollars
- M3 is closely watched by some central banks (the Bundesbank after 1988, for instance, and the ECB currently)
- M3 is thought by some to bear a more stable relation to other macroeconomic variables

M3 (cont.)



Savings deposits are the largest component of M2, followed by M1, small time deposits, and money market mutual funds

Credit Cards

- Credit cards are not part of money supply
- Credit cards are not money
- You borrow an amount from the bank at the time of purchase and repay your debt with money later

Banks as Financial Intermediaries

- Banks pool deposits from many households and lend these funds to investors
- Balance sheet:
  - Assets (uses of funds)
    - Loans, reserves,...
  - Liabilities (source of funds)
    - Deposits from HH,...
  - Net worth=assets-liabilities

Balance Sheet for a Commercial Bank

- Reserves are assets that are not lent out
- Required reserves are the fraction of banks' deposits they are legally required to hold in their vaults or as deposits at the Fed
- Excess reserves are any additional reserves that a bank chooses to hold beyond what is required
- When a customer makes a cash deposit, the bank's reserves increase
- Since the currency held by the public decreases but checking deposits increase, the money supply remains unchanged

Assets	Liabilities
\$ 200 Reserves	\$2,000 Deposits
\$2,000 Loans	\$ 200 Owners' equity
Total: \$2,200	Total: \$2,200

Reserves

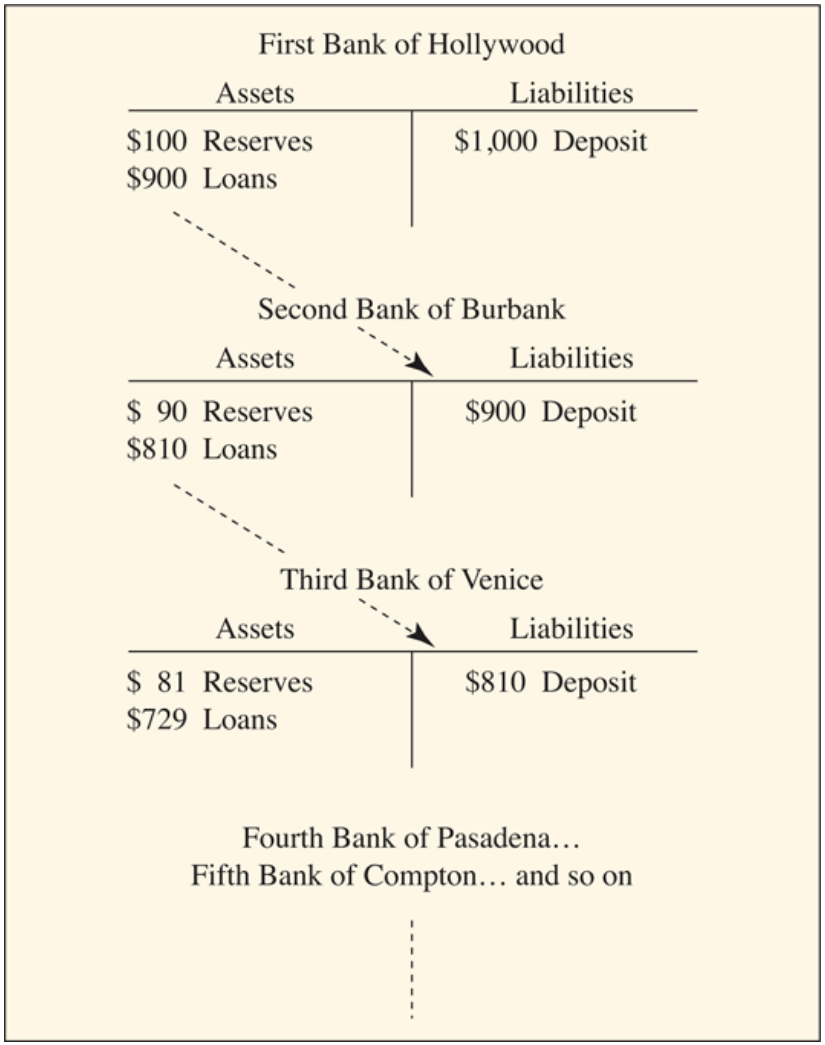
- Banks are required by law to hold a certain amount of assets as reserves
- They cannot lend these funds out
- Banks hold reserves in cash in their vaults or as deposits with the Federal Reserve
- Reserves do not earn interest

Money Creation

- Money is injected by the government
- Loans made by private banks, "multiply" an initial money deposit
- Initial money goes into bank, reducing money held by the public and increasing checking bank deposits $\rightarrow$ no change in money supply.
- Then the bank is giving out loans of the whole amount only retaining the reserves required percentage, 10%

- Let's assume that banks are required to keep 10% of their deposits as reserves
- That means that the reserve ratio—the ratio of reserves to deposits—equals 0.1
- After a customer makes a \$1,000 deposit, the bank's balance sheet changes as follows:

Money Creation (cont.)



