CHAPTER

29

The Monetary System

Goals

In this chapter you will

- Consider what money is and what functions money has in the economy
- Learn what the Federal Reserve System is
- Examine how the banking system helps determine the supply of money
- See what tools the Federal Reserve uses to alter the supply of money

Outcomes

After accomplishing these goals, you should be able to

- Define money and list the three functions of money
- Explain the role of the Fed in money creation
- Explain the money multiplier in a fractional reserve banking system
- List and explain the three tools the Fed uses to change the money supply

Strive for a Five

This chapter is important as the information presented constitutes 15-20 percent of the AP macroeconomics exam. Students should focus on the following in preparation for the exam:

- The three functions of money
- Definitions of the supply of money; M1 and M2
- Kinds of money
- The Federal Reserve System's structure
- Monetary policy and the three tools of the Fed
- Money creation ability of the Fed and the banking system

Key Terms

- *Barter*—Trading goods and services directly for goods and services
- *Money*—The set of assets generally accepted in trade for goods and services
- *Medium of exchange*—The function of money when used to purchase goods and services
- *Unit of account*—The function of money when used as a yardstick to post prices and record debts
- *Store of value*—The function of money when used to transfer purchasing power to the future
- *Liquidity*—The ease with which an asset can be converted into the economy's medium of exchange
- *Commodity money*—Money in the form of a commodity with intrinsic value
- *Fiat money*—Money without intrinsic value
- *Currency*—Paper bills and coins in the hands of the public
- *Demand deposits*—Balances in bank accounts that can be accessed on demand by check
- *Federal Reserve (Fed)*—The central bank of the United States
- *Central bank*—An institution designed to regulate the banking system and money supply
- *Money supply*—The quantity of money in the economy
- *Monetary policy*—Decisions by the central bank concerning the money supply
- *Federal Open Market Committee*—The monetary policy committee within the Federal Reserve
- *Reserves*—Deposits that banks have received but have not lent out
- *Fractional-reserve banking*—A banking system in which banks hold only a fraction of deposits as reserves
- *Reserve ratio*—The fraction of deposits held as reserves
- *Money multiplier*—The amount of money the banking system generates from each dollar of reserves
- *Open-market operations*—The purchase and sale of U.S. government bonds by the Fed
- *Reserve requirements*—The minimum legal percent of deposits that banks must hold as reserves
- *Discount rate*—The interest rate the Fed charges on loans to banks
- *Federal funds rate*—The interest rate at which banks make overnight loans to one another

Chapter Overview

Context and Purpose

Chapter 29 is the first chapter in a two-chapter sequence dealing with money and prices in the long run. Chapter 29 describes what money is and develops how the Federal Reserve controls the quantity of money. Since the quantity of money influences the rate of inflation in the long run, the following chapter concentrates on the causes and costs of inflation.

The purpose of Chapter 29 is to help you develop an understanding of what money is, what forms money takes, how the banking system helps create money, and how the Federal Reserve controls the quantity of money. An understanding of money is important because the quantity of money affects inflation and interest rates in the long run and production and employment in the short run.

Chapter Review

Introduction If there were no such thing as money, people would have to rely on barter. *Barter* is when people trade goods and services directly for other goods and services. Barter requires that there be a *double coincidence of wants.* For a trade to take place, each trader has to have what the other one wants—an unlikely event. The existence of money facilitates production and trade, which allow people to specialize in what they do best and raise the standard of living.

The Meaning of Money

Money is the set of assets commonly used to buy goods and services. That is, money is the portion of someone's wealth that is directly spendable or exchangeable for goods and services.

There are three functions of money:

- Money serves as a medium of exchange because money is the most commonly accepted asset when a buyer purchases goods and services from a seller.
- Money serves as a unit of account because money is the yardstick with which people post prices and record debts.
- Money serves as a store of value because people can use money to transfer purchasing power from the present to the future. Other types of wealth—stocks, bonds, rare art—may be a better store of value, but they are not as good at providing liquidity. Liquidity is the ease with which an asset can be converted into a medium of exchange. Money is liquid but loses value when prices rise. The value of rare art tends to rise with inflation, but it is much less liquid.

Money can be divided into two fundamental types—commodity money and fiat money.

