

Chapter 12

Depository Institutions: Banks and Bank Management

Learning Objectives

After reading this chapter, you should be able to:

- L01** Describe a commercial bank's assets and liabilities.
- L02** Define bank capital and key measures of bank profits and returns.
- L03** Identify the types and sources of bank risk and explain how to control them.

Banks are the most visible financial intermediaries in the economy. Most of us use the word *bank* to describe what people in the financial world call **depository institutions**. These are the financial institutions that accept deposits from savers and make loans to borrowers. What distinguishes depository institutions from **nondepository institutions** is their primary source of funds—that is, the liability side of their balance sheets. Depository institutions include commercial banks, savings and loans, and credit unions—the financial intermediaries most of us encounter in the course of our day-to-day lives.

Banking is a business. Actually, it's a combination of businesses designed to deliver the services discussed in Chapter 11. One business provides the accounting and record-keeping services that track the balances in your accounts. Another grants you access to the payments system, allowing you to convert your account balances into cash or transfer them to someone else. Yet a third business pools the savings of many small depositors and uses them to make large loans to trustworthy borrowers. A fourth business offers customers diversification services, buying and selling financial instruments in the financial markets in an effort to make a profit. Banks trade in the financial markets not just as a service to their customers but in an effort to earn a profit for their owners as well.

The intent of banks, of course, is to profit from each of these lines of business. Our objective in this chapter is to see how they do it. Not all banks make a profit. While some banks are extremely large, with hundreds of billions of dollars in loans and securities on their balance sheets, their access to funds is no guarantee of profitability. The risk that banks may fail is a problem not just for their owners and managers but for the rest of us, too. In the years from 2009 to 2015, nearly 500 U.S. banks failed outright, while more than 1,300 merged, reflecting the most severe financial crisis since the 1930s.

We have emphasized repeatedly that financial and economic development go hand in hand. An economy that lacks the financial institutions to effectively channel resources

from savers to investors is much less likely to thrive. This statement applies regardless of whether a country is rich or poor. The United States and Japan provide a striking example. By virtually any standard, both countries are well off. Yet during the 1990s, U.S. banks made substantial profits, while Japanese banks suffered prodigious losses. At the same time, Japan's economy grew at a rate of just over 1 percent, while the U.S. economy grew at a rate well over 3 percent. The financial problems of Japanese banks played an important role in Japan's poor economic performance. Banks are important; when they are poorly managed, we all suffer. Similarly, the damage to U.S. banks in the crisis of 2007–2009 helped make the U.S. recovery that began in 2009 the weakest since the Great Depression.

In this chapter, we will examine the business of banking. We will see where depository institutions get their funds and what they do with them. That is, we will study the sources of banks' liabilities and learn how they manage their assets. And because banking is a risky business, we will examine the sources of risk that bankers face, as well as how those risks can be managed.

The Balance Sheet of Commercial Banks

To focus our discussion of depository institutions, we will concentrate on what are called *commercial banks*. These institutions were established to provide banking services to businesses, allowing them to deposit funds safely and borrow them when necessary. Today, many commercial banks offer accounts and loans to individuals as well. To understand the business of commercial banking, we'll start by examining the commercial bank's balance sheet. Recall that a balance sheet is a list of a household's or firm's assets and liabilities: the sources of its funds (liabilities) and the uses to which those funds are put (assets). A bank's balance sheet says that

$$\text{Total bank assets} = \text{Total bank liabilities} + \text{Bank capital} \quad (1)$$

Banks obtain their funds from individual depositors and businesses, as well as by borrowing from other financial institutions and through the financial markets. They use these funds to make loans, purchase marketable securities, and hold cash. The difference between a bank's assets and liabilities is the bank's capital, or *net worth*—the value of the bank to its owners. The bank's profits come both from service fees and from the difference between what the bank pays for its liabilities and the return it receives on its assets (a topic we'll return to later).

Table 12.1 shows a consolidated balance sheet for all the commercial banks in the United States in December 2015. It reports the sum of all the items on all the balance sheets of the 5,380 commercial banks that existed in the United States at the time. The government collects these statistics in the course of supervising and regulating the financial system, to ensure bank safety and soundness. The numbers in the table are also related to the measures of money discussed in Chapter 2. Recall that the monetary aggregate M2 includes deposits, which are liabilities of the banking system.

Assets: Uses of Funds

Let's start with the asset side of the balance sheet—what banks do with the funds they raise. Table 12.1 shows that assets are divided into four broad categories: cash, securities, loans, and all other assets. Roughly 20 percent of assets, or \$3.1 trillion, is held in the form of securities; 56 percent (\$8.7 trillion) in the form of loans; and the remaining 24 percent, in the form of cash and “other assets.” The last category includes

Table 12.1 Balance Sheet of U.S. Commercial Banks, December 2015

Assets in billions of dollars (numbers with % sign are percentages of total assets)			
Cash items		2,548	16.4%
Securities*		3,097	19.9%
U.S. government and agency	2,220	14.3%	
Other securities	877	5.6%	
Loans		8,591	55.3%
Commercial and industrial	1,977	12.7%	
Real estate (including mortgage)	3,864	24.9%	
Consumer	1,270	8.2%	
Interbank	62	0.4%	
Other (including loss allowance)	1,418	9.1%	
Other Assets (including trade allowance)		1,296	8.3%
Total Commercial Bank Assets		15,532	
Liabilities in billions of dollars (numbers with % sign are percentages of total liabilities)			
Deposits		10,912	78.9%
Large time deposits	1,669	12.1%	
Borrowings		1,885	13.6%
From banks in the U.S.	105	0.8%	
From others	1,779	12.9%	
Other liabilities		1,028	7.4%
Total Commercial Bank Liabilities		13,825	
Bank Capital = Bank Assets – Bank Liabilities		1,707	11.0%

*Securities include mortgage-backed securities worth \$1,677 billion, equivalent to 10.8% of assets.

