Meir Kohn: *Financial Institutions and Markets*, 2nd edition, Oxford University Press, 2004, chapter 5, pp. 103–127.

CHAPTER 5

UNDERSTANDING FINANCIAL INTERMEDIARIES

When you finish this chapter you will understand:

- The different ways banks and other financial intermediaries can increase their profits
- The two biggest dangers they face in doing so
- Why banks are always trying to get bigger and to expand into new activities

Having laid the foundations, we are now ready to study how our financial system is organized and why it is changing. We saw in Chapter 2 that the financial system facilitates payments, lending, and trade in risk. We also saw that it does this in two different ways—indirectly, through intermediaries, and directly, through organized markets. We begin here, in Part II, with financial intermediaries. We look at financial markets in Part III.

In studying financial intermediaries we face a dilemma. To make sense of real-world financial intermediaries, we need to know what is involved in their management. But to understand what is involved in their management we need to know a lot about real-world financial intermediaries.

We will resolve this dilemma by tackling the management of financial intermediaries twice. We take a first look here. While this first look is necessarily schematic and incom-

plete, it will give us the basic tools we need to understand financial intermediaries. When we have completed our review of real-world financial intermediaries and financial markets, we will, in Chapter 18, take a second look at the management of financial intermediaries. This second look will be more detailed and realistic.

We begin this chapter by looking at the factors that affect the profitability of a bank. We then review them one by one to see how profitability can be improved. We look at the issues involved in setting interest rates on loans and on deposits. We look at reserves and at alternative ways of ensuring liquidity. We look at the role of equity in protecting a bank from insolvency. We then examine the effect of size on a bank's profitability and the possibility of improving profitability by engaging in other, related activities. We conclude by drawing some lessons about the management of financial intermediaries in general.

YOU OPEN A BANK

The best way to learn about managing a financial intermediary is to give it a try. To that end, we will help you set up a bank and learn how to manage it. Much of what you learn about managing a bank applies in equal measure to other types of intermediary.

Balance Sheets and T-Accounts

To start a bank you need to put up some of your own money. Depositors will be more willing to trust you with their money if they see you are also risking some of your own. So, mobilizing your resources, and borrowing from friends and family, you raise $5 million. This is the bank's initial equity—the owners' stake in the bank. Next, you rent a building, obtain a charter, and hang up a freshly painted sign saying "NOVA BANK."

To manage your bank effectively, you need a system of accounts. This will enable you to see the effects of your decisions on the bank's profitability. The type of account you will use most often is a **balance sheet**. This lists, at a given moment, the bank's **assets** (what the bank owns), its **liabilities** (what it owes others), and its net worth or **equity** (what belongs to the owners). Equity is calculated as a residual:

balance sheet
Financial statement that lists a firm's assets, liabilities, and net worth.

$$\text{equity} = \text{assets} - \text{liabilities} \qquad [5.1]$$

assets
What a firm owns.

Your balance sheet, as you open for business, is as follows:

ASSETS		LIABILITIES AND EQUITY	
Cash	$5m	Liabilities	0
		Equity	$5m

liabilities
What a firm owes.

equity
The value of a firm to its owner.

Because of the way equity is defined, the left- and right-hand columns always balance (sum to the same amount). Hence the name. Your initial equity is the amount of money you yourself (the owner) have put into the bank.

With each transaction, the balance sheet will change. For example, suppose you take $4 million of your cash and deposit it at the Fed (this deposit will be useful later for clearing checks). After the transaction is completed, your balance sheet will read:

Cash	$1m	Liabilities	0
Deposit at Fed	4m	Equity	$5m

T-account Accounting statement that lists only the changes that occur in balance sheet items as the result of a transaction.

Rather than rewriting the balance sheet after each change, we will usually describe the effect of a transaction on the balance sheet with a **T-account**. A T-account shows only the *changes* to the balance sheet that result from a particular transaction. For example, the T-account for the foregoing change is

Cash	−$4m		
Deposit at Fed	+4m		

Entries in a T-account, unlike those in the balance sheet, are always preceded by a plus or minus. This is because all the entries in the T-account refer to changes. Balance sheet items that have not changed do not appear on the T-account. Like the balance sheet itself, the T-account must balance. Total changes on the left (to assets) must equal total changes on the right (to liabilities and net worth). In this case, since there is no change on the right, the changes on the left must sum to zero.

Soon after you open the bank, Meg Willis, the owner of a local camera store, comes in to ask for a 6-month loan of $50,000. She plans to use the money to finance an expansion into audio equipment. After checking out the application, you approve the loan.

As we saw in Chapter 2, fractional reserve banks (like Nova) make loans by creating deposits. The *immediate* effect on your balance sheet of your making the loan is

Loans		Checking deposits	
Willis	+$50,000	Willis	+$50,000

However, Willis soon spends the money she has borrowed. She writes a dozen checks to various suppliers for a total of $50,000. When these checks clear, the effect on your balance sheet is

Deposit at Fed	−$50,000	Checking deposits	
		Willis	−$50,000

As you can see, checks clear through your deposit at the Fed. Your deposit there falls by $50,000, and you debit Willis's deposit for the same amount.

In the months that follow, many more new customers come in to borrow and to open checking deposits. Most new deposits are in the form of checks drawn on other banks. As these clear, the Fed credits your deposit. For example, the effect of one $30,000 deposit is

Deposit at Fed	+$30,000	Checking deposits	
		Smith	+$30,000

A year later—after many deposits, withdrawals, loans, and repayments—your balance sheet reads[1] (Reserves are the sum of Cash and Deposit at Fed):

Reserves	$4.0m	Deposits	$20.0m
Loans	21.0m	Equity	5.0m

Profits and Return on Equity

The time has come for you to take stock. How are you doing in terms of the bottom line? To find out, you need to calculate your income and your costs. The difference is profit.

Loan income. Your income is what you earn on your loans. The first thing we need to know is the yield you earn. The yield that counts is not the interest rate that appears on the loan contracts, but the rate you actually earn—the **realized yield**. The two differ because repayment is uncertain: some of your borrowers will default.

realized yield on loans The rate that is actually earned, after subtracting losses.

Your realized rate can be calculated from the following formula:

$$\text{realized rate} = \text{contractual rate} \times \text{fraction of good loans} - (1 - \text{recovery rate}) \times \text{fraction of bad loans} \qquad [5.2]$$

Suppose the average contractual rate on your loans is 12%. Some 90% of your loans are paid as promised. On the remainder, you lose 15% of the principal and all of the interest, so your recovery rate is 85%. Then your realized rate is

$$0.12 \times 0.90 - (1 - 0.85) \times 0.10 = 0.0930$$

or 9.3%. (Notice that all the percentages are converted into decimal fractions when used in the formula.)

Your total revenue is your realized yield times the amount of your loans:

$$0.093 \times \$21.0\text{m} = \$1{,}953{,}000$$

explicit interest on a deposit The contractual interest rate.

implicit interest on a deposit The value of services provided to a depositor without charge, expressed as a percentage of the amount of the deposit.

