

Money and the Financial System

23



Over all history, money has oppressed people in one of two ways: either it has been abundant and very unreliable, or reliable and very scarce.

John Kenneth Galbraith
The Age of Uncertainty (1977)

The financial system is one of the most important and innovative sectors of a modern economy. It forms the vital circulatory system that channels resources from savers to investors. Whereas finance in an earlier era consisted of banks and the country store, finance today involves a vast worldwide banking system, investment banks, pension funds, and a wide array of derivatives that carve up and resell assets and securities. When the financial system functions smoothly, as has been the norm in the developed world over the last half-century, it contributes to healthy economic growth. However, when people lose confidence in the financial system, as happened in the U.S. financial crisis of 2007–2008, credit becomes scarce, investment is curbed, and economic growth slows.

Overview of the Monetary Transmission Mechanism

One of the most important topics in macroeconomics is the *monetary transmission mechanism*. This refers to the process by which monetary policy undertaken by the central bank, our Federal Reserve (the Fed), interacts with banks and the rest of the economy to determine interest rates, financial conditions, aggregate demand, output, and inflation.

We can provide an overview of the monetary transmission mechanism as a series of five logical steps:

1. The central bank announces a target short-term interest rate that depends upon its objectives and the state of the economy.
2. The central bank undertakes daily open-market operations to meet its interest-rate target.
3. The central bank's new interest-rate target and expectations about future financial conditions help determine the entire spectrum of short- and long-term interest rates, asset prices, and exchange rates.
4. The changes in interest rates, credit conditions, asset prices, and exchange rates affect investment, consumption, and net exports.
5. Changes in investment, consumption, and net exports affect the path of output and inflation through the *AS-AD* mechanism.

We will review the different elements of this mechanism in the three chapters on money, finance, and central banking. Chapter 15 examined the major elements of interest rates and capital. The present chapter focuses on the private financial sector, including the structure of the financial system (Section A), the

demand for money (Section B), banks (Section C), and the stock market (Section D). The next chapter surveys central banking as well as the way in which financial markets interact with the real economy to determine output and inflation. When you have completed these chapters, you should understand the different steps in the monetary transmission mechanism. It is one of the most important parts of all of macroeconomics.

A. THE MODERN FINANCIAL SYSTEM

The Role of the Financial System

The financial sector of an economy is the circulatory system that links together goods and assets, domestic and foreign, present and future. It is through money and finance that households and firms borrow from and lend to each other in order to consume and invest. People may borrow or lend because their cash incomes sometimes do not match their desired spending. For example, students generally have spending needs for tuition and living expenses that exceed their current incomes. They often finance their excess spending with student loans. Similarly, working couples will generally save some of their current incomes for retirement, perhaps by buying stocks or bonds. They are thereby financing their retirement.

The activities involved in finance take place in the **financial system**. This encompasses the markets, firms, and other institutions which carry out the financial decisions of households, businesses, governments, at home and abroad. Important parts of the financial system include the money market (discussed later in this chapter), markets for fixed-interest assets like bonds or mortgages, stock markets for the ownership of firms, and foreign exchange markets which trade the monies of different countries. Most of the financial system in the United States is composed of for-profit entities, but government institutions such as the Federal Reserve System and other regulatory bodies are particularly important for ensuring an efficient and stable financial system.

Borrowing and lending take place in financial markets and through financial intermediaries. **Financial markets** are like other markets except that

their products and services consist of financial instruments like stocks and bonds. Important financial markets are stock markets, bond markets, and foreign exchange markets.

Institutions which provide financial services and products are called **financial intermediaries**. Financial institutions differ from other businesses because their assets are largely financial, rather than real assets like plant and equipment. Many retail financial transactions (such as banking or purchase of insurance) take place through financial intermediaries rather than directly in financial markets.

The most important financial intermediaries are commercial banks, which take deposits of funds from households and other groups and lend these funds to businesses and those who need funds; banks also “create” the special product known as money. Other important financial intermediaries are insurance companies and pension funds, which provide specialized products, insurance policies, and investments held for retirement.

Yet another group of intermediaries pools and subdivides securities. These intermediaries include mutual funds (which hold bonds and corporate stocks on behalf of small investors), government-sponsored mortgage buyers (which buy mortgages from banks and sell them to other financial institutions), and “derivative” firms (which buy assets and then subdivide them into various parts).

Table 23-1 shows the growth and composition of the assets of financial institutions in the United States. There has been substantial growth and innovation in this area, such that the ratio of all assets to GDP grew from 1.3 in 1965 to 4.3 in 2007. This growth took place because of increased *financial intermediation*, which is a process in which assets are bought, repackaged, and resold several times. The purpose of financial intermediation is to transform illiquid assets into liquid assets that small investors can buy. By the end of 2007, financial intermediaries had total assets of \$58 trillion, or around \$550,000 per American household. Clearly, given the investments people have in this sector, a careful study is important not only for good policy but also for wise household financial decision making.

The Functions of the Financial System

Because the financial system is such a critical part of a modern economy, let's consider its major functions:

	1965		2007	
	Total assets (\$, billion)	Percent of total	Total assets (\$, billion)	Percent of total
Federal Reserve	112	11	2,863	5
Commercial banks	342	33	11,195	18
Other credit institutions	198	19	2,575	4
Insurance and pension funds	325	31	16,557	27
Money market and mutual funds	43	4	11,509	19
Government-sponsored mortgage firms	20	2	9,322	15
Asset-backed securities	0	0	4,221	7
Security brokers, dealers, and miscellaneous	10	1	3,095	5
Total	938	100	58,473	100
Percent of GDP	130%		428%	

TABLE 23-1. Assets of Major Financial Institutions in the United States

The financial sector has evolved rapidly over the last four decades. The table shows the total assets of all financial institutions, the grand total of which increased from 130 to 428 percent of GDP. Banks and other credit institutions declined in importance as secondary institutions like mutual funds and government-sponsored mortgage guarantors expanded sharply. Some important new areas, such as asset-backed securities, did not even exist in the 1960s.

Source: Federal Reserve Board, Flow of Funds, available at www.federalreserve.gov/releases/z1/, level tables.

- The financial system *transfers resources* across time, sectors, and regions. This function allows investments to be devoted to their most productive uses rather than being bottled up where they are least needed. We provided the example above of student loans and retirement saving. Another example is found in international finance. Japan, which has a high saving rate, transfers resources to China, which has robust investment opportunities; this transfer occurs through both loans and direct foreign investments in China.
- The financial system *manages risks* for the economy. In one sense, risk management is like resource transfer: it moves risks from those people or sectors that most need to reduce their risks and transfers or spreads the risks to others who are better able to weather them. For example, fire insurance on your house takes a risk that you may lose a \$200,000 investment and spreads that risk among hundreds or thousands of stockholders of the insurance company.
- The financial system *pools and subdivides funds* depending upon the need of the individual saver or investor. As an investor, you might want

to invest \$10,000 in a diversified portfolio of common stocks. To buy efficiently a portfolio of 100 companies might require \$10 million of funds. Here is where a stock mutual fund comes in: by having 1000 investors, it can buy the portfolio, subdivide it, and manage it for you. In return, a well-run mutual fund might charge \$30 per year on your \$10,000 portfolio. Additionally, a modern economy requires large-scale firms which have billions of dollars of invested plant and equipment. No single person is likely to be able to afford that—and if someone could, that person would not want all his or her eggs in one basket. Here is where the modern corporation comes in, with its ability to sell shares of stock to many people and pool these funds to make large and risky investments.

- The financial system performs an important *clearinghouse function*, which facilitates transactions between payers (purchasers) and payees (sellers). For example, when you write a check on your checking account to buy a new computer, a clearinghouse will debit your bank and credit the bank of the company selling the computer. This function allows rapid transfers of funds around the world.

