Robin **Bade**

Michael **Parkin**

Foundations of Economics

Seventh Edition

How does the Fed create money and regulate its quantity?

The Monetary System

27

CHAPTER CHECKLIST

When you have completed your study of this chapter, you will be able to

1. Define money and describe its functions.
2. Describe the functions of banks.
3. Describe the functions of the Federal Reserve System (the Fed).
4. Explain how the banking system creates money and how the Fed controls the quantity of money.

27.1 WHAT IS MONEY?

Definition of Money

Money is any commodity or token that is generally accepted as a means of payment.

A Commodity or Token

Money is something that can be recognized.

Money can be divided up into small parts.

27.1 WHAT IS MONEY?

Generally Accepted

Money can be used to buy anything and everything.

Means of Payment

A **means of payment** is a method of settling a debt.

The Functions of Money

Money performs three vital functions:

- Medium of exchange
- Unit of account
- Store of value

27.1 WHAT IS MONEY?

Medium of Exchange

Medium of exchange is a object that is generally accepted in return for goods and services.

Without money, you would have to exchange goods and services directly for other goods and services—an exchange called **barter**.

27.1 WHAT IS MONEY?

Unit of Account

A *unit of account* is an agreed-upon measure for stating the prices of goods and services.

Table 27.1 shows how a unit of account simplifies price comparisons.

A UNIT OF ACCOUNT SIMPLIFIES PRICE COMPARISONS

Good	Price in money units	Price in units of another good
Rock concert	$64.00	8 movies
Movie	$8.00	2 cappuccinos
Cappuccino	$4.00	2 ice-cream cones
Ice-cream cone	$2.00	4 sticks of gum
Stick of gum	$0.50	

27.1 WHAT IS MONEY?

Store of Value

A *store of value* is any commodity or token that can be held and exchanged later for goods and services.

The more stable the value of a commodity or token, the better it can act as a store of value and the more useful it is as money.

27.1 WHAT IS MONEY?

Money Today

Money in the world today is called fiat money.

Fiat money is objects that are money because the law decrees or orders them to be money.

The objects that we use as money today are

- Currency
- Deposits at banks and other financial institutions

27.1 WHAT IS MONEY?

Currency

The notes (dollar bills) and coins that we use in the United States today are known as **currency**.

Notes are money because the government declares them to be with the words printed on every dollar bill:

"This note is legal tender for all debts, public and private."

27.1 WHAT IS MONEY?

Deposits

Deposits at banks, credit unions, savings banks, and savings and loan associations are also money.

Deposits are money because they can be converted into currency on demand and are used directly to make payments.

27.1 WHAT IS MONEY?

Currency inside Banks Is Not Money

Bank deposits are one form of money, and currency *outside the banks* is another form.

Currency *inside* the banks is not money.

When you get some cash from the ATM, you convert your bank deposit into currency.

27.1 WHAT IS MONEY?

Official Measures of Money: M1 and M2

M1 consists of currency, traveler's checks, and checkable deposits owned by individuals and businesses.

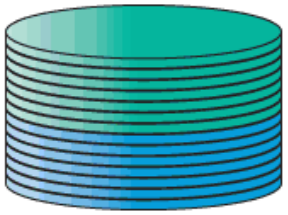
M2 consists of M1 plus savings deposits and small time deposits, money market funds, and other deposits.

27.1 WHAT IS MONEY?

Figure 27.1 shows two measures of money.

M1

- Currency and traveler's checks
- Checkable deposits

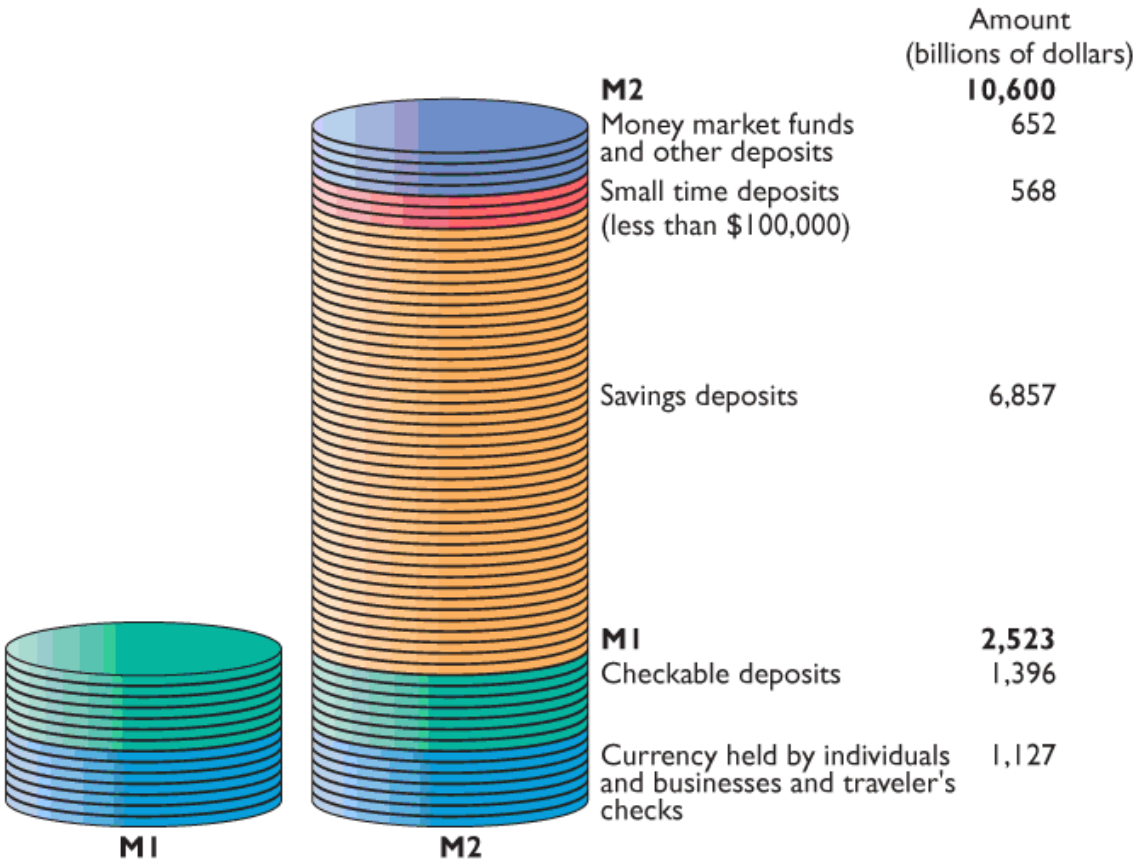


	Amount (billions of dollars)
Checkable deposits	1,396
Currency held by individuals and businesses and traveler's checks	1,127

27.1 WHAT IS MONEY?

M2

- M1
- Savings deposits
- Small time deposits
- Money market funds and other deposits



27.1 WHAT IS MONEY?

Are M1 and M2 Means of Payment?

The test of whether something is money is whether it is generally accepted as a means of payment.

M1 passes this test and is money.

Some savings deposits in M2 are just as much a means of payment as the checkable deposits in M1.

Other savings deposits, time deposits, and money market funds are *not* instantly convertible and are *not* a means of payment.

27.1 WHAT IS MONEY?

Checks, Credit Cards, Debit Cards and E-Checks

Checks

A check is not money. It is an instruction to a bank to make a payment.

27.1 WHAT IS MONEY?

Credit Cards

A credit card is not money because it does not make a payment.

When you use your credit card, you create a debt (the outstanding balance on your card account), which you eventually pay off with money.

