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CHAPTER 2

THE FINANCIAL SYSTEM AND ITS TECHNOLOGY

When you finish this chapter you will understand:

- How banks make payments easier and how they create money
- How financial markets and banks make it easier to lend
- How insurance companies and futures markets operate
- The four basic techniques that all financial institutions and markets use

To understand the changes taking place in the financial system, you need to understand what the financial system does and how it does it. In Chapter 1, we saw what it does: the financial system makes it easier to trade. We saw that there are various types of trade—trade in goods and services, lending, and trade in risk (insurance and forward transactions). These different types of trade face similar obstacles—the problems associated with promises and with incentives, and illiquidity. The financial system addresses these problems. In this chapter, we shall see how.

The chapter looks in turn at lending, payments, and trade in risk. In each case, we review the key institutions and the methods they use. The final section highlights the similarities in these techniques. Our goal in this chapter is to understand basic principles: we shall have much more to say about specific institutions later in the book.

PAYMENTS

In Chapter 1, we saw that there are two general methods of trading—*credit trading* and *cash trading*. We looked at some examples in the fictional Republic of Ruthenia. The system of mutual credit, in which factories provide each other's workers with goods, was an example of credit trading. Payment in U.S. dollars was an example of cash trading. As we saw, both methods had their problems. Let us see how Ruthenia's emerging financial system addresses these problems.

Reducing the Costs of Payment in Cash

In Borodino, the capital of Ruthenia, trade is mostly in cash. The anonymity of the big city, and the large number of traders, make promises of payment unacceptable. This exclusive reliance on cash is costly and cumbersome. People need to hold large amounts of cash and guard them against theft. Large payments require secure transportation, the counting of large amounts of currency, and authentication of each bill (counterfeiting is widespread).

Ruthenia's new entrepreneurs see these problems as a profit opportunity. They are sure that if they can offer a service that reduces the transactions costs of cash payment, they will attract plenty of business and make a good profit.

warehouse bank
A bank that keeps depositors' cash in storage.

Warehouse Banks. Several entrepreneurs set up **warehouse banks**. In exchange for a fee, warehouse banks offer security and ease of payment. They accept deposits of cash, count and authenticate the currency, and store it in a solid and well-guarded vault. They allow depositors to make payments by transferring title to deposited cash rather than by transferring the cash itself.

check
An order to a bank to make payment from a deposit.

For example, Yuri has a deposit at Svoboda Bank. He needs to pay Natasha \$100,000. Rather than having to go to the trouble and expense of transferring to Natasha a large amount of U.S. currency, Yuri simply writes an order to his bank to pay her that amount. Such an order is called a **check**. If Natasha, too, has a deposit at Svoboda Bank, the institution simply credits the deposit with an extra \$100,000 and debits Yuri's for that amount.

clearing
Collection process for checks in which checks drawn on one bank are offset against checks drawn on another.

The Clearinghouse. What if Natasha has a deposit at a different bank? She could cash the check at Svoboda and carry the cash to her own bank, Narodny, for deposit. But that would be risky and inconvenient. Happily, the banks have an arrangement that makes such a physical transfer of cash unnecessary. The arrangement is called **clearing**.

Clearing works like this. On a typical day, each bank receives many checks drawn on other banks. So each afternoon, messengers from all the banks get together at an agreed location, trade checks, and settle the net amounts owed. For example, suppose Svoboda has \$10,000,000 of checks drawn on Narodny and Narodny has \$9,600,000 drawn on Svoboda. Instead of Narodny paying Svoboda \$10,000,000 and Svoboda paying Narodny \$9,600,000, they net the two amounts: Narodny pays Svoboda the difference: $\$10,000,000 - \$9,600,000 = \$400,000$.

Narodny could pay this amount by physically delivering cash. However, there are less costly alternatives. Svoboda could simply agree to hold a \$400,000 deposit at Narodny: it may well have to use it the next day to settle with Narodny. Or the two banks could keep



A HISTORY OF CLEARING

London in the eighteenth century was a center of financial innovation. One of the most successful new ideas was the check. As the use of checks increased, banks began to send “walks clerks” to other banks to collect payment. This meant having hundreds of clerks walking across town carrying large sums of cash, with all the attendant dangers.

The clerks themselves eventually established an informal, unsanctioned meeting, usually at a local coffeehouse. There, they traded checks with one another, settling net balances only. This required less walking and reduced the need to carry cash—probably making the lives of the clerks much safer.

By 1770, the banks formally recognized the clearing and established an official meeting place. By the 1850s, they were settling with deposits at the Bank of England rather than with cash.

