

Objectives for Classes 27 and 29: Introduction to Money and Banking

At the end of Classes 27 and 29, you will be able to answer the following:

1. What are the three **functions of money**? What is **"barter"**?
2. What is meant by **"commodity money"**? by **"fiat money"**?
3. What are the components of the money supply (**M-1**)? What does each represent?
4. What is the difference between **"money", "income", and "wealth"**?
5. What is a **"savings and loan" (S&L)**? What is a **"credit union"**?
6. What is **"liquidity"**?
7. What are the components of **M-2**? What does each represent? What is a **"time deposit" (CD)**? What is a **"money market (mutual) fund"**?
8. What is a **credit card**? Why is it NOT money?
9. Describe the **structure** of the **Federal Reserve System (Fed)**. What is a **"central bank"** (i.e., what are its functions)? How is the **Board of Governors** chosen? How is the **chair** chosen? What is the **Federal Open Market Committee (FOMC)**?
10. What is **"discounting"**? What does **"discount rate"** mean?
11. Describe a bank's balance sheet. What is meant by its **"assets"**? by its **"liabilities"**? by its **"stockholders' equity" or "net worth"**? What are a bank's main assets and liabilities?
12. Define **"reserves", "required reserves", and "excess reserves"**.
13. What are **"federal funds"**? What is meant by **the "federal funds rate"**?
14. What is meant by **"collateral"**?
15. What is the **"prime rate"**?
15. What is a **"Treasury Security"**? What is a **"bill", a "note", or a "bond"**?
16. Why might a bank or savings and loan become **"insolvent"**?
17. What is the **FDIC**?
18. What does a bank do that allows it to create money? Why does this create new money? Under what condition is it allowed to do so?
19. Define **"monetary base"**.
20. Why is there a **Money Multiplier**? (i.e., why will an increase in the monetary base have a multiplied effect on the money supply?) What is **the formula** for the money multiplier?
21. What is meant by **"monetary policy"**?
22. Name three ways by which the Fed can increase (or decrease) the money supply. Why does each have this effect?
23. Define the following:

a. open market operations	b. discount rate	c. Treasury security
d. prime rate	e. Federal funds rate	f. FOMC
24. Explain why an increase (decrease) in the money supply will cause interest rates to fall (rise).

Classes 27 and 29: Introduction to Money and Banking (latest revision October 2004)

1. What is Money?

Every society that we know anything about has had something to serve as money. To understand what money is we need to imagine how the world would operate without money. How would people deal with each other? The answer is that people would **barter** with each other. *Barter means that people would have to trade goods for goods.* If you desire credit in Principles of Macroeconomics, you would have to provide me goods that I want --- food, housing, and so forth. If you cannot produce the goods I want, we would have to do a more complicated arrangement. You would produce goods for Jose. Jose would then produce goods that I desire. I would provide you with credit for Principles of Macroeconomics. When more than three people have to be involved, you can imagine how complicated this can become. As a result, all societies developed something to serve as a *medium of exchange*. I accept this something in exchange for teaching Principles of Macroeconomics. If you produce food, you will accept this something from me in exchange for your food. Because we have something to serve as a medium of exchange, trade between us is much easier. This trade allows us to specialize in producing the goods or services that we produce best. With trade, there are more goods and services available and both of us have a higher standard of living.

There are certain characteristics that a good needs to be a good medium of exchange. First, the good needs to be **durable**. Having ice serve as a medium of exchange in Southern California would present many problems. Indeed, almost anything that is durable has served as money somewhere in the world. Tobacco was money in and around the American colony of Virginia for about 200 years. Rice, indigo, wheat, and maize (corn) also served as money in the American colonies. Seashells (wampum) were money among Native American tribes in the Northeast. Tree bark, bones of dead animals, eggs, feathers, jade, pigs, and so forth have served as money. Second, the good needs to be **high in value in relation to its weight**. This means that one will need only a small amount of it in order to be able to exchange for the goods and services one desires. Cotton would not be a good candidate for a medium of exchange because one would require trucks of it just to buy weekly groceries. A good that is high in value in relation to its weight is **portable**. Because one does not need much of it in order to exchange for goods and services, it is easy to carry around. Third, the good needs to be **scarce**. Something that is easily available will not have any value. Finally, the most important characteristic for a good to serve as a medium of exchange is that it is **acceptable**. *Indeed, money is whatever people will accept as a medium of exchange.*

While most goods that are durable have served as money somewhere and sometime, there are two commodities that stand out. **Gold and silver** have served as money most places in the world and over most of world history. The practice of making metal into coins of predetermined weight supposedly began with the kings of Lydia in the 8th century B.C. (in what is now Turkey) but may have existed in India hundreds of years earlier. In the Old Testament, the shekel that is mentioned is a silver coin of a certain weight. The custom of depicting the head of the sovereign on the coin goes back to

Alexander the Great (336 B.C.). In approximately the year 800 A.D., the emperor Charlemagne created the monetary system that governed Europe for 1000 years. The basic unit of money was the **pound of silver**. The name of the British money is based on this. The British money is called the pound sterling (sterling is silver that is at least 95% pure). The Italian money was called the lira until Italy became part of the European Union. Lira means pound in Italian. In Charlemagne's system, the silver pound was then broken into twenty parts. These were called **schillings** in the German speaking areas and called **sous** in the French speaking areas. The schilling was the name of the Austrian money. You will find references to the sou in Shakespeare's plays, such as the Merchant of Venice. The schilling was then divided into twelve parts. These were called **pennies or pence** in the German speaking areas and **denier** in the French speaking areas. So a penny was 1/240 of a pound of silver. In Britain, the pennies were then divided into two parts (halfpence) and into four parts (farthings). So, a farthing was a coin of 1/960 of a pound of silver.

Gold and silver had very nice properties to serve as media of exchange. First, they were durable. Second, they were high in value in relation to their weight. Therefore, they were portable. Third, it didn't hurt that they were shiny. Fourth, they are soft metals and therefore could be easily molded into many different shapes and sizes. Fifth, and most importantly, they were widely acceptable in exchange for goods and services. While there is no biblical command that gold or silver be accepted in exchange for goods and services, people have chosen to do so. However, gold and silver have one property that is bad for a medium of exchange. They are easy to debase. Generally, some monarch would melt down the coins, add some of a metal of lesser value such as brass, and then reproduce the coins. The coins would look the same to the untrained eye but were actually not worth as much. It was also possible for merchants to shave a few micromilligrams from the coin without being detected. As a result, it was common for merchants to carry scales to weigh the coins they received. Because this slowed down trade, some monarchs placed a special mark on the coin to certify that the coin did indeed weigh what it was supposed to weigh and that the coin was indeed pure gold or silver. Hence, the German money was called the Mark until Germany joined the European Union. If the mark was a picture of the official crown, the money came to be called the crown. This is still the name of the money in Denmark, Norway, Sweden, and the Czech Republic.

The American dollar was based on the Spanish money that circulated in the American colonies along with the British pounds. Remember that money is whatever is accepted as money. In the American colonies, there was a preference for the Spanish peso produced in Mexico City and for the Portuguese "pieces of eight". These two coins were very similar in weight for they were imitations of the "thaler", a coin that had been produced for centuries from the silver mines of Joachimsthal in Bohemia (in what is now the Czech Republic). Our word "dollar" is derived from "thaler". The symbol for the dollar, "\$", is the symbol for the Spanish peso.

All of the monies discussed so far have been what are called **"commodity money"**. ***This means that the value of the coin as money was equal to its value as a commodity.*** One could melt down a coin and sell the metal for the same worth as the coin. For centuries, countries have also used what is called **"fiat money" or "token money"**. ***This***

means that the metal in the coin is worth less than the value of the coin. So, if you were to take an American quarter today and melt the coin down, you would have some copper and some nickel. If you sold this metal, you would receive less than one cent. Yet the quarter coin is worth 25 cents in exchange for goods and services. Again, something is money if it is accepted as money. The 25 cent token coin is accepted in exchange for 25 cents worth of goods and services even though the metal in the coin is not worth 25 cents. Today, nearly all money is fiat money. Commodity money is extremely rare.