Money Creation (cont.)

- First Bank of Hollywood makes a $900 loan which is used to open a checking account in the Second Bank of Burbank, with a balance of $900
- The Second bank of Burbank makes loans in the amount of $810, which are deposited in the Third Bank of Venice, and so on

The Money Multiplier

- The original \$1,000 cash deposit has created checking account balances equal to:
- \$1,000 + \$900 + \$810 + \$729 + \$656.10 +... . = \$10,000
- The general formula for deposit creation is:

$$\text{increase in checking accoutn balance} = \frac{1}{\text{reserve ratio}} \times \text{initial deposit}$$

- The increase in the money supply, M1, resulting from the increase in the \$1,000 deposit equals \$10,000 - \$1,000 = \$9,000
- This term in the formula is called the money multiplier
- The money multiplier shows the total increase in checking account deposits for any initial cash deposit
- The initial cash deposit triggers additional rounds of deposits and lending by banks, which leads to a multiple expansion of deposits

Derivation of the Money Multiplier

- Say the reserve requirement is: 10% and the initial money is \$1000
- Then the string of deposits looks like:
- \$1000+\$900+\$810+\$729+...
- =\$1000*(1+0.9+0.92+0.93+...)
- =\$1000*1/(1-0.9)
- =\$1000*10
- =\$10,000
- Hence, the money multiplier is 10

Multiplier Revisited

- r is reserve ratio
- cash*[(1+(1-r)+(1-r)2+(1-r)3+...]
- =cash*[1/(1-(1-r))]
- =cash*(1/r)
- Multiplier = 1/reserve ratio

Multiplier in the U.S.

- Although reserve requirements for checking accounts where
  - 3% for deposits up to $42 million and
  - 10% on all deposits exceeding $42
- The multiplier was only between 2 or 3
- This is because not all cash loans enter perfectly as new deposits in new checking accounts
- People hold money in their wallets

Checks

- Writing a check to someone, does not increase the money supply
- A check reduces deposits in one bank and increase deposits in another $\rightarrow$ neutral operation

Federal Reserve and Open Market Operations

Federal Reserve and Open Market Operations

- Central Bank:
  - A banker's bank: an official bank that controls the supply of money in a country
- Lender of last resort A central bank is the lender of last resort, the last place, all others having failed, from which banks in emergency situations can obtain loans

- Federal reserve can increase or decrease the total amount of reserves in the banking system
- Open market purchases
  - increase money
  - Fed buys government bonds from the private sector
- Open market sales
  - decrease money
  - Fed sells government bonds to the private sector

Open Market Purchase

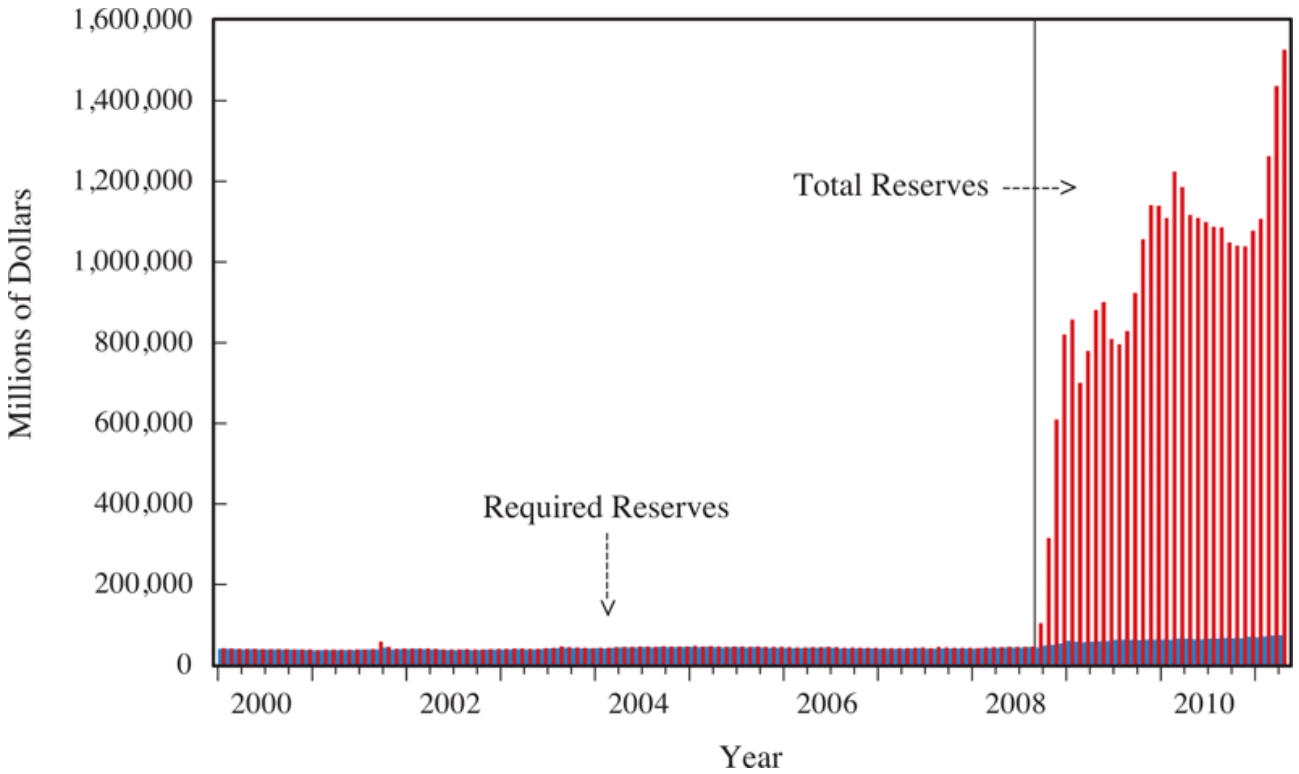
- Fed buys $1 million of bonds and writes a check to the public
- Public brings check to its bank and deposits increase by $1 million
- Banks cash in the check with Fed, which increases the total funds available to the banking system
- With the extra cash the banks then starts the loan cycles $\rightarrow$ money has been increased