SOURCE: Data are for the end of 2015, seasonally adjusted, from Board of Governors of the Federal Reserve System statistical release H.8. "Assets and Liabilities of Commercial Banks in the United States," available at www.federalreserve.gov/releases/h8/current.

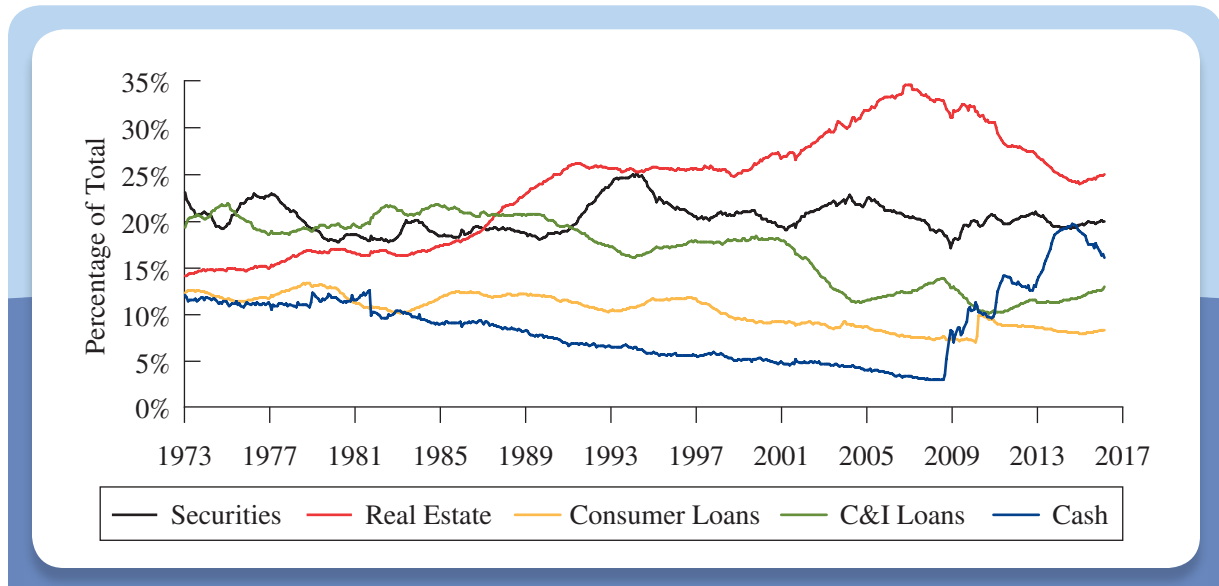
mostly buildings and equipment, as well as collateral repossessed from borrowers who defaulted. In looking at consolidated figures like the ones in Table 12.1, we can get some sense of their scale by comparing them to *nominal GDP*. In the fourth quarter of 2015, U.S. nominal GDP was roughly \$18.2 trillion, so total bank assets were equivalent to nearly 85 percent of one year's GDP.

Cash Items Cash assets are of three types. The first and most important is **reserves**. Banks hold reserves because regulations require it and because prudent business practice dictates it. Reserves include the cash in the bank's vault (and the currency in its ATM machines), called **vault cash**, as well as the bank's deposits at the Federal Reserve System. Cash is the most liquid of the bank's assets; the bank holds it to meet customers' withdrawal requests.

Cash items also include what are called *cash items in process of collection*. When you deposit your paycheck into your checking account, several days may pass before your

Figure 12.1

U.S. Commercial Bank Assets, 1973–2016



SOURCE: Monthly data, seasonally adjusted from “Assets and Liabilities of Commercial Banks in the United States,” Board of Governors of the Federal Reserve System Statistical Release H.8. (FRED data codes: INVEST, REALLN, CONSUMER, BUSLOANS, CASACBM027SBOG, and TLACBM027SBOG).

bank can collect the funds from your employer’s bank. In the meantime, the uncollected funds are considered your bank’s asset because the bank is expecting to receive them.

Finally, cash includes the balances of the accounts that banks hold at other banks. In the same way that individuals have checking accounts at the local bank, small banks have deposit accounts at large banks, and those accounts are classified as cash. Over the years, the practice of holding such accounts has declined, so the total quantity of these *correspondent bank* deposits has shrunk.

In December 2015, banks held more than 16 percent of their assets in cash (see Table 12.1). Up to the financial crisis of 2007–2009, that share was much smaller (in early 2007, it was about 3 percent; see Figure 12.1). Banks usually try to minimize their cash holdings because they typically earn less interest than loans or securities. However, the crisis forced them to change their strategy: A heightened possibility of bank runs, credit line takedowns, and borrower defaults prompted them to scramble for liquidity, and as market interest rates fell and the Federal Reserve began to pay interest on reserves, the opportunity cost of holding cash plummeted.



Securities The second-largest component of bank assets is marketable securities. While banks in many countries can hold stock, U.S. banks cannot, so this category of assets includes only bonds. Banks’ bond holdings are split between U.S. government and agency securities, which account for 14.3 percent of their assets, and other securities (including state and local government bonds), which account for an additional 5.6 percent.¹

¹While there is nothing to prevent banks from holding corporate bonds, regulatory rules make the practice expensive. In Chapter 14, we will learn that banks are required to hold capital based on the composition of their balance sheets. The amount of capital required to extend a loan to a corporation is the same as the amount required to purchase a corporate bond. But because interest rates banks can charge on loans are generally higher than interest rates on corporate bonds, there is no price incentive to purchase a bond.

Note that more than half of all the securities are mortgage-backed (10.8 percent of assets). Nevertheless, a sizable proportion of the securities held by banks are very liquid. They can be sold quickly if the bank needs cash, which makes them a good backup for the bank's cash balances. For this reason securities are sometimes referred to as *secondary reserves*.