The first clearinghouse in the United States was established in New York City in 1854. By the end of the century most large cities had a clearinghouse.

clearinghouse

An association of banks to facilitate clearing.

clearing deposits at a third bank, on which each could write checks to the other.¹ The clearing of payments among banks is organized through an association called a **clearinghouse**. Clearing and clearinghouses have a long history (see “A History of Clearing”).

So, Natasha signs over Yuri’s check to her own bank, Narodny. Narodny credits her deposit with an extra \$100,000 and collects from Svoboda through the clearinghouse.

Bank Deposits as Money. Notice that “payment in cash” has taken on a new meaning. For large payments, it is deposits that are now used as money, rather than the underlying cash. When a payment is made, it is the ownership of a deposit, rather than the underlying cash, that changes hands.

The cash in the banks’ vaults is rarely touched. There is no need to move cash, to count it, or to authenticate it. Since physical cash rarely changes hands for large payments, the cost of such payments is greatly reduced.

Fractional Reserve Banking

Noticing that the cash backing the bank’s deposits is rarely touched, the owner of Svoboda Bank has an interesting idea. How about *creating* “deposits” and lending them? The borrowers would have “deposits” without ever having deposited any cash with the bank.

Here is how it works. Ivan applies for a \$1 million loan. If the loan is approved, Svoboda creates for him a \$1 million deposit and accepts his IOU in exchange. Ivan can

¹ We shall have much more to say about checks and clearing in Chapter 8.

draw on this \$1 million “deposit” to make payments in precisely the same way he could draw on a regular deposit.

When Ivan draws on his deposit, checks clear through the clearinghouse and Svoboda loses some of its cash to other banks. Since the cash legally belongs to the regular depositors, the bank must have their agreement to use it in this way. To win their agreement, it offers them “free checking” and waives the fees they have been paying on their deposits. It also assures them that they can still withdraw their deposits whenever they wish.

Svoboda’s innovation has a number of far-reaching implications.

Bank Deposits Become IOUs. Once it creates these new deposits, Svoboda Bank ceases to be a warehouse bank. The deposits of a warehouse bank are claims to specific dollars left in safekeeping—in the same way that a cloakroom check is a claim to a specific coat or umbrella. There is a one-to-one correspondence between deposits and cash in the bank’s vault.²

With the creation of deposits through lending, the nature of the bank deposit and so the nature of the bank changes. A deposit at Svoboda becomes no more than an IOU of the bank—a promise by the bank to pay on demand a certain sum of dollars. It is a claim on the bank’s assets in general, rather than on any particular sum of vault cash in particular. The cash in the bank’s vault becomes a general reserve that helps ensure that the promise to pay can be met. Since the amount of this reserve is only a fraction of the amount of deposits, this new type of bank is called a **fractional reserve bank**.

**fractional
reserve bank**

A bank that holds reserves of cash equal to only a fraction of its deposit liabilities.

Adding to the Quantity of Money. While warehouse banking does not alter the total quantity of money in the economy, fractional reserve banking increases it. To see why, let us begin with the situation before Svoboda’s innovation.

If the total quantity of currency in Ruthenia is \$100 million, this is also the total quantity of money. Warehouse banking does not change this total. The deposits of warehouse banks *are* money: we have seen that people make payments by transferring ownership of their deposits. So we must include the quantity of warehouse bank deposits in the total quantity of money. However, for each dollar of warehouse bank deposit, one dollar of currency is “retired” by being locked up in a bank’s vault. For example, if there is \$30 million of warehouse bank deposits, there is also \$30 million of currency in bank vaults. Therefore,

$$\begin{array}{rcccl} \text{total quantity} & & \text{total} & \text{bank} & \text{currency in} \\ \text{of money} & = & \text{currency} & + \text{deposits} & - \text{bank vaults} \\ (\$100\text{m}) & & (\$100\text{m}) & (\$30\text{m}) & (\$30\text{m}) \end{array} \quad [2.1]$$

When Svoboda creates and lends a “deposit” to Ivan and becomes a fractional reserve bank, this arithmetic changes. The loan creates an additional \$1 million of money in the

² However, since dollar bills are more interchangeable than umbrellas, the bank does not keep specific dollar bills associated with specific deposits. When a depositor makes a withdrawal, he receives an equivalent amount of dollar bills, rather than the very same ones deposited originally.

form of bank deposits, *without* any addition to the amount of currency in bank vaults. So the total quantity of money increases by \$1 million. Now,

$$\begin{array}{rcll} \text{total quantity} & & \text{total} & \text{bank} & \text{currency in} \\ \text{of money} & = & \text{currency} + \text{deposits} & - & \text{bank vaults} \\ (\$101\text{m}) & & (\$100\text{m}) & (\$31\text{m}) & (\$30\text{m}) \end{array} \quad [2.2]$$

A New Method of Trading. Remember our two methods of trading. Credit trading involves the exchange of value for promise: the seller provides the buyer with value in exchange for the buyer's promise. Cash trading involves the exchange of value for value: there is no promise, and, therefore no trust is required.