Cost of Deposits. From this revenue we need to subtract your costs. A bank is a financial intermediary: it borrows in order to lend. So a substantial part of your costs is the cost of the funds that you borrow—your deposits.

The cost of your deposits is made up of two parts. The first is the interest you actually pay. The second is the cost of the services you provide to your depositors free of charge. Such services might include free checking, free ATM transactions, and so on. We will call the interest you actually pay **explicit interest**. We will call the value of free services, expressed as a percentage of the amount of deposits, **implicit interest**.

[1] As we shall see later, these are not exactly the categories that banks use on real balance sheets. However, this way of dividing up the balance sheet is the most useful for our purposes.

If explicit interest is 3% and implicit interest 2%, then your total cost per dollar of deposit is 5%. If we multiply this by the amount of your deposits, then the cost of your deposits is

$$0.05 \times \$20.0\text{m} = \$1{,}000{,}000$$

variable costs Costs that vary directly with the amount of deposits or loans.

fixed costs Costs that do not vary directly with the amount of deposits or loans.

Fixed Costs. The cost of your deposits is a **variable cost**: it depends on the amount of your deposits. In addition, you also have **fixed costs** that you must pay whatever the amount of your deposits. Whether you have $1 in deposits or $100 million, you need a bank office, a computer, a bank president, and a security guard. All of these are fixed costs.

In addition, many of the costs of being a financial intermediary are fixed. You need a loan department to process loan applications, to write loan contracts, and to monitor borrowers. To some extent, the cost will vary with the number of loans to be processed. But it will not vary much with the amount of those loans. Much the same work will be involved whether your average loan is for $100,000 or $10 million.[2]

Adding together these and other fixed costs, the total comes to $600,000.

Profits. We can summarize all the factors affecting profits in a formula:

$$\pi = (L \times i_L) - (D \times i_D) - FC \qquad [5.3]$$

where π = profits
L = amount of loans
i_L = realized yield on loans
D = amount of deposits
i_D = cost per dollar of deposit
FC = fixed costs[3]

Applying Equation 5.3 to Nova Bank, your profit is

$$\pi = (\$21.0\text{m} \times 0.093) - (\$20.0\text{m} \times 0.05) - \$0.6\text{m} = \$353{,}000$$

return on equity (ROE) Profit as a percentage return on the owners' stake in a firm.

Return on Equity. Should you be happy with this level of profit? That depends on what sort of return it is on the sum that you and your friends and relatives have invested in the bank (your equity). That is, it depends on the **return on equity (ROE)**—the profit per dollar invested:

$$\text{ROE} = \frac{\pi}{E} \qquad [5.4]$$

where E = equity.

[2] Costs that do vary with the amount of loans are variable costs. We should deduct them directly from the realized yield to see how much an extra dollar of loan adds to revenue.

[3] We are abstracting here from various complications, such as taxes.

EXHIBIT 5.1 Ways to Increase Return on Equity

Lower E
Raise π
  Increase revenue
    Raise i_L
    Raise L
      By increasing D
      By decreasing reserves
  Lower variable costs
    Lower i_D
    Lower D (not very attractive—see revenue)
  Lower FC

Nova's ROE is

$$\text{ROE} = \frac{353{,}000}{5{,}000{,}000} = 0.071, \text{ or } 7.1\%$$

Whether this is good or bad depends on the alternatives. Could you have done better with the money you invested in the bank? For example, instead of setting up Nova, you could have bought the stock of existing banks of similar risk. Suppose that that would have yielded 25%. Then your investment in Nova does not look very good at all.

Ways to Increase Return on Equity

Exhibit 5.1 lists the ways you could raise your ROE. From Equation 5.3, you see that to raise ROE you must either lower the amount of your equity or increase the amount of your profits. From Equation 5.4, you see that to increase your profits you must either raise revenue, lower variable costs, or lower fixed costs. To raise revenue you must either raise the realized rate on your loans or increase their amount. From your balance sheet, you see that to increase the amount of your loans you must either attract more deposits or reduce your reserves. To reduce variable costs, you must lower the cost of your deposits or reduce their amount. The latter is not very attractive because it means that you will be able to make fewer loans. We will look at all of these options in turn.[4]

SETTING RATES ON DEPOSITS AND LOANS

Let us begin with the cost of your deposits and the realized rate on your loans. Lowering the former or raising the latter will increase your profits and so your ROE. Your ability to do either will depend on how much competition your face. The desirability of raising the

[4] For now, we will assume that your fixed costs are as low as you can make them. We will have more to say about fixed costs later in the chapter.

realized rate on your loans will be further constrained by information problems and by your willingness to bear risk.

The Competitive Environment

If Nova is the only bank in the area, you may be able to get away with paying less on your deposits or charging more for your loans. You may lose some business, but the extra revenue and lower costs on the business that is left will more than make up for it. However, if there are many other banks, then paying less on deposits or charging more for loans than your competitors will lose you a lot of business. The extra profit on the little that is left will not make up for the business you lose.

However, if there are only a few banks in your area, you may be able to arrange things to your mutual benefit. Explicit collusion to set rates is illegal, so you cannot simply get together and agree to lower your deposit rates or raise your loan rates. However, nothing rules out *tacit* collusion. For example, you could try to lower your deposit rates and see whether the other banks follow your lead.

Even if yours is the only bank or if there are few banks in the area, competition from nonbank substitutes may be a problem. For example, thrift NOW accounts and money market mutual funds are substitutes for your checking deposits. Savings bonds, bond mutual funds, and many other things are substitutes for your time deposits. Consumer or business loans from finance companies and mortgage loans from mortgage banks are substitutes for your loans.[5] This means that even if you and the other banks lower your deposit rates or raise your loan rates together, you will as a group lose business to these nonbank substitutes.

We saw in Chapter 3 that competitive pricing is good for the economy. Here we see it from a different perspective. From your point of view as a banker, competitive pricing does not seem so appealing. For you, it means lower profits.

Asymmetric Information and Adverse Selection

Raising the interest rates you charge on your loans has problems beyond the possible loss of business. One of those problems is the business you will *not* lose.

The underlying problem is asymmetric information: your customers know more about their own businesses than you do. Of course, you realize that even some of your "best" loans will turn out to be bad, but you do not know which ones. To you, all the loans in a certain risk class look much the same. For example, you have loans outstanding to Meg Willis and to Sly and Sons. To you, they both look like good risks, so you charge them both your best rate of 10%. Willis is in fact a good risk, but, unknown to you, Sly is in serious trouble.

Now suppose you raise your best loan rate from 10% to 12% while the rates your competitors charge remain the same. Willis will find it relatively easy to switch to another lender. Since her business is in good shape she will be happy to show the books to another bank. Sly, on the other hand, will not want the scrutiny that switching lenders would

[5] We will learn about all of them in the following chapters.

involve. Sly will stay with you. The higher interest rate doesn't much matter: the bad risks don't expect to pay it anyhow!

So raising your loan rates above competing rates will increase the default risk of your loan portfolio. You will lose your better customers and be left with the lemons. New customers willing to pay the higher rates will probably be lemons too. Because the default rate goes up, the realized yield will increase by less than the increase in the contractual rate and it may even fall.