Figure 12.1 shows the trends in the composition of bank assets over the past four decades. Focusing on the line representing securities, we can see that the share of securities in bank assets has varied around 20 percent throughout the period.

Loans Loans are the primary asset of modern commercial banks, accounting for well over one-half of assets. We can divide loans into five broad categories: business loans, called commercial and industrial (C&I) loans; real estate loans, including both home and commercial mortgages as well as home equity loans; consumer loans, like auto loans and credit card loans; interbank loans (loans made from one bank to another); and other types, including loans for the purchase of other securities. These types of loans vary considerably in their liquidity. Some, like home mortgages and auto loans, usually can be securitized and resold. (We discussed this process in Chapter 3, in connection with asset-backed securities.) Others, like small business loans, may be very difficult to resell.

The primary difference among various kinds of depository institutions is in the composition of their loan portfolios. Commercial banks make loans primarily to businesses; savings and loans provide mortgages to individuals; credit unions specialize in consumer loans. See the Tools of the Trade box on page 306 for a more detailed description of the various types of depository institutions.

Figure 12.1 shows that, prior to the crisis of 2007–2009, commercial banks became more and more involved in the real estate business. Their involvement grew for a number of reasons. First, the rise of the commercial paper market made securities market debt finance more convenient for large firms, which reduced the quantity of commercial and industrial loans demanded. (Commercial paper is described in Chapter 7.) Second, the creation of mortgage-backed securities meant that banks could sell the mortgage loans they had made. This innovation reduced the risk associated with an illiquid asset, encouraging banks to move into the business of home lending. So, on top of making more real estate loans, banks also acquired mortgage-backed securities (MBS), which recently accounted for more than half of securities held (see Table 12.1). Since the crisis, however, banks appear to have reduced their overall real estate exposure, underscoring the critical role that housing prices and MBS played in the 2007–2009 episode (see Lessons from the Crisis: Information Asymmetry and Securitization in Chapter 11, page 284).

Liabilities: Sources of Funds

To finance their operations, banks need funds. They get them from savers and from borrowing in the financial markets. To entice individuals and businesses to place their funds in the bank, institutions offer a range of deposit accounts that provide safekeeping and accounting services, access to the payments system, liquidity, and diversification of risk (see Chapter 11), as well as interest payments on the balance. There are two types of deposit accounts, transaction and nontransaction accounts. Transaction accounts are known as checkable deposits. As of December 2015, checkable deposits totaled \$1.87 trillion, or roughly 17 percent of total deposits in the commercial banking system.

Checkable Deposits “Demand deposits,” which allow a customer to withdraw funds without notice on a first-come, first-served basis, make up the largest component



YOUR FINANCIAL WORLD

Choosing the Right Bank for You

Choosing the right bank takes some work. First, you should decide exactly why you need a bank and whether a particular bank will serve your needs conveniently and cheaply. Shop around for the best deal. Make sure the bank will pay a competitive interest rate on your deposit balance and you won't be paying for services you don't use. You may want to make sure the bank will give you immediate access to your deposits. The ability to reach someone either in person or on the phone during hours that are convenient for you is also important. And be sure the bank has a reputation for courteous, efficient service. Because service isn't cheap, ask what it will cost you. Will you have to pay a fee to see a teller in person? Will you have to pay a fee to cash a check? If you have friends with needs similar to yours, find out where they bank and ask whether they're happy with the cost and service.

The Internet has revolutionized banking. Traditional "bricks and mortar" banks now provide many of their services on the Internet. Using your smartphone or computer,

you can access your account, review and pay your bills, or transfer funds. In fact, when you decide to open a bank account, you may be tempted to give your business to an Internet bank—one without any local branches. If you do, be careful. Looking at your computer screen, you may not be able to tell where the website you are viewing is physically located. While many people think the irrelevance of physical location is a real benefit of the Internet, in making financial transactions, it presents a challenge. Unfortunately, U.S. laws and regulations may not protect transactions with institutions located outside the United States. Instead, the laws and regulations of a foreign bank's home country may apply. So if you choose an Internet bank, make sure that its operations are located in the United States. The easiest way to find out is to verify that the bank is a member of the *Federal Deposit Insurance Corporation (FDIC)*. You can check by going to <http://research.fdic.gov/bankfind>. If a bank is listed there, it is a legitimate U.S. bank, and your deposits will be insured.

of checkable deposits. Banks also offer customers a variety of similar options that fall into the category of checking accounts, such as insured market rate accounts. A typical bank will offer half a dozen or more of these, each with slightly different characteristics. In addition to the names created by banks' marketing departments, economists use various other terms in speaking of checkable deposits. For example, some economists call them "sight deposits" because a depositor can show up to withdraw them when the bank is in sight.

Over the years, financial innovation has reduced the importance of checkable deposits in the day-to-day business of banking. As a share of total liabilities, checkable deposits plummeted from 40 percent in the 1970s to about 17 percent at the end of 2015. The reason for their decline is that checking accounts pay little or no interest; they are a low-cost source of funds for banks but a low-return investment for depositors. As interest rates rose through the 1970s and remained high into the 1990s, individuals and businesses realized the benefits of reducing the balances in their checking accounts and began to look for ways to earn higher interest rates. Banks obliged by offering innovative accounts whose balances could be shifted automatically when the customers' checking accounts ran low.² Thus, traditional checking accounts are no longer the principal source of bank funds.