Debit Cards

A debit card is not money. It is like an electronic check.

It is an electronic equivalent of a paper check.

27.1 WHAT IS MONEY?

E-Checks

An e-check is not money.

It is an electronic equivalent of a paper check.

■ An Embryonic New Money: E-Cash

Works like money and when it becomes widely acceptable, it will be money.

27.2 THE BANKING SYSTEM

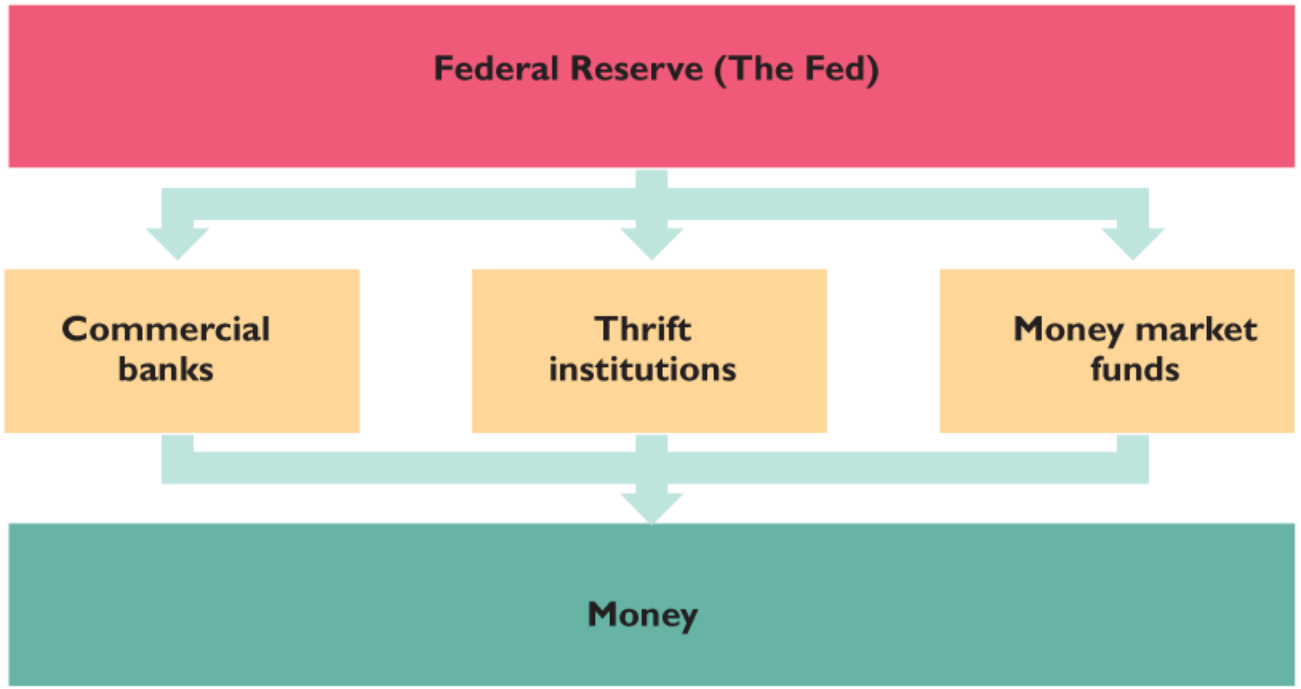
The **banking system** consists of

- The Federal Reserve
- The banks and other institutions that accept deposits and that provide the services that enable people and businesses to make and receive payments.

27.2 THE BANKING SYSTEM

Figure 27.2 shows the institutions of the banking system.

The Federal Reserve regulates and influences the activities of the commercial banks, thrift institutions, and money market funds, whose deposits make up the nation's money.



27.2 THE BANKING SYSTEM

Commercial Banks

A *commercial bank* is a firm that is licensed by the Comptroller of the Currency in the U.S. Treasury (or by a state agency) to accept deposits and make loans.

In 2013, about 5,850 commercial banks operated in the United States.

Because of mergers, this number is down from 13,000 a few years ago.

27.2 THE BANKING SYSTEM

Bank Deposits

A commercial bank accepts three types of deposits:

- Checkable deposits
- Savings deposits
- Time deposits

27.2 THE BANKING SYSTEM

Profit and Risk: A Balancing Act

The goal of a commercial bank is to maximize the long-term wealth of its stockholders.

To achieve this goal, banks borrow from depositors and others and lend for long-terms at high interest rates.

Lending is risky, so a bank must be prudent in the way it uses its depositors' funds and balance security for depositors and stockholders against high but risky returns.

27.2 THE BANKING SYSTEM

To trade off between risk and profit, a bank divided its assets into four parts:

- Reserves
- Liquid assets
- Securities
- Loans

27.2 THE BANKING SYSTEM

Reserves

A bank's **reserves** consist of currency in the bank's vaults plus the balance on its reserve account at a Federal Reserve Bank.

The Fed requires the banks and other financial institutions to hold a minimum percentage of deposits as reserves, called the **required reserve ratio**.

Banks' *desired* reserves might exceed the required reserves, especially when the cost of borrowing reserves is high.

27.2 THE BANKING SYSTEM

Liquid Assets

Banks' *liquid assets* are short-term Treasury bills and overnight loans to other banks.

When banks have excess reserves, they can lend them to other banks that are short of reserves in an interbank loans market.

The interbank loans market is called federal funds market and the interest rate on interbank loans is the **federal funds rate**.

The Fed's policy actions target the federal funds rate.

27.2 THE BANKING SYSTEM

Securities and Loans

Securities held by banks are bonds issued by the U.S. government and by other organizations.

A bank earns a moderate interest rate on securities, but it can sell them quickly if it needs cash.

Loans are the funds that banks provide to businesses and individuals and include outstanding credit card balances.

Loans earn the bank a high interest rate, but they are risky and cannot be called in before the agreed date.

27.2 THE BANKING SYSTEM

Bank Assets and Liabilities: The Relative Magnitudes

In 2013, checkable deposits at commercial banks in the United States, included in M1, were about 9 percent of total commercial bank deposits.

Another 46 percent of deposits were savings deposits and small time deposits, which are part of M2.

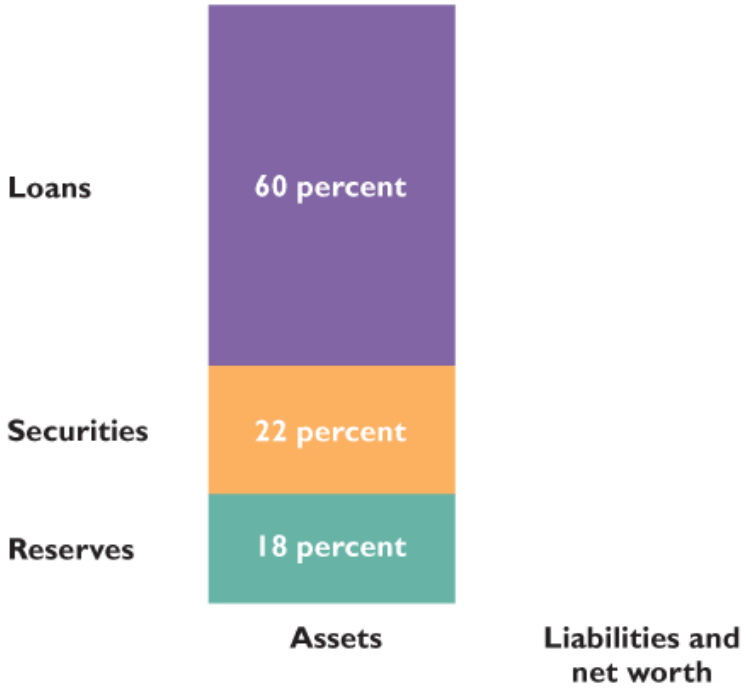
27.2 THE BANKING SYSTEM

Figure 27.3 shows that in 2013, commercial banks held :