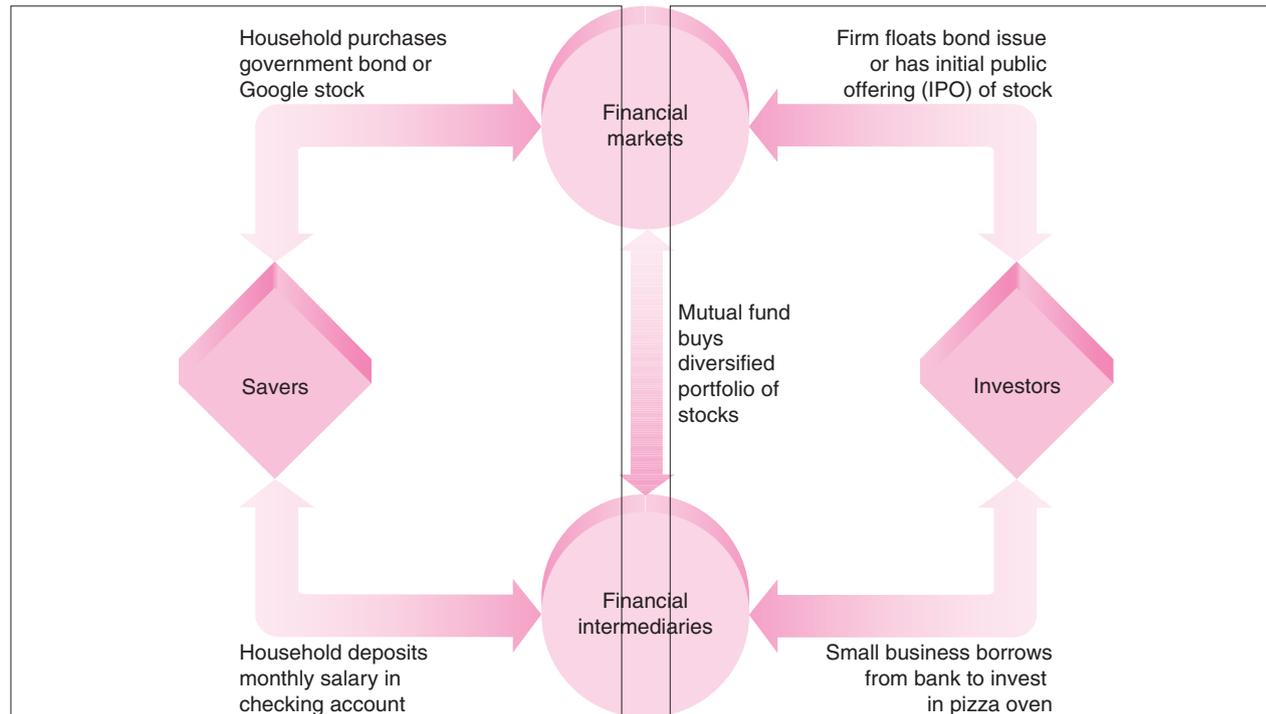


FIGURE 23-1. The Flow of Funds Tracks Financial Flows in the Economy

Savers and investors transfer funds across time, space, and sectors through financial markets and financial intermediaries. Some flows (such as buying 100 shares of XYZ) go directly through financial markets, while others (such as purchasing shares of mutual funds or depositing money in your checking account) go through financial intermediaries.

The Flow of Funds

We can illustrate a simplified account of financial markets through a picture of the **flow of funds**, shown in Figure 23-1. This shows two sets of economic agents—savers and investors—and representative examples of saving and investing through financial markets and financial intermediaries.

This picture is simplified, for there are many different kinds of financial assets or instruments, as we will see in the next section.

A MENU OF FINANCIAL ASSETS

Financial assets are claims by one party against another party. In the United States, they consist primarily of *dollar-denominated assets* (whose payments are fixed in dollar terms) and *equities* (which are

claims on residual flows such as profits or on real assets). Table 23-2 shows the major financial instruments for the United States at the end of 2007. The total value of financial assets was \$142 trillion, or a whopping \$1.4 million per American household. Of course, many of these assets are canceling items, but the high values show how vast the financial system has become.

Here are the major financial instruments or assets:

- *Money* and its two components are very special assets, and they will be defined carefully later in this chapter.
- *Savings accounts* are deposits with banks or credit institutions, usually guaranteed by governments, that have a fixed-dollar principal value and interest rates determined by short-term market interest rates.

Financial instrument	Total (\$, billion)	Percent of total
Money (M_1)		
Currency	774	0.5
Checkable deposits	745	0.5
Savings deposits	7,605	5.4
Money market and mutual funds	10,852	7.6
Credit market instruments		
Government and government-sponsored	12,475	8.8
Private	38,660	27.2
Corporate and noncorporate equity	29,355	20.7
Insurance and pension reserves	13,984	9.9
Miscellaneous credit and other	27,470	19.4
Total, all financial instruments	141,921	100.0

TABLE 23-2. Major Financial Instruments in the United States, 2007

This table shows the wide range of financial assets owned by households, firms, and businesses in the United States. The total value is larger than the amount issued by financial institutions alone because many assets are issued by other entities, such as governments.

Source: Federal Reserve Board, Flow of Funds, available at www.federalreserve.gov/releases/z1/, level tables.

- *Credit market instruments* are dollar-denominated obligations of governments or private entities. Federal securities are generally thought to be risk-free assets. Other credit market instruments, which have varying degrees of risk, are mortgages, corporate securities, and junk bonds.
- *Common stocks* (which are a kind of equity) are ownership rights to companies. They yield dividends, which are payments drawn from company profits. Publicly traded stocks, which are priced on stock markets, are discussed later in this chapter. Noncorporate equities are the values of partnerships, farms, and small businesses.
- *Money market funds* and *mutual funds* are funds that hold millions or billions of dollars in either short-term assets or stocks and can be subdivided into fractional shares to be bought by small investors.
- *Pension funds* represent ownership in the assets that are held by companies or pension plans. Workers and companies contribute to these funds during working years. Companies then draw upon these funds to pay pensions during retirement.
- *Financial derivatives* are included in the credit market instruments. These are new forms of financial instruments whose values are based on

or derived from the values of other assets. One important example is a stock option, whose value depends upon the value of the stock to which it is benchmarked.

Note that this list of financial assets excludes the single most important asset owned by most people—their houses, which are tangible as opposed to financial assets.

▼ **Review of Interest Rates**

Chapter 15 presented a full survey of concepts of rates of return, present value, and interest rates. You should review them carefully. Below are the main points.

The interest rate is the price paid for borrowing money. We usually calculate interest as percent per year on the amount of borrowed funds. There are many interest rates, depending upon the maturity, risk, tax status, and other attributes of the loan.

Some examples will illustrate how interest works:

- When you graduate from college, you have only \$500. You decide to keep it in the form of currency in a jar. If you don't spend any, you will still have \$500 at the end of 1 year because currency has a zero interest rate.

Au: Please check in macro split.

- A little later, you deposit \$2000 in a savings account at your local bank, where the interest rate on savings accounts is 4 percent per year. At the end of 1 year, the bank will have paid \$80 in interest into your account, so the account will now be worth \$2080.
- You start your first job and decide to buy a small house that costs \$100,000. You go to your local bank and find that a 30-year, fixed-rate mortgage has an interest rate of 5 percent per year. Each month you must make a mortgage payment of \$536.83. Note that this payment is a little bit more than the pro-rated monthly interest charge of 0.417 ($= \frac{5}{12}$) percent per month. Why? Because the monthly payment includes not only interest but also *amortization* (the repayment of principal, the amount borrowed). By the time you have made your 360 monthly payments, you will have completely paid off the loan.

B. THE SPECIAL CASE OF MONEY

Let's now turn to the special case of money. If you think about it for a moment, you will realize that money is a strange thing. We study for years so that we can earn a good living, yet each dollar bill is just paper, with minimal intrinsic value. Money is useless until we get rid of it.

However, money is anything but useless from a macroeconomic point of view. Monetary policy is today one of the two important tools (along with fiscal policy) the government has to stabilize the business cycle. The central bank uses its control over money, credit, and interest rates to encourage growth when the economy slows and to slow growth when inflationary pressures rise.

When the financial system is well managed, output grows smoothly and prices are stable. But an unstable financial system, as has been seen in many countries torn apart by war or revolution, can lead to inflation or depression. Many of the world's major macroeconomic traumas of the twentieth century can be traced to mismanaged monetary systems.

We now turn to a careful analysis of the definition of and demand for money.

THE EVOLUTION OF MONEY

The History of Money

What is money? **Money** is anything that serves as a commonly accepted medium of exchange. Because money has a long and fascinating history, we will begin with a description of money's evolution.

Barter. In an early textbook on money, when Stanley Jevons wanted to illustrate the tremendous leap forward that occurred as societies introduced money, he used the following experience:

Some years since, Mademoiselle Zélie, a singer of the Théâtre Lyrique at Paris, . . . gave a concert in the Society Islands. In exchange for an air from Norma and a few other songs, she was to receive a third part of the receipts.

When counted, her share was found to consist of three pigs, twenty-three turkeys, forty-four chickens, five thousand cocoa-nuts, besides considerable quantities of bananas, lemons, and oranges. . . . [I]n Paris . . . this amount of live stock and vegetables might have brought four thousand francs, which would have been good remuneration for five songs. In the Society Islands, however, pieces of money were scarce; and as Mademoiselle could not consume any considerable portion of the receipts herself, it became necessary in the mean time to feed the pigs and poultry with the fruit.

This example describes **barter**, which consists of the exchange of goods for other goods. Exchange through barter contrasts with exchange through money because pigs, turkeys, and lemons are not generally acceptable monies that we or Mademoiselle Zélie can use for buying things. Although barter is better than no trade at all, it operates under grave disadvantages because an elaborate division of labor would be unthinkable without the introduction of the great social invention of money.

As economies develop, people no longer barter one good for another. Instead, they sell goods for money and then use money to buy other goods they wish to have. At first glance this seems to complicate rather than simplify matters, as it replaces one transaction with two. If you have apples and want nuts, would it not be simpler to trade one for the other rather than to sell the apples for money and then use the money to buy nuts?

Actually, the reverse is true: two monetary transactions are simpler than one barter transaction. For example, some people may want to buy apples, and some may want to sell nuts. But it would be a most unusual circumstance to find a person whose desires exactly complement your own—eager to sell nuts and buy apples. To use a classical economics phrase, instead of there being a “double coincidence of wants,” there is likely to be a “want of coincidence.” So, unless a hungry tailor happens to find an undraped farmer who has both food and a desire for a pair of pants, under barter neither can make a direct trade.