What we see at work here is the same process of adverse selection we encountered in Chapter 1 in our discussion of insurance. The loss of good borrowers when you raise your loan rates is very much like the loss of good risks when an insurance company raises its premiums. The problem in both case is asymmetric information and the resulting inability to discriminate good risks from bad.

The Risk–Return Trade-off

Competition and adverse selection prevent you from increasing what you earn from a given type of loan. So how about increasing revenue by changing the type of loan you make?

For example, loans to developers of commercial real estate or to Latin American governments carry higher realized yields than loans to the most creditworthy corporations or to the U.S. government. If you increase the share in your loan portfolio of such higher yield loans, you will increase the average return.

But are you really gaining anything by doing this? Loans of these types have a higher realized yield because there is greater uncertainty of payment. Riskier securities pay a risk premium. Hence, you can increase your average revenue in this way only by increasing the risk of your portfolio. You may decide to so anyhow, but you should be aware of the trade-off.

How about investing in long-term U.S. government securities? There is no uncertainty of payment there, and the yields are very attractive. Or how about Italian government securities? No uncertainty of payment, and even higher yields. Unfortunately, here too you can increase your average yield only by increasing your exposure to risk.

The yields on long-term U.S. government securities are higher for good reason. That reason is interest rate risk. The rate on long-term U.S. government securities may be higher than short-term rates because the market expects short-term rates to rise. If they do, you are in trouble. You pay short-term rates on your deposits: if short-term rates rise, your deposits will become more expensive. However, the rate on the long-term securities you have bought will not change. You may wind up paying more for funds than you are earning on your investments. If the market does not actually expect a rise in short-term rates, the long-term rate may be high because of the *possibility* of such a rise. The term premium is compensation for the interest-rate risk.

We also saw that there is a reason Italian government securities carry such a high yield—exchange rate risk. Italian government securities pay in lire. To fund your purchase, you are borrowing in U.S. dollars (your deposits). If the value of the lira falls, the value of your asset goes down, while the value of the corresponding liability stays the same. You take a loss.

In sum, you cannot get something for nothing. There is no way to increase the yield on your assets without increasing your exposure to risk. We will see in Chapter 18 that

there are sophisticated ways to manage these risks and to improve the trade-off between risk and return. For the moment, however, as a beginner, you had best set your loan and deposit rates at competitive levels and keep away from risky investments. Let us move on to the various other ways you might increase your return on equity.

DEPOSITS, RESERVES, AND LIQUIDITY

If you cannot increase your revenue by increasing the yield on your assets, how about increasing the *amount* of your assets? Looking at your balance sheet, there are two ways you can do this—increase the amount of your deposits or decrease the amount of your reserves.

Increasing Deposits

Your bank is a financial intermediary. It borrows in order to relend. If it borrows more it can lend more. Your borrowing takes the form of deposits. To increase their amount, you can try to make your deposits more attractive than those of your competitors. You can do this by paying higher explicit interest or by providing better service (higher implicit interest).

There are dangers here, however. If you attract more deposits by making your deposits more attractive, you are also making them more expensive. We have seen that you cannot expect to earn more on your assets than your competitors do. So if your deposits cost more than theirs, your profit margins will be squeezed. You may be obliged to take on more risky assets to cover your higher costs.

We shall see in later chapters that banks do not have to wait passively for depositors to come in the door. There are ways for banks to borrow money actively. Most of these ways, however, are available only to banks much larger than yours. All of them are expensive.

It is probably best, therefore, to follow a conservative policy and content yourself with the deposits that competitive rates bring to you.

Reducing Reserves

If you cannot expand your deposits, then the only way you can increase your lending is to reduce your reserves. You currently have $4 million of reserves earning no interest at all. How about replacing some of them on your balance sheet with additional loans? Loans, unlike reserves, earn interest and contribute to profits.

For example, suppose you make another $1 million in loans at the expense of reserves:

Reserves	−$1m
Loans	+$1m

If the new loans earn the same 9.3% realized rate as your existing loans, they will add $93,000 to your profits, and your ROE will increase to

$$\text{ROE} = \frac{446{,}000}{5{,}000{,}000} = 0.089, \text{ or } 8.9\%$$

How far can you reduce your reserves? Your freedom is limited by legal reserve requirements. Currently, the Fed requires banks to hold 10% against checking deposits and nothing against other types of deposit. Since half your deposits are checking deposits, you must hold at least 10% of $10 million or $1 million.[6] These are called **required reserves**. So regulations allow you to reduce your reserves by $3 million, increasing your loans by the same amount, and substantially increasing your profits.

required reserves Minimum amount of reserves a financial institution must hold.

Why a Bank Needs Liquidity

The extra profits would be welcome, but can you manage without the extra reserves? To answer this, we must see why you need reserves in the first place.

Reserves provide you with liquidity—a source of ready money. You need liquidity for two reasons. First, your deposits are convertible on demand (or with specified notice) into cash. As we saw in Chapter 2, pooling takes care of the problem most of the time. Demands for conversion (withdrawals, checks drawn) are offset by new deposits. Sometimes, however, there is an excess of demands for conversion. You must be able to meet such demands.

The second reason you need liquidity is to be able to accommodate your customers when they come to you for loans. Sometimes, this is just a matter of good customer relations. For example, if Meg Willis comes to you for another loan and you have to turn her down because you lack the funds, she may take all of her business elsewhere.

Frequently, though, you have no choice about making the loan. Banks often make formal **loan commitments** in advance to lend to their customers: a majority of commercial loans are made this way. For example, you might have given Meg Willis a formal commitment that she can borrow $100,000 from you at any time over the next 6 months. In that case you would be in default of your commitment if you could not provide her with the funds.

loan commitment A commitment of a bank in advance to provide credit.

Your $1 million of required reserves will not give you the liquidity you need. Required reserves are just that—required. You cannot draw on them as you please. For example, suppose you made a loan under a commitment by running down your required reserves. This would leave with a reserve ratio of about 5%. You would be in violation of reserve requirements and in serious trouble.

Required reserves are not really there to provide banks with liquidity. Their purpose is different. They help the Fed control the banks' creation of new deposits. And they also provide the Fed with an interest-free loan. This is a source of income for the government, currently worth over $3 billion a year.

You could ensure liquidity with reserves in excess of the those required—**excess reserves**. But excess reserves are expensive: their opportunity cost is the interest you could be earning on something else.

excess reserves Reserves held in excess of the required amount.

Asset Management and Liability Management

There are ways to ensure liquidity other than by holding excess reserves. The two basic approaches are called *asset management* and *liability management*. Although we must leave the details for Chapter 18, the basic ideas are quite simple.

[6] Reserve requirements are a little more complicated than this. We will look at them in detail in Chapter 19.

asset management The use of a financial institution's asset structure to provide liquidity.

secondary reserves Earning assets that can readily be turned into cash.

overnight loan A loan made one day to be repaid the next.

liability management The use of a financial institution's liability structure to provide liquidity.