Nontransaction Deposits In December 2015, nontransaction deposits, including savings and time deposits, accounted for more than half of all commercial bank

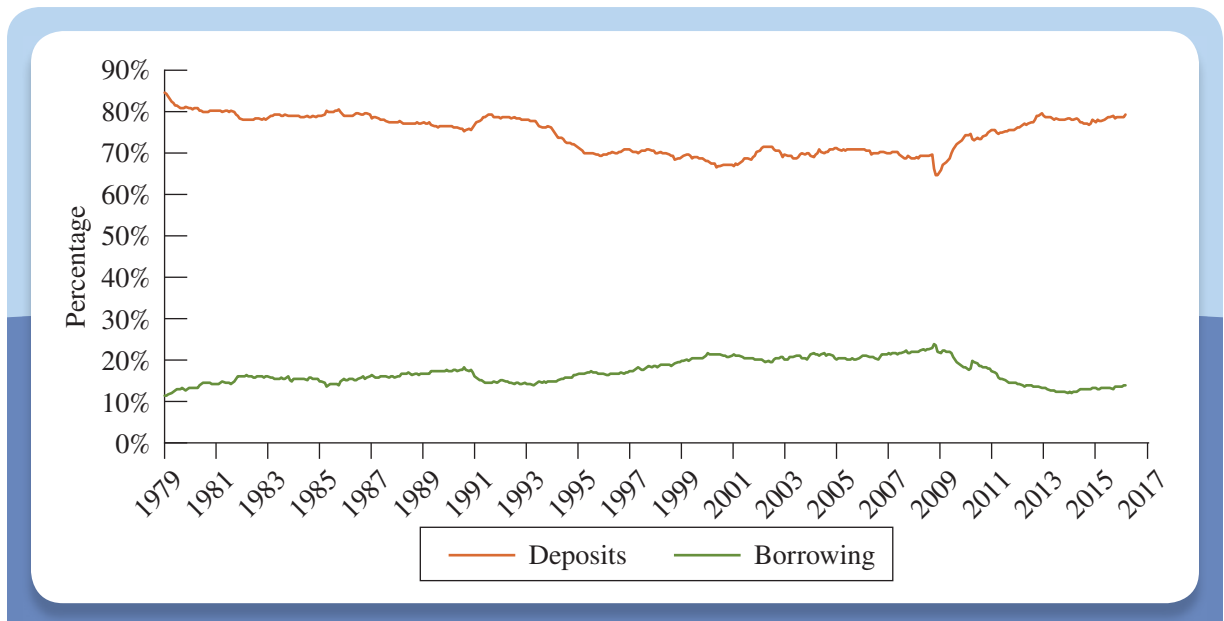
²This is also related to a practice called *deposit sweeping*, in which banks take checking account balances and put them into savings deposits, thereby reducing the level of reserves they are required to hold. Over recent decades, deposit sweeping has lowered required reserves even as the monetary aggregates have risen markedly.

liabilities. Savings deposits, commonly known as *passbook savings* accounts, were popular for many decades, though they are less so today. Time deposits are *certificates of deposit (CDs)* with a fixed maturity. When you place your savings in a CD at your local bank, it is as if you are buying a bond issued by that bank. But unlike government or corporate bonds, there isn't much of a resale market for your small CD. So if you want to withdraw your funds before the CD matures, you must get them back from the bank. To discourage early withdrawals, banks charge a significant penalty.

Certificates of deposit come in two varieties: small and large. Small CDs are issued for \$100,000 or less; *large certificates of deposit* exceed \$100,000 in face value. Large CDs are negotiable, which means that they can be bought and sold in the financial markets, just like bonds and commercial paper. Investors in this *wholesale money market* include corporate treasurers and others with large cash balances to manage. Because large CDs can be resold, they have become an important source of bank financing. When a bank needs funds, it can issue large CDs, in addition to commercial paper and more conventional bonds.

Borrowings Borrowing is the second most important source of bank funds. Figure 12.2 shows that borrowing grew increasingly important over the past four decades, until the financial crisis of 2007–2009 triggered greater bank caution. Today, borrowings account for somewhat less than 15 percent of bank liabilities. Banks borrow in a number of ways. First, they can borrow from the Federal Reserve. We'll have much more to say about such **discount loans** in Part IV. For now, think of this source of funds as borrowing from the government.

Figure 12.2 U.S. Commercial Bank Liabilities, 1979–2016



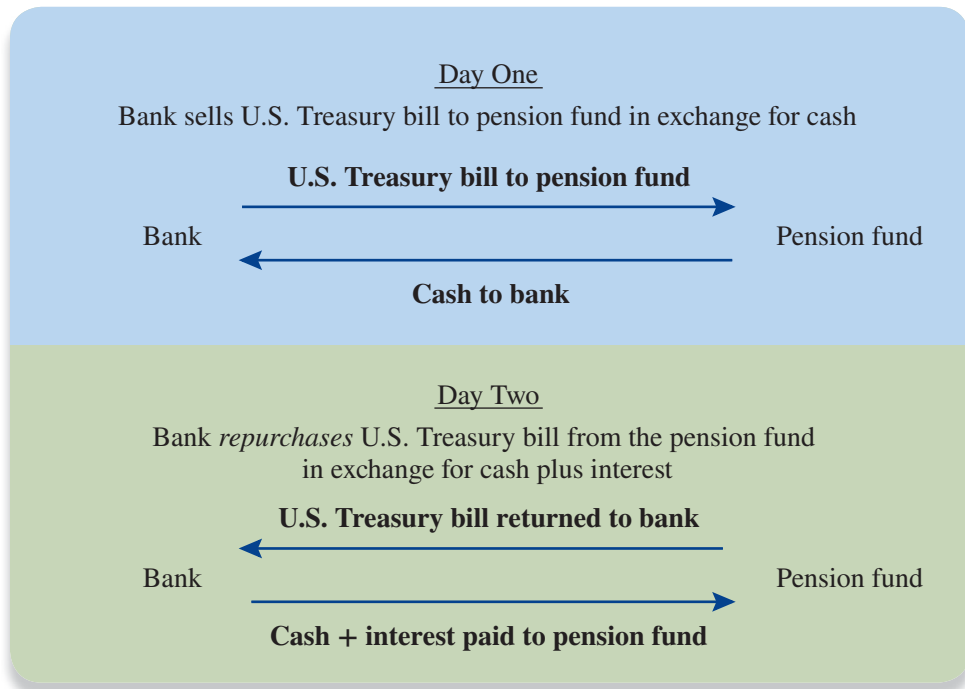
SOURCE: Monthly data, seasonally adjusted from "Assets and Liabilities of Commercial Banks in the United States," Board of Governors of the Federal Reserve System Statistical Release H.8. (FRED data codes: DPSACBM027SBOG, BOWACBM027SBOG, and TLBACBM027SBOG).