Open Market Sales

- Fed sells $1 million to a Wallstreet firm
- Firm writes a check to Fed and gets bonds
- Fed cashes in check with the bank of the firm
- Bank reduces its reserves with the Fed
- Since bank's reserves are reduced it has to make fewer loans to meet the reserve requirement $\rightarrow$ money destruction

Additional Tools of the Fed

- Change reserve requirements (the % banks have to hold as reserves)
  - Not used often, since it is very disruptive to the banking system
- Change the discount rate (interest rate)
  - Fed lends reserves to banks at an interest rate, the discount rate



Additional Tools of the Fed (cont.)

- Until September of 2008, banks held few excess reserves so total reserves (in red) were very close to required reserves (in purple)
- In response to the financial crisis of 2008, the Fed injected large amounts of reserves into the system and began paying interest on reserves in October
- As a result, excess reserves rose and total reserves now exceed required reserves

How's it work?

- Customer wants a big loan
- Banks does not have the money, hence it has to try to get a loan from another bank on the federal funds market (inter bank loan market)
- If interest rates are too high, the bank can borrow directly from Fed at the discount rate
- Fed is the lender of last resort

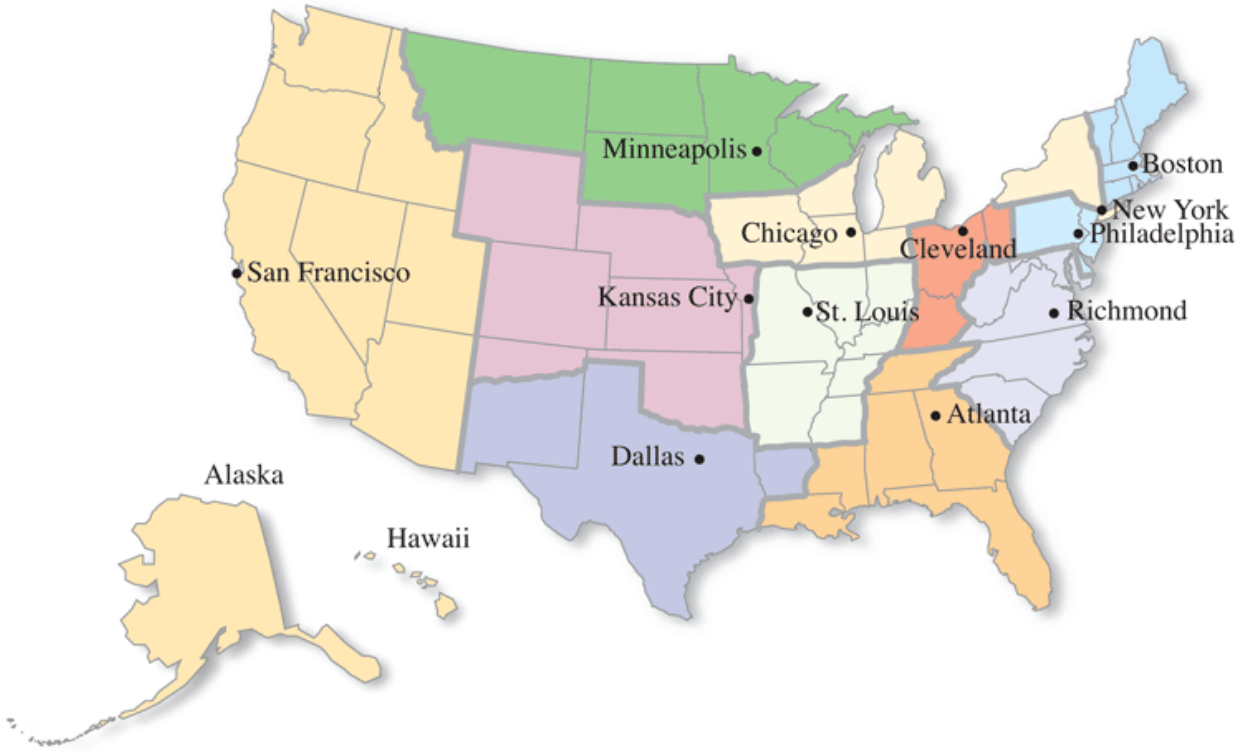
Discount Rate and Federal Funds Rate

- In practice the two rates are very similar, in order to avoid large swings in borrowed reserves
- However, changes in the discount rate are a major "signal" to the market about the Fed's intentions
- The Fed typically announces a target for the Federal Funds Rate and then uses open market transactions to keep rate at these targets

