29

# The Monetary System

# The Meaning of Money

- Money
  - Set of assets in an economy
  - That people regularly use
  - To buy goods and services from other people
- The functions of money
  - Medium of exchange
  - Unit of account
  - Store of value

# The Meaning of Money

- Medium of exchange
  - Item that buyers give to sellers when they want to purchase goods and services
- Unit of account
  - Yardstick people use to post prices and record debts

# The Meaning of Money

- Store of value
  - Item that people can use to transfer purchasing power
    - From the present to the future
- Liquidity
  - Ease with which an asset can be converted into the economy’s medium of exchange

# The Kinds of Money

- Commodity money
  - Money that takes the form of a commodity with intrinsic value
    - Gold, cigarettes
- Intrinsic value
  - Item would have value even if it were not used as money
- Gold standard - Gold as money
    - Or paper money that is convertible into gold on demand

# The Kinds of Money

- Fiat money
  - Money without intrinsic value
  - Used as money because of government decree
  - "This note is legal tender for all debts, public and private"
- Fiat
  - Order or decree

# Money in the U.S. Economy

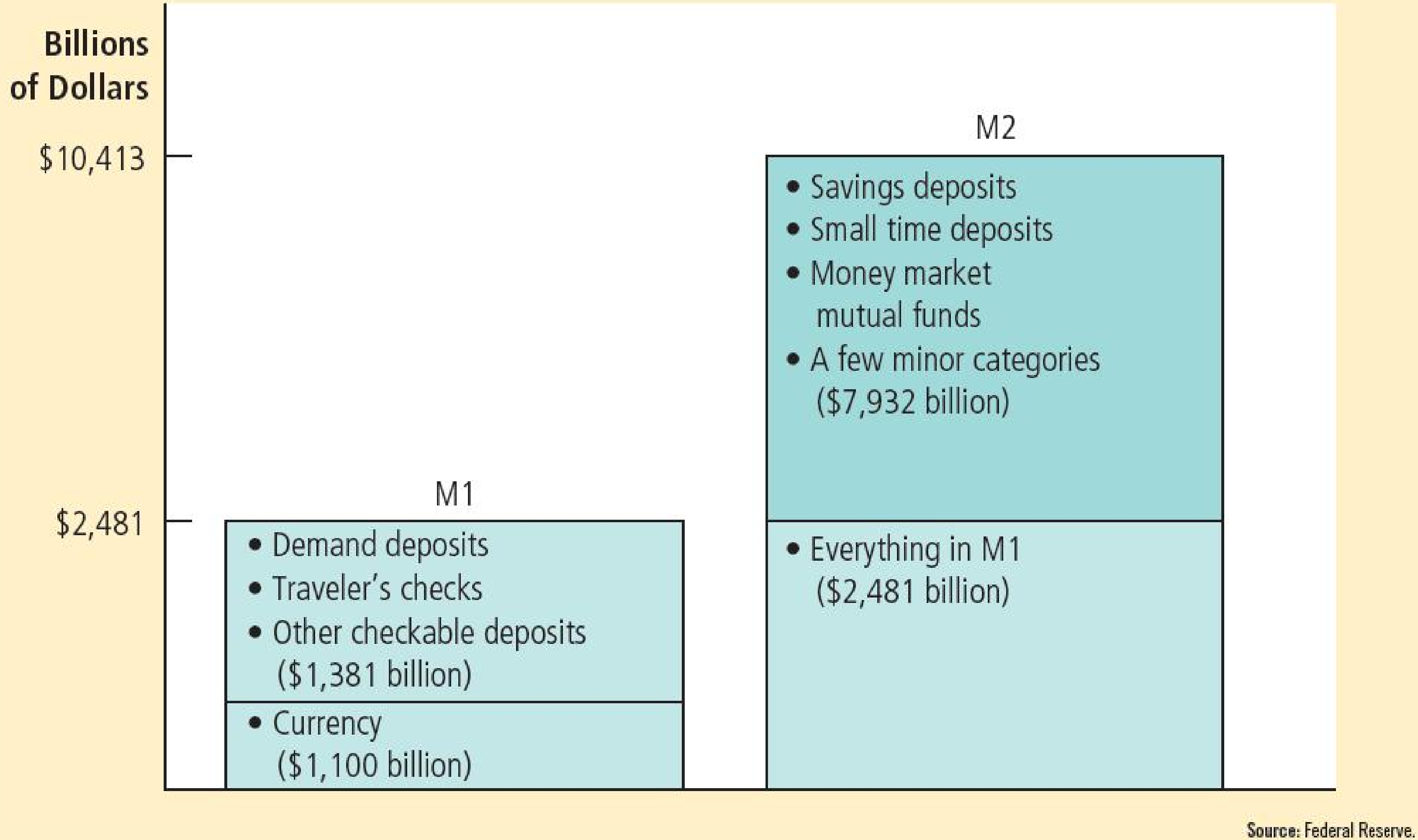
- Money stock
  - Quantity of money circulating in the economy
- Currency
  - Paper bills and coins in the hands of the public
- Demand deposits
  - Balances in bank accounts; depositors can access on demand by writing a check