With **asset management** instead of holding excess reserves you hold earning assets that can readily be turned into cash. Such assets are called **secondary reserves**. Business loans, like the one you made to Meg Willis, are of no use: they are too illiquid. You cannot ask Willis to repay the loan early, and selling the loan to someone else, say another bank, won't work either. The transactions costs are too high, and it will take too long to close the deal. So you need a different type of asset—one that *can* be turned into cash quickly. One candidate is an **overnight loan**—a loan made one day to be repaid the next. We shall see that much lending by one bank to another is in this form. Another type of asset that is suitable as a secondary reserve is a security that can be sold easily—government securities are perfect.

With **liability management**, rather than holding assets that you can turn into cash, you simply borrow cash as you need it. If you need to make a new loan, or if you have an outflow of deposits, you borrow the cash you need. The trick to liability management is always being able to borrow when you need to.

Weighing all these alternatives, you decide to keep $500,000 of excess reserves, and convert the rest into secondary reserves in the form of government securities.[7] The government securities earn 6%, which is substantially less than the 9.3% you make on loans. So liquidity does have its cost.

After you make these changes, your balance sheet becomes

Reserves	$1.5m	Deposits	$20.0m
Securities	2.5m		
Loans	21.0m	Equity	5.0m

Your profits increase to

$$\pi = (\$21.0\text{m} \times 0.093) + (\$2.5\text{m} \times 0.06) - (\$20.0\text{m} \times 0.05) - \$0.6\text{m} = \$503{,}000$$

This boosts your ROE to

$$\text{ROE} = \frac{503{,}000}{5{,}000{,}000} = 0.101, \text{ or } 10.1\%$$

EQUITY AND SOLVENCY

You have done all you can to increase your profits. The only remaining way to increase your return on equity is to reduce your equity (see Exhibit 5.1).

Equity and ROE

Of course, you cannot reduce your equity without some other compensating change in the balance sheet. You cannot reduce reserves or securities because you need them for liquidity. So you will have to reduce the amount of your loans. Say you want to reduce your

[7] As we shall see in Chapter 18, liability management is not really an option for a small bank like yours.

equity by $2 million. As $2 million in loans are repaid, instead of making new loans, you take the money out of the bank and invest it elsewhere.[8]

Reducing the amount of loans by $2 million reduces your profits by 9.3% of this amount or $186,000, so profits fall to $317,000. However, because the amount of equity has been reduced, your return on equity rises to

$$\text{ROE} = \frac{317{,}000}{3{,}000{,}000} = 0.106, \text{ or } 10.6\%$$

Assuming you invested the $2 million you took out of the bank well (say in the stocks of other banks), your total return on the $5 million of original equity will now be higher.

Reducing equity looks like a good idea. Let's take it further, and reduce your equity to $100,000. The balance sheet becomes

Reserves	$1.5m	Deposits	$20.0m
Securities	2.5m		
Loans	16.1m	Equity	0.1m

Profit falls by a further $269,700, to $47,300. However, return on equity rises to a very satisfying

$$\text{ROE} = \frac{47{,}300}{100{,}000} = 0.473, \text{ or } 47.3\%$$

Equity and Risk

This looks too good to be true, and, of course, it is. While ROE is up, so is the probability the bank will fail.

For example, suppose one of your larger borrowers defaults on a $200,000 loan and nothing can be recovered. Your assets will have to be marked down by $200,000. To maintain balance on the balance sheet, some item on the right-hand side will also have to be reduced by $200,000. It cannot be deposits. Your debt to your depositors is unconditional. No matter how poorly your loans do, you still owe the depositors $20 million. So the reduction will have to be in equity. Subtract $200,000 from $100,000 and your equity is −$100,000. The minus sign means your bank is **insolvent**: its liabilities exceed its assets.

insolvent
An entity is insolvent if its liabilities exceed its assets.

Since your bank is insolvent, it will be closed down and its charter revoked. When the bank's assets are liquidated, assuming all the other assets can be realized at full value, there will be only $19.9 million available to pay off $20 million in deposits. If your deposits are not insured, your depositors will take a loss. If your deposits are insured, then depositors will be paid off to the extent their deposits are covered (there is a maximum per depositor), and the insurance fund will bear part of the loss.[9]

[8] You could take the money out by buying back $2 million of the outstanding stock.

[9] We will discuss deposit insurance and the resolution of bank failures in detail in Chapter 19.

Market Value and Book Value

If your bank fails and its charter is revoked, you will obviously lose your $100,000 equity in the bank. But you may lose much more, because the bank may be worth considerably more than the amount you had invested in it.

market value of a bank
The amount for which the bank could be sold.

The true value of a bank is the amount you could sell it for—its **market value**. The market value of your bank might have been, say, $3 million. Why would anyone pay more for the bank than the equity value on the balance sheet (its **book value**)? Perhaps because the bank had good prospects for future profits. The difference between the book value and the market value is called the **value of the charter**.[10]

book value of a bank
The value of a bank's equity calculated from its balance sheet.

If the bank fails, what you really lose is its market value. So you may have considerably more at stake than just the book value of equity.

value of the charter
The excess of the market value of a bank over its book value.

Equity, Depositor Behavior, and Bank Runs

We have assumed that reducing equity has no effect on the behavior of depositors. But depositors understand very well that as equity falls, the risk of insolvency increases. To prevent them from withdrawing their deposits, you will have to pay them a better rate. So, as you reduce equity, your deposits will become more expensive. If you take the increased cost of your deposits into account, then reducing the amount of your equity becomes less attractive.[11]

Depositor behavior may be affected in more drastic ways. As we saw in Chapter 3, when depositors lose confidence they may run on the bank. A run can be disastrous even for a solvent bank. A bank run might force you to sell off some of your assets to accommodate withdrawals. If you had to sell these assets at "fire-sale" prices, the losses could force the bank under, even if it had been solvent before the run. The larger your equity, the less nervous will be your depositors, and the lower will be the probability of a bank run.

Of course, deposit insurance alters depositor behavior. Depositors who are fully insured will not be concerned about the level of the bank's equity: if the bank fails, they will be compensated. Any increased risk is now borne by the insurer. Consequently, it is the insurer who will now take a keen interest in the level of your equity. Massive recent losses of the federal deposit insurance funds have led bank regulators to impose minimum equity requirements on banks and on other financial institutions. These requirements are quite complicated, and we shall discuss them in detail in Chapter 19.[12]

---

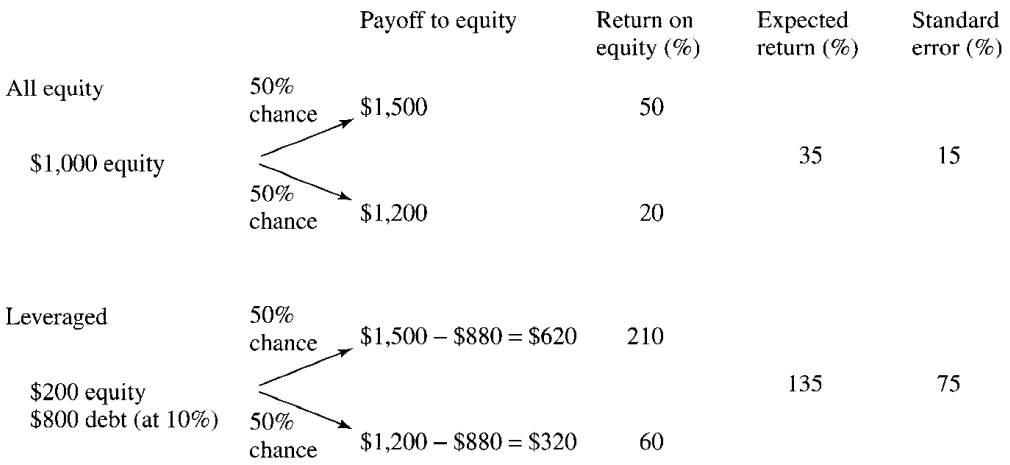
[10] If the bank is sold—say to another bank—for more than its book value, then the difference between its market value and its book value will appear as an asset called "goodwill" on the balance sheet of the purchaser.