Structure of the Fed

- The Federal Reserve System was created in 1913 following a series of financial panics in the United States
- Congress created the Federal Reserve to be a central bank, serving as a banker's bank
- One of the Fed's primary jobs was to serve as a lender of last resort—lending funds to banks that suffered from panic runs
- Split into 3 sub-parts
  - Federal Reserve Banks (12 districts)
  - Board of Governors
  - Federal Open Market Committee

Structure of the Fed (cont.)



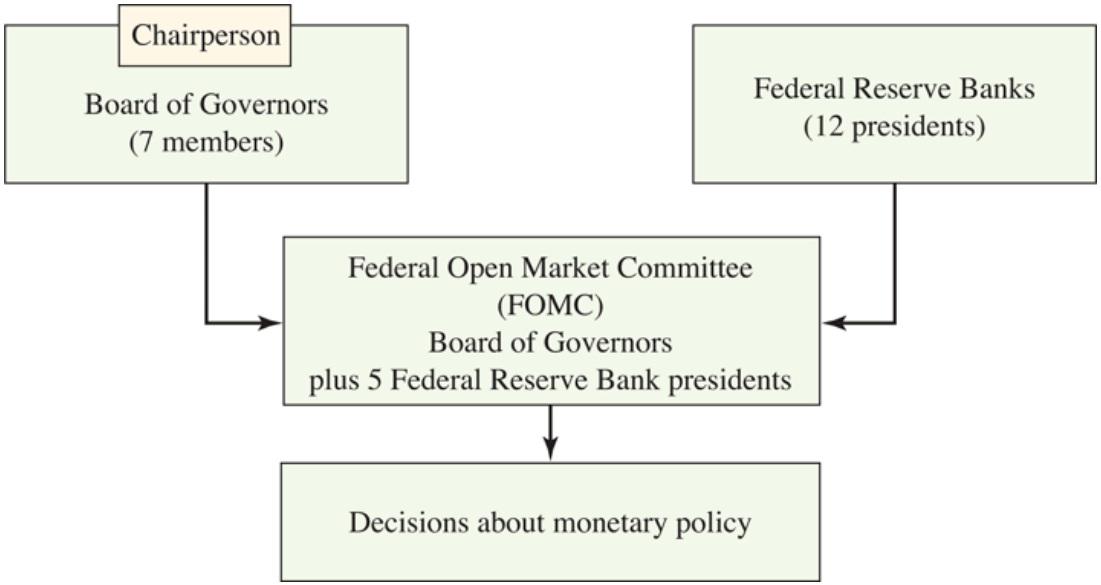
- 12 Federal Banks
  - Provide advice on monetary policy
  - Take part in decision-making on monetary policy
  - Provide a liaison between the Fed and the banks in their districts
- Board of Governors of the Federal Reserve

Structure of the Fed (cont.)

- The seven-person governing body of the Federal Reserve System in Washington, D.C.
- Appointed for 14 years by the President and confirmed by the Senate
- Chairperson of the Board serve a four-year term
- And everybody is carefully watching Janet Yellen

- Federal Open Market Committee (FOMC)
  - The group that decides on monetary policy:
  - 12-person board
    - 7 members of the board of Governors
    - 1 president of Fed New York
    - 4 rotating members of the other regional Feds
  - Chairperson of the Board of Gov. is also chairperson of the FOMC
  - The chairperson has to report to congress on a regular basis

Structure of the Fed (cont.)



Policies and Power

- The Fed is independent of the Treasury Dept.
- The Fed has to do what the Congress tells it
- However, in practice the Fed acts "independently" and reports to the congress afterwards
- Should the Fed be independent?