# Money in the U.S. Economy

- Measures of money stock
  - M1
    - Demand deposits, Traveler's checks
    - Other checkable deposits, Currency
  - M2
    - Everything in M1
    - Savings deposits, Small time deposits
    - Money market mutual funds
    - A few minor categories

# Figure 1

- Two Measures of the Money Stock for the U.S. Economy




- The two most widely followed measures of the money stock are M1 and M2. This figure

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# Where is all the currency?

- January 2013: $1.1 trillion currency outstanding
  - Implies the average adult holds about $4,490 of currency
  - Much of the currency is held abroad
  - Much of the currency is held by drug dealers, tax evaders, and other criminals
- Currency is not a particularly good way to hold wealth
    - Can be lost or stolen; doesn’t earn interest

# The Federal Reserve System

- The Federal Reserve (the Fed)
  - The central bank of the United States
- Central bank
  - Institution designed to
    - Oversee the banking system
    - Regulate the quantity of money in the economy

# The Fed's Organization

- The Federal Reserve
  - Created in 1913
  - After a series of bank failures in 1907
  - Purpose: to ensure the health of the nation's banking system

# The Fed's Organization

- Board of governors
  - 7 members, 14-year terms
    - Appointed by the president and confirmed by the Senate
  - The chairman
    - Directs the Fed staff
    - Presides over board meetings
    - Testifies regularly about Fed policy in front of congressional committees.
    - Appointed by the president (4-year term)

# The Fed’s Organization

- The Federal Reserve System
  - Federal Reserve Board in Washington, D.C.
  - 12 regional Federal Reserve Banks
    - Major cities around the country
    - The presidents are chosen by each bank’s board of directors

# The Fed’s Organization

- The Fed’s jobs
  - Regulate banks and ensure the health of the banking system
    - Regional Federal Reserve Banks
    - Monitors each bank’s financial condition
    - Facilitates bank transactions - clearing checks
    - Acts as a bank’s bank
    - The Fed – lender of last resort

# The Fed’s Organization

- The Fed’s jobs
  - Control the money supply
    - Quantity of money available in the economy
    - Monetary policy
      - By Federal Open Market Committee (FOMC)
- Money supply
  - Quantity of money available in economy
- Monetary policy
  - Setting of the money supply

# Federal Open Market Committee

- FOMC
  - 7 members of the board of governors
  - 5 of the twelve regional bank presidents
    - All twelve regional presidents attend each FOMC meeting, but only five get to vote
  - Meets about every 6 weeks in Washington, D.C.
  - Discuss the condition of the economy
  - Consider changes in monetary policy

# Federal Open Market Committee

- Fed's primary tool: open-market operation
  - Purchase & sale of U.S. government bonds
- FOMC - increase the money supply
  - The Fed: open-market purchase
- FOMC - decrease the money supply
  - The Fed: open-market sale

# Banks and the Money Supply

- Money
  - Currency + Demand deposits
- Behavior of banks
  - Can influence the quantity of demand deposits in the economy (and the money supply)

*“I’ve heard a lot about money, and now I’d like to try some.”*

# Banks and the Money Supply

- Reserves
  - Deposits that banks have received but have not loaned out
- The simple case of 100% reserve banking
  - All deposits are held as reserves
    - Banks do not influence the supply of money