More often, banks borrow from other intermediaries. For example, banks with **excess reserves** can lend their surplus funds to banks that need them through an interbank market called the **federal funds market**. Loans made in the federal funds market are unsecured—they lack collateral—so the lending bank must trust the borrowing bank. Look back at the balance sheet in Table 12.1; you will see interbank loans listed as an asset and borrowings from banks in the United States listed as a liability.³ Besides borrowing from U.S. banks in the federal funds market, commercial banks also borrow from foreign banks and from U.S. government-sponsored enterprises that hold deposits at the Federal Reserve.

Finally, banks borrow using an instrument called a **repurchase agreement**, or **repo**, a short-term collateralized loan in which a security is exchanged for cash, with the agreement that the parties will reverse the transaction on a specific future date, typically the next day. For example, a bank that has a U.S. Treasury bill might need cash, while a pension fund might have cash that it doesn't need overnight. Through a repo, the bank would give the T-bill to the pension fund in exchange for cash, agreeing to buy it back—repurchase it—with interest the next day. In short, the bank gets an overnight loan and the pension fund gets some extra interest, along with the protection provided by collateral. The details are shown in Figure 12.3.

Figure 12.3

Mechanics of an Overnight Repurchase Agreement



³An astute reader will notice that the amount of “Interbank loans” on the asset side of the balance sheet does not match the amount for “Borrowings from Banks in the U.S.” on the liability side of the balance sheet. In fact, the two amounts differ by more than \$40 billion. If the data in the table cover the entire banking system, shouldn't loans to banks (assets) equal borrowings from banks (liabilities)? There are two reasons why the amounts do not match. First, the data in the table are constructed from a survey that covers all large banks but only a minority of small banks. Large banks tend to be borrowers, while small banks tend to be lenders. The way in which the data are collected, then, distorts the comparison. Second, small banks may report their lending to large banks as deposits rather than as interbank loans. For both these reasons, the entry on the liability side of Table 12.1 is larger than the corresponding entry on the asset side.

Bank Capital and Profitability

Net worth equals assets minus liabilities, whether we are talking about an individual's net worth or a bank's. In the case of banks, however, net worth is referred to as **bank capital**, or *equity capital*. (Important tip: Do not confuse bank capital and cash reserves. Capital appears on the liability side of the balance sheet, whereas reserves are an asset.) If the bank's owners sold all its assets (without taking a loss) and used the proceeds to repay all the liabilities, capital is what would be left. We can think of capital as the owners' stake in the bank.

Capital is the cushion banks have against a sudden drop in the value of their assets or an unexpected withdrawal of liabilities. It provides some insurance against insolvency (the inability to repay debts when a firm's liabilities exceed its assets). An important component of bank capital is **loan loss reserves**, an amount the bank sets aside to cover potential losses from defaulted loans. At some point a bank gives up hope that a loan will be repaid and the loan is *written off*, or erased from the bank's balance sheet. At that point the loan loss reserve is reduced by the amount of the loan that has defaulted.

Looking once again at the balance sheet in Table 12.1 (page 299), we can see that in December of 2015, bank capital in the U.S. commercial banking system totaled \$1.7 trillion. That \$1.7 trillion of capital was combined with \$13.8 trillion worth of liabilities to purchase \$15.5 trillion in assets. So the ratio of debt to equity in the U.S. banking system was about 8 to 1. That's a substantial amount of leverage, but it is nearly 25 percent below the average commercial bank debt-to-equity ratio that prevailed prior to the financial crisis of 2007–2009. As we saw in Chapter 3, Lessons from the Crisis: Leverage, the crisis compelled banks to reduce their leverage sharply. (Recall that the term *leverage* refers to the portion of an asset that is purchased using borrowed funds.)

To put this ratio of 8 to 1 into perspective, we can compare it to the debt-to-equity ratio for nonfinancial businesses in the United States, which is less than 1 to 1. Household leverage is much lower, roughly $\frac{1}{3}$ to 1.⁴ Recall from Tools of the Trade in Chapter 5 that leverage increases both risk and expected return. If you contribute half the purchase price of a house and borrow the other half, both your risk and your expected return double. If you contribute one-fifth of the purchase price and borrow the other four-fifths, your risk and expected return go up by a factor of 5 (see the Tools of the Trade box in Chapter 5). So if a bank borrows \$8 for each \$1 in capital, its risk and expected return increase a whopping 9 times! Banking, it seems, is a very risky business. As we will see in Chapter 14, one of the explanations for the relatively high degree of leverage in banking is the existence of government guarantees like deposit insurance, which allow banks to capture the benefits of risk taking without subjecting depositors to potential losses.

There are several basic measures of bank profitability. The first is called **return on assets (ROA)**. Return on assets equals a bank's net profit after taxes divided by the bank's total assets:

$$ROA = \frac{\text{Net profit after taxes}}{\text{Total bank assets}} \quad (2)$$

⁴You can arrive at these figures yourself by looking at the *Financial Accounts of the United States*, which is computed by the Board of Governors of the Federal Reserve (see its website). The appropriate tables are L.100 for households and L.102 for nonfarm nonfinancial corporate business; both include assets, liabilities, and net worth for their parts of the U.S. economy.