So far, we have considered only one function of money --- acting as a medium of exchange. There are two other functions that money serves. *First, money is a store of value. This means that money is one way of holding wealth.* Wealth is the value of everything you own. Think of everything you own --- your car, your clothes, your stereo, your home, your summer home, your private plane, your yacht, and some money. Money is part of your wealth. Later, we will consider how you determine the part of your wealth that you will hold in the form of money. You can have more money as part of your wealth (and less of something else) if you choose. You can do so by selling something you own. And you can have less money as part of your wealth (and more of something else) if you choose. You can do so by buying something. As we shall see, your decision as to how much of your wealth you choose to hold in the form of money has a role to play in determining what interest rates will be. *Second, money acts as a unit of account. This means that money is a unit of measurement of value.* So, just as we have pounds or grams to measure weight and we have miles or kilometers to measure distance, we have dollars to measure value. If I tell you that I live in a million dollar home, you have a good idea as to where and how I live. (What about a million peso home? What about a million ruble home?)

2. The Money Supply in the United States Today

So what comprises the money supply in the United States today? In the late 1970s, there was a commission created to study this question. The commission came up with four definitions of money that we use today. These are called **M-1, M-2, M-3, and L**. We will consider M-1 and M-2 below. We will not consider M-3 or L. However, you should know that L stands for **Liquidity**. It includes everything that is considered liquid. What does this mean? *An asset is considered “liquid” if it can be easily converted into money without risk of loss.* We will encounter many liquid assets as we discuss the financial system below.

Let us begin with **M-1**. This definition coincides with the medium of exchange function of money. M-1 includes mainly two items. We will call these **currency (including coins) and checkable deposits**. Actually, travelers’ checks are also included, but these are similar to currency. (“Checkable deposits” are found at Savings and Loans and at Credit Unions. At commercial banks, they are called “**demand deposits**”. Since they are the same, and since “checkable deposits” is a better name, we will call all of these “checkable deposits” here.)

Test Your Understanding

Before you read on, try to answer the following questions. After you have read the text, check to see how you did.

1. Take out some currency. Any amount will do. Examine the front of the bill. Based on your examination, **what does this piece of paper represent?** That is, what is currency?
2. "I have \$200 in my checking account." If I go into the bank and tell them that I want to see my \$200, what will they show me? That is, **what is a checking account?**
3. What is a **credit card?**

Currency comprises a bit more than one fourth of the money supply as defined by M-1. Just what is currency? Take out a dollar bill and look at it. Just above the picture of George Washington, it tells you what it is --- a **Federal Reserve Note**. The Federal Reserve System will be discussed in detail below. For now, know that the Federal Reserve is a central bank. Just what is a note? The answer is that it is **a promise to pay -- or an IOU (I owe you)**. So that piece of paper you have in your hand tells you that a Federal Reserve Bank owes you \$1. If you look to the left of the picture, you will see a letter --- from A to L (on the older bills). Around the letter, it says Federal Reserve Bank of _____ (name of a city). As we shall see below, there are twelve Federal Reserve Banks around the country. Suppose you go to that city, show up at the Federal Reserve Bank building, present that piece of paper, and say to them "it says here that you owe me \$1. I am here to collect." What will they give you? Besides a dirty look, the answer is nothing (perhaps another dollar bill or four quarters). As you know from the description of the gold standard, there once was a time when you could receive approximately 1/20 of an ounce of gold. But today, that dollar bill is an IOU on which they will not pay you anything. It is uncollectible debt. So why do you hold it? The answer, of course, is that you hold it because you can exchange it for the goods and services you desire. You take it because you know that other people will take it. Once again, money is whatever people will accept as money. Just above the letter on the front of the dollar bill, it says that this note is **legal tender** for all debts, public and private. This means that, if I owe you \$1 and offer you that bill in payment, you are legally obligated to accept it. But they can print any phrase they want on the bill. If people will not accept the bill, it is not money. So in Russia, rubles were not accepted by many people for several years despite the fact that they were legal tender in Russia. And of course, your American dollar can be exchanged for goods and services in northern Mexico as well as in many other countries, even though it is definitely not legal tender there.

Checkable deposits comprise a bit less than three fourths of the money supply as defined by M-1. Just what is a checkable deposit, known to most of us as a **checking account?** Suppose I get a statement from my bank that says that I have \$200 in my checking account. I go to the bank and tell them that I want to see my \$200. What will they show me? Of course, they do not show me two \$100 bills. What they show me is their debt. The bank owes me \$200. I cannot see it. I cannot touch it. It has no President's face on it. But it is very real. The bank owes me \$200. And it is money because I can exchange it for goods and services. If I write you a check, I am transferring the IOU of the commercial bank from me to you in exchange for whatever goods or services you are selling me. Checkable deposits are not legal tender; if I owe you, you are

entitled to refuse payment by check. But most people do accept checks. So the amounts in checking accounts are money.

We have focused exclusively on commercial banks here. But there are other financial institutions whose IOUs also serve as money. A **Savings and Loan (S&L)** today is similar to a commercial bank. But until the early 1980s, a Savings and Loan only had savings accounts (no checking accounts) and made loans almost exclusively for housing. And a **credit union** is also similar to a commercial bank. The only differences are (1) a credit union is owned by its depositors and (2) one must belong to a specific group to be a member of a credit union. In the following, we shall use the words “financial institutions” to refer to commercial banks, savings and loans, and credit unions – the only financial institutions allowed to offer checking accounts.

Now let us consider **M-2**, the second definition of the money supply. *M-2 includes M-1, currency plus checkable deposits. But it adds three others: savings deposits, small time deposits (known as CDs), and money market funds (at a bank these are called money market deposit accounts).* All three are IOUs of a financial institution. But the rules of the IOU differ. A **savings account** pays a higher rate of interest. There are usually some restrictions as to when one can take money out of a savings account. However, these are rarely enforced for small savings accounts. A **time deposit** (usually called a **Certificate of Deposit or CD**) is also an IOU of a financial institution. These pay an even higher rate of interest. But the funds cannot be withdrawn until the specified time period expires (without a significant penalty). The time involved can be as little as a few months or can be several years. Finally, **Money Market Funds** (or Money Market Deposit Accounts) are also IOUs of financial institutions. Again, there are some restrictions as to when you can take the funds out of the account. The money placed in this account is invested in the money market. *The money market is a market for short-term IOUs.* Two short-term IOUs are particularly important. One is the short-term IOU of the federal government, known as a **Treasury Bill**. These will be discussed below. The other is the short-term IOU of a very large corporation, known as **commercial paper**. The interest rate that you are paid on your money market fund depends on the interest rates received by your financial institution when it invests in the money market.

Notice that these three components of M-2 are not media of exchange. That is, you cannot take your savings account book nor your CD nor your money market fund to a store and exchange them for any goods or services. First, you must convert them into money, either as currency or into your checking account. But these are extremely **liquid**. That is, they are extremely easy to convert into money. For your savings account (and sometimes for your money market fund), all you have to do is use your ATM card (or call the financial institution) and instruct the financial institution to convert your account into either your checking account or into currency. There is no risk of loss. For your Certificate of Deposit (CD), you do have to wait until the time period expires. But this is usually not very long. M-2 is a very important measure. It is important because it seems to explain changes in Real GDP better than M-1. We know that when the money supply increases, people will take the extra money and spend some of it. This increase in spending will cause Real GDP to rise (and may also cause prices to rise).

In discussing the money supply, we have not mentioned **credit cards**. Just what is a credit card? Like money, a credit card is an IOU. But this time, you owe the financial

institution. *A credit card is a pre-approved loan up to a certain amount (your credit limit) at a very high interest rate. Every time you use your credit card, you are borrowing from the financial institution.* Credit cards are substitutes for money, but are not money itself.