Payment with warehouse bank deposits is cash trading. Such payment is easier and less costly than the physical transfer of cash, but the two are essentially equivalent. The seller receives title to cash rather than physical cash, but no trust is involved (assuming that warehouse banks are run honestly).

Payment with the deposits of fractional reserve banks, however, represents a fundamentally new method of trading. When the seller receives payment in the form of a claim on a fractional reserve bank, he receives not value, but a promise. However, the promise is not the promise of the buyer: it is the promise of a third party—the bank. For example, suppose the seller receives payment in the form of \$100 of bank deposits. As we have seen, the deposits of a fractional reserve bank are IOUs. The \$100 in deposits is a promise of the bank to pay \$100 in cash on demand.

The new method makes trade easier because the promise of the bank is more readily acceptable to the seller than is the promise of the buyer himself. One reason is better credit. The bank is better known, and it has an interest in maintaining its reputation by honoring its promises. A second reason is that the bank's promise is money: the seller can pass it on to someone else in payment. The seller could not, in general, do this with a promise from the buyer.

Because it relies on the credit of a bank rather than on the credit of the buyer, this new method of trading extends the potential scope of credit trading enormously. The exchange of value for promise becomes possible not only in a small community of mutual trust, but also in the larger community of anonymous traders.

We have seen some of the things financial systems can do to make payment easier. Modern financial systems have developed many refinements of the simple payments process described here—for example, credit cards, debit cards, electronic payments, and foreign exchange. We shall discuss these in detail in Chapter 8.

LENDING

We saw in Chapter 1 that lending is difficult. Generally, it involves risk. To manage the risk, you need to acquire and process information, to draw up a contract with the borrower—with due attention to the incentives this creates—and to monitor compliance. Liquidity too may be a problem: circumstances may change, and you may want your money back. The financial system addresses these difficulties and so makes lending easier.

The best way to see how the financial system does this is through an example. You have \$50,000 you would like to save. Origen, the promising biotech company we encountered in Chapter 1, needs \$10 million to invest in a new project. There is potential here for a trade. If the difficulties can be overcome, you can lend your \$50,000 to Origen to the mutual benefit of yourself and the firm.

Direct Lending and Financial Markets

Financial markets are organized to make it easier for you to lend. Let us see how.

Market Institutions That Make It Easier to Lend. The first step in making a loan is gathering and digesting information. A variety of institutions exist to satisfy your need for information:

- The financial press—*The Wall Street Journal*, *the New York Times*, *Business Week*, and other publications—gathers and disseminates news about individual companies and about the economy as a whole.
- Accounting firms audit a firm's books. Firms that borrow from the public must make the results of these audits publicly available.
- Investment information services such as Standard & Poor's, Moody's, and Value Line gather and publish information and analysis on individual companies and industries.

loan indenture (trust deed)

A loan contract.

underwriter

Someone who purchases new securities from an issuer with the intention of reselling them.

trustee

Someone granted the legal power to manage property for someone else.

The next step is to negotiate and write a loan contract called a **loan indenture** (or **trust deed**). Fortunately, you do not have to do this yourself. New securities are usually sold to the public through an **underwriter**, generally a securities firm. The underwriter negotiates the terms of the loan contract with the issuer and appoints a **trustee** to monitor compliance. In the United States, the trustee is usually a commercial bank.³

When the contract is written and the trustee appointed, the underwriter usually buys the whole issue from the borrower and resells it to the public.⁴ In doing so, the underwriter incurs a legal obligation to provide purchasers with accurate information about the risks involved.

These market institutions greatly reduce the cost to you of lending to Origen. Relying on the information they provide, you decide to go ahead with your loan. You make the loan by buying Origen's securities from the underwriter. Over the life of the loan, your legal interests are represented by the trustee. Rather than you, and hundreds of other lenders like you, having to do all the necessary work individually, it is done for you by these market institutions.

These institutions—underwriters, trustees, accountants, and information sources—have an interest in doing their work well. Their reputations will affect how much business

³ This function used to be performed by specialized *trust companies*, but the distinction between such companies and banks eventually disappeared. The word "trust" still appears in the names of many banks as a hint of their origins as trust companies—for example, Bankers Trust, Morgan Guaranty Trust. In Canada, trust companies remain distinct from banks.

⁴ We will look at underwriting in detail in Chapter 11.

they get in the future. For example, an underwriter that gets the reputation of floating issues that turn out to be lemons will find it hard to sell new issues in the future. As a result, issuers will not hire the firm as an underwriter.