TOOLS OF THE TRADE

A Catalog of Depository Institutions

While the financial landscape is constantly shifting, it is safe to assume that depository institutions will be with us for some time. These are the financial intermediaries for whom deposits are the primary source of funds. There are three basic types of depository institution: commercial banks, savings institutions, and credit unions.

Commercial Banks

A commercial bank is an institution that accepts deposits and uses the proceeds to make consumer, commercial, and real estate loans. Originally established to meet the needs of businesses, many of these banks now serve individual customers as well. Commercial banks tend to specialize as community, regional and super-regional, or money center banks. As a result of mergers during the crisis of 2007–2009, more than one-third of U.S. commercial bank deposits are in four institutions (ranked in order of deposits): Bank of America, JPMorgan Chase, Wells Fargo, and Citigroup.

Community Banks

Community banks are small banks—those with assets of less than \$1 billion—that concentrate on serving consumers and small businesses. These are the banks that take deposits from people in the local area and lend them back to local businesses and consumers. Of the roughly 6,200 banks and savings institutions in the United States at the end of 2015, more than 90 percent were community banks.

Regional and Super-Regional Banks

Regional and super-regional banks are larger than community banks and much less local. Besides consumer and residential loans, these banks also make commercial and industrial loans. Regional banks obtain their funds through borrowing as well as from deposits. These banks can be very large. When the largest regional bank, Wachovia, faced a bank run in 2008, it was taken over by Wells Fargo.

Money Center Banks

A few large banks—only five or six—do not rely primarily on deposit financing. These banks rely instead on borrowing for their funding. They stand at the center of the *wholesale money market*, the market for short-term debt. Citigroup and JPMorgan Chase are two examples. (Recall from Chapter 3 that money-market instruments are bonds with a maturity of less than 12 months.)

Savings Institutions

Savings institutions are financial intermediaries that were established to serve households and individuals. They provide both mortgage and lending services and a place for households to deposit their savings. There are two types of savings institutions, S&Ls and savings banks.

Savings and Loan Institutions

Savings and loan institutions (S&Ls) were established in the 1800s to help factory workers become homeowners. They accepted workers' savings deposits and used the funds to make loans to homebuyers, most of whom were not served by traditional banks. These institutions traditionally specialized in taking short-term deposits and turning them into residential mortgages. The S&Ls that still exist today engage in a much broader range of financial activities.

Savings Banks

Most savings banks are mutually owned. That is, the depositors are also the legal owners. These institutions specialize in residential mortgages that are funded by deposits. They are permitted to exist only in certain states. When the largest savings bank, Washington Mutual, failed during the crisis of 2007–2009, JPMorgan Chase acquired its deposits.

Credit Unions

Credit unions are nonprofit depository institutions that are owned by people with a common bond—members of police associations, union members, and university students and employees. Credit unions specialize in making small consumer loans. They originated in the 19th century to meet the needs of people who could not borrow from traditional lenders. Before credit unions existed, many ordinary people had nowhere to turn when they faced unexpected home repairs or medical emergencies.

Not all these depository institutions are likely to survive the financial innovations and economic upheaval of the coming decades. Commercial banks will likely remain with us, but savings institutions have already declined in importance and are at risk of disappearing altogether due to changes in the mortgage business. Whether credit unions remain viable will depend on their continuing ability to exploit their advantage in verifying members' creditworthiness.

ROA is an important measure of how efficiently a particular bank uses its assets. By looking at the different units' ROAs, for example, the manager of a large bank can also compare the performance of the bank's various lines of business. But for the bank's owners, return on assets is less important than the return on their own investment, which is leveraged at an average ratio of 9 to 1. (The leverage ratio equals total assets divided by bank capital. It also equals the debt-to-equity ratio plus 1.) The bank's return to its owners is measured by the **return on equity (ROE)**, which equals the bank's net profit after taxes divided by the bank's capital:

$$ROE = \frac{\text{Net profit after taxes}}{\text{Bank capital}} \quad (3)$$

Not surprisingly, ROA and ROE are related to leverage. One measure of leverage is the ratio of bank assets to bank capital. Multiplying ROA by this ratio yields ROE:

$$\begin{aligned} ROA \times \frac{\text{Bank assets}}{\text{Bank capital}} &= \frac{\text{Net profit after taxes}}{\text{Total bank assets}} \times \frac{\text{Bank assets}}{\text{Bank capital}} \\ &= \frac{\text{Net profit after taxes}}{\text{Bank capital}} = ROE \end{aligned} \quad (4)$$

For a typical U.S. bank, prior to the financial crisis of 2007–2009, the return on assets was about 1.3 percent, while the return on equity was 10 to 12 times that high. For large banks, the return on equity tends to be higher than for small banks, which suggests greater leverage, a riskier mix of assets, or the existence of significant economies of scale in banking. The poor performance of many large banks in the crisis, combined with moderate returns in its aftermath, suggests that their pre-crisis higher returns (compared to small banks) at least partly reflected more leverage or a riskier asset mix. Nevertheless, research also points to sizable economies of scale for banks with assets exceeding \$100 billion.⁵

Before continuing, it is important to introduce one more measure of bank profitability: net interest income. This measure is related to the fact that banks pay interest on their liabilities, creating interest expenses, and receive interest on their assets, creating interest income. Deposits and bank borrowing create interest expenses; securities and loans generate interest income. The difference between the two is the bank's *net interest income*.

Net interest income can also be expressed as a percentage of total assets to yield a quantity called **net interest margin**. This is the bank's **interest-rate spread**, which is the (weighted) average difference between the interest rate received on assets and the interest rate paid for liabilities. A bank's net interest margin is closely related to its return on assets. Just take the bank's fee income minus its operating costs, divide by total assets, add the result to the net interest margin, and you get its ROA. Roughly equivalent to a manufacturer or retailer's gross profits and gross profit margin, net interest income and net interest margin reveal a great deal about a bank's business.