In conclusion, notice that **money is not “backed”**. Until 1934, one could exchange dollars for gold. So dollars were backed by gold. But this is no longer true. The United States does not have a certain amount of gold for every dollar in circulation. If money is not backed, what gives it its value? **The answer is its acceptability**. As long as people are willing to accept dollar bills or checks in exchange for goods and services, these dollar bills and checks have value. Indeed, their value is equal to the goods and services one can obtain in exchange for them.

3. The Federal Reserve System

Earlier, we said that the Federal Reserve System (known as **“the Fed”**) is the central bank of the United States. *A central bank is simply a bank for banks.* It does for commercial banks what the commercial banks do for you. You have an account at your bank, say Wells Fargo Bank. Wells Fargo has an account at its bank, the Federal Reserve Bank. You call your account at Wells Fargo Bank a checking account. Remember that your checking account represents the IOU of Wells Fargo Bank. *Wells Fargo’s account at the Federal Reserve Bank is called “reserves”. Reserves represent the IOU of the Federal Reserve Bank to Wells Fargo Bank.* Unlike you, Wells Fargo does not write checks against its account. But otherwise, reserves are to Wells Fargo Bank what your checking account is to you. You also are able to borrow at your bank, Wells Fargo Bank. You can borrow to buy a car, buy a home, and so forth. Wells Fargo Bank is also able to borrow from its bank, the Federal Reserve Bank. This borrowing is called “discounting”. *Therefore, discounting is the act of a Federal Reserve Bank lending to a commercial bank.* Like you and any other borrower, Wells Fargo Bank must repay its loan with interest. This interest rate is named the discount rate. *Therefore, the discount rate is the interest rate charged by a Federal Reserve Bank to a commercial bank.* As we shall see, the Federal Reserve System has more important functions than simply holding reserves and lending to commercial banks. Through its holding of reserves and its lending to commercial banks it controls how many dollars are in existence. As you already know, the number of dollars in existence, called the **money supply**, is a major influence on the amount of aggregate demand (total spending) and therefore on Real GDP and on prices.

The organization of the Federal Reserve System is shown below. As we saw earlier, there are **twelve Federal Reserve Banks** in the United States. (This is the reason that the letters on the currency go from A to L.) The Fed is a **system** of twelve central banks. When the Federal Reserve Act was written in 1913, the country was divided into twelve Federal Reserve Districts. Each district has a Federal Reserve Bank. So there is a Federal Reserve Bank of Boston, New York, Philadelphia, Richmond, Atlanta, Cleveland, Chicago, Minneapolis, St. Louis, Dallas, Kansas City, and San Francisco. The western region of the Federal Reserve Bank of San Francisco includes all of California, Oregon, Washington, Hawaii, Alaska, Idaho, Nevada, Utah, and Arizona. Each Federal Reserve Bank is technically organized as a private bank would be organized. Each is owned by

the commercial banks in its territory. Therefore, Wells Fargo Bank is an owner of the Federal Reserve Bank of San Francisco. Wells Fargo had no choice in becoming an owner. And the amount it had to pay to become an owner was set for it. So Wells Fargo Bank considers itself a **member bank**, as though the Federal Reserve System were a club it was forced to join. Each Federal Reserve Bank has a **Board of Directors**, as would any private business. And each of the 12 Federal Reserve Banks has a **President**.

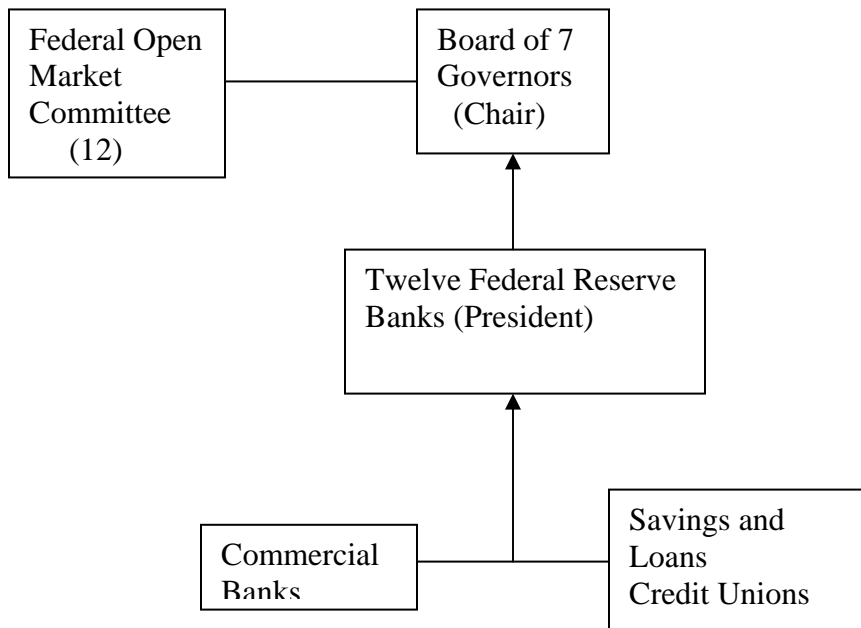
Governing the entire Federal Reserve System is a **Board of Governors**, located in Washington D.C. **The Board of Governors is composed of seven people**. Each one is appointed by the President of the United States and confirmed by the Senate. If appointed, one gets a **non-renewable fourteen-year term**. The idea was to take the governance of the Federal Reserve System out of everyday politics as much as possible. So once appointed, you do as you think is best for fourteen years. You cannot be removed from the Board for any reason except corruption. (There have so far been no examples of corruption.) After fourteen years, you cannot be re-appointed. So there is no sense trying to please a President just to keep your job. (If you are appointed to fill out the term of another governor who died or resigned, you may have the rest of that term plus one 14-year term of your own.) The fourteen-year terms are staggered so that one begins every two years. The date of a new term is January 31st of the even numbered year. Therefore, in a four year Presidential term, if there are no deaths or resignations, a President can appoint only two of the seven Governors.

Of the seven Governors, one is the **Chair**. The Chair is appointed to the Board of Governors according to the rules stated in the previous paragraph. **But as Chair of the Board, the Chair is appointed by the President of the United States for a four-year term**. At the end of that term, the Chair can be reappointed by the President of the United States (as long as the Chair has time left to serve on the Board). Or the Chair may be demoted to being just another member of the Board. Unless the fourteen-year term is complete, the Chair cannot be removed from the Board by the President of the United States. As we shall see, the Chair is one of the most powerful people in the world as regards economic matters. If the Chair is a good leader, the Board will follow the wishes of the Chair most of the time. (The Board has seven people, so a vote of four to three wins. But the Board tries to make its decisions by consensus.) A few words from the Chair as to what he or she is thinking can have major effects throughout the world.

Let us illustrate this process. In 1979, President Carter appointed **Paul Volcker** as Chair. The term had originally begun in 1978. But the person who had been appointed in 1978, G. William Miller, left the position of Chair to become Secretary of the Treasury.) Volcker had been a top executive in some of the commercial banks in New York City as well as a top executive of the Federal Reserve Bank of New York. Many people credit Volcker for the rapid reduction of the inflation rates in the early 1980s. Other people blame Volcker for the very deep recession and high rates of unemployment of the early 1980s. The first term as Chair for Volcker finished in 1983. President Reagan re-appointed him for another term. He did so reluctantly. But he believed that the financial leaders had great faith in Volcker. Four years later, in 1987, Volcker's term was concluded again. Most people thought he would be re-appointed. But President Reagan did not re-appoint him. President Reagan demoted Volcker and brought in **Alan Greenspan** to be the Chair. Volcker immediately resigned from the Board (and accepted a \$3 million book advance). Alan Greenspan was re-appointed by President Bush in

August 1991. In January of 1992, the fourteen-year term ended; Alan Greenspan was appointed to the new 14-year term (he was entitled to a term of his own because he had served only 4 ½ years of the previous term). His term on the Board will end on January 31, 2006. He was re-appointed as Chair by President Clinton in 1996 and again in 2000, even though President Clinton is a Democrat and Alan Greenspan is a Republican. His term as Chair will expire in January of 2004. Since George W. Bush will still be President at that time, it is a good bet that Alan Greenspan will be asked to complete the last two years of the term. Alan Greenspan has ended much of the secrecy that used to exist at the Fed. Because he has been a much more public figure than his predecessors, many people are aware of him. Many people give him credit for the remarkable economic performance of the 1990s. Although he has many critics, his views on economic matters are very highly respected.