18 percent of total assets as reserves

22 percent as securities

60 percent as loans



27.2 THE BANKING SYSTEM

The source of the funds allocated was

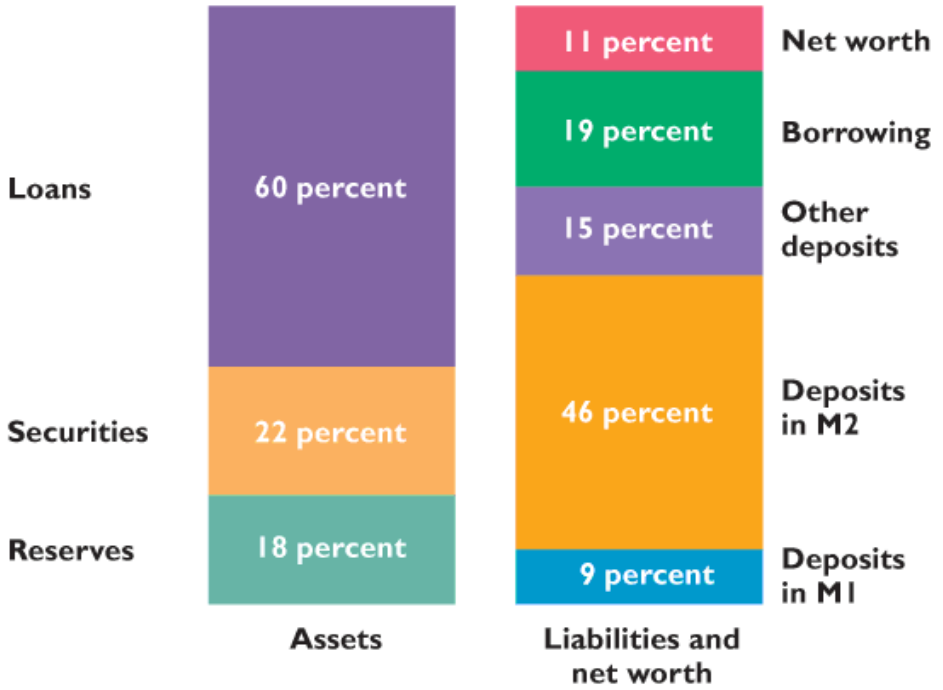
Deposits in M1: 9 percent

Deposits in M2: 46 percent

Other deposits: 15 percent

Borrowing: 19 percent

Net worth: 11 percent



27.2 THE BANKING SYSTEM

Thrift Institutions

Three types of thrift institutions are savings and loan associations, savings banks, and credit unions.

A *savings and loan association* (S&L) is a financial institution that accepts checkable deposits and savings deposits and that makes personal, commercial, and home-purchase loans.

A *savings bank* is a financial institution that accepts savings deposits and makes mostly consumer and home-purchase loans.

27.2 THE BANKING SYSTEM

A *credit union* is a financial institution owned by a social or economic group, such as a firm's employees, that accepts savings deposits and makes mostly consumer loans.

Like commercial banks, thrift institutions hold reserves and must meet minimum reserve ratios set by the Fed.

27.2 THE BANKING SYSTEM

Money Market Funds

A *money market fund* is a financial institution that obtains funds by selling shares and uses these funds to buy assets such as U.S. Treasury bills.

Money market fund shares act like bank deposits. Shareholders can write checks on their money market fund accounts.

There are restrictions on most of these accounts.

27.3 THE FEDERAL RESERVE SYSTEM

The Federal Reserve System

The **Federal Reserve System (the Fed)** is the central bank of the United States.

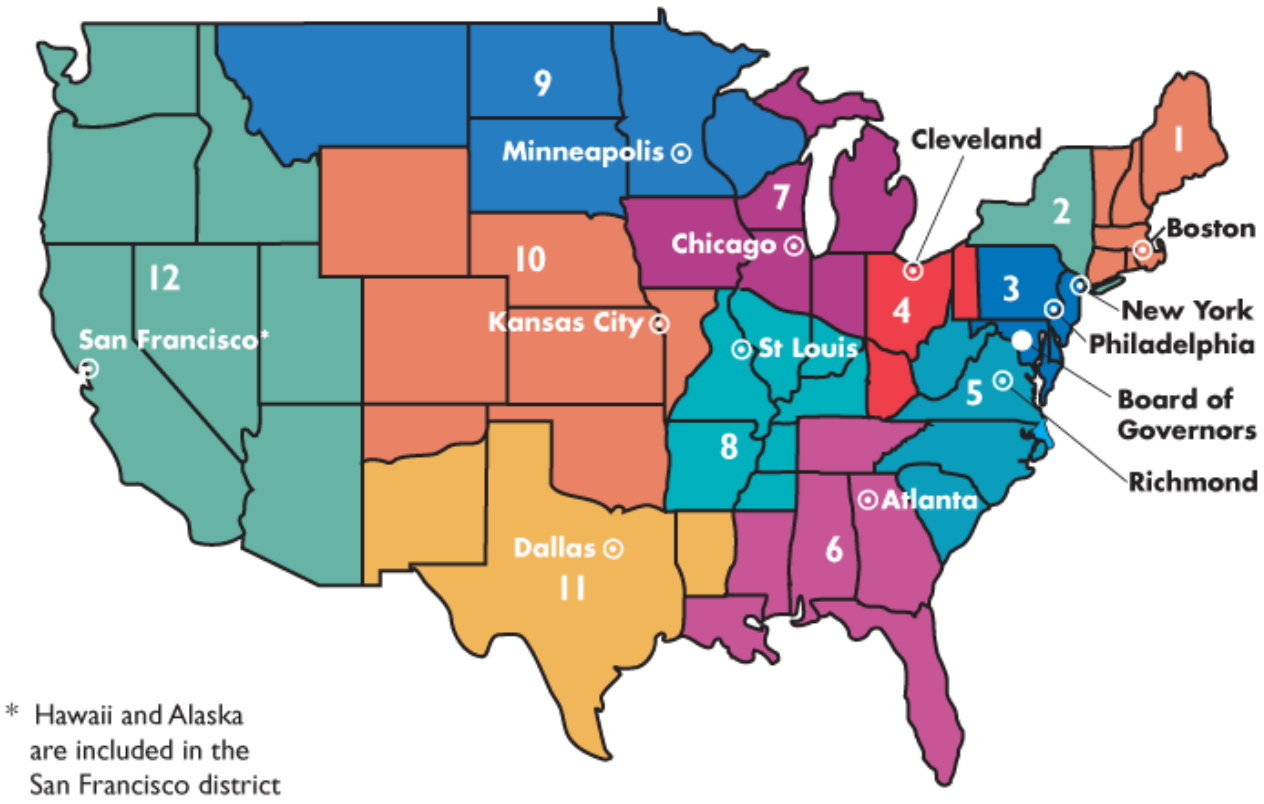
A *central bank* is a public authority that provides banking services to banks and regulates financial institutions and markets.

The Fed's main task is to regulate the interest rate and quantity of money to achieve low and predictable inflation and sustained economic growth.

27.3 THE FEDERAL RESERVE SYSTEM

Figure 27.4 shows the 12 Federal Reserve districts.