Well-run banks have high net interest income and a high net interest margin. And because we would expect most of a bank's loans to be repaid, net interest margin tells us not just current profitability but future profitability as well; it is a forward-looking measure. If a bank's net interest margin is currently improving, its profitability is likely to improve in the future.

⁵See John P. Hughes and Loretta Mester, "Who Said Large Banks Don't Experience Scale Economies? Evidence from a Risk-Return-Driven Cost Function," *Journal of Financial Intermediation*, Volume 22, Issue 4, October 2013, pages 559–585.



APPLYING THE CONCEPT

SHADOW BANKING IN CHINA

By almost any measure, the residents of China save more than virtually any other population in the world. Yet, until recently, they have had few attractive avenues for investing.

Until 2015, for example, regulation capped bank deposit rates at a level far below the growth rate of the economy. This was part of a strategy whereby the government—through the large state-controlled banks—funneled an outsized proportion of national savings to favored borrowers, typically state-owned enterprises (SOEs), at low interest rates. This is an example of *financial repression*.

Enter shadow banking. In 2008, as the global economy tanked, China sought to boost domestic demand by relaxing the supply of credit. To fund the credit expansion, regulators allowed banks and others to offer new products that looked a lot like short-term deposits but with much higher interest rates—often in excess of 10 percent. Hungry household investors flocked to these products.

So, viewed in the most favorable light, the rise of shadow banking in China constituted backdoor financial liberalization. However, the rapid expansion of shadow banking occurred in a financial system plagued by poor incentives. Neither lenders (the banks and other intermediaries) nor borrowers (especially SOEs and local government financing vehicles—LGFVs) had much of an interest in controlling risk taking. This, plus the lack of clarity about

who bears the risk of failure, fueled worries about financial instability in China.

As a result of rapid credit growth, the ratio of overall credit to GDP has soared since 2008 to more than 250 percent, and nonfinancial corporations in China became the most indebted among those in countries for which we have accurate data. Furthermore, a significant portion of the credit in China flowed through off-balance-sheet finance to LGFV real estate projects that had uncertain prospects for repayment. Experience teaches us that credit booms like this one are the fuel for financial crises.

Fortunately, the Chinese government has considerable wherewithal to steady the financial system even as many loans go bad. But over time, government bailouts undermine the discipline needed to make the financial system efficient. Without the force of market discipline—including the trauma of creditors bearing the losses from borrower failures—there is little incentive to limit or even monitor risk taking.

The challenge for China's authorities is to keep the benefits of shadow banking while containing the risks. The recent global crisis shows that this is difficult anywhere. For China, it may be especially so. Some of the country's most stunning successes—including its rapid infrastructure development—reflect the government's virtually unrestrained use of authority. In contrast, building a large and efficient financial system requires curbing that authority so that—consistent with Core Principle 4—markets determine prices and allocate resources. It remains to be seen whether the Chinese government can exhibit the restraint needed to reap the benefits markets have to offer.

Off-Balance-Sheet Activities

A financial firm's balance sheet provides only so much information. To generate fees, banks engage in numerous **off-balance-sheet activities**. Recall that banks exist to reduce transactions costs and information costs as well as to transfer risks. When they perform these services, bankers expect to be compensated. Yet many of these activities do not appear as either assets or liabilities on the bank's balance sheet, even though they may represent an important part of a bank's profits and may add significantly to the risks that a bank faces.

For example, banks often provide trusted customers with lines of credit, which are similar to the credit limits on credit cards. The firm pays the bank a fee in return for the ability to borrow whenever necessary. When the agreement is signed, the bank receives the payment and the firm receives a *loan commitment*. However, not until a loan has actually been made—until the firm has *drawn down* the credit line—does the transaction appear on the bank's balance sheet.

In the meantime, the bank is compensated for reducing both transactions and information costs. Without the loan commitment, the firm would find credit difficult and potentially expensive to obtain on short notice (a transactions cost). And because the bank usually knows the firms to which it grants lines of credit, the cost of establishing their creditworthiness (an information cost) is negligible.

Letters of credit are another important off-balance-sheet item for banks. These letters guarantee that a customer of the bank will be able to make a promised payment. For example, a U.S. importer of television sets may need to reassure a Chinese





YOUR FINANCIAL WORLD

The Cost of Payday Loans

If you drive through the streets of a U.S. city, you will eventually pass a store with a sign saying “Checks Cashied.” Or, if you start looking for a loan on the Internet, you will quickly find a slew of lenders who advertise things like “Bad Credit Okay.” These financial intermediaries lend to people who cannot borrow from mainstream financial institutions such as banks.

The most common type of loan these stores and websites offer is a *payday loan*. To get one, you need provide only a very limited amount of information to identify yourself. If you are doing this online, you will receive a deposit into your bank account within a day or two and must agree to let the lender directly debit your account when the loan is due, usually within two weeks. If you make the transaction in a store, you walk out with the cash.

The catch is a huge fee, typically equal to 15 percent of the loan’s principal. So if you borrow \$500, you will have to repay a minimum of \$575. In many cases, lenders are required to disclose the implied annual interest rate on these loans. It can exceed 2,000 percent, which should give all but the most desperate borrowers pause.

But the main problem with these loans is that they trap some borrowers in a vicious cycle of new fees for repeated loan renewals. A study by the Consumer Financial Protection Bureau (CFPB) reports that more than 80 percent of payday

borrowers take out another loan within two weeks.* And 15 percent of borrowers will roll over the original debt in a series of 10 loans or more. For a \$500 loan, 10 renewals means the borrower will pay \$825 in fees over a 22-week period and still owe the original \$500!