We hear on the news that “the Fed will meet next Tuesday”. There is a meeting and then there is an announcement that interest rates will rise or will fall. How the Fed influences interest rates will be considered later. But the group involved with this meeting is called the Federal Open Market Committee (FOMC). ***The Federal Open Market Committee is composed of twelve people. Seven are the Governors, headed by the Chair. The other five are Presidents of the Federal Reserve Banks.*** Remember that there are twelve Federal Reserve Banks and that each has a President. The President of the Federal Reserve Bank of New York is always one of the members of the Federal Open Market Committee. The other eleven Presidents rotate in and out of the other four positions. The Federal Open Market Committee meets about every six weeks in Washington D.C. It may also meet via conference call in between scheduled meetings. While technically the seven Governors can outvote the five Federal Reserve Bank Presidents, in practice they debate the issues until they reach a consensus as to what to do. An announcement of their decision is made at the end of the meeting. This announcement is greatly anticipated and is always a big news story.



4. The Balance Sheet of a Financial Institution

Modern banking began in ancient Babylonia, some 7,000 years ago. The first banks were mainly money changers (the word “bank comes from the Italian word for bench). Let us examine what a bank (or other financial institution) does today. Examine the following **T account**. A T account is commonly used in accounting. **On the left side, there is a list of all of the financial institution’s assets.** That is, there is a list of everything the financial institution owns. **On the right side, there is a list of the places that the financial institution got the money to buy what it owns. This is a list of its liabilities (its debts) and its owners’ equity (or net worth).** That is, the financial institution got its assets either by borrowing to pay for them or by paying for them with the money invested by the owners.

Bank A	
Assets:	Liabilities:
Reserves	Checkable Deposits
Federal Funds	Savings Deposits
Treasury Securities	Time Deposits (CDs)
Loans	Money Market Funds (or Deposit Accts)
Buildings, Land, and Other Capital	Other Deposits
	Discounts
	Net Worth (Owner’s Equity)

Let us examine each of these in turn. As noted above, **reserves are the IOUs of a Federal Reserve Bank to the commercial bank, Bank A.** This is Bank A’s account at its bank, the Federal Reserve Bank. (Currency in the bank is also part of these reserves.) **Reserves pay an interest rate of zero** (just like currency pays you an interest rate of zero). So why would a commercial bank have these reserves? The answer is that “they are required to”. **All commercial banks that are members of the Federal Reserve System must have ten cents in their reserves for every \$1.00 they have in checkable deposits. This is called the “reserve requirement” – 10%.** That is, if you put \$1.00 into your checking account at Bank A, then Bank A must have ten cents in its account at the Federal Reserve Bank. These reserves are then called **“required reserves”**. If a commercial bank chooses to have more reserves than it is required to have, the difference is called **“excess reserves”**. Because reserves pay no interest, commercial banks usually will not choose to have excess reserves.

The second asset is called **“federal funds”**. The **Federal Funds Market** was developed in the 1920s. This is **a market in which one commercial bank can lend to another commercial bank.** These loans are typically for a very short term. Because “Federal Funds” are listed as an asset in the T account above, Bank A must have loaned to another commercial bank. If Bank A had borrowed from another commercial bank, “Federal Funds” would be listed as a liability. As with any other loan, commercial banks pay interest to other banks. **The interest rate charged by one commercial bank to another commercial bank is called the federal funds rate.** As we will see, this is one of the most important interest rates there is.

The third asset is called “Treasury Securities”. *Treasury Securities are IOUs of the United States Treasury.* The Treasury Department runs the financial affairs for the executive branch of the federal government. So these are IOUs of the United States government. (Do not confuse the “United States Government” with the “Federal Reserve”.) The sum of all the Treasury Securities is called the **national debt**. As we saw earlier, part of the national debt is held by commercial banks. Banks hold this debt because it pays a good interest rate and because it is very liquid (that is, it can easily be converted into money without loss). The Treasury Securities come in three forms --- bills, notes, and bonds. *A Treasury Bill (or T-Bill) is an IOU of the United States government that will be repaid in one year or less.* Typically, there are 3-month, 6-month, and 1-year Treasury Bills. *A Treasury Note is an IOU of the United States government that will be repaid in more than one year and usually in no more than ten years.* *A Treasury Bond is an IOU of the United States government that will be repaid in more than ten years.* (The ten-year dividing line is not rigid.)

Loans are the main asset of a financial institution. In fact, over 80% of a financial institution’s assets are in the form of loans. Financial institutions make loans for all kinds of purposes --- personal loans, credit cards, home loans, car loans, business loans, and so forth. There are commercial banks that specialize in lending to businesses. There are mortgage companies that specialize in lending to people to buy homes. Credit Unions tend to specialize in personal loans. And then there are general financial institutions that make loans for many different purposes. Some of the loans require collateral. *Collateral means that the financial institution will get something physical if the borrower fails to repay the loan.* So, if you borrow to buy a home or car, you pledge the home or car as collateral. If you fail to repay, the financial institution gets the home or car. The interest rates charged by the commercial banks have many names. An important rate is called the prime rate. *The prime rate is the interest rate charged by a commercial bank to those borrowers considered the least risky.* It is important because many other interest rates are connected to it. So, for example, if I have a small business and the prime rate rises, the interest rate that I will have to pay will also rise.

The other assets of the commercial banks are less significant. Of course, they own the buildings for their banks and land on which to build the buildings. They own computers and other capital goods.

The most important **liabilities** of a financial institution have been described already. Checkable deposits, savings deposits, time deposits (CDs), and money market funds (or money market deposit accounts) are all IOUs of the financial institution. There are various rules for the IOUs, as described earlier. Discounts represent the amount that Bank A has borrowed from the Federal Reserve Bank.

The **Net Worth (or Owner’s Equity)** represents the amount the owners have invested into the financial institution. *What is unique about a financial institution is that the share of the assets paid for by the owners is very small.* In a typical business, perhaps 30% to 50% or more of the assets will have been provided by the owners. In a financial institution this is typically about 8%. In the 1980s, some major financial institutions had the owners’ share drop to 2% and below.

The small share of Net Worth (and the corresponding large share of liabilities) puts financial institutions in a somewhat precarious situation. In making their loans, they

assume that perhaps 2% to 3% of the loans will not be repaid and make provision for this loss. But what happens if the economy goes into a very serious recession and many more borrowers than expected are unable to repay their loans? Assume that the liabilities are equal to 92% of the value of the assets. If the value of the loans (the main asset) were to decline by more than 8%, the value of the assets would become less than the value of the liabilities. To see this assume the following numbers exist for Bank A.

Bank A	
Assets:	100
Reserves	10
Federal Funds	5
Treasury Securities	5
Loans	80
Buildings, Land, and Other Capital	
Liabilities	92
Checkable Deposits	
Savings Deposits	
Time Deposits (CDs)	
Money Market Funds (or Deposit Accts)	
Other Deposits	
Discounts	
Net Worth (Owner's Equity)	8

If, for some reason, \$10 of loans cannot be repaid and the value of the Loans falls to 70 and the total assets of the Bank A would fall to 90. With total assets of \$90 and total liabilities of \$92, **Bank A does not own enough to pay all of its liabilities**. Its Net Worth is negative. We say that Bank A is *“insolvent”*. If this is a temporary situation, Bank A might borrow from the Federal Reserve Bank (discounting) or from other commercial banks (federal funds) to get it through the bad period. The real problem occurs if this is a permanent situation. For example, Bank A may have made many high-risk loans that did not pay off. In most cases, the Federal Reserve will try to find a healthy commercial bank to take over Bank A. For example, in the early 1970s, there was a corruption scandal involving the largest commercial bank in San Diego County. The owner of the commercial bank had made loans to his other business enterprises that he had no intention of repaying. For doing this, he ultimately went to jail. This bank was taken over by Crocker Bank of San Francisco, which was subsequently taken over by Wells Fargo Bank. If you were a customer of the bank, you received new checks; otherwise, nothing changed. If there is no healthy commercial bank willing to take over Bank A, the next step is to pay off the depositors at Bank A. There is insurance specifically for this purpose. The agency that handles this insurance is called the *Federal Deposit Insurance Corporation (FDIC)*. Despite the name, it is a government agency. All accounts at the commercial bank are officially insured up to \$100,000. (The largest bank failure in American history was that of the Continental Illinois Bank of Chicago in the 1980s. In this episode, every depositor received every penny of his or her account --- even those who had more than \$100,000 in their accounts.)

