



# ECON 202 - MACROECONOMIC PRINCIPLES

Instructor: Dr. Juergen Jung

Towson University

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# Chapter 13 - Money and the Banking System

# Money and the Banking System - Topics

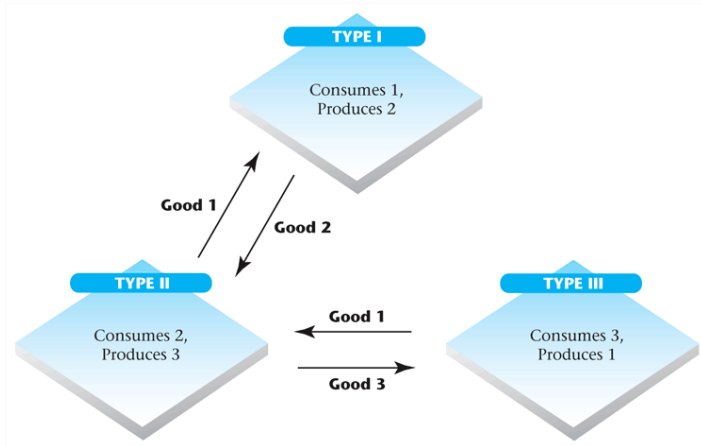
- 1 What is money?
- 2 Identify the components of money in the U.S. economy
- 3 Explain the process of multiple expansion and contraction of deposits
- 4 Describe the structure of the Federal Reserve
- 5 Discuss examples of how the Federal Reserve acts during financial crises

# What is Money?

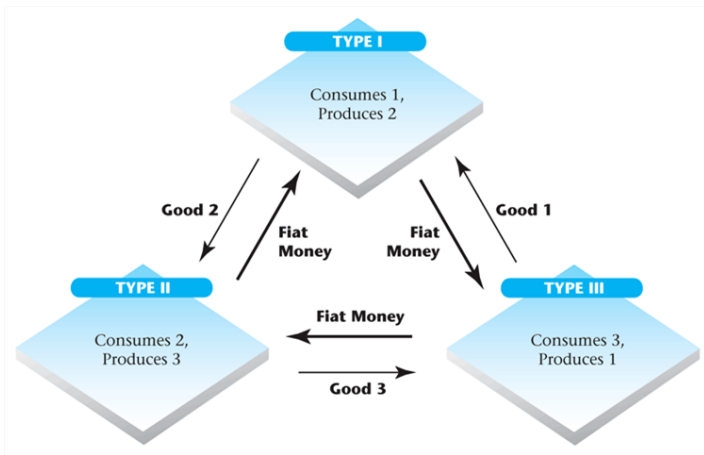
Three properties of money

- 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

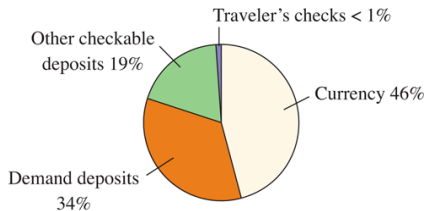
TABLE 13.1 Components of M1, March 2012

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.)



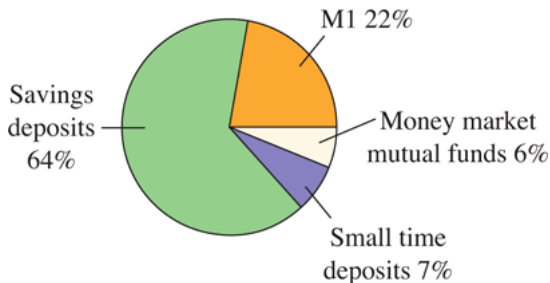
- M1 is the most narrowly constructed aggregate.
- Principally, M1 consists of cash and its very close substitutes: Demand deposits Checking deposits Travelers checks

# 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.)



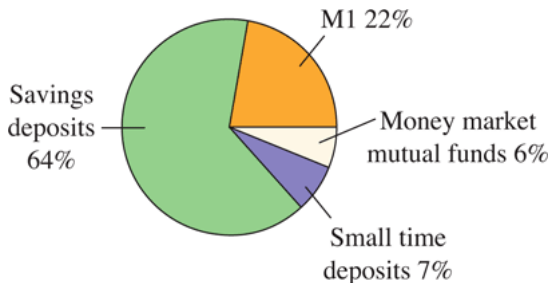
Savings deposits are the largest component of M2, followed by M1, small time deposits, and money market mutual funds