Societies that traded extensively simply could not overcome the overwhelming handicaps of barter. The use of a commonly accepted medium of exchange, money, permits the farmer to buy pants from the tailor, who buys shoes from the cobbler, who buys leather from the farmer.

Commodity Money. Money as a medium of exchange first came into human history in the form of commodities. A great variety of items have served as money at one time or another: cattle, olive oil, beer or wine, copper, iron, gold, silver, rings, diamonds, and cigarettes.

Each of the above has advantages and disadvantages. Cattle are not divisible into small change. Beer does not improve with keeping, although wine may. Olive oil provides a nice liquid currency that is as minutely divisible as one wishes, but it is a bit messy to handle. And so forth.

By the eighteenth century, commodity money was almost exclusively limited to metals like silver and gold. These forms of money had *intrinsic value*, meaning that they had use value in themselves. Because money had intrinsic value, there was no need for the government to guarantee its value, and the quantity of money was regulated by the market through the supply and demand for gold or silver. But metallic money has shortcomings because scarce resources are required to dig it out of the ground; moreover, it might become abundant simply because of accidental discoveries of ore deposits.

The advent of monetary control by central banks has led to a much more stable currency system. The intrinsic value of money is now the least important thing about it.

Modern Money. The age of commodity money gave way to the age of *paper money*. The essence of money is now laid bare. Money is wanted not for its own sake but for the things it will buy. We do not wish to consume money directly; rather, we use it by getting rid of it. Even when we choose to keep money, it is valuable only because we can spend it later on.

The use of paper currency has become widespread because it is a convenient medium of exchange. Currency is easily carried and stored. The value of money can be protected from counterfeiting by careful engraving. The fact that private individuals cannot legally create money keeps it scarce. Given this limitation on supply, currency has value. It can buy things. As long as people can pay their bills with currency, as long as it is accepted as a means of payment, it serves the function of money.

Paper money issued by governments was gradually overtaken by *bank money*—the checking accounts that we will discuss shortly.

A few years ago, many people predicted that we would soon move to a cashless society. They foresaw that cash and checking accounts would be replaced by electronic money, such as the stored-value cards found in many stores today. But, in fact, consumers have been reluctant to adopt electronic money in substantial amounts. They trust and prefer government money and checks. To some extent electronic transfers, debit cards, and e-banking have replaced paper checks, but these should be seen as different ways of *using* a checking account rather than as different *kinds* of money.

Components of the Money Supply

Let us now look more carefully at the different kinds of money, focusing on the United States. The main *monetary aggregate* studied in macroeconomics is known as M_1 . This is also called *transactions money*. In earlier times, economists examined other concepts of money, such as M_2 . These concepts included further assets and were often useful for looking at broad trends, but they are little used in monetary policy today. The following are the components of M_1 :

- **Currency.** Currency is defined as coins and paper money held outside the banking system. Most of us know little more about a \$1 or \$5 bill than that each is inscribed with the picture of an American

statesman, bears some official signatures, and has a number showing its face value. Examine a \$10 bill or some other paper bill. You will find that it says “Federal Reserve Note.” But what “backs” our paper currency? Many years ago, paper money was backed by gold or silver. There is no such pretense today. Today, all U.S. coins and paper currency are *fiat money*. This term signifies something declared to be money by the government even if it has no intrinsic value. Paper currency and coins are *legal tender*, which must be accepted for all debts, public and private. Currency is approximately one-half of total M_1 .

- **Checkable deposits.** The other component of M_1 is “bank money.” This consists of funds, deposited in banks and other financial institutions, on which you can write checks and get your money on demand. These funds are technically known as “demand deposits and other checkable deposits.” If I have \$1000 in my checking account at the

Albuquerque National Bank, that deposit can be regarded as money. Why? For the simple reason that I can pay for purchases with checks drawn on it. The deposit is a medium of exchange, and it is therefore counted as money.

Students often wonder if credit cards are money. Actually, they are not. The reason is that a credit card is actually an easy (but not cheap!) way to *borrow* money. When paying with a credit card, you are promising to pay the credit-card company—with money—at a later date.

Figure 23-2 shows the trend in the ratio of M_1 to GDP. This ratio has declined by a factor of 3 over the last half-century. At the same time, all other financial assets have grown sharply.

Money is anything that serves as a commonly accepted medium of exchange. Today, we define transactions money as M_1 , which is the sum of currency held by the public and checkable deposits.

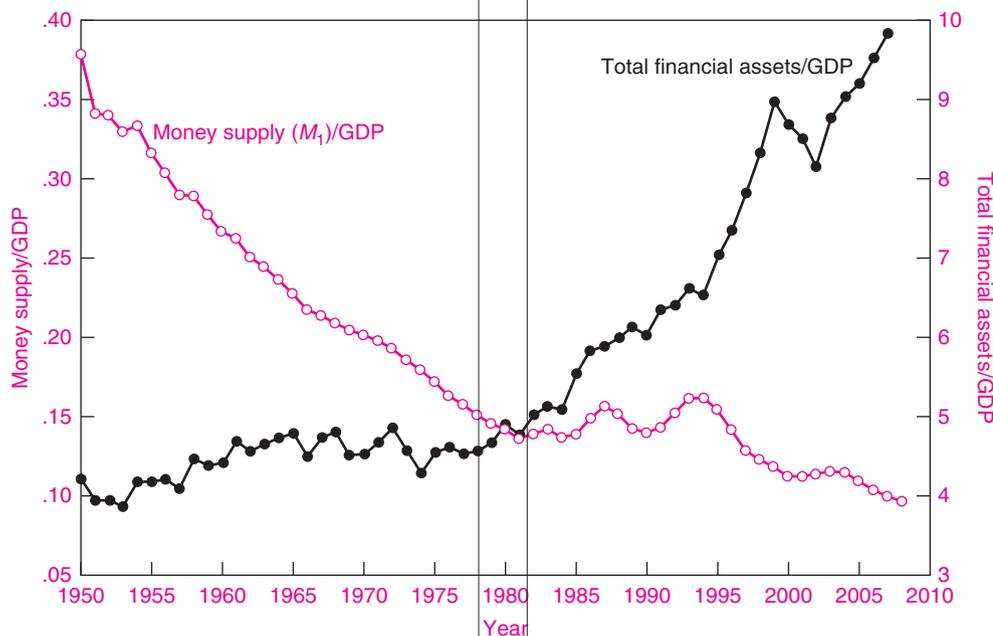


FIGURE 23-2. Money Holdings and Total Financial Assets per Unit of GDP

Total financial assets have risen sharply relative to GDP, while the money-supply–GDP ratio has gradually declined. Note the vast difference in scale. Total financial assets are defined similarly here as in Table 23-1.

Source: Financial data from the Federal Reserve Board; GDP from the Bureau of Economic Analysis.

THE DEMAND FOR MONEY

The demand for money is different from the demand for ice cream or movies. Money is not desired for its own sake; you cannot eat nickels, and we seldom hang \$100 bills on the wall for the artistic quality of their engraving. Rather, we demand money because it serves us indirectly, as a lubricant to trade and exchange.

Money's Functions

Before we analyze the demand for money, let's note money's functions:

- The central function emphasized here is that money serves as a *medium of exchange*. Without money, we would be constantly roving around looking for someone to barter with. Money's value is often shown when the monetary system malfunctions. After Russia abandoned its central-planning system in the early 1990s, for example, people spent hours waiting in line for goods and tried to get dollars or other foreign currencies because the ruble had ceased to function as an acceptable means of exchange.
- Money is also used as the *unit of account*, the unit by which we measure the value of things. Just as we measure weight in kilograms, we measure value in money. The use of a common unit of account simplifies economic life enormously.
- Money is sometimes used as a *store of value*. In comparison with risky assets like stocks or real estate or gold, money is relatively riskless. In earlier days, people held currency as a safe form of wealth. Today, when people seek a safe haven for their wealth, the vast preponderance of their wealth is held in nonmonetary assets, such as savings accounts, stocks, bonds, and real estate.

The Costs of Holding Money

What is the *cost* of holding money? Money is costly because it has a lower yield than do other safe assets. Currency has a nominal interest rate of exactly zero percent per year. Checking deposits sometimes have a small interest rate, but that rate is usually well below the rate on savings accounts or money market mutual funds. For example, over the period 2000–2007, currency had a yield of 0 percent per

year, checking accounts had an average yield of around 0.2 percent per year, and short-term money funds had a yield of around 4.6 percent per year. If the weighted yield on money (currency and checking accounts) was 0.1 percent per year, then the *cost of holding money* was $4.5 = 4.6 - 0.1$ percent per year. Figure 23-3 shows the interest rate on money as compared to that on safe short-term assets.

The cost of holding money is the interest forgone from not holding other assets. That cost is usually very close to the short-term interest rate.

Two Sources of Money Demand

Transactions Demand for Money. People need money primarily because their incomes and expenditures do not come at the same time. For example, I might be paid on the last day of the month, but I buy food, newspapers, gasoline, and clothing throughout the month. The need to have money to pay for purchases, or transactions, of goods, services, and other items constitutes the *transactions demand for money*.