- Commodity money is money that has "intrinsic value." That is, it has value independent of its use as money. Gold, silver, and cigarettes in a prisoner-of-war camp are all examples of commodity money. When a country uses gold as money, it is operating under a gold standard.
- Fiat money is money without intrinsic value. It is money by government fiat or declaration. Paper dollars are an example of fiat money.

When we measure the quantity of money, sometimes called the *money stock*, we should clearly include currency (paper bills and coins in the hands of the public) and demand deposits (balances in bank accounts that can be accessed on demand by check) because these assets are a medium of exchange. Savings balances, however, can easily be transferred into checking; other more restrictive checking accounts, such as money market mutual funds, offer some degree of spendability. In an economy with a complex financial system, it is difficult to draw the line between assets that are money and assets that are not. For this reason, in the United States, we calculate multiple measures of the money stock, two of which are shown below:

- M1: Currency, demand deposits, traveler's checks, other checkable deposits
- M2: M1, savings deposits, small time deposits, money market mutual funds, a few minor categories

For our purposes, consider money in the United States to be currency and spendable deposits.

Credit cards are not counted in the stock of money because they are not a method of payment but are instead a method of deferring payment. Debit cards are like an electronic check in that money from the buyer's account is directly transferred to the seller's account. Thus, the value is already captured by the account balance.

In comparison to the size of the U.S. population, there is an unusually large amount of currency in circulation. It is likely that a large portion of this currency is circulating overseas or used by criminal enterprises.

The Federal Reserve System

The Federal Reserve (Fed) is the central bank of the United States. It is designed to oversee the banking system and regulate the quantity of money in the economy.

The Fed was created in 1913 in response to a series of bank failures in 1907. The Fed is run by the Board of Governors, which has seven members appointed by the president and approved by the Senate. The members of the Board of Governors have fourteen-year terms to insulate them from political pressures. One of the seven members of the Board of Governors is appointed by the president to serve as chairman for a four-year term. The Federal Reserve System is composed of the Federal Reserve Board in Washington, D.C., and twelve regional Federal Reserve Banks.

The Fed has two main jobs:

- To regulate the banks and ensure the health of the banking system. The Fed monitors each bank's financial condition and helps clear checks. In a crisis, when banks find themselves short of cash, the Fed may act as the *lender of last resort* to the banks.
- To control the quantity of money in the economy, called the money supply. The Fed's decisions about the money supply are called monetary policy.

The monetary policy branch of the Fed is the *Federal Open Market Committee* (FOMC). There are twelve voting members on the FOMC—the seven members of the Board of Governors plus five of the twelve regional bank presidents. The voting among the regional bank presidents is rotated. The FOMC meets about every six weeks to discuss the condition of the economy and to vote on changes in monetary policy.

The Fed primarily changes the money supply with open-market operations, which are the purchase and sale of U.S. government bonds by the Fed in the open market for debt (thus, the name Federal Open Market Committee).

- To increase the money supply, the Fed creates dollars and uses them to purchase government bonds. After the transaction, additional dollars are in the hands of the public, so the money supply is larger.
- To decrease the money supply, the Fed sells government bonds to the public. After the transaction, fewer dollars are in the hands of the public, so the money supply is smaller.

Changing the money supply changes inflation in the long run and may change employment and output in the short run.

Banks and the Money Supply

Recall that the public can hold its money as currency or demand deposits. Since these deposits are in banks, the behavior of banks affects the money supply. This complicates the Fed's task of controlling the money supply.

The impact that banks have on the money supply can be seen by going through the following three cases:

- Suppose there are *no banks.* Then currency is the only money. If there is $1,000 of currency, there is $1,000 of money.