**First National Bank**

| Assets | | Liabilities | |
|---|---|---|---|
| Reserves | $100.00 | Deposits | $100.00 |

# Fractional-Reserve Banking

- Fractional-reserve banking
  - Banks hold only a fraction of deposits as reserves
- Reserve ratio
  - Fraction of deposits that banks hold as reserves
- Reserve requirement
  - Minimum amount of reserves that banks must hold; set by the Fed

# Fractional-Reserve Banking

- Excess reserve
  - Banks may hold reserves above the legal minimum
- Example: First National Bank
  - Reserve ratio 10%

**First National Bank**

| Assets | | Liabilities | |
|---|---|---|---|
| Reserves | $10.00 | Deposits | $100.00 |
| Loans | 90.00 | | |

# Fractional-Reserve Banking

- Banks hold only a fraction of deposits in reserve
  - Banks create money
    - Assets
    - Liabilities
  - Increase in money supply
  - Does not create wealth

# The Money Multiplier

**Second National Bank**

| Assets | | Liabilities | |
|---|---|---|---|
| Reserves | $ 9.00 | Deposits | $90.00 |
| Loans | 81.00 | | |

**Third National Bank**

| Assets | | Liabilities | |
|---|---|---|---|
| Reserves | $ 8.10 | Deposits | $81.00 |
| Loans | 72.90 | | |

# The Money Multiplier

- The money multiplier
  - Original deposit = $100.00
  - First National lending = $ 90.00 [= .9 × $100.00]
  - Second National lending = $ 81.00 [= .9 × $90.00]
  - Third National lending = $ 72.90 [= .9 × $81.00]
  - …
  - Total money supply = $1,000.00

# The Money Multiplier

- The money multiplier
  - Amount of money the banking system generates with each dollar of reserves
  - Reciprocal of the reserve ratio = 1/R
- The higher the reserve ratio
  - The smaller the money multiplier

# Financial Crisis of 2008–2009

- Bank capital
  - Resources a bank's owners have put into the institution
  - Used to generate profit

**More Realistic National Bank**

| Assets | | Liabilities and Owners' Equity | |
|---|---|---|---|
| Reserves | $200 | Deposits | $800 |
| Loans | 700 | Debt | 150 |
| Securities | 100 | Capital (owners' equity) | 50 |

# Financial Crisis of 2008–2009

- Leverage
  - Use of borrowed money to supplement existing funds for purposes of investment
- Leverage ratio
  - Ratio of assets to bank capital
- Capital requirement
  - Government regulation specifying a minimum amount of bank capital

# Financial Crisis of 2008–2009

- If bank’s assets rise in value by 5%
  - Because some of the securities the bank was holding rose in price
  - $1,000 of assets would now be worth $1,050
  - Bank capital rises from $50 to $100
  - So, for a leverage rate of 20
    - A 5% increase in the value of assets
    - Increases the owners’ equity by 100%

# Financial Crisis of 2008–2009

- If bank's assets are reduced in value by 5%
  - Because some people who borrowed from the bank default on their loans
  - $1,000 of assets would be worth $950
  - Value of the owners' equity falls to zero
  - So, for a leverage ratio of 20
    - A 5% fall in the value of the bank assets
    - Leads to a 100% fall in bank capital

# Financial Crisis of 2008–2009

- If bank's assets are reduced in value by more than 5%
  - Because some people who borrowed from the bank default on their loans
  - For a leverage ratio of 20
    - The bank's assets would fall below its liabilities
    - The bank would be insolvent
      - Unable to pay off its debt holders and depositors in full

# Financial Crisis of 2008–2009

- Many banks in 2008 and 2009
  - Incurred sizable losses on some of their assets
    - Mortgage loans and securities backed by mortgage loans
  - Shortage of capital induced the banks to reduce lending
    - Credit crunch
    - Contributed to a severe downturn in economic activity