For example, suppose that a family that earns \$3000 per month, keeps it in money, and spends it evenly during the month. Calculation will show that the family holds \$1500 on average in money balances.

This example can help us see how the demand for money responds to different economic influences. If all prices and incomes double, the nominal demand for M doubles. Thus the transactions demand for money doubles if nominal GDP doubles with no change in real GDP or other real variables.

How does the demand for money vary with interest rates? As interest rates rise, the family might say, "Let's put only half of our money in the checking account at the beginning of the month and put the other half in a savings account earning 8 percent per annum. Then on day 15, we'll take that \$1500 out of the savings account and put it in our checking account to pay the next 2 weeks' bills."

This means that as interest rates rose and the family decided to put half its earnings in a savings account, the average money balance of our family fell from \$1500 to \$750. This shows how money holdings (or the demand for money) may be sensitive to interest rates: other things equal, as interest rates rise, the quantity of money demanded declines.

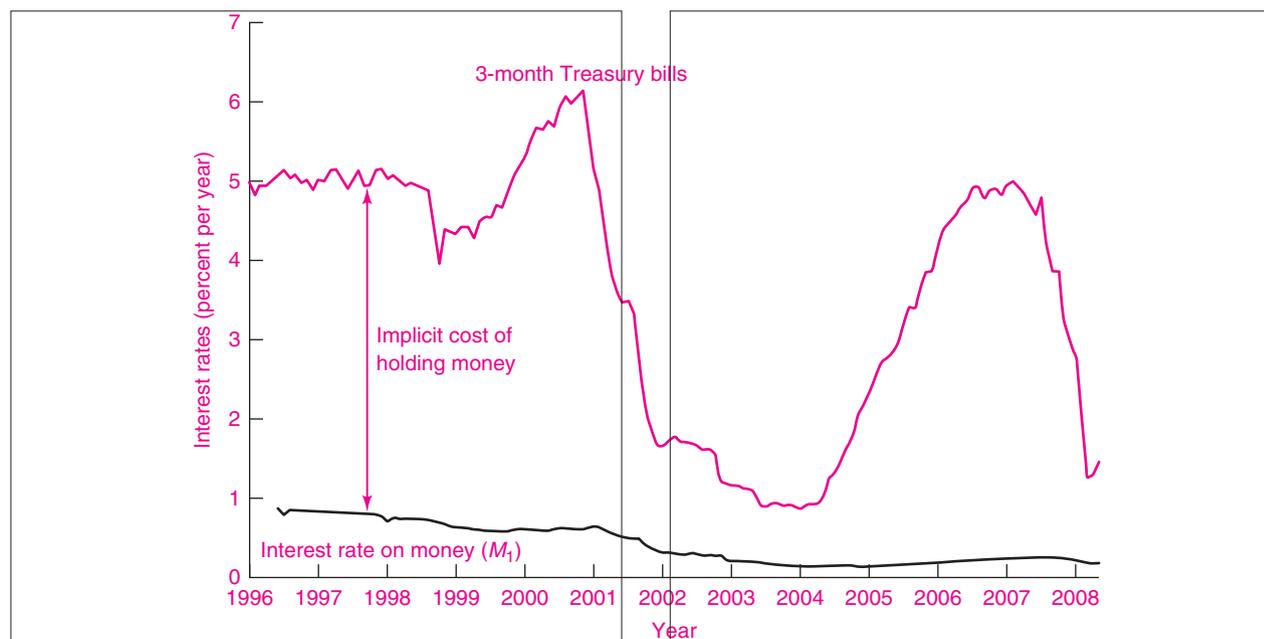


FIGURE 23-3. Interest Rates on Money and Safe Short-Term Assets

This figure shows the interest rate on money (which is the average of zero on currency and the rate on checking accounts) as compared to the interest rate on short-term Treasury securities. The difference between these two interest rates is the implicit price of holding money.

Source: Treasury interest rate from Federal Reserve; interest rate on checking accounts from Informa Research Services, Inc.

Asset Demand. In addition to its use for transaction needs, money is sometimes used as a store of value. You might wonder if money itself would ever be used as a store of value. The answer today is, not often. In a modern economy in normal times, people prefer to keep their nontransaction assets in safe interest-bearing assets such as savings accounts or money funds. Suppose you need \$2000 a month in your checking account for your transactions, and you have another \$50,000 in savings. Surely, you would be better off putting the \$50,000 in a money market fund earning 4.6 percent per year than in a checking account earning 0.2 percent per year. After a decade, the latter would be worth only \$51,009 while the former would be worth \$78,394. (Make sure you can reproduce these numbers.)

There are some important exceptions, however, where money itself might be used as a store of value. Money might be an attractive asset in primitive financial systems where there are no other reliable assets.

U.S. currency is widely held abroad as a safe asset in countries where hyperinflation occurs, or where a currency might be devalued, or where the financial system is unreliable. Additionally, in advanced countries, people might hold money when interest rates are near zero. This occurred in Japan over the last two decades when Japan fell into a “liquidity trap.” This situation is one that, as we will see, terrifies central bankers. This also occurred in the United States briefly during the credit crisis in 2008.

The main reason people hold money (M_1) is the transactions demand. This means that money is an acceptable medium of exchange that can be used to buy goods and pay our bills. As our incomes rise, the dollar value of the goods we buy tends to go up as well, and we therefore need more money for transactions, raising our demand for money. In a modern financial system, there is generally little or no asset demand for M_1 .

C. BANKS AND THE SUPPLY OF MONEY

Now that we have described the basic structure of the financial system, we turn to commercial banks and the supply of money. If you look back at the description of the monetary transmission mechanism at the beginning of this chapter, you will see that the activities of banks are the third critical step. While money constitutes a relatively small fraction of all financial assets, the interaction between the central bank and commercial banks turns out to play a central role in the setting of interest rates, ultimately influencing macroeconomic behavior.

Banks are fundamentally businesses organized to earn profits for their owners. A commercial bank provides certain services for its customers and in return receives payments from them.

Table 23-3 shows the consolidated balance sheet of all U.S. commercial banks. A *balance sheet* is a statement of a firm's financial position at a point in time. It lists *assets* (items that the firm owns) and *liabilities* (items that the firm owes). Each entry in a balance sheet is valued at its actual market value or its historical cost.¹ The difference between the total value of assets and total liabilities is called *net worth*.

¹ Balance sheets, assets, and liabilities are extensively discussed in Chapter 7 in the full textbook.

Except for the details, a bank balance sheet looks much like a balance sheet for any other business. The unique feature of a bank balance sheet is an asset called **reserves**. This is a technical term used in banking to refer to a special category of bank assets that are regulated by the central bank. Reserves equal currency held by the bank ("vault cash") plus deposits with Federal Reserve Banks. In earlier days, reserves were held to pay depositors, but today they serve primarily to meet legal reserve requirements. We will discuss reserves in detail in the next chapter.

How Banks Developed from Goldsmith Establishments

Commercial banking began in England with the goldsmiths, who developed the practice of storing people's gold and valuables for safekeeping. At first, such establishments simply functioned as secure warehouses. Depositors left their gold for safekeeping and were given a receipt. Later they presented their receipt, paid a fee, and got back their gold.

What would the balance sheet of a typical goldsmith establishment look like? Perhaps like Table 23-4. A total of \$1 million has been deposited in its vaults, and this whole sum is held as a cash asset (this is the item "Reserves" in the balance sheet). To balance this asset, there is a demand deposit of the same amount. Reserves are therefore 100 percent of deposits.

In today's language, the goldsmiths' demand deposits would be part of the money supply; they would be "bank money." However, the bank money

Balance Sheet of All Commercial Banking Institutions, 2008 (billions of dollars)

Assets		Liabilities	
Reserves	43	Checking deposits	629
Loans	6,250	Savings and time deposits	5,634
Investments and securities	2,265	Other liabilities	2,643
Other assets	1,082	Net worth (capital)	1,056
Total	9,961	Total	9,961

TABLE 23-3. Balance Sheet of All U.S. Commercial Banks

Commercial banks are diversified financial institutions and are the major providers of checking deposits, a major component of M_1 . Checking accounts are payable on demand and thus can be used as a medium of exchange. Reserves are held primarily to meet legal requirements, rather than to provide against possible unexpected withdrawals.

Source: Federal Reserve Board, available at www.federalreserve.gov/releases/.

Goldsmith Balance Sheet with 100% Reserves			
Assets		Liabilities	
Reserves	1,000,000	Demand deposits	1,000,000
Total	1,000,000	Total	1,000,000

TABLE 23-4. First Goldsmith Bank Held 100 Percent Cash Reserves against Demand Deposits

In a primitive banking system, with 100 percent backing of deposits, no creation of money out of reserves is possible.

just offsets the amount of ordinary money (gold or currency) placed in the bank’s vaults and withdrawn from active circulation. No money creation has taken place. The process is of no more interest than if the public decided to convert nickels into dimes. A 100 percent-reserve banking system has a neutral effect on money and the macroeconomy because it has no effect on the money supply.

We can go a step further and ask what would happen if there were paper money issued under a gold standard with 100 percent backing by gold. In this case, you can create a new Table 23-4 by writing “gold notes” instead of “demand deposits.” The gold notes would be currency and part of M_1 . Again, the money supply would be unchanged because the currency has 100 percent backing.