# M3

- $M3 = M2 +$ 
  - 1 time deposits and RPs over \$100,000
  - 2 money market deposits owned by firms
  - 3 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

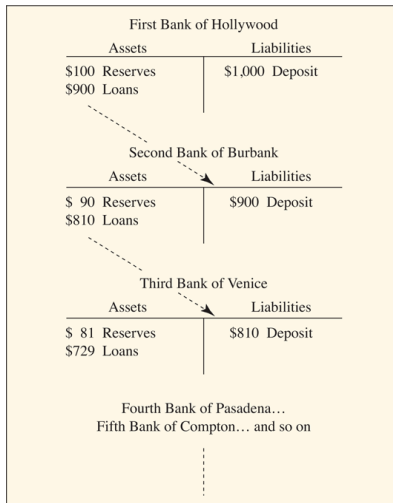
# Balance Sheet for a Commercial Bank

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

# Money Creation



# The Money Multiplier

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

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

- 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:
- $\$1000 + \$900 + \$810 + \$729 + \dots$
- $= \$1000 * (1 + 0.9 + 0.9^2 + 0.9^3 + \dots)$
- $= \$1000 * 1 / (1 - 0.9)$
- $= \$1000 * 10$
- $= \$10,000$
- Hence, the money multiplier is 10



# Multiplier Revisited

- $r$  is reserve ratio
- $\text{cash} * [(1 + (1 - r) + (1 - r)^2 + (1 - r)^3 + \dots)]$
- $= \text{cash} * [1 / (1 - (1 - r))]$
- $= \text{cash} * (1 / r)$
- $\text{Multiplier} = 1 / \text{reserve ratio}$

# 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  
→ 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

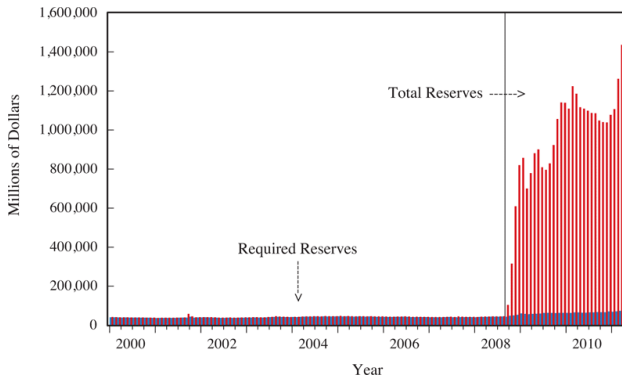
- Fed buys \$1 million of bonds and writes a check to the public
- Public brings check to its bank and deposits increase by \$1 million
- Banks cash in the check with Fed, which increases the total funds available to the banking system
- With the extra cash the banks then starts the loan cycles → money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

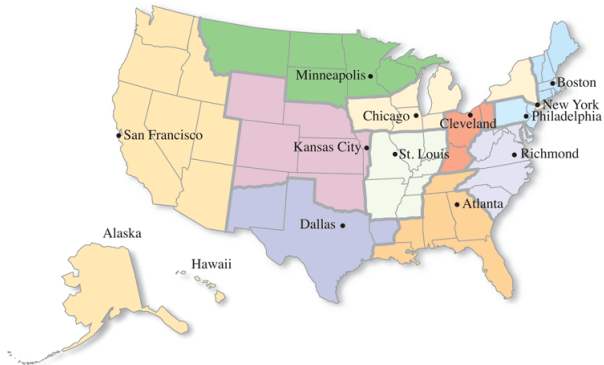
# Discount Rate and Federal Funds Rate

- 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.)

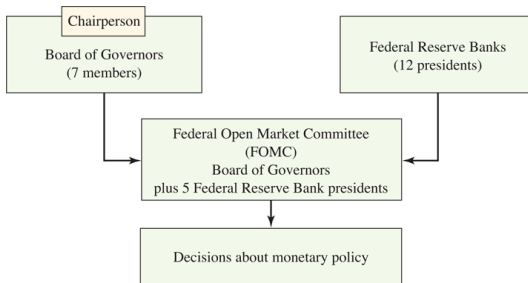


- 12 Federal Banks
  - Provide advice on monetary policy
  - Take part in decision-making on monetary policy
  - Provide a liaison between the Fed and the banks in their districts
- Board of Governors of the Federal Reserve

# 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.)



- 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?