Each Federal Reserve district has its own Federal Reserve Bank.



The Board of Governors of the Federal Reserve System is located in Washington, D.C.

27.3 THE FEDERAL RESERVE SYSTEM

The Structure of the Federal Reserve

The key elements in the structure of the Federal Reserve are

- The Chairman of the Board of Governors
- The Board of Governors
- The Regional Federal Reserve Banks
- The Federal Open Market Committee

27.3 THE FEDERAL RESERVE SYSTEM

The Chairman of the Board of Governors

The chairman is the Fed's chief executive, public face, and center of power and responsibility. The current chair is Janet Yellen.

Fed Chair Janet Yellen

The Board of Governors consist of

- Seven members, appointed by the President of the United States and confirmed by the Senate.
- Each for a 14-year term.
- The President appoints one of the board members as Chairman for a term of 4 years, which is renewable.

27.3 THE FEDERAL RESERVE SYSTEM

The Regional Federal Reserve Banks

- There are 12 Federal Reserve banks, one for each of 12 Federal Reserve districts.
- Each Federal Reserve Bank has nine directors, three of whom are appointed by the Board of Governors and six of whom are elected by the commercial banks in the Federal Reserve district.
- The Federal Reserve Bank of New York implements some of the Fed's most important policy decisions.

27.3 THE FEDERAL RESERVE SYSTEM

The Federal Open Market Committee

The **Federal Open Market Committee** (FOMC) is the Fed's main policy-making committee.

The FOMC consists of

- The chairman and other six members of the Board of Governors.
- The president of the Federal Reserve Bank of New York.
- Four presidents of the other regional Federal Reserve banks (on a yearly rotating basis).

The FOMC meets approximately every six weeks.

27.3 THE FEDERAL RESERVE SYSTEM

The Fed's Policy Tools

The Fed uses three main policy tools:

- Required reserve ratios
- Discount rate
- Open market operations
- Extraordinary crisis measures

27.3 THE FEDERAL RESERVE SYSTEM

Required Reserve Ratios

Banks hold reserves.

These reserves are

- Currency in the institutions' vaults and ATMs
- Deposits held with other banks or with the Fed

Banks and thrifts are required to hold a minimum percentage of deposits as reserves, a required reserve ratio.

27.3 THE FEDERAL RESERVE SYSTEM

Discount Rate

The discount rate is the interest rate at which the Fed stands ready to lend reserves to commercial banks.

A change in the discount rate begins with a proposal to the FOMC by at least one of the 12 Federal Reserve banks.

If the FOMC agrees that a change is required, it proposes the change to the Board of Governors for its approval.

27.3 THE FEDERAL RESERVE SYSTEM

Open Market Operations

An **open market operation** is the purchase or sale of government securities—U.S. Treasury bills and bonds—by the New York Fed in the open market.

When the New York Fed conducts an open market operation, the New York Fed does *not* transact with the federal government.

27.3 THE FEDERAL RESERVE SYSTEM

Extraordinary Crisis Measures

Following the collapse of Lehman Brothers, the Fed (working closely with the U.S. Treasury Department) took a number of major policy moves that created new policy tools.

These new tools can be grouped under three broad headings:

- Quantitative easing
- Credit easing
- Operation Twist

27.3 THE FEDERAL RESERVE SYSTEM

Quantitative Easing (QE)

When the Fed creates bank reserves by conducting a large-scale open market purchase at a low or possibly zero federal funds rate, the action is called *quantitative easing*.

This action differs from a normal open market purchase in its scale and purpose, and it might require the Fed to buy any of a number of private securities rather than government securities.

27.3 THE FEDERAL RESERVE SYSTEM

Credit Easing

When the Fed buys private securities or makes loans to financial institutions to stimulate their lending, the action is called *credit easing*.

Operation Twist

When the Fed buys long-term government securities and sells short-term government securities, the action is called *operation twist*.

The idea is to lower long-term interest rates and stimulate borrowing and investment.

27.3 THE FEDERAL RESERVE SYSTEM

How the Fed's Policy Tools Work

The Fed's normal policy tools work by changing either the demand for or the supply of monetary base, which in turn changes the interest rate.

The **monetary base** is the sum of coins, Federal Reserve notes, and banks' reserves at the Fed.

The monetary base is so called because it acts like a base that supports the nation's money.

The larger the monetary base, the greater is the quantity of money that it can support.

27.3 THE FEDERAL RESERVE SYSTEM

By increasing the required reserve ratio, the Fed can force banks to hold a larger quantity of monetary base.

By raising the discount rate, the Fed can make it more costly for the banks to borrow reserves—borrow monetary base.

By selling securities in the open market, the Fed can decrease the monetary base.

All these actions lead to an increase in the interest rate.

27.3 THE FEDERAL RESERVE SYSTEM

By decreasing the required reserve ratio, the Fed can permit the banks to hold a smaller quantity of monetary base.

By lowering the discount rate, the Fed can make it less costly for the banks to borrow monetary base.

By buying securities in the open market, the Fed can increase the monetary base.

All these actions lead to a decrease in the interest rate.

27.4 REGULATING THE QUANTITY OF MONEY

Creating Deposits by Making Loans

Banks create deposits when they make loans and the new deposits created are new money.

The quantity of deposits that banks can create is limited by three factors:

- The monetary base
- Desired reserves
- Desired currency holding

27.4 REGULATING THE QUANTITY OF MONEY

The Monetary Base

The monetary base is the sum of Federal Reserve notes, coins, and banks' deposits at the Fed.

The size of the monetary base limits the total quantity of money that the banking system can create because

1. Banks have desired reserves.

2. Households and firms have desired currency holdings.

And both of these desired holdings of monetary base depend on the quantity of money.

27.4 REGULATING THE QUANTITY OF MONEY

Desired Reserves

A bank's *actual reserves* consists of notes and coins in its vault and its deposit at the Fed.

The fraction of a bank's total deposits held as reserves is the *reserve ratio*.

The *desired reserve ratio* is the ratio of reserves to deposits that a bank wants to hold. This ratio exceeds the required reserve ratio by the amount that the bank determines to be prudent for its daily business.

Excess reserves equal the bank's actual reserves minus its desired reserves.

27.4 REGULATING THE QUANTITY OF MONEY

Desired Currency Holding

We hold money in the form of currency and bank deposits and some fraction of their money as currency.

So when the total quantity of money increases, so does the quantity of currency that people want to hold.

Because desired currency holding increases when deposits increase, currency leaves the banks when they make loans and increase deposits.

This leakage of currency is called the *currency drain*.

The ratio of currency to deposits is called the *currency drain ratio*.

27.4 REGULATING THE QUANTITY OF MONEY

The Fed constantly takes actions that influence the quantity of money, and open market operations are the Fed's major policy tool.

An *open market operation* is the purchase or sale of government securities by the Fed in the open market.

27.4 REGULATING THE QUANTITY OF MONEY

How Open Market Operations Change the Monetary Base

When the Fed buys securities in an open market operation, it pays for them with newly created bank reserves and money.

With more reserves in the banking system, the supply of interbank loans increases, the demand for interbank loans decreases, and the federal funds rate falls.

The **federal funds rate** is the interest rate on loans in the interbank market.

27.4 REGULATING THE QUANTITY OF MONEY

Similarly, when the Fed sells securities in an open market operation, buyers pay for them with bank reserves and money.

With fewer reserves in the banking system, the supply of interbank loans decreases, the demand for interbank loans increases, and the federal funds rate rises.