Fractional-Reserve Banking

Let’s take another step toward today’s banking system by introducing *fractional-reserve banking*. Banks soon learned that they did not need to keep 100 percent of their gold or silver as reserves against their notes and deposits. People did not all come to redeem their notes at the same time. A bank might be safe if it kept only fractional reserves to back its notes and deposits. This was a tiny first step on the road to today’s vast financial system.

We explore the implications of fractional-reserve banking starting with a situation where a system of banks operates with a customary or legal requirement that it keep reserves equal to at least 10 percent of deposits. Suppose that the president of Goldsmith Bank wakes up and says, “We do not need to keep all this sterile gold as reserves. In fact, we can lend out 90 percent of it and still have sufficient gold to meet the demands of depositors.”

Goldsmith Balance Sheet with Fractional Reserves			
Assets		Liabilities	
Reserves	100,000	Demand deposits	
Investments	900,000	and gold notes	1,000,000
Total	1,000,000	Total	1,000,000

TABLE 23-5. Goldsmith Bank Keeps 10 Percent Reserves against Deposits and Gold Notes

Later, Goldsmith Bank learns that it does not need to keep 100 percent reserves. Here, it has decided to invest 90 percent and keep only 10 percent in reserves against deposits and notes.

So Goldsmith Bank lends out \$900,000 and keeps the remaining \$100,000 as gold reserves. The initial result is shown in Table 23-5. The bank has invested \$900,000—perhaps lending money to Duck.com, which is building a factory.

But that is not the end of the process. Duck.com will take the \$900,000 loan and deposit it in its own checking account to pay the bills for the factory. Suppose, for simplicity, that the firm has a checking account in Goldsmith Bank. The interesting result here, shown in Table 23-6, is that Goldsmith Bank has recovered the \$900,000 of reserves. In essence, Duck.com took the loan of gold and then lent it back to the bank. (The process would be exactly the same if Duck.com went to another bank: that bank would have an excess reserve of \$900,000.)

Goldsmith Balance Sheet after Deposit of Loan by Duck.com			
Assets		Liabilities	
Reserves	1,000,000	Demand deposits	
Investments	900,000	and gold notes	1,900,000
Total	1,900,000	Total	1,900,000

TABLE 23-6. After the Firm Deposits Its Loan, the Banking System Has Excess Reserves to Lend Out Again

The Duck firm deposits its \$900,000 loan into its account. This increases Goldsmith Bank’s reserves of gold back to \$1,000,000. Soon the excess will be lent out again.

But now the bank needs to keep only 10 percent \times \$1.9 million = \$190,000 for reserves, so it can lend out the excess \$810,000. Soon the \$810,000 will show up in a bank deposit. This process of deposit, relending, and redeposit continues in a chain of dwindling expansions.

Final System Equilibrium

Now let's sum up the total of all deposits. We started with \$1,000,000 in deposits, then added \$900,000, then \$810,000 and so on. The total is given by the sum:

$$\begin{aligned} \text{Total deposits} &= 1,000,000 + 1,000,000 \times 0.9 \\ &\quad + 1,000,000 \times 0.9^2 + \dots \\ &= 1,000,000[1 + 0.9 + 0.9^2 + \dots \\ &\quad + (0.9)^n + \dots] \\ &= 1,000,000 \left(\frac{1}{1 - 0.9} \right) \\ &= 1,000,000 \left(\frac{1}{0.1} \right) = 10,000,000 \end{aligned}$$

At the end of the process, the total amount of deposits and money is \$10 million, which is 10 times the total amount of reserves. Assuming that Goldsmith is the only bank, or that we are looking at the consolidated banking system, we can show the final balance sheet in Table 23-7. The point here is that once banks require only fractional reserves, the total money is a multiple of the reserves.

This can be seen intuitively. The cumulative process just described must come to an end when every bank in the system has reserves equal to 10 percent of deposits. In other words, the final equilibrium

Consolidated Balance Sheet of All Banks in Equilibrium

Assets		Liabilities	
Reserves	1,000,000	Demand deposits	
Investments	9,000,000	and gold notes	10,000,000
Total	<u>10,000,000</u>	Total	<u>10,000,000</u>

TABLE 23-7. Final Equilibrium Balance Sheet When Banking System Has No Excess Reserves

We aggregate the banking system together assuming that there are \$1,000,000 of total reserves. When banks have lent out all excess reserves, so reserves are just 10 percent of deposits and notes, total money is $1/0.1 = 10$ times reserves.

of the banking system will be the point at which 10 percent of deposits (D) equals total reserves. What level of D satisfies this condition? The answer is $D = \$10$ million.

When banks hold fractional reserves against their deposits, they actually create money. The total bank money is generally equal to total reserves multiplied by the inverse of the reserve ratio:

$$\text{Bank money} = \text{total reserves} \times \left(\frac{1}{\text{reserve ratio}} \right)$$

A Modern Banking System

It is time to put our fable of goldsmiths behind us. How does all this relate to the actual banking system today? The surprising answer is that with some additional details, the process we just described fits today's banking system exactly. Here are the key elements of the modern banking system:

- Banks are required to hold at least 10 percent of their checkable deposits as reserves, in the form of either currency or deposits with the Federal Reserve (more on this in the next chapter).
- The Federal Reserve buys and sells reserves at a target interest rate set by the Fed (again, more on this in the next chapter).
- The checkable-deposit component of M_1 is therefore determined by the amount of reserves along with the required reserve ratio.

A few qualifications need to be mentioned before closing this section. First, commercial banks do much more than simply provide checking accounts, as we saw in Table 23-3. This fact may complicate the regulatory authorities, but it does not change the basic operation of monetary policy.

A second complication involves a challenge that arises as nominal interest rates approach zero. Central banks generally pay either zero or some other submarket interest rate on reserves. Banks therefore tend to minimize their reserves, keeping them only at the required level. If banks earn 4 percent in the market but only 0 percent on reserves, keeping reserves to the minimum would clearly maximize their profits.

However, as nominal interest rates fall to zero, banks no longer have any reason to minimize their reserves. This situation occurred in the Great Depression, when interest rates fell to 0.1 percent per year.

During this period, banks often held significant excess reserves. Over the last decade, a similar situation occurred in Japan. Short-term interest rates were essentially zero, and banks had significant quantities of excess reserves. In such a pathological situation, known as a “liquidity trap,” central banks have major difficulties in affecting financial markets.

D. THE STOCK MARKET

We close this chapter with a tour through one of the most exciting parts of a capitalist system: the stock market. A **stock market** is a place where shares in publicly owned companies—the titles to business firms—are bought and sold. In 2008, the value of corporate equities in the United States was estimated at \$21 trillion. The stock market is the hub of our corporate economy.

The New York Stock Exchange is America’s main stock market, listing more than a thousand securities. Another important market is the NASDAQ, which had a meteoric rise and subsequent collapse in stock prices after 2000. Every large financial center has a stock exchange. Major ones are located in Tokyo, London, Frankfurt, Shanghai, and, of course, New York.

Risk and Return on Different Assets

Before discussing major issues in stock market analysis, we need to introduce some basic concepts in financial economics. We noted earlier in this chapter that different assets have different characteristics. Two important characteristics are the rate of return and the risk.

The *rate of return* is the total dollar gain from a security (measured as a percent of the price at the beginning of the period). For savings accounts and short-term bonds, the return would simply be the interest rate. For most other assets, the return combines an income item (such as dividends) with a *capital gain or loss*, which represents the increase or decrease in the value of the asset between two periods.

We can illustrate the rate of return using data on stocks. (For this example, we ignore taxes and commissions.) Say that you bought a representative portfolio of \$10,000 worth of stocks in U.S. companies

at the end of 1996. Over the next 3 years, your fund would have had a total real return (including dividends plus capital gains and correcting for inflation) of 32 percent per year.

However, before you get too excited about these fantastic gains, be forewarned that the stock market also goes down. In the 3 years after 1999, real stock prices declined by 19 percent per year. An even worse experience came in 2008, when stock prices declined 40 percent.

The fact that some assets have predictable rates of return while others are quite risky leads to the next important characteristic of investments. **Risk** refers to the variability of the returns on an investment. If I buy a 1-year Treasury bond with a 6 percent return, the bond is a riskless investment because I am sure to get my expected dollar return. On the other hand, if I buy \$10,000 worth of stocks, I am uncertain about their year-end value.

Economists often measure risk as the standard deviation of returns; this is a measure of dispersion whose range encompasses about two-thirds of the variation.² For example, from 1908 to 2008, common stocks had an average annual real return of 6 percent per year with an annual standard deviation of return of 16 percent. This implies that the real return was between 22(= 6 + 16) percent and -10(= 6 - 16) percent about two-thirds of the time.

Individuals generally prefer higher return, but they also prefer lower risk because they are *risk-averse*. This means that they must be rewarded by higher returns to induce them to hold investments with higher risks. We would not be surprised, therefore, to learn that over the long run safe investments like bonds have lower average returns than risky investments like stocks.

