

Objectives for Chapter 21: How Money Is Created

At the end of Chapter 21, you will be able to answer the following:

1. 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?
2. Define "*monetary base*".
3. 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?
4. What happens to the money supply if people hold **more currency and less checkable deposits** (or vice versa)? Why?
5. What happens to the money supply if banks choose to **hold excess reserves**? Why? In what circumstances might banks choose to hold excess reserves?
6. What is meant by "*monetary policy*"?
7. Name three ways by which the Fed can increase (or decrease) the money supply. Why does each have this effect?
8. Define the following:
 - a. open market operations
 - b. discount rate
 - c. Treasury security
 - d. prime rate
 - e. Federal funds rate
 - f. FOMC
9. Explain why an increase (decrease) in the money supply will cause interest rates to fall (rise).

Chapter 21: How Money Is Created (latest revision September 2004)

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.

1. The Role of the Financial Institutions

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 the creation 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** (also called “**high powered money**”). *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:		Liabilities	
Reserves	900	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:		Liabilities	
Required Reserves	90	Checkable Deposits to Sears	900
Excess Reserves	810		

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:		Liabilities	
Reserves	900	Checkable Deposits to Sears	900
Loans	810	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 should begin to look like a **multiplier**. It should because that is exactly what it is. So we have yet another multiplier here --- called 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 will be created by the various banks. So we say that the Money Multiplier is equal to 10.

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

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,

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

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

Test Your Understanding

1. Assume that \$10,000 in new currency is deposited in a checking account in Bank A. Assume the reserve requirement is **20% (0.2)**. Make the change in the Bank A's balance sheet:

<u>Assets</u>		<u>Liabilities</u>	
Reserves	_____	Checkable Deposits	_____
Loans	_____		
The change in total reserves = _____			

The change in **required reserves** = _____

The change in **excess reserves** = _____

The change in **M - 1** = _____

2. Do the same as in question #1, but analyze the situation if a \$8,000 loan is made by the bank to Mary to buy a new car:

<u>Assets</u>	<u>Liabilities</u>
Reserves _____	Checkable Deposits _____
Loans _____	

The change in **total reserves** = _____

The change in **required reserves** = _____

The change in **excess reserves** = _____

The change in **M - 1** = _____

3. Mary buys the car from Joan. Joan deposits Mary's check for \$8,000 in her account in Bank B. Show the changes on the balance sheet for both Bank A and Bank B

Bank A		Bank B	
<u>Assets</u>	<u>Liabilities</u>	<u>Assets</u>	<u>Liabilities</u>
Reserves _____	Checkable Deposits _____	Reserves _____	Checkable Deposits _____
Loans _____		Loans _____	

4. Assuming no currency is held, how much money (M-1) will ultimately be created as a result of the original creation of \$10,000 in new currency? \$ _____
5. If the original \$10,000 were all held as currency, with no use of checking accounts at all, how much money (M-1) would ultimately be created?

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 ½ .

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?
2. If you draw a Supply of Money curve, it looks like any other supply curve: it is upward sloping. This means that as interest rates rise, the supply of money also rises. Explain why this is so. (If you have trouble with this, review the previous two paragraphs.)

2. 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.**

(A) Change 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

- Explain in your own words why an increase in the reserve requirement, say from 10% to 15%, would cause the money supply to decrease.
- 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 _____.

(B) 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 in the previous chapter.

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 \$ _____.

(C) 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's 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 are no physical or legal controls 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.

3. 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 (that is,

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.

Now that we have seen what money is and how money is created, we need to analyze the effects that a change in the money supply has on the economy. That is the topic of the next chapter.

Practice Quiz for Chapter 21

- The sum of **currency in circulation and total bank reserves** equals the:
 - monetary base
 - money supply (M-2)
 - total required reserves
 - money supply (M-1)
- A commercial bank creates **money** when it
 - makes a new loan
 - accepts a checkable deposit
 - buys gold
 - holds reserves
- A commercial bank can make a **new loan** only if it has:
 - required reserves
 - Treasury securities
 - excess reserves
 - gold
- 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?
 - \$100,000
 - \$70,000
 - \$1,428
 - \$8,572
- If people choose to **hold less currency and more checkable deposits**, the money supply
 - increases
 - decreases
 - remains unchanged
- In order to **increase (ease)** the money supply, the Fed should
 - raise the reserve requirement
 - buy Treasury securities in the open market
 - raise the discount rate
 - all of the above
- The interest rate charged by a commercial bank to **the least risky borrower** is the:
 - discount rate
 - prime rate
 - federal funds rate
 - Treasury bill rate
- The interest rate charged by a commercial bank to another commercial bank is called the:
 - discount rate
 - prime rate
 - federal funds rate
 - Treasury bill rate
- If the **price of a security** is falling, the **interest rate** on it must be:
 - rising
 - falling
 - staying the same
- If the Federal Reserve (Fed) increases the money supply, interest rates will
 - rise
 - fall
 - be unaffected

Answers: 1. A 2. A 3. C 4. B 5. A 6. C 7. B 8. C 9. A 10. B