The Fed sets a target for the federal funds rate and conducts open market operations on the scale needed to hit its target.

27.4 REGULATING THE QUANTITY OF MONEY

A change in the federal funds rate is only the first stage in an adjustment process that follows an open market operation.

If banks' reserves increase, they increase their lending, which increases the quantity of money.

If banks' reserves decrease, they decrease their lending, which decreases the quantity of money.

27.4 REGULATING THE QUANTITY OF MONEY

The Fed Buys Securities

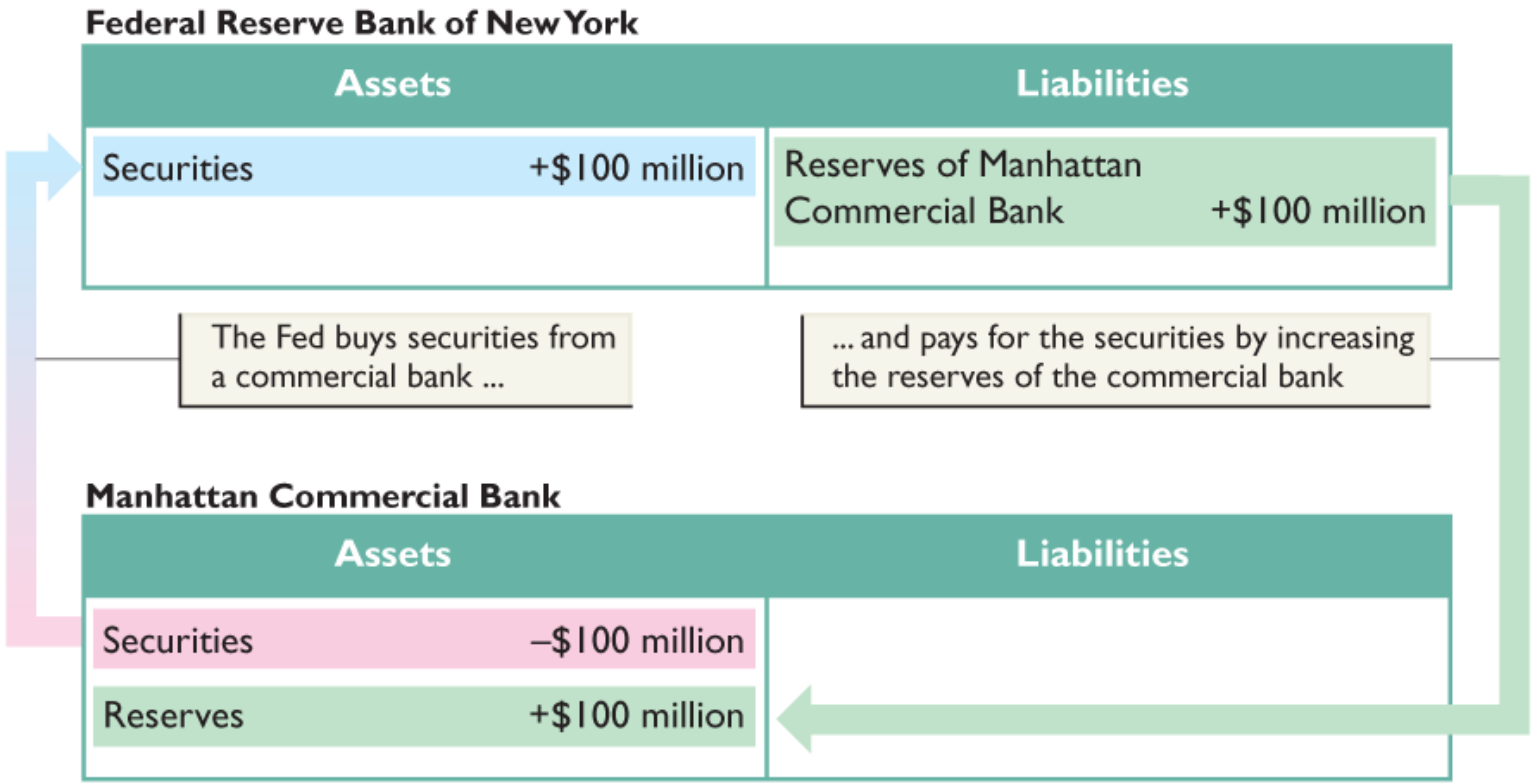
Suppose the Fed buys $100 million of U.S. government securities in the open market.

The seller might be

- A commercial bank
- The nonbank public

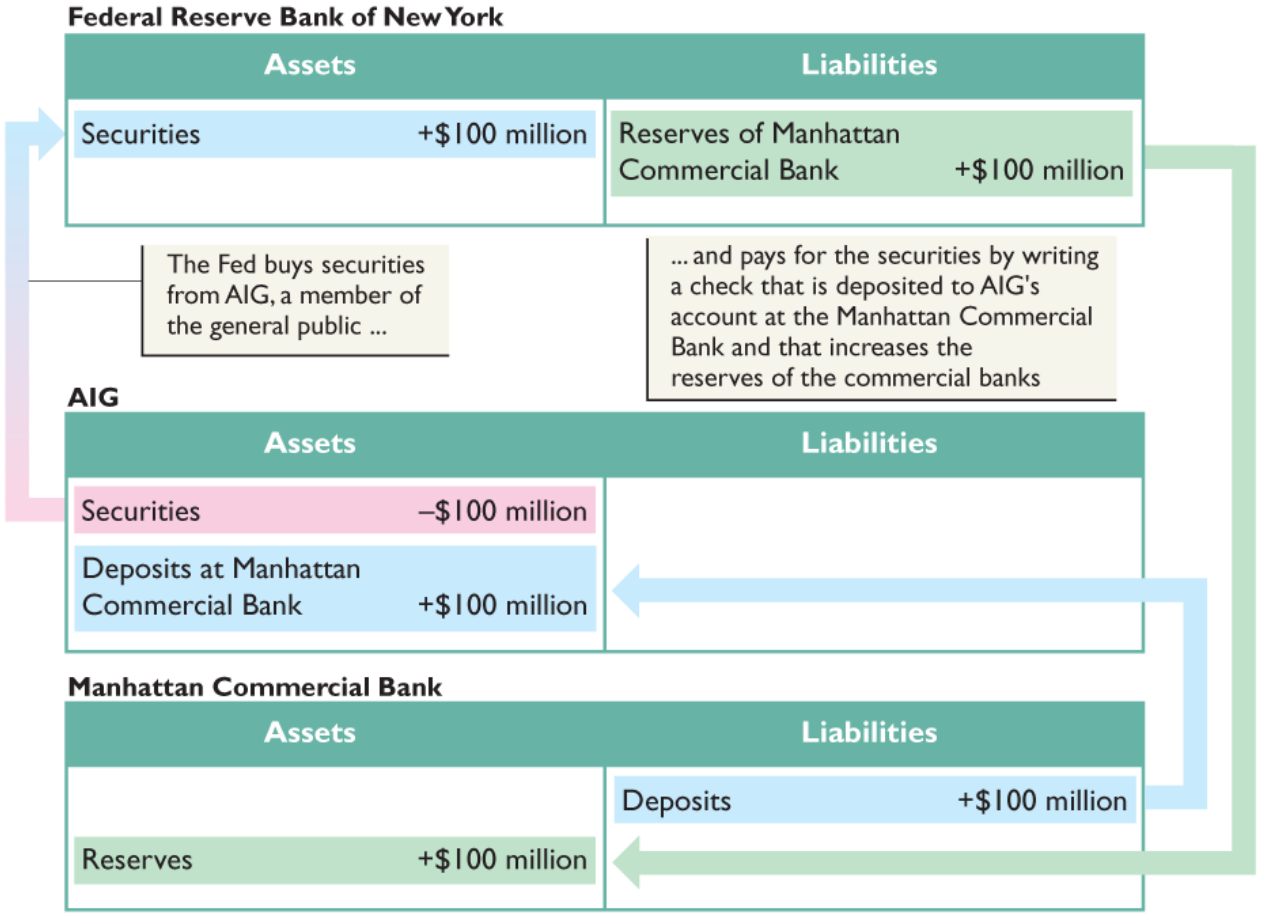
27.4 REGULATING THE QUANTITY OF MONEY

Figure 27.5 shows what happens when the Fed buys securities from a commercial bank.