The reduction in cost to you comes at a substantial cost to Origen. It must pay the accountants to prepare the required information; it must pay lawyers to draw up the contract and the trustee to administer it; it must pay the underwriter to organize and to sell the issue to the public (see “The Cost of a Public Issue”).

Many of the costs of a public issue are indivisible. That is, they are incurred whether the sum borrowed is large or small. For example, the legal fees and the costs of providing information will be much the same whether Origen borrows \$1 million or \$100 million. These indivisibilities make it very expensive—and so unattractive—to raise small sums in this way. A public issue will make sense only when the amount to be raised is substantial.

Liquidity and the Secondary Market. Once you have made your loan, Origen has your \$50,000 and you have some securities acknowledging its obligation to you. If the securities are bonds (debt securities), Origen’s obligation is to pay you interest periodically and to repay the \$50,000 at a specified time—say in 20 years. If the securities are equities, its obligation is to pay you dividends (a share in the firm’s profits); it has no obligation to repay you the \$50,000.

THE COST OF A PUBLIC ISSUE

To float a \$1 million issue, Origen would incur something like the following costs:

Underwriter’s fee (2% of face value plus \$15,000 expense allowance)	\$ 35,000
Legal fees	75,000
Accounting fees	65,000
Printing costs	50,000
Debt rating by Moody’s or Standard & Poor’s	25,000
Assorted fees (includes stock exchange, state “blue sky” law, SEC registration, and registrar’s fees)	18,000
Total	\$268,000

The cost is nearly 27% of the total amount raised.

To raise \$10 million in this way would cost \$215,000 in underwriter’s fees (2% of \$10 million, plus \$15,000). The other costs would be roughly the same. The total cost would be \$448,000—only 4.5% of the amount raised.

Sources: Jennings and Marsh (1987) and Soderquist (1982).

transferable security

A security that may be transferred from one person to another.

secondary market

Financial market in which previously issued securities are traded.

primary market

A market for newly issued securities.

dealer

Someone who makes a market by standing ready to buy or sell at quoted prices.

brokers

Someone who arranges trades but is not a party to them.

bid price

The price at which a market maker is willing to purchase.

asked price

The price at which a market maker is willing to sell.

over-the-counter (OTC) market

Physically dispersed market in which market makers are in communication by phone or electronically.

exchange

A market at a specific location, in which traders trade face to face.

What if circumstances change and you would like your money back immediately? Origen is under no obligation to give you back your money. As we saw in Chapter 1, for the money to be of use, Origen needs to be able to rely on having the use of it for a specified period.

Financial markets have developed a solution to this problem—a way for you to get your money *without* Origen having to give it up. In principle, the solution is simple: sell the security to someone else. That way, you get your money, but from someone other than Origen. Origen's obligation of future payment to you is transferred to the purchaser of the security. If the loan contract allows you to do this, the security is described as being **transferable**.

Of course, being *allowed* to sell the security is not enough: you have to be *able* to sell it. But selling securities is just another form of trade. We know that trade is difficult and costly. You will be able to sell your securities relatively easily and at a fair price only if there is an organized market there to help you. Such a market in existing securities is called a **secondary market**. For example, the principal secondary market for equities in the United States is the New York Stock Exchange. A market for new issues is called a **primary market**.

A secondary market will exist only if someone creates it. Market creators come on two types—dealers and brokers. **Dealers** stand ready to buy and sell at posted prices. You could sell your Origen securities immediately by contacting the appropriate dealer and accepting his posted price. The dealer would hold onto the securities until someone else came along wishing to buy them.

Brokers differ from dealers in that they bring buyers and sellers together but do not themselves buy or sell the securities. For example, you would probably sell your Origen securities through a stockbroker. The stockbroker, rather than buying the securities from you, would find someone willing to buy them (perhaps a dealer).

To help you remember the distinction between dealers and brokers, think of used car dealers and a real estate brokers. Used car dealers buy and sell cars and keep an inventory of cars on display with prices posted. Real estate brokers simply help people selling houses find buyers; they do not buy houses themselves for resale.

Dealers make a profit from the difference between the price at which they buy—their **bid price**—and the price at which they sell—their **asked price**. Brokers usually charge a commission for their services.

A secondary market for securities typically consists of many brokers and dealers in communication with one another. Where the organization is loose and communication mainly over the telephone (or over a computer network), the market is called an **over-the-counter (OTC) market**. Where the organization is more structured and communication is often face to face, the market is known as an **exchange**. As examples, we shall see in later chapters that the secondary market for government securities is an OTC market and the secondary market for corporate equities consists of both OTC markets and exchanges.⁵

Making a market in a security is costly. Apart from the actual transactions costs of trading, the broker or dealer must invest time in learning about the company and about the market. A dealer must invest in an inventory of the security and accept the risk of capital loss if the value of the security falls. Many of the costs of making a market are indivisible:

⁵ We shall learn in detail about securities markets in Chapter 11.

they do not depend on the volume of trading. It will therefore be worthwhile to make a market only if trading volume in a given security is large.