Table 23-00 on page 000 showed the historical returns or interest rates on a number of important investments. We show the most important assets in the *risk-return diagram* in Figure 23-4. This diagram shows the average real (or inflation-corrected) return on the vertical axis and the historical risk (measured

² The standard deviation is a measure of variability that can be found in any elementary statistics text. It is roughly equal to the average deviation of a series from its mean. The precise definition of standard deviation is the square root of the squared deviations of a variable from its mean. As an example, if a variable takes the values of 1, 3, 1, 3, the mean or expected value is 2 while the standard deviation is 1.

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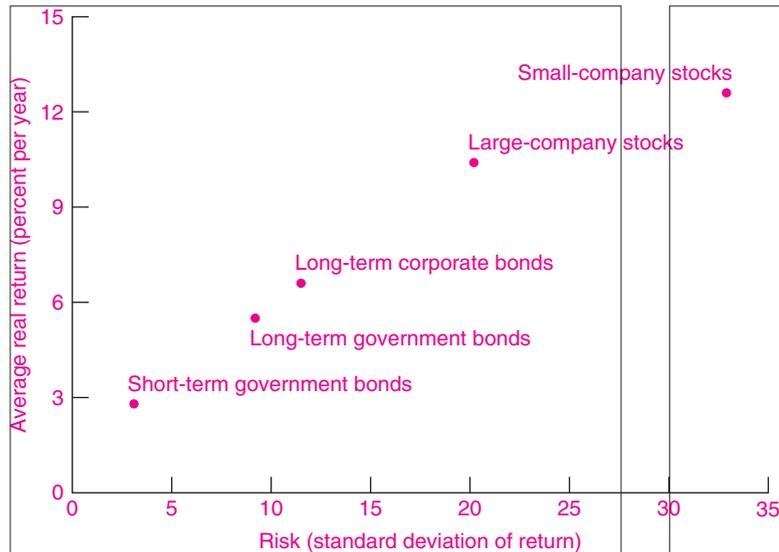


FIGURE 23-4. Risk and Return on Major Investments, 1926–2005

Investments vary in their average returns and riskiness. Bonds tend to be safe, while stocks have much higher returns but face higher risks. This diagram shows the *historical* risk and return on different financial assets. Depending upon market sentiments, the *expected* risk and return may differ markedly from the historical experience.

Source: Ibbotson Associates, 2006.

as a standard deviation) on the horizontal axis. Note the positive relationship between risk and return.

Bubbles and Crashes

The history of finance is one of the most exciting parts of economics. Sometimes, sound judgments get put aside as markets engage in frenzies of speculation, often followed by moods of pessimism and falling prices.

Investors are sometimes divided into those who invest on firm foundations and those who try to out-guess the market psychology. The firm-foundation approach holds that assets should be valued on the basis of their intrinsic value. For common stocks, the intrinsic value is the expected present value of the dividends. If a stock has a constant dividend of \$2 per year and the appropriate interest rate with which to discount dividends is 5 percent per year, the intrinsic value would be $\$2 / .05 = \40 per share. The firm-foundation approach is the slow but safe way of getting rich.

Impatient souls might share the view of Keynes, who argued that investors are more likely to worry about market psychology and to speculate on the future value of assets rather than wait patiently for stocks to prove their intrinsic value. He argued, “It is not sensible to pay 23 for an investment which is worth 30, if you also believe that the market will value it at 20 three months hence.” The market psychologist

tries to guess what the average investor thinks, which requires considering what the average investor thinks about the average investor, and so on, ad infinitum.

When a psychological frenzy seizes the market, it can result in speculative bubbles and crashes. A *speculative bubble* occurs when prices rise because people think they are going to rise in the future—it is the reverse of Keynes’s just-cited dictum. A piece of land may be worth only \$1000, but if you see a land-price boom driving prices up 50 percent each year, you might buy it for \$2000 hoping you can sell it to someone else next year for \$3000.

A speculative bubble fulfills its own promises for a while. If people buy because they think stocks will rise, their act of buying sends up the price of stocks. This causes other people to buy even more and sends the dizzy dance off on another round. But, unlike people who play cards or dice, no one apparently loses what the winners gain. Of course, the prizes are all on paper and would disappear if everyone tried to cash them in. But why should anyone want to sell such lucrative securities? Prices rise because of hopes and dreams, not because the profits and dividends of companies are soaring.

History is marked by bubbles in which speculative prices were driven up far beyond the intrinsic value of the asset. In seventeenth-century Holland, a tulip mania drove tulip prices to levels higher than the price of a house. In the eighteenth century, the stock

of the South Sea Company rose to fantastic levels on empty promises that the firm would enrich its stockholders. In more recent times, similar bubbles have been found in biotechnology, Japanese land, “emerging markets,” and a vacuum-cleaning company called ZZZZ Best, whose business was laundering money for the Mafia.

The most famous bubble of them all occurred in the American stock market in the 1920s. The “roaring twenties” saw a fabulous stock market boom, when everyone bought and sold stocks. Most purchases in this wild bull market were on margin. This means that a buyer of \$10,000 worth of stocks put up only part of the price in cash and borrowed the difference, pledging the newly bought stocks as collateral for the purchase. What did it matter that you had to pay the broker 6, 10, or 15 percent per year on the borrowing when Auburn Motors or Bethlehem Steel might jump 10 percent in value overnight?

Speculative bubbles always produce crashes and sometimes lead to economic panics. The speculation of the 1920s was soon followed by the 1929 panic and crash. This event ushered in the long and painful Great Depression of the 1930s. By the trough of the Depression in 1933, the market had declined 85 percent.

Trends in the stock market are tracked using *stock-price indexes*, which are weighted averages of the prices of a basket of company stocks. Commonly followed averages include the Dow-Jones Industrial Average (DJIA) of 30 large companies; Standard and Poor’s index of 500 companies (the “S&P 500”), which is a weighted average of the stock prices of 500 large American corporations; and the NASDAQ Composite Index, which includes more than 3000 stocks listed on that market.

Figure 23-5 shows the history of the Standard and Poor’s 500 price index over the last century. The

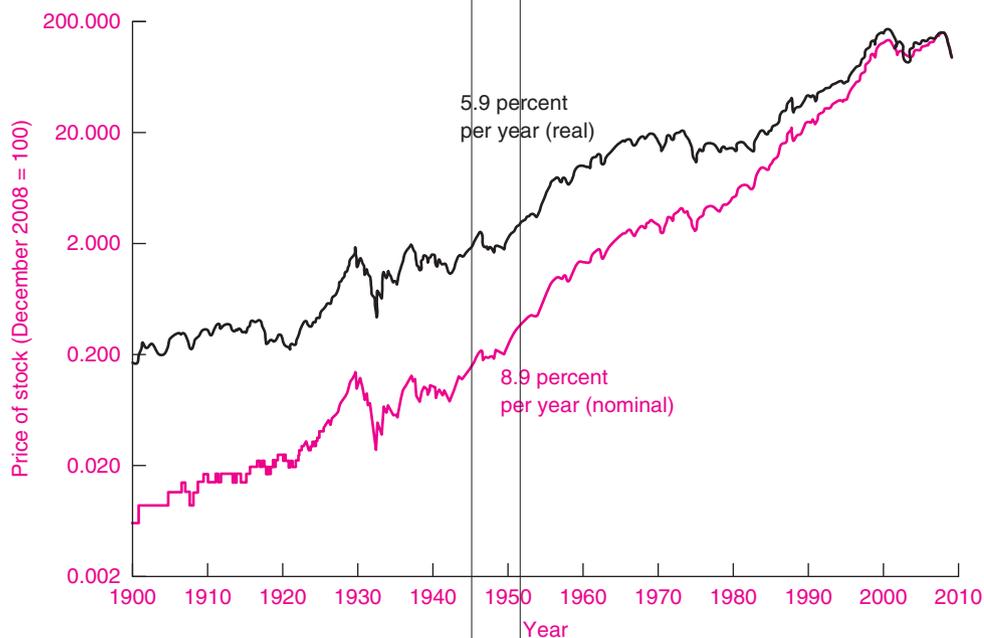


FIGURE 23-5. The Only Guarantee about Stock Prices Is That They Will Fluctuate

The Standard and Poor’s index (the S&P 500) tracks the value-weighted average of the stock prices of 500 large American companies. It is shown here including reinvested dividends. Stock prices in nominal terms are shown by the bottom line; these averaged a growth of 9.7 percent per year from 1900 to 2008. The top line shows the “real” S&P 500, which is the S&P 500 corrected for movements in the consumer price index. It rose 6.4 percent per year on average.

Source: Standard and Poor, Bureau of Labor Statistics.

lower curve shows the nominal stock-price average, which records the actual average during a particular month. The upper line shows the real price of stocks; this equals the nominal price divided by an index of consumer prices. Both curves are indexed to equal 100 in December 2008. The average growth rate of stocks over the period was 8.9 percent per year in dollar terms but only 5.9 percent per year after correcting for inflation.

Stocks have proved to be a good investment over the long term. But what about over the next few years? Is there a crystal ball that can foretell the movement of stock prices? This is the subject of modern finance theory.