5. Summary

In this chapter so far, we have examined the phenomenon of money. We have seen that it serves three main functions: a medium of exchange, a store of value, and a unit of account. What have examined those things that have served as money in the past as well as those things that serve as money in the United States today (using both the M-1 and

M-2 definitions). In the world today, money is composed of IOUs. Indeed, most financial instruments are IOUs. This money is not “backed” by anything other than the willingness of the people to accept it in exchange for goods and services. What have also examined some major parts of the financial system: the Federal Reserve System and those financial institutions that are allowed to offer checking accounts (commercial banks, savings and loans, and credit unions). We saw how the Federal Reserve System is organized and governed. And we saw what the financial institutions do. Both of these have a major role to play in the process by which money is created. So we shall now turn to this topic: how is money created?

6. How Money Is Created

In the story of the creation of money, there are two main characters: the financial institutions and the Federal Reserve. This first section will focus on the role of the financial institutions. The next section will focus on the role of the Federal Reserve. In order to focus on the role of the financial institutions, **we will begin by making several simplifying assumptions:**

1. **We assume that no one holds any currency. Every purchase is done by check.**
2. **We assume that there are only checking accounts. There are no savings accounts, time deposits, and so forth.**
3. **We assume that financial institutions choose to hold no excess reserves.**

We will relax these assumptions later in this section.

4. Finally, so that we can separate the role of the financial institutions and the role of the Federal Reserve, I will make a silly assumption here. We will assume that new money grows on trees! In order to understand the role of the financial institutions, we must begin with an injection of new money. The real “tree” will be considered in the next section. Here I will be silly so that we will not confuse the part the financial institutions play in the creation of money with the part played by the Federal Reserve.

So, with these assumptions, let us begin the story. A person (named Bill) is standing outside and notices a brand new \$1,000 bill growing on a tree. Needless to say, Bill picks it. So there is now \$1,000 of new money. (The story must begin with an injection of new money.) This \$1,000 bill is an IOU of a Federal Reserve Bank, called currency. Because of our assumption #1 that no one holds currency, Bill deposits the \$1,000 in his account at his bank, Bank A. The \$1,000 bill is still an IOU of a Federal Reserve Bank. But now it is owed to the bank instead of owed to Bill. When it was owed to Bill, it was called “**currency**”. As we saw in the previous chapter, when it is now owed to the bank, it changes names. It is now called “**reserves**”. ***Currency and reserves are both IOUs of a Federal Reserve Bank.*** In fact, they are the only IOUs of the Federal Reserve. They are given a name --- the **monetary base**. ***So the monetary base is the sum of currency plus reserves, the two IOUs of the Federal Reserve Bank.*** And the monetary base has increased by \$1,000.

What did Bill get when he deposited the \$1,000 bill in the bank? The answer is that he got **\$1,000 added to his checking account --- an IOU Bank A**. So at this point, the situation for Bank A looks as follows:

Bank A			
Assets:		Liabilities	
Reserves	1,000	Checkable Deposit to Bill	1,000

As described in the previous chapter, the **reserve requirement** is 10%. This means that Bank A is required to keep 10% of its \$1,000 in checkable deposits in its reserves. Therefore, reserves are required to be \$100. But total reserves are actually \$1,000. So the other \$900 is **excess reserves**. We have assumed (probably correctly) that Bank A would not want to keep any excess reserves. What will it do with them? The answer is that it will make a new loan.

Bank A			
Assets:		Liabilities	
Required Reserves	100	Checkable Deposits to Bill	1,000
Excess Reserves	900		

Imagine that last night, Mary found that her refrigerator had died. Mary needs a new refrigerator. But Mary has no money. So Mary goes to Bank A and asks to borrow \$900 so that she can buy a new refrigerator at Sears. Bank A agrees to lend \$900 to Mary. Mary signs forms indicating that she owes the bank \$900. This is a **Loan** --- an asset for Bank A, as we saw in the previous chapter. The key question is: what does Mary get from the bank? The answer is that Mary has \$900 added to her checking account (either by receiving a check or by adding \$900 into the account on the computer). The situation for Bank A now looks as follows:

Bank A			
Assets:		Liabilities	
Reserves	1,000	Checkable Deposits to Bill	1,000
Loans	900	Checkable Deposits to Mary	900

At this point, how much money is there? The answer is \$1,900. **Money (M-1) is the sum of currency plus checkable deposits**. There is no currency. But the checkable deposits total \$1,900. Bill still has the \$1,000 that grew on the tree. And Mary has the other \$900. **The money supply has been increased by \$900 --- there is \$900 of new money**. Where did this money come from? Remember that checkable deposits are IOUs of a commercial bank. **Someone at Bank A just created an IOU of Bank A**. He or she created it out of thin air.

Imagine that you and I do this. I write "IOU \$900" on a piece of paper. You also write "IOU \$900" on a piece of paper. Then, we exchange IOUs. So I owe you \$900 and you owe me \$900. Has anything happened? Of course not. This is all that has occurred between Mary and Bank A. Mary owes the bank \$900. And Bank A owes Mary \$900. Neither is better off and neither is worse off. **There is no new wealth**. However, if you and I exchange IOUs, neither IOU is money. But if Mary and Bank A exchange IOUs, the IOU of Bank A is money. **Remember that money is whatever people accept in exchange for goods and services**. People will accept the IOU of Bank A in exchange for goods and services. So even though no new wealth has been created, there is the creation of \$900 of new money.

You might be wondering how to get a job in a bank where you can create money out of thin air. But remember that there is a control of the ability of the commercial bank to create money. ***A commercial bank can create money if and only if it has excess reserves.*** Therefore, Bank A can create \$900 of new money and no more. **How much money can be created is controlled by the reserve requirement. This reserve requirement, as we shall see, is set by the Federal Reserve.**

Let us get back to Mary. Mary goes to Sears and buys a refrigerator for \$900. She writes a check --- "Pay to the order of Sears \$900" --- signs it and gives it to Sears. What has she done? **The answer is that she has transferred the IOU from herself to Sears.** She has said to Bank A "don't owe me \$900 anymore. Owe the \$900 to Sears." After checking Mary's identification, the representative from Sears stamps the check on the back. The stamp says something like "Pay to the order of Bank B". What has Sears done? **The answer is that Sears has transferred the IOU from itself to Bank B, where Sears banks.** Later in the day, someone will pick up the check and deposit it in Sears account at Bank B. At this point, the situation at the two banks will look as follows:

Bank A			
Assets:		Liabilities	
Reserves	1,000	Checkable Deposits to Bill	1,000
Loans	900	IOU to Bank B	900

Bank B			
Assets:		Liabilities	
IOU of Bank A	900	Checkable Deposits to Sears	900

The money supply is still \$1,900. Bill still has the \$1,000 he found on the tree. And Sears has the other \$900.