27.4 REGULATING THE QUANTITY OF MONEY

Figure 27.6 shows what happens when the Fed buys securities from the public.



27.4 REGULATING THE QUANTITY OF MONEY

The Fed Sells Securities

Suppose the Fed sells $100 million of U.S. government securities in the open market.

The Fed's assets decrease by $100 million.

The reserves of the banking system decrease by $100 million and banks borrow in the interbank market to meet their desired reserve ratio.

The change in bank reserves is just the beginning.

A multiplier effect on the quantity of money begins.

27.4 REGULATING THE QUANTITY OF MONEY

The Multiplier Effect of an Open Market Operation

An open market purchase that increases bank reserves also increases the monetary base.

The increase in the monetary base equals the amount of the open market purchase.

The quantity of bank reserves increases and gives the banks excess reserves that they can start to lend.

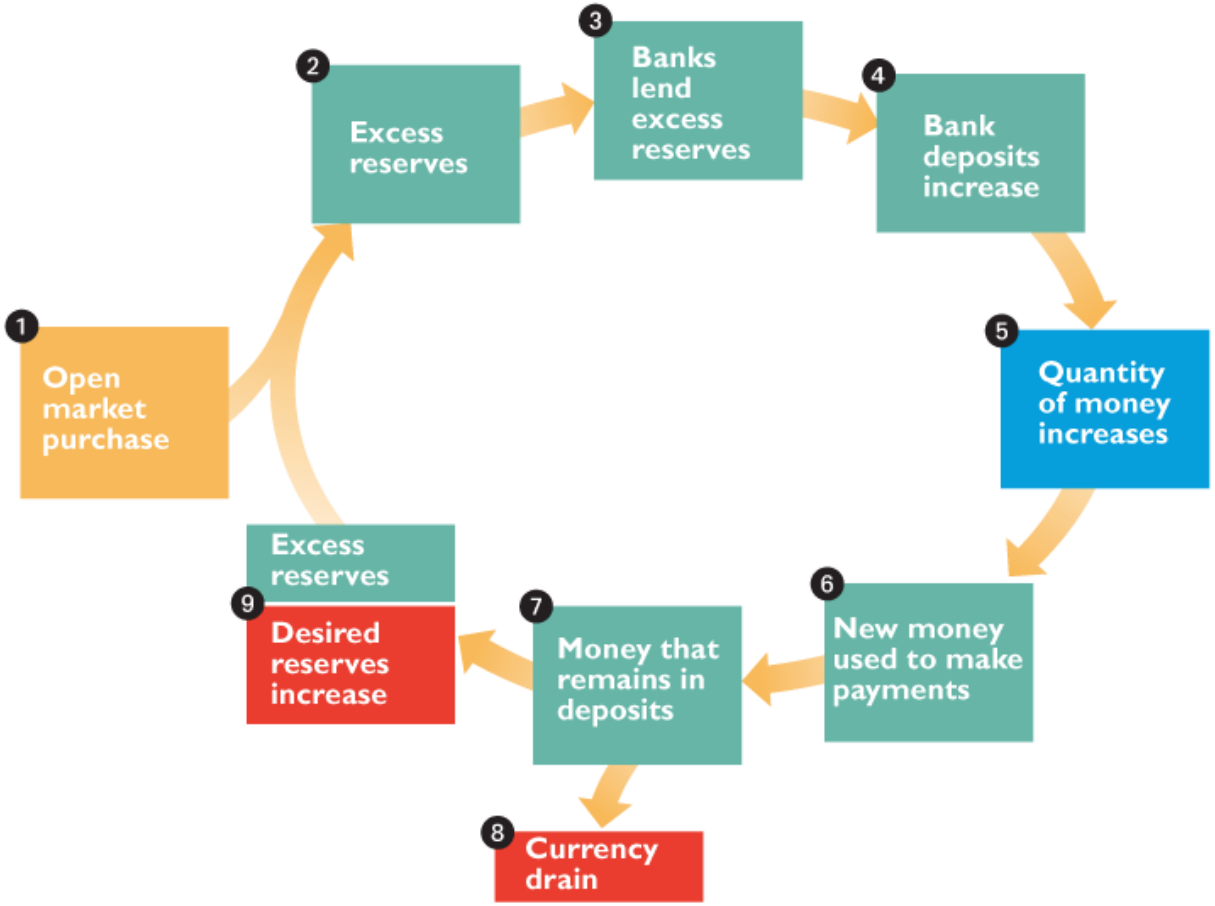
27.4 REGULATING THE QUANTITY OF MONEY

The following sequence of events takes place:

- An open market purchase creates excess reserves.
- Banks lend excess reserves.
- Bank deposits increase.
- The quantity of money increases.
- New money is used to make payments.
- Some of the new money is held as currency—currency drain.
- Some of the new money remains on deposit in banks.
- Banks' desired reserves increase.
- Excess reserves decrease but remain positive.

27.4 REGULATING THE QUANTITY OF MONEY

Figure 27.7 illustrates this sequence of events.



The process repeats until excess reserves have been eliminated.

27.4 REGULATING THE QUANTITY OF MONEY

The Money Multiplier

The **money multiplier** is the number by which a change in the monetary base is multiplied to find the resulting change in the quantity of money.

It is also the ratio of the change in the quantity of money to the change in the monetary base.

The magnitude of the money multiplier depends on the desired reserve ratio (*R*) and the currency drain ratio (the ratio of currency to deposits *C*).

27.4 REGULATING THE QUANTITY OF MONEY

The larger the currency drain and the larger the desired reserve ratio, the smaller is the money multiplier.

Desired reserves = R

Currency = C

Monetary base, MB, is the sum of reserves and currency, so

$$MB = (R + C)$$

The quantity of money, M, is the sum of deposits and currency, so

$$M = \text{Deposits} + \text{Currency} = (D + C)$$

27.4 REGULATING THE QUANTITY OF MONEY

$$M = (D + C)$$

$$MB = (R + C)$$

So

$$\frac{M}{MB} = \frac{(D + C)}{(R + C)}$$

$$\text{Money multiplier} = \frac{(1 + C/D)}{(R/D + C/D)}$$

The quantity of money *changes* by the *change* in the monetary base multiplied by $(1 + C/D)/(R/D + C/D)$.

EYE on CREATING MONEY

How Does the Fed Create Money and Regulate Its Quantity?

During the Great Depression, many banks failed, bank deposits were destroyed, and the quantity of money crashed by 25 percent.

Most economists believe that it was these events that turned an ordinary recession in 1929 into a deep and decade-long depression.

The figure on the next slide shows what the Fed did to avoid another great depression.

EYE on CREATING MONEY

How Does the Fed Create Money and Regulate Its Quantity?

The Fed pumped reserves into the banking system.