A existence of a good secondary market is of benefit to borrowers as well as to lenders. The existence of a good secondary market makes the loan more liquid and therefore more attractive to lenders. The more attractive the loan, the lower the return the borrower will have to pay.

Indirect Lending and Financial Intermediaries

We have seen how financial markets make it easier for you to lend to Origen directly. The financial system also offers you an alternative to such **direct lending**. You could lend your \$50,000 to First National Bank and First National could lend to Origen. First National is acting as a **financial intermediary** in this transaction: it is borrowing in its own name to relend to others. The process is called **indirect lending**.

You are still the ultimate source of the loan: it is you who is giving up purchasing power now in exchange for a promise of purchasing power in the future. However, now the promise to you is from First National, not from Origen. As a result, you face no risk from Origen's defaulting. Indeed, you may not even know to whom First National is lending your money. If Origen defaults, the bank's promise to you is unaffected. Any loss on the loan is First National's problem, not yours.

As a result, all that matters to you is the reliability of First National's promise to you. You should be able to satisfy yourself relatively easily that First National is a reasonable risk. Since banks are in the business of borrowing money and relending it, they have an interest in being safe and in having customers know they are safe. To encourage depositors to trust them with their money, banks reduce the information and monitoring costs of lending to them.⁶

While Origen's creditworthiness is now of no concern to you, it is of great concern to the bank. So the costs of making the loan are passed on to First National. However, its costs will be much lower than yours would have been. Let us look at some of the reasons.

Informational Advantages. First National can obtain a wealth of information about its customers that is not available to the public at large. For example, from observing transactions in Origen's checking account, the bank will have direct access to information on Origen's cash flow. Origen may also be more willing to provide information to its bank in private than to the public at large because it doesn't carry as much risk that valuable secrets will be revealed to its competitors.

Pooling to Make Large Loans. We have seen that because many of the costs of a loan are indivisible, making large loans is relatively less expensive than making small ones. Compared to individual investors, banks make very large loans. For example, the loan First National makes to Origen might be for \$10 million. To make a loan of this size,

direct lending

Lending by ultimate lender to ultimate borrower with no intermediary.

financial intermediary

Institution that borrows by issuing its own securities and relends the funds it raises.

indirect lending

Lending by ultimate lender to financial intermediary that then relends to ultimate borrower.

⁶ In many countries, small deposits are wholly or partly guaranteed by the government. This effectively reduces the information and monitoring costs of depositors to zero. Of course, the insurer of the deposits is faced with substantial information and monitoring costs. We shall have much to say about this in Chapter 19.

First National will put together your \$50,000 with money it receives from many other depositors. On average, bank loans are much larger than individual deposits.

Gains from Specialization. Banks are specialists in assessing the creditworthiness of borrowers and in monitoring their performance. Because of this specialization, they tend to be better at it than the average small lender. Banks are good at reading between the lines of financial statements, and they are less likely to be misled. Experience helps them detect early signs of impending trouble that a small lender might not recognize. This is not to say that banks make no mistakes: in later chapters we shall learn of some doozies.

The Value of a Continuing Relationship. When Origen borrows from First National, it expects to come back to the bank repeatedly for additional loans. It therefore cannot afford to jeopardize its ability to borrow by failing to honor the terms of its current loan. If Origen does default and is cut off by First National, the biotech firm cannot simply switch banks. Being cut off by one bank is hardly a recommendation to others. This strong incentive for a borrower to behave makes monitoring less expensive.

Diversification. The amount of money you, as a single individual, can lend is small compared to the average amount that borrowers like Origen want to borrow. Therefore, if you lend directly, you will not have the resources to lend to more than a few borrowers. If one of your borrowers defaults, you are likely to lose a large portion of your assets.

A bank like First National pools the deposits of thousands of people like you, giving it a very large amount to lend. It can therefore make many loans, each of which is small relative to the size of its total portfolio. Splitting up one's lending in this way is called **diversification**. With a diversified portfolio, if a few borrowers default, only a small part of the total amount will be lost.