- Suppose there is *100-percent-reserve banking*. Deposits that are received by a bank but are not loaned out are called reserves. With 100-percent-reserve banking, banks are safe places to store money, but they are not lenders. If the public deposits all $1,000 of its currency in Bank 1, Bank 1's *T-account*, which records changes in the bank's assets and liabilities, would be the following:

Bank 1			
Assets		Liabilities	
Reserves	$1,000	Deposits	$1,000

Bank 1 has liabilities of $1,000 because it owes the $1,000 deposit back to the depositor. It has assets of $1,000 because it has cash reserves of $1,000 in its vault. Since currency held by the public has gone down by $1,000 and deposits held by the public have increased by $1,000, the money supply is unaffected. *If banks hold all deposits on reserve, banks do not influence the money supply.*

- Suppose there is fractional-reserve banking. Since few people request the return of their deposit on any given day, Bank 1 need not hold all $1,000 of the deposit as cash reserves. It could lend some of the $1,000 and keep only the remainder on reserve. This is called fractional-reserve banking. The fraction of deposits held as reserves is the reserve ratio. The Fed sets the minimum reserve ratio with a reserve requirement. Suppose Bank 1 has a reserve ratio of 10 percent, which means that it keeps 10 percent of its deposits on reserve and lends out the rest. Its T-account becomes:

Bank 1			
Assets		Liabilities	
Reserves	$100	Deposits	$1,000
Loans	$900		

Bank 1 has created money because it still holds a $1,000 deposit, but now a borrower has $900 in currency. *When banks hold only a fraction of deposits as reserves, banks create money.*

This story is not complete. Suppose the borrower of the $900 spends it and the receiver of the $900 deposits it in Bank 2. If Bank 2 also has a reserve ratio of 10 percent, its T-account becomes:

Bank 2			
Assets		Liabilities	
Reserves	$ 90	Deposits	$900
Loans	$810		

Bank 2 has created another $810 by its lending activity. Each time money is deposited and a portion of it loaned, more money is created.

If this process continues forever, the total amount of money created by the banking system from the original deposit of $1,000 is $1,000 + $900 + $810 + $729 + . . . = $10,000 (in this case, each loan is 90 percent of the previous loan).

The amount of money the banking system creates from each dollar of reserves is called the money multiplier. The money multiplier is the reciprocal of the reserve ratio. If R is the reserve ratio, then the money multiplier is $1/R$. In the case described here, the money multiplier is 1/.10 or 10. Thus, $1,000 of new reserves created from the original $1,000 deposit can create a total of $10,000 in deposits. The smaller the reserve ratio, the greater the amount of lending from the same amount of reserves and, hence, the larger the money multiplier. The larger the reserve ratio, the smaller the multiplier.

Fractional-reserve banking does not create net wealth because when a bank loans reserves, which creates money (someone's asset), it also creates an equal value debt contract (someone's liability).

The Fed has three main tools it uses to alter the money supply:

- *Open-market operations:* Recall, when the Fed buys government bonds from the public, the dollars it uses to pay for them increase the dollars in the economy. Each new dollar held as currency increases the money supply one dollar. Each dollar deposited with banks increases bank reserves and, thus, increases the money supply by some multiple. When the Fed sells government securities, dollars are removed from circulation and reserves are reduced at banks. This reduces lending and further reduces the money supply. Open-market operations can easily be used for small or large changes in the money supply. Hence, it is the day-to-day tool of the Fed.
- *Reserve requirements:* Reserve requirements set the minimum reserve ratio for a bank. An increase in the reserve requirement reduces the money multiplier and decreases the money supply. A decrease in the reserve requirement increases the money multiplier and increases the money supply. The Fed rarely changes reserve requirements because changes in reserve requirements disrupt the business of banking. For example, an increase in reserve requirements immediately restricts bank loans.
- *Discount rate:* The discount rate is the interest rate the Fed charges on loans to banks. When the Fed raises the discount rate, banks tend to borrow fewer reserves from the Fed and the money supply decreases. When the Fed decreases the discount rate, banks tend to borrow more reserves from the Fed and the money supply increases. The Fed also acts as a lender of last resort to banks during a crisis when depositors withdraw unusually large amounts of their deposits from banks.

The Fed's control of the money supply is not precise because:

- The Fed does not control the amount of money people choose to hold as deposits versus currency. When the public deposits a greater amount of their currency, bank reserves increase and the money supply increases.
- The Fed does not control the amount of reserves that the banks lend. The reserve requirement sets the minimum reserve ratio, but banks can hold *excess reserves*—reserves in excess of those required. If banks increase their excess reserves, lending decreases and the money supply decreases.