Efficient Markets and the Random Walk

Economists and finance professors have long studied prices in speculative markets such as the stock market or the foreign exchange market. One important hypothesis is that speculative markets tend to be “efficient.” This finding has stirred great controversy in the economics profession and with financial analysts.

What is the essence of the **efficient-market theory**? A summary statement is the following:

Securities markets are extremely efficient in absorbing information about individual stocks and about the stock market as a whole. When new information arrives, the news is quickly incorporated into stock prices. Systems which attempt to forecast prices on the basis of the past or of fundamentals cannot produce higher returns greater than those that could be obtained by holding a randomly selected portfolio of individual stocks of comparable risk.⁴

A colorful story illustrates the basic message. A finance professor and a student are walking across the campus when they see what looks like a \$100 bill lying on the ground. The professor tells the student, “Don’t bother to pick it up. If it were really a \$100 bill, it wouldn’t be there.” In other words, you can’t get rich simply by bending down on a public thoroughfare!

This paradoxical view has been generally confirmed in hundreds of studies over the last

⁴ This definition is adopted from Malkiel’s 2003 article; see Further Readings. Note that “efficiency” is used differently in finance theory than in other parts of economics. Here, “efficiency” means that information is quickly absorbed, not that resources produce the maximal outputs.

half-century. Their lesson is not that you will never become rich by following a rule or formula but that, on average, such rules do not outperform a diversified portfolio of stocks.

Rationale for the Efficient-Market View. Finance theorists have spent many years analyzing stock and bond markets in order to understand why well-functioning financial markets rule out persistent excess profits. The theory of efficient markets explains this.

An **efficient financial market** is one where all new information is quickly understood by market participants and becomes immediately incorporated into market prices. For example, say that Lazy-T Oil Company has just struck oil in the Gulf of Alaska. This event is announced at 11:30 A.M. on Tuesday. When will the price of Lazy-T’s shares rise? The efficient-market theory holds that market participants will react at once, bidding the price of Lazy-T up by the correct amount. In short, at every point in time, markets have already digested and included in stock prices or corn prices or other speculative prices all the latest available information.

The theory of efficient markets holds that market prices contain all available information. It is not possible to make profits by acting on old information or at patterns of past price changes. Returns on stocks will be primarily determined by their riskiness relative to the market.

A Random Walk. The efficient-market view provides an important way of analyzing price movements in organized markets. Under this approach, the price movements of stocks should look highly erratic, like a random walk, when charted over a period of time.

A price follows a **random walk** when its movements over time are completely unpredictable. For example, toss a coin for heads or tails. Call a head “plus 1” and a tail “minus 1.” Then keep track of the running score of 100 coin tosses. Draw it on graph paper. This curve is a random walk. Now, for comparison, also graph 100 days’ movement of Microsoft stock and of Standard and Poor’s 500 index. Note how similar all three figures appear.

Why do speculative prices resemble a random walk? Economists, on reflection, have arrived at the following truths: **In an efficient market all predictable things have already been built into the price. It**

is the arrival of *new* information that affects stock or commodity prices. Moreover, the news must be random and unpredictable (or else it would be predictable and therefore not truly news).

To summarize:

The efficient-market theory explains why movements in stock prices look so erratic. Prices respond to news, to surprises. But surprises are unpredictable events—like the flip of a coin or next month’s rainstorm—that may move in any direction. Because stock prices move in response to erratic events, stock prices themselves move erratically, like a random walk.

Qualifications to the Efficient-Market View. Although the efficient-market view has been the canon of finance in economics and business, many believe that it is oversimplified and misleading. Here are some of the reservations:

1. Researchers have uncovered many “anomalies” in stock-price movements that lead to some predictability. For example, stocks with high dividends or earnings relative to prices appear to perform better in subsequent periods. Similarly, sharp upward or downward movements tend to be followed by “reversals” in movements. To some, these anomalies are persuasive indicators of market inefficiencies; to others, they simply reflect the tendency of analysts to mine the data looking for patterns that are in fact spurious correlations.
2. Economists who look at the historical record ask whether it is plausible that sharp movements in stock prices could actually reflect new information. Consider the 30 percent drop in stock prices that occurred from October 15 to October 19, 1987. Efficient-market theories imply that this drop was caused by economic events that depressed the expected present value of future corporate earnings. Critics of the efficient-market view argue that there was no news that could make a 30 percent difference in the value of stock prices over those 4 days. Efficient-market theorists fall silent before this criticism.
3. Finally, the efficient-market view applies to individual stocks but not necessarily to the market as a whole. There is persuasive evidence of long, self-reversing swings in stock market prices.

These swings tend to reflect changes in the general mood of the financial community. We saw periods of an exhilarated mood in the 1920s and 1990s, while the 1930s, 1970s, and 2008 showed a nervous mood in which the price of risk shot up sharply. However, say that we believed that the market reflected an “irrational exuberance” and was overvalued. What could we do? We could not individually buy or sell enough stocks to overcome the entire national mood. In addition, we might get wiped out if we bet against the market a year or two before the peak. So, from a macroeconomic perspective, speculative markets can exhibit waves of pessimism and optimism without powerful economic forces moving in to correct these mood swings.

PERSONAL FINANCIAL STRATEGIES

While taking a course in economics is no guarantee of great wealth, the principles of modern finance can definitely help you invest your nest egg wisely and avoid the worst financial blunders. What lessons does economics teach about personal investment decisions? We have culled the following five rules from the wisdom of the best brains on the street:

Lesson 1: Know thy investments. The absolute bedrock of a sound investment strategy is to be realistic and prudent in your investment decisions. For important investments, study the materials and get expert advice. Be skeptical of approaches that claim to have found the quick route to success. You can’t get rich by listening to your barber or consulting the stars (although, unbelievably, some financial advisers push astrology to their clients). Hunches work out to nothing in the long run. Moreover, the best brains on Wall Street do not, on average, beat the averages (Dow-Jones, Standard and Poor’s, etc.).

Lesson 2: Diversify, diversify—that is the law of the prophets of finance. One of the major lessons of finance is the advantage of diversifying your investments. “Don’t put all your eggs in one basket” is one way of expressing this rule. By putting funds in a number of different investments, you can continue to average a high yield while reducing the risk. Calculations show that by diversifying their wealth among a broad array of investments—different

common stocks, conventional and inflation-indexed bonds, real estate, domestic and foreign securities—people can attain a good return while minimizing the downside risk on their investments.

Lesson 3: Consider common-stock index funds. Investors who want to invest in the stock market can achieve a good return with the least possible risk by holding a broadly diversified portfolio of common stocks. A good vehicle for diversifying is an *index fund*. This is a portfolio of the stocks of many companies, weighting each company in proportion to its market value and often tracking a major stock index like the S&P 500. One major advantage of index funds is that they have low expenses and turnover-induced taxes.

Lesson 4: Minimize unnecessary expenses and taxes. People often find that a substantial amount of their investment earnings is nibbled away by taxes or expenses. For example, some mutual funds charge a high initial fee when you purchase the fund. Others might charge a management fee of 1 or even 2 percent of assets each year. Additionally, heavily “managed” funds have high turnover and may lead to large taxes on capital gains. Day traders may find great enjoyment in lightning movements in and out, and they may strike it rich, but they *definitely* will pay heavy brokerage and investment charges. By choosing your investments carefully, you can avoid these unnecessary drains on your investment income.

Lesson 5: Match your investments with your risk preference. You can increase your expected return by picking riskier investments (see Figure 23-4). But always consider how much risk you can afford—financially *and psychologically*. As one sage put it, investments are a tradeoff between eating well and sleeping well. If you get insomnia worrying about the ups and downs of the market, you can maximize your sleep by keeping your assets in inflation-indexed U.S. Treasury bonds. But in the long run, you might be snoozing soundly on a cot! If you want to eat well and can tolerate disappointments, you might invest more heavily in stocks, including ones in foreign countries and emerging markets, and incorporate more volatile small companies into your portfolio—rather than concentrating on short-term bonds and bank deposits.

Such are the lessons of history and economics. If, after reading all this, you still want to try your hand in the stock market, do not be daunted. But take to heart the caution of one of America’s great financiers, Bernard Baruch:

If you are ready to give up everything else—to study the whole history and background of the market and all the principal companies whose stocks are on the board as carefully as a medical student studies anatomy—if you can do all that, and, in addition, you have the cool nerves of a great gambler, the sixth sense of a kind of clairvoyant, and the courage of a lion, you have a ghost of a chance.

SUMMARY

A. The Modern Financial System

1. Financial systems in a modern economy transfer resources over space, time, and sectors. The flow of funds in financial systems occurs through financial markets and financial intermediaries. The major functions of a financial system are to transfer resources, to manage risk, to subdivide and pool funds, and to clear transactions.
2. Interest rates are the prices paid for borrowing funds; they are measured in dollars paid back per year per dollar borrowed. The standard way we quote interest

rates is in percent per year. People willingly pay interest because borrowed funds allow them to buy goods and services to satisfy current consumption needs or make profitable investments.

3. Recall the menu of financial assets, especially money, bonds, and equities.
4. Study the *monetary transmission mechanism*. This refers to the process by which monetary policy undertaken by the central bank, our Federal Reserve, interacts with banks and the rest of the economy to determine interest rates, other financial conditions, aggregate

demand, output, and inflation. Make sure you understand each of the five steps (page 000).