In situations more complicated than the one we are considering here, market value may diverge from book value for another reason. Accounting conventions may not reflect the true market values of existing assets and liabilities. Consequently, the calculated book value may not give an accurate estimate of the owner's equity.

[11] As we saw in Chapter 2, the value of the bank to you (its market value) can be seen as a *performance bond.* Intermediaries seek ways to make it easier and cheaper for lenders to lend to them rather than to other potential borrowers. One way to do this is to post a bond. If you yourself stand to lose from bad loans, your depositors can be more confident that you will exercise the necessary care. Reducing the size of the bond reduces depositor confidence.

[12] What we see at work here is the *Modigliani–Miller theorem.* Applied to a bank, it states that the market value of all claims on the bank (deposits plus equity) is invariant to changes in the amount of equity. If depositors are compensated fairly for the increased risk to their deposits, the increase in the expected return on equity does no more than compensate you for the increased risk you bear. Of course, if deposits are insured, and if deposit insurance premiums do not increase with risk, then the value of the bank will increase as equity is reduced. The insurer will therefore want to restrict your freedom to reduce the level of equity.

EXHIBIT 5.2 The Effects of Leverage



The Effects of Leverage

Reducing equity, therefore, increases risk as well as return. Equity is a cushion against insolvency. For example, had your equity been $2 million instead of $100,000, the $200,000 loss would have been painful but not fatal. You would have been able to rebuild your equity over time and the bank would have continued to operate.

leverage
The use of borrowed money to acquire an asset.

The effect of equity on risk and return is an example of **leverage**—the financing of an investment with borrowed money. We can illustrate the principles with the simple example shown in Exhibit 5.2. There is a $1,000 investment project that pays either $1,200 or $1,500 at the end of the year: both outcomes are equally likely. The return is either 20% or 50%, so the expected return is 35%. The standard error of the return, a measure of the risk, is 15%.[13]

If you finance the project entirely with your own money ("all equity"), then your expected return is the expected return of the project; the standard error of your return is the standard error of the project.

If you finance the project with $200 of your own money and $800 of money borrowed at 10% ("leveraged"), then your expected return and your risk are altered. The return to you, after paying off the debt, is now either $1,200 − $880 = $320 or $1,500 − $880 = $620. The return on your original $200 is either 60% or 210%, for an expected return of 135%. The standard error of the return is 75%. Both the expected return and the risk have increased with leverage.

leverage ratio
The value of an asset divided by the amount of the owner's own investment in it.

We can express the leverage in terms of a **leverage ratio**. This is the value of the investment divided by the amount you yourself invest. In this case the leverage ratio is $1,000/$200 = 5. The greater the leverage ratio, the higher the expected return and the greater the risk.

[13] The variance is $0.5\ (0.20 - 0.35)^2 + 0.5(0.50 - 0.35)^2 = 0.0225$. The standard error is the square root of the variance.

In terms of leverage, your bank is exactly like this simple example. The money you yourself have put up is your equity—originally $5 million. The borrowed money is your deposits—$20 million. The investment project is the bank's assets—$25 million. The leverage ratio is $25 million/$5 million = 5. If you reduce your equity to $100,000, then the leverage ratio increases to $20.1 million/$100,000 = 201. By increasing the leverage, you have increased your expected return and your risk.

Since part of a bank's assets, its reserves, has no effect on either risk or return, its equity position is often described, not in terms of its leverage ratio, but in terms of its **equity ratio.** This is defined as

equity ratio (of a bank) The amount of a bank's equity divided by the amount of its loans and investments.

$$\text{equity ratio} = \frac{\text{equity}}{\text{loans and investments}} \qquad [5.5]$$

where "loans and investments" means all earning assets, including loans and government securities. With $5 million of equity, your bank's equity ratio is $5 million/$23.5 million = 0.213 or 21.3%. With $100,00 in equity, your bank's equity ratio is $0.1 million/ $18.6 million = 0.0054 or 0.54%.[14]

Having weighed the pros and cons, your final decision is to reduce your equity to $1.5 million. Your balance sheet becomes

Reserves	$1.5m	Deposits	$20.0m
Securities	2.5m		
Loans	17.5m	Equity	1.5m

This gives an equity ratio of 7.5%.

You have now done everything you can to increase your return on equity. As a result of your efforts, your profits are now

$$\pi = (\$17.5\text{m} \times 0.093) + (\$2.5\text{m} \times 0.06) - (\$20.0\text{m} \times 0.05) - \$0.6\text{m} = \$177{,}500$$

and your return on equity is

$$\text{ROE} = \frac{177{,}500}{1{,}500{,}000} = 0.118, \text{ or } 11.8\%$$

To see how the various ratios we have discussed look in reality, see "A Balance Sheet of U.S. Commercial Banks."

ECONOMIES OF SCALE AND SCOPE

Although your return on equity is now much improved from the 7% you started with, it is still well short of the 25% that other banks seem to be earning. Why are they doing so much better?

[14] We shall see in Chapter 19, that there are measures that adjust for differences in risk among assets in a more sophisticated way.

A BALANCE SHEET OF U.S. COMMERCIAL BANKS

The accompanying table shows the combined balance sheet of all U.S. commercial banks. Each item on the balance sheet is a total for all banks taken together.

You can see that the average ratio of reserves to checking deposits is

$$\frac{\$40 \text{ billion}}{\$597 \text{ billion}} = 0.067, \text{ or } 6.7\%$$

Total assets are $6,086 billion, so the average leverage ratio is

$$\frac{\$6{,}086 \text{ billion}}{\$424 \text{ billion}} = 14.4$$

The average equity ratio is

$$\frac{\$424 \text{ billion}}{\$5{,}222 \text{ billion}} = 0.081, \text{ or } 8.1\%$$

BALANCE SHEET OF U.S. COMMERCIAL BANKS

December 31, 2000
(billions of dollars)

Assets			Liabilities and Net Worth	
Reserves		$ 40	Checking deposits	$ 597
Cash in vault	15		Time deposits	3,252
Deposits at Fed	25		Other liabilities	1,813
Loans and securities		5,222		
Other assets		824	Equity	424

Source: Board of Governors of Federal Reserve, various releases.