In times prior to the existence of deposit insurance, if depositors feared that a bank had made unsound loans with their deposits and that the bank might become bankrupt, they would "run" to the bank to remove their deposit. This is known as a "bank run." With fractional reserves, only a few depositors can immediately get their money back. This behavior causes a decrease in the money supply for two reasons. First, people increase their holdings of currency by withdrawing deposits from banks. This reduces reserves, bank lending, and the money supply. Second, banks, fearing deposit withdrawal, hold excess reserves and further decrease lending and the money supply. This is no longer a major problem due to the Federal Deposit Insurance Corporation (FDIC). Also, the Fed collects weekly data on reserves and deposits so it can detect changes in depositor and bank behavior.

The federal funds rate is the interest rate banks charge each other for short-term loans. When the Fed lowers the target for the federal funds rate, it buys bonds with open-market operations supplying more bank reserves, and the money supply increases. When the Fed raises the federal funds target, the money supply decreases.

Helpful Hints

1. Fiat money maintains value due to artificial scarcity. Gold has value because people desire it for its intrinsic value and because it is naturally scarce (alchemists have never been able to create gold). However, fiat money is cheap and easy to produce. Therefore, fiat money maintains its value only because of self-restraint on the part of the producer. If U.S. dollars are a quality store of value, it is because the dollar is difficult to counterfeit and the Fed shows self-restraint in the production of dollars.

2. Paper dollars are considered "currency" only when in the hands of the nonbank public. When economists use the word currency, we mean "currency in the hands of the nonbank public." When you deposit currency in the bank, you now own a deposit and your paper dollars are now the "reserves" of the bank. Currency in the hands of the nonbank public has decreased while deposits have increased by an equal amount. At this point, the money supply is unaltered because money is the sum of currency (in the hands of the nonbank public) and deposits.

3. The money multiplier is most easily understood in words. If we state the relationship among reserves, deposits, and the multiplier in words, it clarifies the relationship. Since a fractional reserve system implies that "reserves are some percent of deposits," it follows that "deposits are some multiple of reserves." For example, if reserves are 1/5 (or 20 percent) of deposits, then deposits are five times (or 1/.20) reserves. Since deposit expansion actually takes place due to banks' lending some of their reserves, it is most useful to us to think in terms of "deposits are some multiple of reserves."

4. It is easy to remember the impact of open-market operations by asking yourself, "Who pays?" When the Fed buys a government bond from the public, the Fed pays with "new dollars" and the money supply expands. When the Fed sells government bonds, the public pays with dollars and the Fed "retires" the dollars. That is, the dollars cease to exist when the Fed receives payment. Note that when the Fed sells bonds, it is not "issuing" bonds. It is selling existing bonds that were previously issued by the U.S. government.

Self-Test

Multiple-Choice Questions

1. Which of the following is (are) part of the definition of money?
   (i) store of value
   (ii) medium of exchange
   (iii) unit of account
   (iv) backed by gold
   a. (i) and (ii) only
   b. (i), (ii), and (iii) only
   c. (i), (ii), (iii), and (iv)
   d. (ii) and (iii) only
   e. (iii) and (iv) only

2. The measure of the money stock called M1 includes
   a. wealth held by people in their checking accounts.
   b. wealth held by people in their savings accounts.
   c. wealth held by people in money market mutual funds.
   d. everything that is included in M2 plus some additional items.
   e. credit cards.

3. Demand deposits are a type of
   a. checking account.
   b. time deposit.
   c. money market mutual fund.
   d. savings deposit.
   e. debit card balance.

4. The Federal Reserve does all EXCEPT which of the following?
   a. It controls the supply of money.
   b. It acts as a lender of last resort to banks.
   c. It makes loans to large business firms.
   d. It tries to ensure the health of the banking system.
   e. Influences interest rates in the economy.

5. If the Federal Open Market Committee decides to increase the money supply, then the Federal Reserve
   a. creates dollars and uses them to purchase government bonds from the public.
   b. sells government bonds from its portfolio to the public.
   c. creates dollars and uses them to purchase various types of stocks and bonds from the public.
   d. sells various types of stocks and bonds from its portfolio to the public.
   e. increases its sales of bonds to the government.