During the months after Lehman Brothers collapsed, using QE1 the Fed doubled the monetary base.

In 2010 and 2011, QE2 took the monetary base to more than 3 times its pre-crisis level.

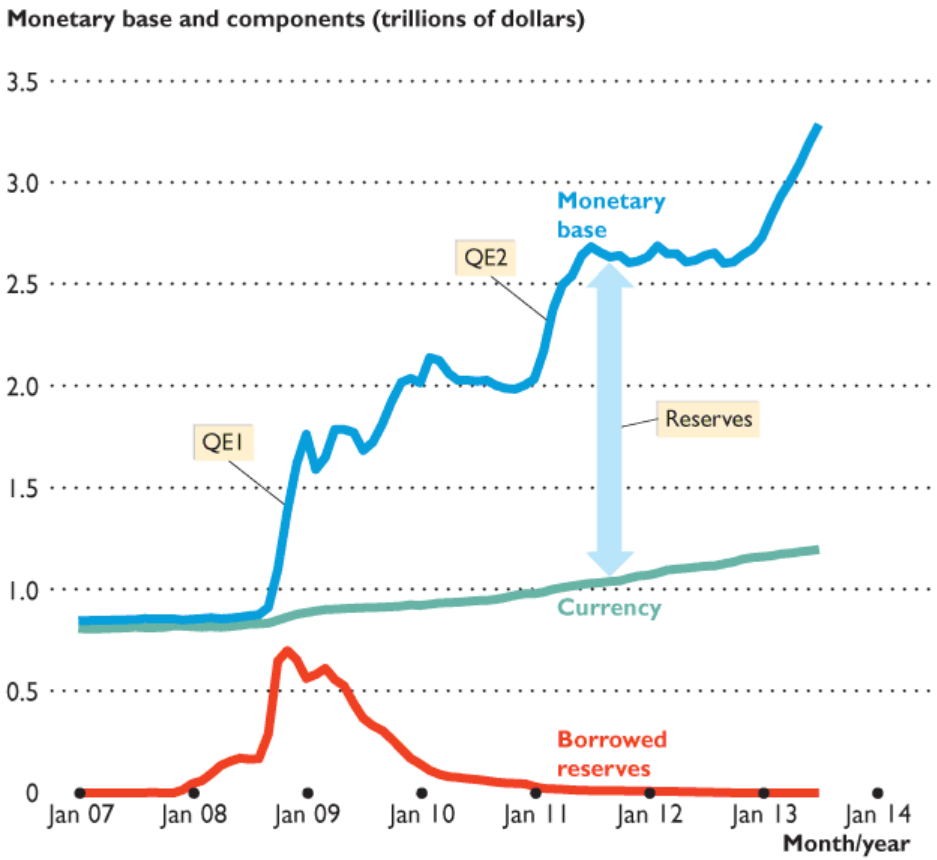


Figure 1 The Monetary Base in Financial Crisis

EYE on CREATING MONEY

How Does the Fed Create Money and Regulate Its Quantity?

In 2012 and 2013, QE3 took the monetary base to more than 4 times its normal level.

This extraordinary increase in the monetary base did not bring a similar increase in the quantity if money.

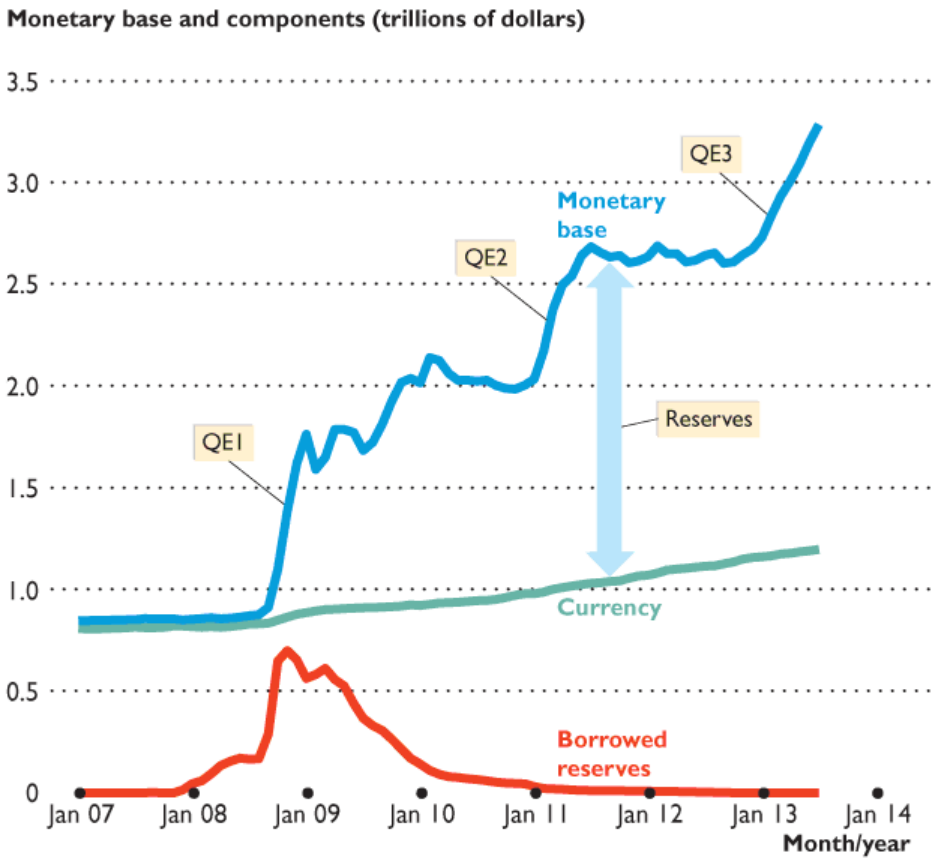


Figure 1 The Monetary Base in Financial Crisis

EYE on CREATING MONEY

How Does the Fed Create Money and Regulate Its Quantity?

The ratio of currency to M2 deposits remains steady.

In 2008, banks' desired reserve ratio increased tenfold from 1.2 to 12 percent.

The money multiplier collapsed.