One reason they may be doing better is because they are larger. Size is an advantage to a bank. The gains from size are called economies of scale. Another reason they may be doing better is because they are doing things other than straightforward banking. Some complementary activities can be added to banking at little extra cost, but with considerable extra profit. The gains from doing this are called economies of scope.

Economies of Scale

Other things equal, large banks should be more profitable than small ones. To understand why, let us merge your bank, Nova, with a bank in the next town, Super Trust. The combined bank, of which you become a 50% owner, is to be called SuperNova. Super Trust's balance sheet is identical to yours, so each item on SuperNova's balance sheet is exactly double the corresponding item on Nova's:

SUPERNOVA			
Reserves	$3.0m	Deposits	$40.0m
Securities	5.0m		
Loans	35m	Equity	3.0m

Given that interest rates on loans and deposits are determined by market forces, SuperNova will charge the same rates on its loans and pay the same rates on its deposits as Nova did.[15] However, SuperNova will be able to improve its profitability in other ways:

- It will have lower fixed cost relative to its assets.
- It will have less need for liquidity.
- It will be able to lower its equity ratio without increasing the danger of insolvency.

Lower Fixed Costs. Many fixed costs are *indivisible*. A bank needs a computer and a vault whether it has $10 million in deposits or $10 billion. It needs loan officers whether the average loan is for $100,000 or for $100 million. Of course, a bank with a thousand times the deposits may need a more expensive computer or vault, but it is unlikely to be a thousand times more expensive. A bank with a thousand times the loans will need more loan officers, but not a thousand times as many. Moreover, many services that a bank provides its customers, like check clearing, investment advice, or international banking, require specialized staff. There is a minimum cost to providing such services whatever the number of customers served.

As a result of these indivisibilities, fixed costs will rise with the size of the bank, but less than proportionately. When banks merge, fixed costs will fall relative to the size of the bank.

When Super and Nova merge, you should be able to reduce their combined fixed costs. The merged bank will have a variety of duplicate facilities—two computers, two branch offices within a block on Main Street, and so on. You can cut costs by eliminating this duplication. In addition, you will find that other parts of the bank—for example, the combined loan department—are larger than you now need. By reducing their size you can further cut costs.

[15] Of course, if the merger significantly reduced the number of banks (say these were the only two banks in the area), then you would be able to raise your loan rates and lower your deposit rates after the merger.

Say the fixed costs of your combined bank can be reduced from $1.2 million, the sum of the fixed costs of Super and Nova, to $1.1 million. As a result, the profits of SuperNova increase from 2 × $177,500 = $355,000 to $455,000, raising the ROE to

$$\text{ROE} = \frac{455{,}000}{3{,}000{,}000} = 0.152, \text{ or } 15.2\%$$

Liquidity. In addition to these physical economies of scale, there are also *financial* economies of scale. We saw in Chapter 2 that the financial technology used by banks and other financial intermediaries relies heavily on pooling and netting. The larger the pool, the better it works. The greater the number of transactions, the better the netting.

Better netting reduces the cost of liquidity for larger banks. For example, suppose the chance of a $1 million excess of withdrawals (5% of deposits) for Nova or for Super is one in a hundred. If the chances of such an event for each of the two banks are independent, then the chance of a $2 million excess of withdrawals for SuperNova (the same 5% of deposits) is less than one in a thousand. This is because on many occasions when there is an excess of withdrawals from the Super half of the bank, it will be balanced by an excess of new deposits to the Nova half, and vice versa.[16]

With better netting, SuperNova can afford to be less concerned about liquidity. It can reduce the liquidity of its assets relative to those of Super or Nova without increasing its risk of liquidity problems. So SuperNova cuts its reserves by $500,000 and its securities by $1 million, allowing it to increase loans by $1.5 million. The balance sheet becomes

SUPERNOVA

Reserves	$2.5m	Deposits	$40.0m
Securities	4.0m		
Loans	36.5m	Equity	3.0m

Profits are now

$$\pi = (\$36.5\text{m} \times 0.093) + (\$4.0\text{m} \times 0.06) - (\$40.0\text{m} \times 0.05) - \$1.1\text{m} = \$534{,}500$$

and return on equity is

$$\text{ROE} = \frac{534{,}500}{3{,}000{,}000} = 0.178, \text{ or } 17.8\%$$

Equity. The better pooling enjoyed by the merged bank also reduces the risk of insolvency. This is because a larger bank can have a more diversified portfolio. A more diversified portfolio of loans means there is a smaller chance that a large loss will wipe out the bank's equity.

[16] Say withdrawals for each bank have a normal distribution with a mean of zero and a standard error of $430,000. Then the probability that withdrawals exceed $1 million is 1%. The standard error of the sum of withdrawals from the two banks together, assuming withdrawals are independent, is $600,000. Total withdrawals of $2 million is 3.3 standard errors below the mean. The probability of more than $2 million in withdrawals is less than 0.1%.

Super and Nova each have about 200 loans outstanding with an average size of about $90,000. The amount of each loan is about 6% of each bank's equity. When we combine the portfolios, the amount of the average loan falls to about 3% of combined equity. So the damage done by a single default is proportionately smaller. Moreover, if the chances of default on different loans are independent, the risk of total losses wiping out, say, 50% of equity, is lower. The reason is that on many occasions when the Super half of the bank has a bad year for defaults, the Nova half will have a good year. Only when bad years coincide will there be a large loss for the combined bank.

Of course, the key to improved diversification is independence of risks. If Super and Nova both draw their loan customers largely from the same group—say hog farmers or the automobile industry—then there is little gain in diversification from combining their loan portfolios. A bad year for hog farmers or for the automobile industry will result in a large number of defaults for *both* the constituent banks.

Because of better diversification, SuperNova can lower its equity ratio below that of Super or Nova without increasing the risk of insolvency. So SuperNova cuts its equity by $500,000, reducing its loans by the same amount. Its balance sheet becomes

SUPERNOVA

Reserves	$2.5m	Deposits	$40.0m
Securities	4.0m		
Loans	36.0m	Equity	2.5m

Profits are now

$$\pi = (\$36.0\text{m} \times 0.093) + (\$4.0\text{m} \times 0.06) - (\$40.0\text{m} \times 0.05) - \$1.1\text{m} = \$488{,}000$$

and return on equity is

$$\text{ROE} = \frac{488{,}000}{2{,}500{,}000} = 0.195, \text{ or } 19.5\%$$

Reputation. We saw in Chapter 2 that delegation and credit substitution are important parts of the technology of financial institutions. The bank is substituting its own credit when it borrows from depositors and then lends the money out to ultimate borrowers.