At this point, Bank A owes Bank B \$900. Assume there are no other transactions in the period. Bank A will pay Bank B in the same way I would pay you. Assume I owe you \$900. I have here nine \$100 bills. What do I have? The answer is that I have the IOUs of a Federal Reserve Bank. So the Federal Reserve Bank owes me \$900 and I owe you \$900. Now I give you the nine \$100 bills. I no longer owe you anything. The Federal Reserve Bank now owes you the \$900. So I have paid my debt to you by giving you the IOU of the Federal Reserve Bank. **Similarly, Bank A will pay Bank B by giving it the IOU of the Federal Reserve Bank.** The only difference is that the IOU of the Federal Reserve Bank to Bank A is called "reserves", not "currency". On the books, the Federal Reserve Bank will take \$900 away from the reserves of Bank A and add it to the reserves of Bank B. The debt between the two banks will have been paid. The situation for the two banks is now as follows:

Bank A			
Assets:		Liabilities	
Reserves	100	Checkable Deposits to Bill	1,000
Loans	900		

Bank B			
Assets:			
Reserves	900	Liabilities	
		Checkable Deposits to Sears	900

At this point, the money supply is still \$1,900. **Bank A has no excess reserves and therefore cannot make another new loan.** All Bank A can do is to keep lending the \$900 when Mary pays back her loan (plus the interest). But Bank B does have excess reserves. Bank B is required to have in reserves 10% of \$900, or \$90. The other \$810 is excess reserves. So Bank B can indeed make a new loan --- up to \$810.

Bank B			
Assets:			
Required Reserves	90	Liabilities	
Excess Reserves	810	Checkable Deposits to Sears	900

Assume that Jose wants to borrow \$810 from Bank B to buy some stereo equipment from Tweeter. Bank B agrees to lend \$810 to Jose. Jose signs the forms promising to pay Bank B \$810 plus interest. This is a **Loan** --- an asset for Bank B. The key question is: what does Jose get from the bank? The answer is that Jose has \$810 added to his checking account (either by receiving a check or by adding \$810 into the account on the computer). The situation for Bank B now looks as follows:

Bank B			
Assets:			
Reserves	900	Liabilities	
Loans	810	Checkable Deposits to Sears	900
		Checkable Deposit to Jose	810

At this point, how much money is there? The answer is \$2,710. There is no currency but the checkable deposits total \$2,710. Bill still has the \$1,000 that grew on the tree. Sears still has its \$900. And now Jose has the other \$810. **The money supply has been increased by \$810 --- there is \$810 of new money.** Where did this money come from? Remember that checkable deposits are IOUs of a commercial bank. **Someone at Bank B just created an IOU of Bank B.** He or she created it out of thin air.

This process will continue as Jose buys the \$810 at Tweeter. It is the same story repeated over and over. So we will not continue with it. Let us summarize here what has happened to the money supply (M-1):

+\$1,000	Grew on a "Tree"
+\$ 900	Created by Bank A
<u>+\$ 810</u>	Created by Bank B
+\$2,710	

But the story is not over. The money that Jose spends will end up in Bank C. Bank C will be required to keep 10% of that amount. The other 90% of the amount will be excess reserves. Bank C will make a loan equal to the amount of these excess reserves

and, in the process will create new money. And so on. This process is called a **multiplier**. So we have here the **“Money Multiplier”**.

At the end of the story, we will see that the total amount of new money created will equal \$10,000. \$1,000 grew on the “tree” and the other \$9,000 was created by the various banks. So we say that the Money Multiplier is equal to 10.

$$\begin{array}{ccc} \text{Change in the Monetary Base} & \times & \text{Money Multiplier} & = & \text{Change in the Money Supply} \\ (\$1,000) & & (10) & & (\$10,000) \end{array}$$

The monetary base (currency plus reserves) changed by \$1,000. At first, it was currency that “grew on a tree”. Then, Bill converted it into reserves by depositing it into his account at Bank A. I know that the total money supply (currency plus checkable deposits) will rise by \$10,000 because I know that the Money Multiplier is equal to 10. I know this because there is a formula for the Money Multiplier. It is probably easiest to just remember the formula.

$$\text{Money Multiplier} = \frac{1}{\text{Reserve Requirement}}$$

Take the reserve requirement (expressed as a decimal or as a fraction) and divide it into one. So in this case,

$$\text{Money Multiplier} = \frac{1}{0.1} \quad \text{or} \quad \frac{1}{1/10} = 10$$

(Be sure to remember to express the reserve requirement as either a decimal or as a fraction. The formula is NOT 1/10.)

The formula for the Money Multiplier is dependent on the simplifying assumptions we made earlier. Now it is time to relax those assumptions and make the analysis more realistic. **First, let us relax the assumption that people hold no currency.** In fact, more than 25% of the money supply (M-1) is currency. To illustrate the effect, let us **imagine the opposite --- all transactions are done with currency and none with checking.** A \$1,000 bill grew on a tree. How much money would be created? The answer is \$1,000. The \$1,000 would be transferred from person to person as it was spent. But it would never get into a bank. Therefore, no bank would be able to create new money. **In this case, the money multiplier is equal to 1** (\$1,000 times 1 = \$1,000). Notice that if people use all checking and no currency, \$10,000 of new money is created. But if they use all currency and no checking, only \$1,000 of new money is created. Therefore, we can generalize. ***The more (less) checkable deposits people choose to hold and the less (more) currency people choose to hold, the greater (lower) is the money supply.*** Notice that this is a choice people have. Currency is necessary for certain transactions. But checking accounts have certain advantages. They are safer. They make it easier to keep track of one’s spending. And they also pay some interest. ***So, the higher the interest rate paid on a checking account, the more people would wish to keep their money in the form of checking accounts. The more they keep their money in the form of checking accounts, the greater is the money supply. Therefore, as interest***

rates rise, the money supply will also rise. Because of the existence of currency, the actual money multiplier is lower than 10. In fact, the actual money multiplier in the United States is approximately $2\frac{1}{2}$.

Test Your Understanding

The reserve requirement on checkable deposits is 10%. The reserve requirement on savings deposits is zero. What would happen to the money supply if Bill took the \$1,000 he found on the tree out of his checking account and put it in his savings account?

Second, let us relax the assumption that there are no savings accounts, CDs, and so forth. While these are not part of M-1, they do affect M-1. The reason is that **the reserve requirement on these accounts is zero.** Return to the situation for Bank A.

Bank A			
Assets:		Liabilities	
Reserves	100	Checkable Deposits to Bill	1,000
Loans	900		

Suppose that Bill decides to shift from a \$1,000 checking account to a \$1,000 savings account. The reserve requirement changes from 10% on the checking account to zero on the savings account. The \$100 in reserves is now excess reserves. Bank A can now make a new loan up to \$100. That new loan will create money. The \$100 created by Bank A will end up in another bank that will create money from it, and so forth. The money supply will increase. *So we can conclude that the more (less) savings accounts and so forth and the less (more) checkable deposits people choose to hold, the greater (lower) is the money supply.* Again notice that this is a choice people have. You and I can choose what kind of accounts we wish. Since savings accounts, CDs, and so forth pay higher rates of interest than checking accounts, interest rates once again are relevant to this decision. As interest rates rise, they are likely to increase more for savings accounts and CDs than for checking accounts. *Therefore, as interest rates rise, people will shift their assets from checking accounts into CDs and so forth. As they do, the money supply rises.*

Test Your Understanding

1. We assumed that the financial institutions choose to hold no excess reserves. Suppose that they become afraid that if they make loans, the loans will not be repaid. So they do indeed hold on to the excess reserves, rather than lend them. What happens to the money supply (M-1)? Why?

7. The Role of the Federal Reserve: The Tools of Monetary Policy

Now it is time for us to consider the role of the Federal Reserve System (Fed) in the creation of money. How does the Fed create money? There are actually three ways --- known as the three tools of monetary policy. (*Monetary policy involves changes in the money supply.*) The Fed can change the reserve requirement, it can change the discount rate, or it can engage in open market operations. Let us examine each of these in order of importance --- least important first.

(1) Changing the Reserve Requirement

The last revision of the Federal Reserve Act came in 1980. In that act, the reserve requirement on checking accounts was set at 12%. The Federal Reserve Board was given the authority to raise this up to 15% or to lower it to 9%. (The Board has made one change in this requirement, lowering it to 10% in 1992.) The reserve requirement on savings accounts, CDs, and so forth was set at 3% in the 1980 act. The Federal Reserve Board was given the authority to lower this to zero, but not to raise it at all. (In 1992, the Board chose to do so, and the reserve requirement on these accounts is now zero.)