6. The Fed can increase the price level by conducting open-market
   a. sales and raising the discount rate.
   b. sales and lowering the reserve requirement.
   c. purchases and raising the discount rate.
   d. purchases and lowering the discount rate.
   e. purchases and raising the reserve requirement.

7. In 1991, the Federal Reserve lowered the reserve requirement ratio from 12 percent to 10 percent. Other things the same, this should have
   a. increased both the money multiplier and the money supply.
   b. decreased both the money multiplier and the money supply.
   c. increased the money multiplier and decreased the money supply.
   d. decreased the money multiplier and increased the money supply.
   e. increased the money supply but not have changed the money multiplier.

8. Imagine that the federal funds rate was not at the level the Federal Reserve had targeted. To move the rate back toward its target, the Federal Reserve could
   (i) buy bonds, thus reducing reserves
   (ii) sell bonds, thus reducing reserves
   (iii) buy bonds, thus increasing reserves
   (iv) sell bonds, thus increasing reserves
   a. (i) only
   b. (ii) only
   c. (iii) only
   d. (i) and (iv) only
   e. (ii) and (iii) only

9. The federal funds rate is the interest rate
   a. the Federal Reserves charges for loans it makes to the federal government.
   b. the Federal Reserve charges banks for short-term loans.
   c. banks charge each other for short-term loans of reserves.
   d. on newly issued one-year Treasury bonds.
   e. on member bank deposits at the Federal Reserve.

10. When the Fed decreases the discount rate, banks will
    a. borrow more from the Fed and lend more to the public. The money supply increases.
    b. borrow more from the Fed and lend less to the public. The money supply decreases.
    c. borrow less from the Fed and lend more to the public. The money supply increases.
    d. borrow less from the Fed and lend less to the public. The money supply decreases.
    e. borrow more from the Fed and lend less to the public. The money supply increases.

11. If the reserve ratio is 10 percent, banks do not hold excess reserves, and people hold only deposits and no currency. When the Fed sells $10 million dollars of bonds to the public, bank reserves
    a. increase by $1 million and the money supply eventually increases by $10 million.
    b. increase by $10 million and the money supply eventually increases by $100 million.
    c. decrease by $1 million and the money supply eventually increases by $10 million.
    d. decrease by $10 million and the money supply eventually decreases by $100 million.
    e. decrease by $10 million and the money supply eventually decreases by $90 million.

12. Other things the same, if reserve requirements are decreased,
    a. the money multiplier increases, the money supply decreases, and interest rates fall.
    b. the money multiplier increases, the money supply increases, and interest rates rise.
    c. the money multiplier increases, the money supply increases, and interest rates fall.
    d. the money multiplier increases, the money supply decreases, and interest rates rise.
    e. the money multiplier increases, the money supply increases, and interest rates rise.

Free Response Questions

1. Explain how each of the following changes the money supply.
    a. the Fed buys bonds
    b. the Fed raises the discount rate
    c. the Fed raises the reserve requirement

2. If the reserve ratio is 20 percent, how much money can be created from $100 of reserves? How much of the change that you identified was created by the banking system?

Solutions

Multiple-Choice Questions

1. b TOP: Money | Liquidity
2. a TOP: Money supply
3. a TOP: Demand deposits
4. c TOP: Federal Reserve System
5. a TOP: Open-markets operations
6. d TOP: Open-markets operations
7. a TOP: Reserve requirements
8. e TOP: Federal funds rate | Open-market operations
9. c TOP: Federal funds rate
10. a TOP: Discount rate
11. d TOP: Open-market operations | Money multiplier
12. c TOP: Reserve requirements

Free Response Questions

1. a. If the Fed buys bonds, it pays for them with reserves so banks will have more reserves and can lend more, which will create more deposits and so more money.
   b. If the Fed raises the discount rate, banks will borrow less from the Fed and so will have fewer reserves, which decreases the money supply.
   c. If the Fed raises the reserve requirement, banks will have to hold more of their deposits as reserves and so will have less to lend out. With less to lend out, deposits and the money supply decrease.

   TOP: Federal Reserve System | Money supply
2. The amount of money created would be 1/reserve requirement X reserves or (1/0.20) $100 = $500. Of the change in the money supply of $500, $400 was created by the banking system and $100 was due to the original reserves.

   TOP: Money multiplier