To illustrate the advantages of diversification, let us look at an example. Suppose the typical loan is for \$1 million. The borrower pays 15%, but there is a 1-in-20 chance of default; in this case, the whole amount is lost. The expected return is

$$0.95 \times 15\% + 0.05 \times (-100\%) = 9.25\%$$

If First National has a total of \$1 billion to lend, it can make 1,000 loans to 1,000 different companies. The law of large numbers translates the 1-in-20 chance of default on a single loan into a fairly reliable 50 defaults among the 1,000 loans. The chance of more than 70 defaults is only 1 in 1,000. The chance of *all* the loans defaulting is less than 1 in $10^{1,700}$, a truly infinitesimal number. As a result, for First National, the 9.25% expected return is fairly reliable. There is only a 1-in-1,000 chance of the return falling below 6.95% (if there are more than 70 defaults).⁷

Diversification works this well only if the chances of default on the various loans are unrelated. There is little reduction in risk to be gained, for example, from making 1,000

⁷ According to the law of large numbers, the total number of defaults has a Normal distribution with a mean of 50 and a standard deviation of 6.9. The chance of an outcome 3.1 standard deviations above the mean ($3.1 \times 6.9 = 21$ defaults) or more is 1 in 1,000. The probability of all the loans defaulting is 0.05 to the power 1,000.

diversification

Spreading of an invested sum over many independent assets (not putting all one's eggs into one basket).

loans, all to real estate developers in the same region. If there is a slump in the local real estate market, all the borrowers will tend to default together. In this case, in terms of risk, the 1,000 loans are really like a single big loan.

Because of diversification, First National can promise a sure return on its deposits, 5% say. This leaves enough to cover expenses, unusual losses, and a modest profit. As a saver, you may prefer to put your \$50,000 in a bank deposit for a sure 5% rather than gambling on a direct loan that pays 15% if things go well but has a 1-in-20 chance of being a total loss.

Liquidity. The bank deposit also offers you superior liquidity. First National promises to pay what it owes you whenever you ask for it. How can the bank do this, given that its loans are illiquid? The loan to Origen, for example, may be for several years, and it is not easy for the bank to sell it.

It is pooling that enables First National to offer liquid deposits despite the illiquidity of its loans. The behavior of any single depositor—the timing and size of additional deposits, the timing and size of withdrawals—is fairly unpredictable. However, First National has not one but 100,000 depositors. The behavior of 100,000 depositors is much easier to predict.

First National has \$1 billion in deposits. Suppose withdrawals vary between \$20 million and \$80 million each day, and new deposits also vary between \$20 million and \$80 million. Withdrawals and new deposits will tend to offset one another: only rarely will a day of many withdrawals also be a day of few new deposits. As a result, the chance that withdrawals will exceed new deposits by more than, say, \$50 million is quite small. Therefore, by making sure it can readily lay its hands on \$50 million in cash, First National can meet most demands for liquidity on the whole \$1 billion of its deposits.⁸

Occasionally, of course, net withdrawals *will* exceed \$50 million, and the bank will have to have a way to deal with this. Of course, the magic of pooling works only when withdrawal by one individual is unrelated to withdrawal by another. If all depositors want to withdraw their money at once (a **bank run**), the bank will be in serious trouble.⁹

bank run

A simultaneous withdrawal of funds from a bank by many depositors.

Direct or Indirect Lending?

We see, then, that the financial system offers two different solutions to the problems of lending: financial markets make it easier to lend directly; financial intermediaries offer the alternative of lending indirectly. What are the relative merits of the two solutions?

Indirect lending generally promises lenders less risk and more liquidity. Consequently, it also promises a lower average return. Of course, less risk is not always a plus. It means a lower chance of loss, but it also means a lower chance of gain. You may get rich with a clever—or lucky—investment in the stock market, but you will never get rich putting your money in the bank.

⁸ The law of large numbers assures that total new deposits and total withdrawals each have a Normal distribution. Assume that the mean of each is \$50 million and the standard deviation, \$15 million. There is a 95% chance that each will be within two standard deviations of the mean—between \$20 million and \$80 million. Assuming they are independent, the mean value of the difference between new deposits and withdrawals is zero, and the standard deviation is $\sqrt{2} \times \$15 \text{ million} = \21 million . There is therefore a 99% probability that withdrawals will exceed new deposits by more than 2.3 standard deviations, or \$48 million.

⁹ We will discuss bank runs thoroughly in Chapter 19.

Indirect lending has advantages too for borrowers. The bank's edge in gathering information and in monitoring allows the borrower to avoid many of the costs of a public issue. Because of the indivisibility of many of these costs, indirect borrowing is usually cheaper for small or short-term loans. Most borrowers, however, have little choice: their lack of credit standing rules out direct borrowing.

Borrowers who *do* have the option of going to the direct market may find it cheaper to raise large sums on that market. In fact, it may not even be possible to borrow *very* large sums of money indirectly: the capacity of the direct financial markets is much larger than that of even the largest intermediaries.