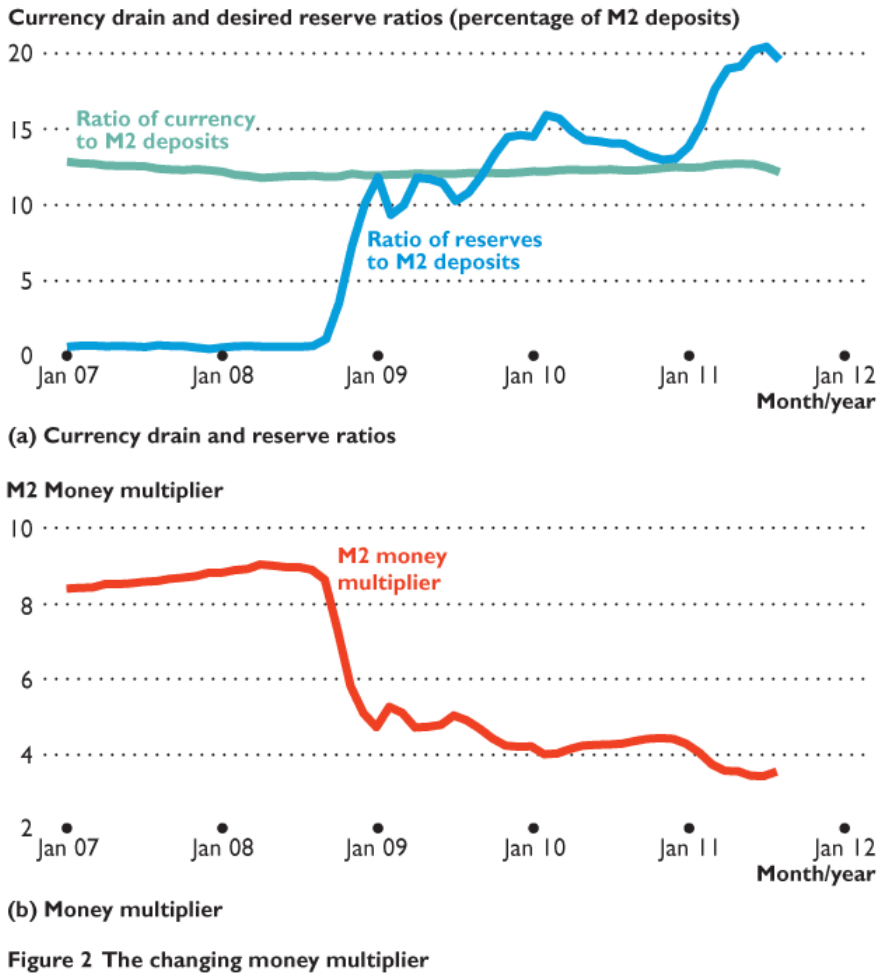


Figure 2 The changing money multiplier

EYE on CREATING MONEY

How Does the Fed Create Money and Regulate Its Quantity?

The surge in the desired reserve ratio is the sole reason for the collapse of the money multiplier.

The currency drain ratio barely changed.

The collapse of Lehman signaled to banks that they faced high risk.

Banks responded by boosting their desired reserve ratio.

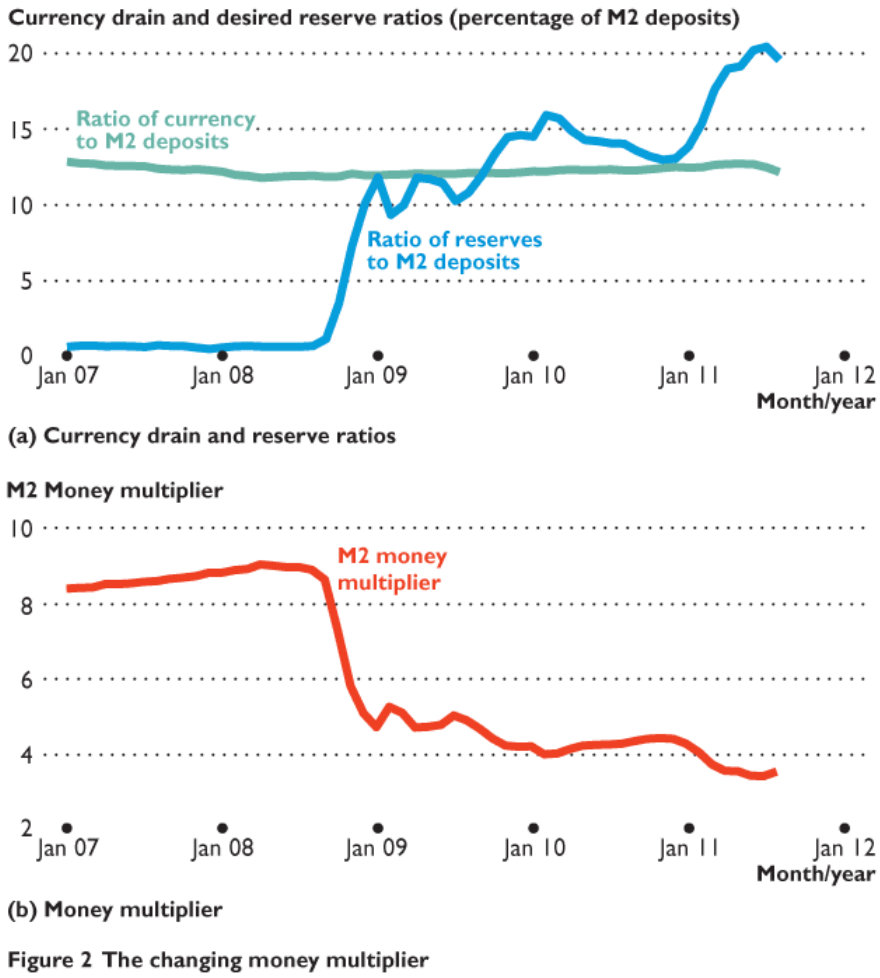


Figure 2 The changing money multiplier

EYE on CREATING MONEY

How Does the Fed Create Money and Regulate Its Quantity?

As the risk faced by banks returns to normal, the desired reserve ratio will fall.

When this happens, the Fed will need to decrease the monetary base or face an explosion in the quantity of money.

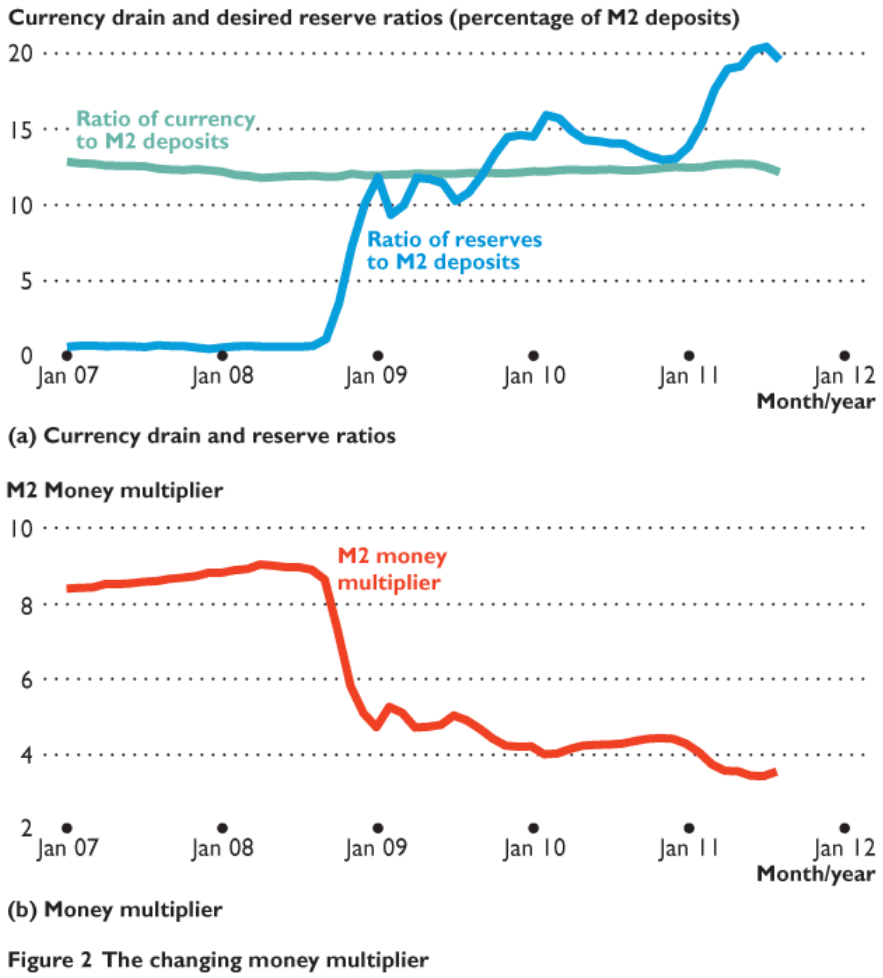


Figure 2 The changing money multiplier