Let us assume the situation for Bank A. The reserve requirement is 10%. Bank A has no excess reserves and therefore cannot make a new loan.

Bank A			
Assets:		Liabilities	
Reserves	100	Checkable Deposit to Bill	1,000
Loans	900		

Now assume that the Federal Reserve Board chooses to **lower the reserve requirement to 9%** (the lowest that is permitted in the act). How much must Bank A now keep in reserves (its account at the Fed)? The answer is 9% of \$1,000, or \$90. But Bank A actually has \$100 in its account at the Fed, that is, in its reserves. So Bank A now has \$10 of excess reserves (more than it is required to have). What will Bank A do with this \$10. The answer is that it will make a new loan of \$10. In making this new loan, Bank A will add \$10 to someone's checking account and in the process will create \$10 of new money. This \$10 will end up in another bank. That bank will be able to create new money from it. And so on. So by lowering the reserve requirement from 10% to 9%, the Fed has generated a situation in which the money supply will increase.

We can summarize this. **To increase (decrease) the money supply, the Fed lowers (raises) the reserve requirements.** Of the three tools of monetary policy, this is the least important because it is rarely used. The Fed likes to make small, frequent changes in order to keep the economy going well (much as you drive a car). Changing the reserve requirement is just too strong of a change at one time. So since 1980, this tool has been utilized only once.

Test Your Understanding

1. Explain in your own words why an increase in the reserve requirement, say from 10% to 15%, would cause the money supply to decrease.
2. Assume that Bank A has \$10,000 in checkable deposits, \$2000 in reserves, and \$8,000 in loans when the reserve requirement is 20%. If the **reserve requirement (ratio) is lowered** to 10%,

Bank A's excess reserves increase by \$ _____
the money supply will ultimately _____ (increase or decrease?)
 by \$ _____.
 The **money multiplier** increases from _____ to _____.

(2) Change the Discount Rate

In the previous chapter, **discounting** was defined as a commercial bank borrowing from a Federal Reserve Bank. *The discount rate was defined as the interest rate that the Federal Reserve Bank charges the commercial bank.* Again, assume the same situation for Bank A.

Bank A			
Assets:		Liabilities	
Reserves	100	Checkable Deposit to Bill	1,000
Loans	900		

Now assume that Bank A borrows \$10 from the Federal Reserve Bank. Such borrowing is not automatic; but let us assume that the Federal Reserve Bank agrees to lend to Bank A. Where will the Federal Reserve Bank get the \$10 to lend to Bank A? The answer is that the Federal Reserve Bank will simply create it. *Reserves are the IOUs of a Federal Reserve Bank to Bank A. The Federal Reserve Bank will simply add \$10 more into the reserves of Bank A.* Of course, there is a corresponding liability by Bank A, called discounting.

Bank A			
Assets:		Liabilities	
Reserves	110	Checkable Deposit to Bill	1,000
Loans	900	Discounts	10

Notice that Bank A now has \$110 in reserves, its account at the Federal Reserve Bank. But Bank A is only required to have \$100 (10% of \$1,000). The other \$10 is excess reserves. What will Bank A do with this \$10? The answer is that it will make a new loan of \$10. In making this loan, Bank A will add \$10 to someone's checking account and in the process will create \$10 of new money. This \$10 will end up in another bank. This bank will be able to create new money from it. And so on.

The problem here is that the initiative to borrow must come from Bank A. The Federal Reserve Bank cannot force a commercial bank to borrow from it. It must persuade the commercial bank to borrow from it. How does it do this? The answer is that it lowers the discount rate, the interest rate charged to the commercial bank. Just like any borrower, Bank A is more likely to desire to borrow if the interest rate it must pay is reduced.

So we can summarize. *To increase (decrease) the money supply, the Federal Reserve lowers (raises) the discount rate. Lowering (raising) the discount rate creates new excess reserves (reduces the amount of excess reserves). This increases (decreases) the amount of money that Bank A (and the other banks) can create.*

Do not confuse the discount rate with other interest rates. Let us once again define a few important interest rates here. These were defined earlier.

The **discount rate** is the interest rate charged by the Federal Reserve Bank to a commercial bank.

The **federal funds rate** is the interest rate charged by one commercial bank to another commercial bank for reserves.

The **prime rate** is the interest rate charged by a commercial bank to the least risky borrower.

The **mortgage rate** is the interest rate charged by a financial institution to anyone borrowing to buy a home. The home serves as **collateral**.

The **Treasury security rate** is the interest rate charged by individuals, businesses, banks, or foreigners to the U.S. Treasury. The U.S. Treasury represents the United States government. Do not confuse the Treasury and the Federal Reserve. The accumulation of all of the Treasury securities is called the National Debt. Treasury securities come in three forms. *They are called “bills” if the government will repay its debt in one year or less. They are called “notes” if the government will repay its debt in more than one year but not more than ten years. And they are called “bonds” if the government will repay its debt in more than ten years.* Bills, notes, and bonds are all forms of securities.

Test Your Understanding

1. Explain in your own words why an increase in the discount rate would cause the money supply to decrease.
2. Assume that **the discount rate is lowered** from 6% to 4%. As a result, Bank A borrows \$1,000 from the Fed.
 The **monetary base** _____ (increases or decreases?) by \$ _____
 Bank A's **excess reserves** _____ (increase or decrease?) by \$ _____
 With a reserve ratio of 20%, the **money supply** will _____ (increase or decrease?) by \$ _____.

(3) Open Market Operations

Open market operations are by far the most important of the three tools of monetary policy. While the reserve requirement is rarely changed and the discount rate is changed perhaps three or four times a year, open market operations is used continually. Let us take these words in reverse order. First, the operator is, of course, the Federal Reserve. The operation is buying and selling. The Federal Reserve comes into a market and either buys or sells. Second, there is the word “market”. The Federal Reserve comes into only one market to buy or sell --- the market for Treasury securities. Finally, there is the word “open”. The Federal Reserve comes into the open market for Treasury securities (bills, notes, or bonds). “Open” means it is a resale (used) market.

Assume that you buy a one-year Treasury bill today for \$10,000. The Treasury will repay you \$10,000 one year from today plus 5% interest (\$500). Assume that tomorrow you realize that this was a big mistake. You need this money. This is no problem. You simply sell the Treasury bill. There is an organized market for them; so you call a broker and sell the Treasury bill. You have no idea who actually bought the Treasury bill from you and you don't care. All you know is that you got your money. But it is possible that the one who bought from you is a government securities dealer. There are several dozen government securities dealers located on the south end of Manhattan Island in New York City. They work for themselves, trying to make a profit by buying and selling government (Treasury) securities. (Perhaps you have heard of one of these --- Cantor

FitzGerald. Cantor Fitzgerald had offices on the top five floors of the World Trade Center and lost hundreds of its employees in the September 11 attack.)

When the Federal Reserve deals in Treasury securities, it deals with these dealers. Let's say that the Federal Reserve decides to buy \$1,000 (million) worth of Treasury securities from Dealer #1. Where does the Federal Reserve get the \$1,000 (million) to pay for these Treasury securities? As you may have guessed by now, the Federal Reserve simply creates the money. In the Federal Reserve Bank of New York building, someone types into a computer "Pay to the Order of Dealer #1 \$1,000 (million)". This is sent to Dealer #1. In the past, Dealer #1 would print it as a check and then deposit the check in its account at its bank. Now the check is direct deposited. This in reality serves as the "tree" in my silly example earlier. *The reserves are an IOU of the Federal Reserve. The Federal Reserve simply creates a new IOU on itself to pay for the Treasury securities.* This IOU ends up in a commercial bank as reserves. Since the commercial bank must hold only 10% of the \$1,000 (million), or \$100 (million), in reserves, the other \$900 (million) is excess reserves. With excess reserves, the commercial bank can make a new loan. In the process, the commercial bank will create money. That will end up in another commercial bank that also will be able to make a new loan (and in the process create even more money). The Fed buying Treasury securities from the dealer has started into motion the process that we call the multiple creation of money.