Direct and indirect lending differ with respect to their flexibility in dealing with repayment problems. The reasons a borrower may be having difficulty repaying a loan may be permanent or temporary. If they are permanent—the result of bad management, for example—**bankruptcy** may be in the lender's best interests. Letting the borrower continue in business will only mean more losses and fewer assets to pay its debts. However, if the problem is temporary—a slow economy, for instance—bankruptcy may not be such a good idea. Bankruptcy is costly, in terms of lawyers' fees, and destructive, in terms of disruption of the firm's normal operations (see "Bankruptcy"). When the problems are temporary, lenders may do better by simply giving the borrower more time to repay the debt.

With direct lending, rescheduling a loan is difficult. The relationship between the borrower and the many, relatively uninformed, lenders is necessarily arm's-length and legalistic. Typically, the lenders do not monitor the borrower closely, and they have no idea whether the problems are permanent or temporary. Because they are so many, it is hard for the lenders to agree on new terms for the loan. As a result, when there are problems, the

bankruptcy

A legal process, supervised by a court, that settles claims against a corporation or individual in default.

BANKRUPTCY

A corporation that is unable to pay its debts may file for bankruptcy. If it does not, its creditors may be able to force it into bankruptcy. Bankruptcy is a legal process, supervised by a court, that settles all claims against the bankrupt to the extent possible. The idea is to ensure that debts are paid in an orderly and equitable fashion, rather than there being a mad scramble among creditors to be paid first. In 2001 some 40,000 businesses filed for bankruptcy.

There are two basic types of bankruptcy—*liquidation* (under Chapter 7 of the bankruptcy code) and *reorganization* (under Chapter 11). About two-thirds of filings are for liquidation; the rest are for reorganization. In a liquidation, the corporation ceases to exist. Its remaining assets are sold. Creditors are paid off to the extent possible from the proceeds. In a reorganization, the corporation, its creditors, and the court agree on a plan for future payment of all or part of its debts. The corporation continues in operation, under court supervision, until the plan is executed.

We shall look at bankruptcy again in Chapter 14.

EXHIBIT 2.1 Direct and Indirect Lending Compared

Example	DIRECT LENDING	INDIRECT LENDING
	Stock Market	Bank
Gathering and evaluating information	Information published by borrower; investment information services; media.	Lender needs information only on bank; bank checks up on borrower
Negotiating and writing loan contract	Underwriter	Bank
Monitoring compliance	Trustee	Bank
Liquidity	Secondary market	Pooling of deposits
Dealing with default	Formal bankruptcy proceedings	Private renegotiation or bankruptcy

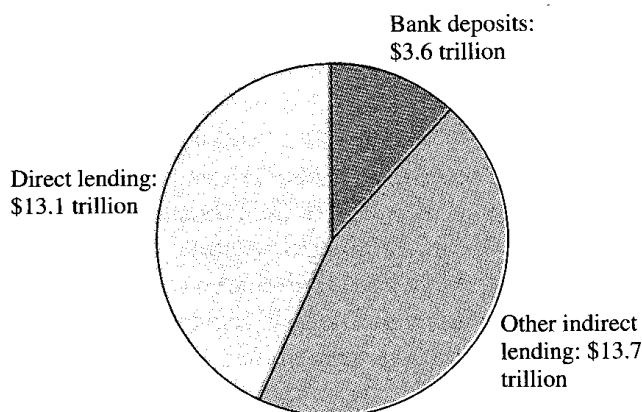
terms of the contract tend to be enforced rigidly—regardless of whether this is in the best interests of the lenders.

With indirect lending, the bank is in a much better position to know whether the problem is permanent or temporary. As a sole lender, it can alter the terms of the loan without having to obtain the agreement of others. It can reschedule payments, waive loan covenants, or even make new loans to help the borrower through a temporary bad spot.

Exhibit 2.1 summarizes the main differences between direct and indirect lending.

Exhibit 2.2 shows the relative importance of different types of direct and indirect lending in the United States. Note that indirect lending dominates.

EXHIBIT 2.2 Amounts of Direct and Indirect Lending Outstanding June 30, 2001 (Billions of Dollars)



Direct lending includes credit market instruments and other corporate equities; other indirect lending includes mutual fund shares, life insurance reserves, and pension fund reserves.

Source: Federal Reserve Bulletin (2001).

Countries differ significantly in their reliance on direct and indirect lending. Exhibit 2.3 shows the split for a number of countries in 1985. Notice that developed countries relied relatively more on direct lending (although France was an exception). Notice, too, that banks were less important in the United States than they were in most other countries—developed or less developed. We shall see some of the reasons for these differences in later chapters.