Delegation and credit substitution depend on reputation. Depositors must feel that it is safer to lend to the bank than to ultimate borrowers. As a result, a bank's reputation is valuable. If the bank has a good reputation, it will be able to attract more deposits or to attract deposits at a lower rate.[17]

Reputation is indivisible in much the same way as many physical fixed costs. It is therefore a source of economies of scale. Because a large bank does more business, it has more to gain from a good reputation, and more to lose from bad behavior. Also, simple

[17] There is another way in which reputation is valuable. As we saw in Chapter 2, bonding and reputation are alternative ways of supporting delegation and credit substitution. So a bank with a stronger reputation will be in less need of bonding. That means that it can reduce its equity and so boost its ROE.

name recognition is an important element of reputation, at least for small depositors. A bank you have never heard of just does not seem as safe as one with a familiar name.

The enhanced reputation of the combined banks attracts $2 million more in deposits. The balance sheet is scaled up accordingly[18]:

SUPERNOVA

Reserves	$2.625m	Deposits	$42.0m
Securities	4.2m		
Loans	37.8m	Equity	2.625m

Profits are now

$$\pi = (\$37.8\text{m} \times 0.093) + (\$4.2\text{m} \times 0.06) - (\$42.0\text{m} \times 0.05) - \$1.1\text{m} = \$567{,}400$$

and return on equity is

$$\text{ROE} = \frac{567{,}400}{2{,}625{,}000} = 0.216, \text{ or } 21.6\%$$

To sum up, your return on equity is much improved by the merger. It has risen from 11.8% to 21.6%. This improvement is the result of two types of economy of scale. The first stems from indivisibilities in fixed costs: increasing the size of the bank increases fixed costs less than proportionately. The second stems from improved pooling—financial economies of scale: increasing the size of the bank lowers the cost of protecting it against illiquidity and insolvency and increases the returns to reputation.

The Limits to Economies of Scale. Your return is still short of the 25% you could have earned from investing in the stocks of other banks of comparable risk. Of course, you have not fully exploited potential economies of scale. SuperNova is still a very small bank. By increasing its size still further you can expect to increase further your return on equity.

However, we shall see in Chapter 7 that in the United States your ability to exploit economies of scale by increasing the size of your bank is limited by laws that restrict geographic expansion. There may be obstacles to merging your bank with another across state lines, and you will generally not be able to open branches in other states.

Even without these restrictions, a point may come when further increases in size will gain you little or may even lower the return on equity. As banks become larger and larger they start to encounter some *dis*economies of scale. These diseconomies largely result from the difficulties of managing large organizations.

For example, at Nova, you can supervise all the bank's loan officers yourself. At SuperNova, you are already forced to delegate some of the responsibility. At a $100 billion bank, several layers of bureaucracy stand between the loan officers and the CEO. The consequence may be poorer control. A serious mistake (or dishonesty) by a single loan officer can cost the bank millions.

[18] Since you have already set the various ratios (reserves, secondary reserves, equity) at their desirable levels, you scale everything up to preserve the same ratios.

More bureaucracy also means less flexibility. At Nova, you could respond to changing circumstances, take the appropriate decision, and have it implemented immediately. At a $100 billion bank, information about changing circumstances has to make its way up the chain of command. Decisions are made by people further removed from the action. And implementation can take a long time as instructions work their way back down the chain of command.

At some point the diseconomies of scale begin to outweigh the economies. Banks beyond a certain size may have little advantage over smaller banks. The point at which there are no further significant net economies is called the **minimum efficient scale**. Banks smaller than the minimum efficient scale are at a disadvantage, but those above this size have no significant advantage.

minimum efficient scale The scale at which there are no further significant net economies.

Economies of Scope

While economies of scale result from doing more of the same thing, economies of scope result from doing different, but related, things. A firm can sometimes benefit from branching out into new lines of business that are closely related to what it is doing already. It may already possess the necessary tools and know-how, making entry into the new line of business less costly than it would be for a firm starting from scratch. A great deal of innovation is the result of such branching out, and it can be an important source of profit.

What lines of business might offer your bank such economies of scope? Well, you have a lot of experience at processing payments. One possibility is to offer to process firms' incoming checks and ensure that they clear as quickly as possible. Such a service is called a cash management system. You will receive a fee for the service, and, since you already have much of the needed technology and trained personnel, providing the service is relatively inexpensive. This new activity is particularly attractive because it makes no demands on the bank's liquidity and does not increase its risk of insolvency. You have no need, therefore, to increase your provision for liquidity or to increase your equity. In principle, there are many other such services your bank could offer. However, as we shall see in Chapter 6, regulations often stand in the way.

Your new cash management department brings in $200,000 of extra revenue and adds $160,000 to your costs.[19] The net addition of $40,000 to your bottom line brings your return on equity up to 23.1%.

BANKS AND OTHER INTERMEDIARIES

We have seen what is involved in managing one type of financial intermediary—a bank. In many ways, managing any other type of intermediary is similar. Like commercial banks, other intermediaries borrow by issuing their own IOUs and use the proceeds to acquire earning assets. In doing so they face the same problems as you encountered in managing Nova.

[19] A completely new firm set up to provide the same services would have costs of about $250,000 a year and would therefore be unable to compete with you.

EXHIBIT 5.3 Major U.S. Financial Intermediaries and Their Functions

	Lending (Billions of Dollars)[a]	Payments	TRADE IN RISK	
			Insurance	Forward Transactions
Commercial banks	6,593	✓	✓	✓
Near banks				
Savings institutions[b]	1,274	✓		
Credit unions	476	✓		
Finance companies	1,124			
Insurance companies				
Life insurance	3,224		✓	
Property–liability	866		✓	
Investment intermediaries				
Pension funds	6,652		✓	
Mutual funds	6,421			
Securities firms	1,333			✓
SPVs[c]	2,797			
Government intermediaries				
The Fed	639	✓		
Agencies[d]	4,984			✓
Nonfinancial companies	2,020	✓		✓

[a] Total financial assets for financial companies and trade credit for nonfinancial companies.
[b] Savings and loans, mutual savings banks, and federal savings banks.
[c] Issuers of asset-backed securities (see Chapter 14).
[d] Includes federally sponsored credit agencies (see Exhibit 12.1 for a breakdown) and federally related mortgage pools (see Chapter 13 for more information).

Source: Flow of Funds Accounts, *Third Quarter, 2001. (http://www.federalreserve.gov/releases/Z1/)*

Exhibit 5.3 lists the major types of financial intermediary in the United States.[20] For each type of intermediary, it shows the amount of lending. You can see that commercial banks are the most important in this respect, although pension funds are close. The exhibit also indicates whether each type of institution is involved in the other two functions of the financial system—payments and trade in risk.

All intermediaries must worry about the cost of their liabilities and the return on their assets. Their liabilities and their assets may be quite different. However, they face the same problems you encountered in managing Nova. Competition constrains their ability to set rates on liabilities and assets. Asymmetric information is a problem in pricing liabilities and in selecting assets. In selecting assets, there is in general a trade-off between risk and return.

All intermediaries must worry about liquidity. Some, such as pension funds, have long-term liabilities, so that liquidity is less of a concern. Others, like money market

[20] On the whole, other countries have similar types of intermediary. However, we shall see that some other types of intermediary that exist in other countries have no exact counterpart in the United States.

mutual funds and securities firms, have very short-term liabilities and are in much the same position as banks. We shall look at liquidity management in some detail in Chapter 18.