# Financial Crisis of 2008–2009

- U.S. Treasury and the Fed
  - Put many billions of dollars of public funds into the banking system
    - To increase the amount of bank capital
  - Temporarily made the U.S. taxpayer a part owner of many banks
  - Goal: to recapitalize the banking system
    - So that bank lending could return to a more normal level - occurred by late 2009

# Fed's Tools of Monetary Control

- Influences the quantity of reserves
  - Open-market operations
  - Fed lending to banks
- Influences the reserve ratio
  - Reserve requirements
  - Paying interest on reserves

# Fed's Tools of Monetary Control

- Open-market operations
  - Purchase and sale of U.S. government bonds by the Fed
  - To increase the money supply
    - The Fed buys U.S. government bonds
  - To reduce the money supply
    - The Fed sells U.S. government bonds
  - Easy to conduct
  - Used more often

# Fed's Tools of Monetary Control

- Fed lending to banks
  - To increase the money supply
  - Discount window
    - At the discount rate
  - Term Auction Facility
    - To the highest bidder

# Fed's Tools of Monetary Control

- The discount rate
  - Interest rate on the loans that the Fed makes to banks
  - Higher discount rate
    - Reduce the money supply
  - Smaller discount rate
    - Increase the money supply

# Fed’s Tools of Monetary Control

- Term Auction Facility
  - The Fed sets a quantity of funds it wants to lend to banks
  - Eligible banks bid to borrow those funds
  - Loans go to the highest eligible bidders
    - Acceptable collateral
    - Pay the highest interest rate

# Fed’s Tools of Monetary Control

- Reserve requirements
  - Minimum amount of reserves that banks must hold against deposits
    - An increase in reserve requirement
      - Decrease the money supply
    - A decrease in reserve requirement
      - Increase the money supply
  - Used rarely – disrupt business of banking
  - Less effective in recent years
    - Many banks hold excess reserves

# Fed’s Tools of Monetary Control

- Paying interest on reserves
  - Since October 2008
  - The higher the interest rate on reserves
    - The more reserves banks will choose to hold
  - An increase in the interest rate on reserves
    - Increase the reserve ratio
    - Lower the money multiplier
    - Lower the money supply

# Problems

- The Fed's control of the money supply
  - Not precise
- The Fed does not control:
  - The amount of money that households choose to hold as deposits in banks
  - The amount that bankers choose to lend

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# Bank runs and the money supply

- Bank runs
  - Depositors suspect that a bank may go bankrupt
    - “Run” to the bank to withdraw their deposits
  - Problem for banks under fractional-reserve banking
    - Cannot satisfy withdrawal requests from all depositors

# Bank runs and the money supply

- When a bank run occurs
  - The bank - is forced to close its doors
  - Until some bank loans are repaid
  - Or until some lender of last resort provides it with the currency it needs to satisfy depositors
  - Complicate the control of the money supply

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# Bank runs and the money supply

- Great Depression, early 1930s
  - Wave of bank runs and bank closings
  - Households and bankers - more cautious
  - Households
    - Withdrew their deposits from banks


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*A not-so-wonderful bank run*

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# Bank runs and the money supply

- Great Depression, early 1930s
  - Bankers - responded to falling reserves
    - Reducing bank loans,
    - Increased their reserve ratios
    - Smaller money multiplier
    - Decrease in money supply

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# Bank runs and the money supply

- Bank runs today
  - Not a major problem for the U.S. banking system
- The federal government
  - Guarantees the safety of deposits at most banks
    - Federal Deposit Insurance Corporation (FDIC)

# Bank runs and the money supply

- No bank runs today
  - Depositors are confident
  - FDIC will make good on the deposits
- Government deposit insurance
  - Cost:
    - Bankers - little incentive to avoid bad risks
  - Benefit:
    - A more stable banking system

# The Federal Funds Rate

- The federal funds rate
  - Interest rate at which banks make overnight loans to one another
    - Lender – has excess reserves
    - Borrower – needs reserves
  - A change in federal funds rate
    - Changes other interest rates

# The Federal Funds Rate

- The Fed: target the federal funds rate
  - Open-market operations
    - The Fed buys bonds
      - Decrease in the federal funds rate
      - Increase in money supply
    - The Fed sells bonds
      - Increase in the federal funds rate
      - Decrease in money supply