To summarize: if it wishes to increase (decrease) the money supply, the Federal Reserve buys (sells) Treasury securities in the open market. As noted, open market operations are undertaken very frequently.

Test Your Understanding

1. Explain in your own words why the Federal Reserve selling Treasury securities to a dealer in the open market would cause the money supply to decrease. (Hint: if the Federal Reserve sells Treasury securities, what does the dealer get? What does the Federal Reserve get? What then happens to the money supply?)
2. Now, assume that the **Fed buys** \$1,000 worth of Treasury Bills from Bank A.
 The **monetary base** _____ (increases or decreases?) by \$ _____
 Bank A's **excess reserves** _____ (increase or decrease?) by \$ _____
 With a reserve ratio of 20%, the **money supply** will _____ (increase or decrease?) by \$ _____.

There are a couple of points to notice about this process. First, the overall direction of monetary policy is made by the **Federal Open Market Committee**. As we saw in the previous chapter, this committee is composed of all seven Governors and five of the twelve Presidents of the Federal Reserve Banks (on a rotating basis). Now that we have described open market operations, you can see how this committee gets its name. Second, it is important to note that the Treasury securities bought by the Federal Reserve pay interest. **This interest is the source of the funds the Fed uses to pay its bills.** In fact, the Fed is not able to spend all of the interest it earns. The part that it does not spend is given back to the Treasury. Having its own source of funds is extremely important. If the Fed did not have its own source of funds, it would have to go to Congress and ask for an appropriation (as do the other agencies of the federal government). In this situation, Congress would have control. If the Fed did not do as Congress wanted, Congress could

always reduce its funding. But because the Fed has its own source of funds, it does not have to go to Congress. Having its own source of funds is vital to the Fed maintaining its independence from politics. Third, we need to ask what controls the ability of the Federal Reserve to buy (or sell) Treasury securities and therefore to create new money (or decrease the amount of money). The answer is “nothing”. The Federal Reserve answers only to history. *If the Federal Reserve creates too much money, there will be inflation. If it creates too little money, there could be recession. But there is no physical or legal control on the behavior of the Federal Reserve Board.* As long as the Federal Reserve is independent, even Congress and the President of the United States cannot determine its behavior directly.

The action of the Fed in buying Treasury securities in the open market has a major effect on interest rates. We can explain this in two ways. First, the Fed has created \$1,000 (million) and given it to Dealer #1 in exchange for Treasury securities. Dealer #1 deposits it in the bank. The commercial bank must keep 10% and would like to make a new loan equal to the remaining \$900 (million). But to make a new loan, the commercial bank must attract a borrower. How does it do so? The answer is that it lowers the interest rates that it charges. *So, an increase in the money supply causes interest rates to fall and vice versa.* Second, the Federal Reserve is a buyer of Treasury securities. As it increases its buying, the demand for Treasury securities rises. When the demand rises, what happens to the price? The answer is that it rises. So suppose that when you go to sell your Treasury security, the price has risen to \$10,500. You have made a \$500 profit on your purchase (called a “capital gain”). For the person who buys the Treasury security from you, what rate of interest is he or she receiving? At the end of the year, the Treasury will pay the holder of the Treasury security the \$10,000 back that it borrowed plus an additional \$500 of interest (5%). Therefore, the person who bought the Treasury security from you paid \$10,500 for the right to receive \$10,500 next year. That person received an interest rate of zero. While this example is extreme, we can use this example to generalize: *when the price of a security is rising (falling), it is the same as the interest rate on that security falling (rising).* Either way we explain it we come to the same conclusion. *When the Fed buys (sells) Treasury securities in order to increase (decrease) the money supply, the interest rates fall (rise).* This is a very important result.

Test Your Understanding

1. Explain in your own words why a decrease in the money supply would cause interest rates to rise.
2. Explain in your own words why a decrease in the price of a security is the same as an increase in the interest rate on that security.

8. Conclusion

Money, as a medium of exchange, is whatever people will accept in exchange for goods and services. People will accept the IOUs of certain financial institutions in exchange for goods and services. Therefore, those institutions, by creating an IOU on themselves, have the ability to create money. They are constrained, however, in their ability to do so. Financial institutions can only create new IOUs on themselves (i.e.,

money) if they have excess reserves. Whether or not they have these excess reserves is determined by the policies of the Federal Reserve. The Federal Reserve can increase the excess reserves available to the commercial banks by lowering the reserve requirement. The Federal Reserve can increase the excess reserves available to the commercial banks by lowering the discount rate and therefore encouraging the commercial banks to borrow from the Federal Reserve (when the commercial banks do borrow, the Federal Reserve will simply create the new reserves to lend to them). And the Federal Reserve can increase the excess reserves available to the commercial banks by buying Treasury securities in the open market (the Federal Reserve will pay for these Treasury securities by creating new IOUs on itself – that is, by creating new reserves). The Federal Reserve has no physical or legal constraints on its behavior. The opposite behaviors cause the money supply to decrease.

Practice Quiz for Classes 27 and 29

1. **The function of money** that is defined as “money is one way of holding wealth” is the _____ function.
 - a. medium of exchange
 - b. store of value
 - c. unit of account
 - d. barter
2. Which of the following has been **commodity money**?
 - a. gold
 - b. a dime
 - c. a dollar bill
 - d. a CD
 - e. all of the above
3. Which of the following is part of **M-1**?
 - a. gold
 - b. checkable deposits
 - b. CDs
 - d. credit cards
4. Which of the following is the most **liquid**?
 - a. a savings account
 - b. a house
 - c. a CD
 - d. a mortgage loan

5 through 10 Match the definition with the appropriate letter below:

5. A commercial bank borrowing from a central bank
6. A bank for commercial banks
7. An IOU of the United States government payable in one year or less
8. The interest rate charged by a commercial bank to another commercial bank
9. 7 Governors and 5 of the Federal Reserve Bank Presidents
10. The government agency that insures commercial bank deposits

5 through 10:

- | | | |
|---------------------------------------|-----------------------|---------------|
| a. FOMC | f. discounting | k. CD |
| b. FDIC | g. Treasury Bill | l. collateral |
| c. Chair of the Federal Reserve Board | h. Treasury Note | m. insolvent |
| d. Central Bank | i. Federal Funds Rate | n. prime rate |
| e. Reserves | j. Net Worth | |

11. The sum of **currency in circulation and total bank reserves** equals the:
 - a. monetary base
 - b. money supply (M-2)
 - c. total required reserves
 - d. money supply (M-1)

12. A commercial bank creates **money** when it
a. makes a new loan b. accepts a checkable deposit c. buys gold d. holds reserves
13. A commercial bank can make **a new loan** only if it has:
a. required reserves b. Treasury securities c. excess reserves d. gold
14. Suppose the Federal Reserve hands \$10,000 in crisp, new currency to Martha who deposits it in her checking account. Under a required reserve ratio of 1/7, what is the maximum increase in the money supply (currency plus checkable deposits) brought about by the banking system?
a. \$100,000 b. \$70,000 c. \$1,428 d. \$8,572
15. If people choose to **hold less currency and more checkable deposits**, the money supply
a. increases b. decreases c. remains unchanged
16. In order to **increase (ease)** the money supply, the Fed should
a. raise the reserve requirement c. buy Treasury securities in the open market
b. raise the discount rate d. all of the above
17. The interest rate charged by a commercial bank to **the least risky borrower** is the:
a. discount rate b. prime rate c. federal funds rate d. Treasury bill rate
18. The interest rate charged by a commercial bank to another commercial bank is called the:
a. discount rate b. prime rate c. federal funds rate d. Treasury bill rate
19. If the **price of a security** is falling, the **interest rate** on it must be:
a. rising b. falling c. staying the same
20. If the Federal Reserve (Fed) increases the money supply, interest rates will
a. rise b. fall c. be unaffected

Answers: 1. B 2. A 3. B 4. A 5. F 6. D 7. G 8. I 9. A 10. B

11. A 12. A 13. C 14. B 15. A 16. C 17. B 18. C 19. A 20. B