All intermediaries must worry about solvency. Their assets are subject to uncertainty of payment, interest rate risk, and exchange rate risk. Consequently, losses on their assets may render them unable to honor their liabilities. We shall see in Chapter 18 that there are ways to manage these risks. Nonetheless, the ultimate protection against insolvency is equity.

All intermediaries face economies of scale and of scope. Many of the changes in the financial system that we shall discuss in the coming chapters are the result of attempts by various institutions to capture economies of scale and of scope.

We have focused in this chapter on only one of the three functions of the financial system—lending. But financial intermediaries are also involved in payments and in trade in risk (see Exhibit 5.3). Even for a small bank like Nova, the payments function is important (as was shown by your expansion into cash management). Gauging the importance of financial intermediaries solely in terms of the amount of their lending is therefore a mistake. For example, the payments function of banks and the insurance function of insurance companies are enormously important to the economy, quite apart from any lending the institutions may do.

In managing Nova, your choices were often constrained by government regulation. Regulations set minimum values for your reserves and for your equity. Regulations limit your ability to capture economies of scale by opening new branches and your ability to capture economies of scope by expanding into related activities. In addition, the existence of federal deposit insurance affects the trade-off you face in increasing your leverage.

All intermediaries face government regulations and other forms of government intervention. Managing an intermediary means doing the best you can, given the constraints imposed by government intervention. As we shall see, the desire to escape these constraints has been a major force behind financial innovation.

The forces of innovation and change, constrained and also driven by government intervention, have resulted in enormous shifts in the relative importance of different types of intermediary. Over the twentieth century, commercial banks declined steadily in relative importance. Pension funds have grown greatly in relative importance since the 1940s. Other intermediaries, such as thrifts (savings banks and savings and loans), life insurance companies, and securities firms have fluctuated widely in their relative importance over the years. In the coming chapters we shall see why these changes have taken place and what further changes lie ahead.

SUMMARY

- The profits of a bank are its revenues (loans times realized yield) less its variable costs (deposits times cost per dollar of deposit) less its fixed costs. The return on equity is profits divided by equity.
- The return on equity can be increased by reducing equity or by increasing profits. Profits can be increased by earning more on loans, by paying less for deposits, by increasing loans (through an increase in deposits or a decrease in reserves), or by lowering fixed costs.
- The ability of a bank to raise the rates it charges on loans or to lower the rate it pays on deposits is constrained by competition from other banks and from nonbank substitutes. Moreover, raising the contractual

rate on loans may be undesirable because of adverse selection. A higher realized yield on assets will generally mean greater risk.

- The ability of a bank to reduce its reserves is limited by reserve requirements and by its need for liquidity. There are two ways to ensure liquidity, other than by holding excess reserves—asset management and liability management.
- Reducing equity raises the return on equity, but it also increase the risk of insolvency. (This is an example of leverage.) Reducing equity also increases the likelihood of a bank run, although this effect is less pronounced because of deposit insurance.
- Because of economies of scale, other things equal, large banks should be more profitable than small ones. Beyond some point, diseconomies of scale begin to reduce profitability.
- Economies of scale in banking are the result of indivisibilities in many fixed costs, financial economies that result from better pooling and netting with larger size, and economies associated with reputation.
- Economies of scope come from engaging in new lines of business at relatively low cost because they are related to existing lines of business.
- The issues involved in managing any financial intermediary are much the same as those involved in managing a bank—setting rates on assets and liabilities, ensuring liquidity and solvency, economies of scale, and economies of scope.
- The choices of managers of financial intermediaries are constrained by government regulation and affected by other forms of government intervention.

DISCUSSION QUESTIONS

1. Draw up T-accounts for the following transactions:
   a. Meg Willis repays the $100,000 loan from Nova Bank with a check drawn on her deposit at the bank.
   b. Meg Willis repays the $100,000 loan from Nova Bank with a check drawn on her deposit at another bank.
   c. A borrower with a $50,000 loan from the bank defaults and the loan is written off.
   d. After market interest rates fall, Nova sells for $2 million some securities for which it paid $1.5 million.
2. Calculate the effect on Nova's profits and on its ROE of each of the following changes. In each case, start from Nova's final balance sheet (before its merger with Super Trust).
   a. A reserve requirements of 5% is imposed on time deposits (half of Nova's deposits are time deposits).
   b. Bank regulators impose a minimum equity ratio of 10% on all banks.
   c. New banking regulations increase the burden of required paperwork. The cost to the bank is $50,000 a year.
   d. The yield curve steepens, so that Nova can pay 1% less in explicit interest on its deposits and earn 1% more on its loans.
3. Banks have received a bad press for the "excessive" interest rates they charge on credit card debt.
   a. Suppose a bank is paying 4% on its deposits and charging 18% on credit card debt. Is it making a profit of 14%? What might account for the difference in rates?
   b. Banks do not usually compete for credit card business by offering lower interest rates. Why not?
   c. At one time Congress was considering legislation to cap credit card interest rates at 14%. As a banker, what would you have done had the legislation gone through?
4. List all the reasons why there are economies of scale and of scope in banking. Which of them do you think would apply to an insurance company (see Chapter 2)? To a an automobile company?
5. The typical bank has a much higher leverage ratio than the typical manufacturing firm. What are the differences between the two kinds of business that account for this?

6. Suppose that servicing the average checking deposit costs a bank $5 a month and that the bank is willing to pay implicit interest of 5% on checking deposits. What average balance would it require for "free checking"? Banks could, in principle, pay higher explicit interest on checking deposits and eliminate implicit interest. That is, they could charge for the "free" services they now provide (checks, teller machine transactions, and so on). Why do you think they do not do so?
7. Consider the following banks:

BANK A

Reserves	$20m	Deposits	$150m
Loans	140m	Equity	10m

BANK B

Reserves	$15m	Deposits	$110.0m
Loans	105m	Equity	10m

Each bank faces a 12.5% realized rate on loans and variable costs of 10¢ per dollar of deposits. Total fixed cost is $750,000 for Bank A and $700,000 for Bank B.

   a. Calculate profit and return on equity for each bank. Why might their return on equity differ?
   b. Now Banks A and B merge to form Bank C. Assume that the reduction in fixed costs is such that the total fixed costs for the combined bank is $750,000. Find Bank C's profit and return on equity assuming no change in the combined balance sheet.
   c. Owing to improved pooling, Bank C can reduce its reserves by $500,000. What, if anything, happens to profit and return on equity?
8. What are the ways that your choices, as the manager of Nova, are restricted by government regulation? Can you justify these restrictions?

KEY TERMS

balance sheet
assets
liabilities
equity
T-account
realized yield on loans
explicit interest on a deposit
implicit interest on a deposit
variable costs
fixed costs
return on equity (ROE)
required reserves
loan commitment
excess reserves
asset management
secondary reserves
overnight loan
liability management
insolvent
market value of a bank
book value of a bank
value of the charter
leverage
leverage ratio
equity ratio of a bank
minimum efficient scale