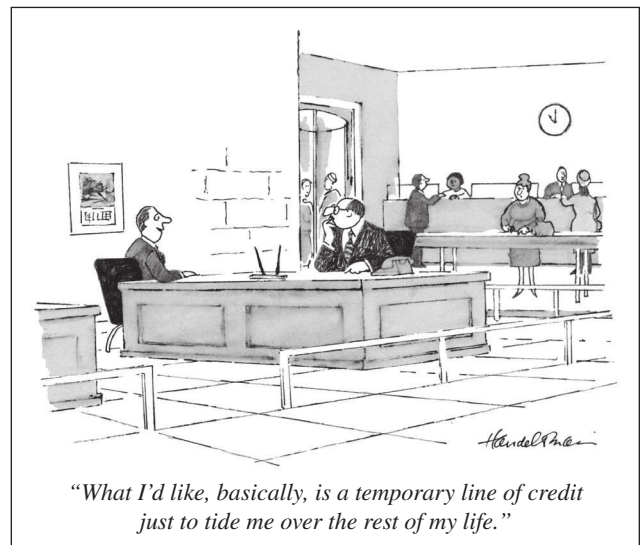
To the extent that payday loans allow people to obtain short-term loans from legitimate financial intermediaries, they are a good thing. You will find testimonials on websites from people who were clearly helped. But when payday loans lead to a cycle of costly renewals, they can do substantial harm.

In response, the federal government is moving to protect borrowers from certain lending practices. The Military Lending Act caps lending rates and rollovers on loans to U.S. service families. And, in June 2016, the CFPB proposed a set of rules aimed at ending payday debt traps. New regulations would require lenders to verify a borrower’s income and borrowing history to ensure that the new loan can be repaid. The rules also would limit renewals in the absence of a material improvement in the borrower’s financial conditions. For further information, visit the CFPB website (www.consumerfinance.gov).

*Consumer Financial Protection Bureau Office of Research, “CFPB Data Point: Payday Lending,” March 2014.

exporter that the firm will be able to pay for the imported goods when they arrive. This customer might request that the bank send a *commercial letter of credit* to the Chinese exporter guaranteeing payment for the goods on receipt. By issuing the letter of credit, the bank substitutes its own guarantee for the U.S. importer’s credit risk, enabling the transaction to go forward. In return for taking this risk, the bank receives a fee.

A related form of the letter of credit is called a *standby letter of credit*. These letters, which are issued to firms and governments that wish to borrow in the financial markets, are a form of insurance. Commercial paper, even when it is issued by a large, well-known firm, must be backed by a standby letter of credit that promises the bank will repay the lender should the issuer default. What is true for large corporations is true for state and local governments as well: in most cases, they need a bank guarantee to issue debt. As with loan commitments, letters of credit expose the bank to risk in a way that is not readily apparent on the bank’s balance sheet.



“What I’d like, basically, is a temporary line of credit just to tide me over the rest of my life.”

SOURCE: 1985 © J.B. Handelsman/The New Yorker Collection/www.cartoonbank.com.

Because off-balance-sheet activities create risk for financial institutions, they have come under increasing scrutiny in recent years. Recall the case of Long-Term Capital Management (LTCM), which we discussed in Chapter 9. While LTCM's balance sheet carried assets worth over \$100 billion when the firm got into trouble, the risky instruments that did *not* appear on its balance sheet—the \$1.25 trillion in interest-rate swaps—were what scared everyone. A similar problem arose in the financial crisis of 2007–2009, when the invisible, off-balance-sheet risks taken by some of the largest banks and other intermediaries added to doubts about their solvency (see Chapter 3, Lessons from the Crisis: Shadow Banks). By allowing for the transfer of risk, modern financial instruments enable individual institutions to concentrate risk in ways that are very difficult for outsiders to discern. When revealed, these hidden attributes can undermine financial stability.

Bank Risk: Where It Comes from and What to Do about It

Banking is risky both because depository institutions are highly leveraged and because of what they do. The bank's goal is to make a profit in each of its lines of business. Some of these are simply fee-for-service activities. For example, a financial institution might act as a broker, buying and selling stocks and bonds on a customer's behalf and charging a fee in return. Banks also transform deposit liabilities into assets such as loans and securities. In the process, they pool savings, provide liquidity services, allow for diversification of risk, and capitalize on the advantages they have in producing information. All along, the goal is to pay less for the deposits the bank receives than for the loans it makes and the securities it buys. That is, the interest rate the bank pays to attract liabilities must be lower than the return it receives on assets.

In the process of all these activities, the bank is exposed to a host of risks. They include the chance that depositors will suddenly withdraw their balances, that borrowers will not repay their loans, that interest rates will change, and that the bank's securities trading operation will do poorly. Each of these risks has a name: *liquidity risk*, *credit risk*, *interest-rate risk*, and *trading risk*. To understand how these risks arise and what can be done about them, we will look at each in detail.



Liquidity Risk

All financial institutions face the risk that their liabilities holders (depositors) will seek to cash in their claims. The holder of a checking account can always take cash out at an ATM or make a transfer to someone else via mobile phone or over the Internet. This risk of a sudden demand for liquid funds is called **liquidity risk**. Banks face liquidity risk on both sides of their balance sheets. Deposit withdrawal is a liability-side risk, but there is an asset-side risk as well. Recall from our discussion of off-balance-sheet activities that banks provide households and firms with lines of credit—promises to make loans on demand. When this type of loan commitment is claimed, or *taken down*, the bank must find the liquidity to cover it.

If the bank cannot meet customers' requests for immediate funds, it runs the risk of failure. Even if a bank has a positive net worth, illiquidity can still drive it out of business. Who would put their funds in a bank that can't always provide cash on demand? For this reason, bankers must manage liquidity risk with great care. Failure to do so in the crisis of 2007–2009 led to bank runs—such as the run on Wachovia in September 2008—and to the failures of numerous bank and nonbank intermediaries.