B. The Special Case of Money

- 5. Money is anything that serves as a commonly accepted medium of exchange, or a means of payment. Money also functions as a unit of account. Unlike other economic goods, money is valued because of social convention. We value money indirectly for what it buys, rather than for its direct utility. Money today is composed of currency and checking deposits and is denoted M_1 .
- 6. People hold money primarily because they need it to pay their bills or buy goods; this is known as the transactions demand. But people keep only a small fraction of their assets in money because money has an opportunity cost: we sacrifice interest earnings when we hold money. Therefore, the asset demand for money is limited.

C. Banks and the Supply of Money

- 7. Banks are commercial enterprises that seek to earn profits for their owners. One major function of banks is to provide checking accounts to their customers. Banks are legally required to keep reserves on their checking deposits. These can be in the form of either vault cash or deposits at the Federal Reserve.
- 8. Under 100 percent reserves, banks cannot create money, as seen in the simplest goldsmith bank example. For illustrative purposes, we then examined a required reserve ratio of 10 percent. In this case, the banking system as a whole creates bank money in a ratio of 10 to 1 for each dollar of reserves. With fractional-reserve banking, the total value of checking deposits is a multiple of reserves. Remember the formula

$$\text{Bank money} = \text{total reserves} \times \left(\frac{1}{\text{reserve ratio}} \right)$$

D. The Stock Market

- 9. The most important factors about assets are the rate of return and the risk. The rate of return is the total dollar gain from a security over a specified period of time. Risk refers to the variability of the returns on an investment, often measured by the statistical standard deviation. Because people are risk-averse, they require higher returns to induce them to buy riskier assets.
- 10. Stock markets, of which the New York Stock Exchange is the most important, are places where titles of ownership to the largest companies are bought and sold. The history of stock prices is filled with violent gyrations, such as the Great Crash of 1929 or the technology-stock bubble of 1995–2003. Trends are tracked using stock-price indexes, such as the Standard and Poor’s 500 and the familiar Dow-Jones Industrial Average.
- 11. Modern economic theories of stock prices generally focus on the efficient-market theory. An “efficient” financial market is one in which all information is immediately absorbed by speculators and built into market prices. In efficient markets, there are no easy profits; looking at yesterday’s news or at past patterns of prices or business cycles will not help predict future price movements. Thus, in efficient markets, prices respond to surprises. Because surprises are inherently random, stock prices and other speculative prices move erratically, as in a random walk.
- 12. Plant the five rules of personal finance firmly in your long-term memory: (a) Know thy investments. (b) Diversify, diversify—that is the law of the prophets of finance. (c) Consider common-stock index funds. (d) Minimize unnecessary expenses and taxes. And (e) Match your investments with your risk preference.

CONCEPTS FOR REVIEW

The Modern Financial System

financial system, financial markets, financial intermediaries
 functions of the financial system
 major financial assets or instruments
 interest forgone as the cost of holding money

The Special Case of Money

Money (M_1) = currency outside the banks plus checkable deposits

commodity M , paper M , bank M
 motives for money demand:
 transactions demand (today)
 asset demand (in a fragile financial system)

Banking and the Money Supply

bank reserves = vault cash plus deposits with the Fed
 fractional-reserve banking

bank money = reserves/required reserve ratio

The Stock Market

common stocks (corporate equities)
 efficient market, random walk of stock prices
 index fund
 five rules for personal investing

FURTHER READING AND INTERNET WEBSITES

Further Reading

There are many fine histories of money. A good one is John Kenneth Galbraith, *Money, Whence It Came, Where It Went* (Houghton, Boston, 1975). There are many good textbooks on monetary economics. The standard reference on U.S. monetary history is Milton Friedman and Anna Jacobson Schwartz, *Monetary History of the United States 1867–1960* (Princeton University Press, Princeton, N.J., 1963).

Modern capital and finance theory are very popular subjects often covered in the macroeconomics part of an introductory course or in special courses. Good books on the subject are Burton Malkiel, *A Random Walk down Wall Street*, 9th ed. (Norton, New York, 2007). A recent book surveying financial history and theory and arguing that the stock market was extraordinarily overvalued in the bull market of 1981–2000 is Robert Shiller, *Irrational Exuberance*, 2d ed. (Princeton University Press, Princeton,

N.J., 2005). A recent summary of evidence on the efficient-market theory by Burton Malkiel and Robert Shiller is found in the *Journal of Economic Perspectives*, Winter 2003.

Websites

Review our list of good blogs in Chapter 19.

Basic data on money, interest rates, and monetary policy can be found at the website of the Federal Reserve, www.federalreserve.gov. Interesting articles on monetary policy can be found in the *Federal Reserve Bulletin* at www.federalreserve.gov/publications.htm. The best comprehensive data on finance are from the Federal Reserve flow of funds at. ←

A good source for data on financial markets is finance.yahoo.com. If you are interested in the latest buzz on stocks, you might visit the Motley Fool at www.fool.com.

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QUESTIONS FOR DISCUSSION

1. Suppose that banks hold 20 percent of deposits as reserves rather than 10 percent. Assuming that reserves are unchanged, redo the balance sheet in Table 23-7. What is the new ratio of bank deposits to reserves?
2. What would be the effect of each of the following on the money demand, (M_1) (with other things held equal)?
 - a. An increase in real GDP
 - b. An increase in the price level
 - c. A rise in the interest rate on savings accounts and Treasury securities
 - d. A doubling of all prices, wages, and incomes (Calculate the exact effect on the money demand.)
 - e. An increase in the interest rate banks pay on checking accounts
3. The implicit cost of checking accounts is equal to the difference between the yield on safe short-term assets (such as Treasury bills) and the interest rate on these accounts. What is the impact of the following on the opportunity cost of holding money in checking deposits?
 - a. Before 1980 (when checking deposits had a zero interest rate under law), market interest rates increased from 8 to 9 percent.
 - b. In 2007, (when interest rates on money were one-quarter of market interest rates), interest rates declined from 4 to 2 percent.
 - c. How would you expect the demand for checking deposits to respond to the change in market interest rates under **a** and **b** if the elasticity of demand for money with respect to the implicit cost of money is -1 ?
4. Explain whether you think that each of the following should be counted as part of the money supply (M_1) of the United States: savings accounts, subway tokens, postage stamps, credit cards, debit cards, Starbucks cash cards, and \$20 bills used by Russians in Moscow.
5. Explain why the best portfolio should not contain any money (use information from Section D of this chapter). How does the notion of the cost of holding money fit in your answer? Would your answer change if your checking account earned a return equal to that of risk-free investments?
6. According to the efficient-market theory, what effect would the following events have on the price of GM's stock?
 - a. A surprise announcement that the government is going to lower business taxes next July 1
 - b. A decrease in business taxes on July 1, 6 months after Congress passed the legislation

- c. An announcement, unexpected by experts, that the United States will impose quotas on imports of Chinese cars during the coming year
 - d. Implementation of **c** by issuing regulations on December 31
7. The Federal Reserve is scheduled to pay interest on bank reserves.
- a. Suppose that the interest rate on reserves is 1 percentage point below market rates. Would banks still desire to minimize excess reserves? Would this affect the bank money equation in Summary point 8 above?
 - b. Suppose that the interest rate on reserves is equal to the market rate. How would your answer to **a** change?
 - c. Using your answer to **b**, can you see why the relationship between reserves and bank money becomes very loose when market interest rates are zero (the “liquidity trap”)?
8. Suppose that one giant bank, the Humongous Bank of America, held all the checking deposits of all the people, subject to a 10 percent legal reserve requirement. If reserves increased by \$1 billion, could the Humongous Bank expect to lend out more than 90 percent of the reserve increase, knowing that the new deposit must come back to it? Would this change the ultimate money-supply multiplier? Explain both answers.
9. **Advanced problem:** An *option* is the right to buy or sell an asset (stocks, bonds, foreign exchange, land, etc.) for a specified price on or before a specific date. A *call option* is the right to buy the stock, while a *put*

- option* is the right to sell the stock. Suppose you have a call option to buy 100 shares in a highly volatile stock, Fantasia.com, at any time in the next 3 months at \$10 per share. Fantasia currently sells at \$9 per share.
- a. Explain why the value of the option is more than \$1 per share.
 - b. Suppose the option were to expire tomorrow and had an even chance of rising \$5 or falling \$5 before then. What would be the value of the option today?
 - c. Replace the figure “\$5” with “\$10” in **b**. What would happen to the value of the option? Explain why an increase in volatility *increases* the value of an option (other things unchanged).
10. This problem will illustrate the point that the prices of many speculative financial assets look like a random walk.
- a. Flip a coin 100 times. Count a head as “plus 1” and a tail as “minus 1.” Keep a running score of the total. Plot your results. This is a random walk. (This is easily accomplished on a computer with a program such as Excel, which contains a random-number generator and a graphics function.)
 - b. Next, keep track of the closing price of the stock of your favorite company for a few weeks, or get it online. Plot the price against time for each day. Compare the random numbers in **a** with your stock prices, or show them to a friend and ask the friend to spot the difference. If they look the same, this illustrates that stocks behave like a random walk.