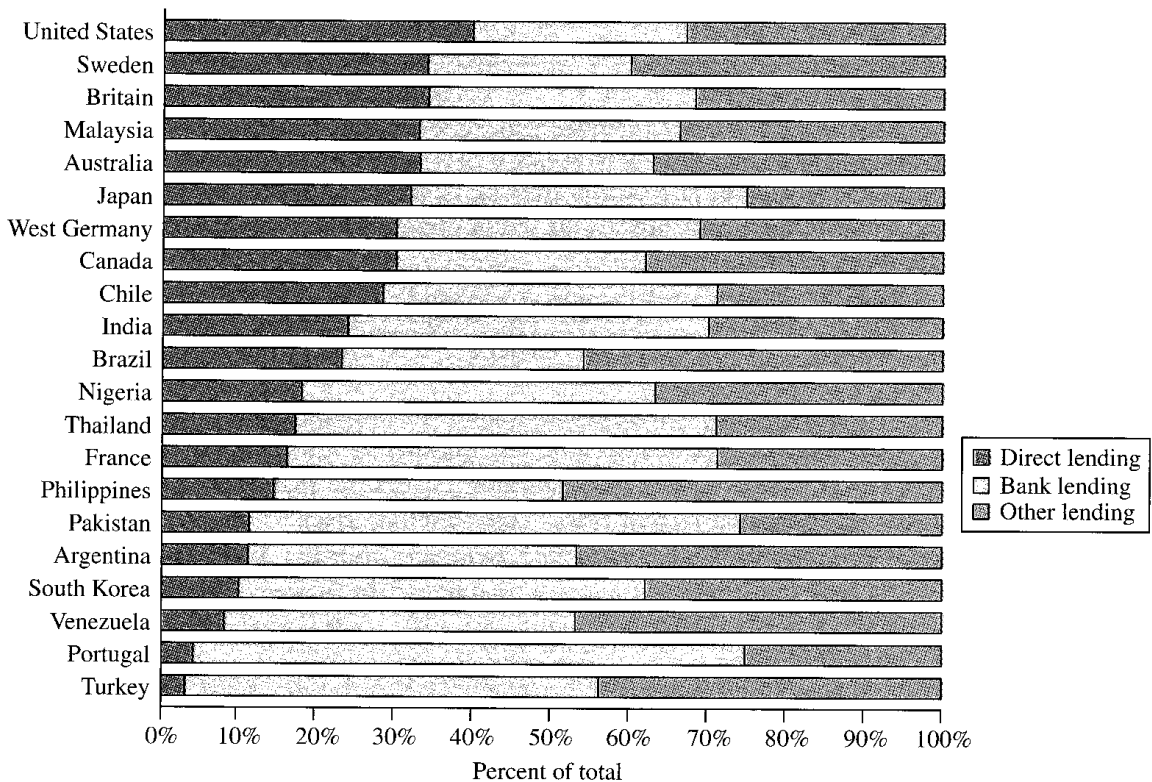
TRADE IN RISK

As we saw in Chapter 1, trade in risk is subject to many of the same problems that affect lending. Let us see how the financial system addresses the problems of the two main types of trade in risk—insurance and forward transactions.

Insurance

In Chapter 1, we looked at some simple forms of reciprocal insurance that did not involve the financial system in any way. For example, under a system of mutual aid, a farmer who

EXHIBIT 2.3 Direct and Indirect Lending—An International Comparison



Source: *The World Bank (1989)*; data are for 1985.

assessment

A share of a loss to be paid by a member of an insurance pool.

insurance policy

A contract with an insurance company under which the insured pays a premium in exchange for coverage of specified losses.

premium

The amount an insured pays for coverage under an insurance policy.

property-liability insurance

Insurance that covers damage to property.

life insurance

Insurance that covers "damage" to individuals.

actuarial risks

Risks experienced by large populations and therefore of known probability.

loses his barn receives help from his neighbors to rebuild it. In exchange, he must provide whatever help is necessary (an **assessment**) to help others in the same predicament.

Let us compare this with the alternative offered by the financial system—an **insurance policy** with an insurance company, Gibraltar Property and Casualty. This is how the policy works. Each year, on January 1, the farmer pays Gibraltar a **premium** of \$1,200. In exchange, if his barn burns down during the year, Gibraltar pays him the replacement cost—\$100,000.

How an Insurance Company Works. How can Gibraltar accept this risk? It can do so because it pools the risks on some 200,000 farmers. Pooling this large number of risks converts the 1-in-100 chance of an individual claim into a near certainty of about 2,000 claims out of the 200,000. Gibraltar takes in \$240 million in premiums and pays out about \$200 million in claims. Thanks to the law of large numbers, there is less than a 1-in-1,000 chance that claims will exceed this amount by more than \$14 million.¹⁰

Gibraltar can increase its profits by investing the premiums it collects. Gibraltar receives the premiums at the beginning of the year and pays claims at a steady rate throughout the year. That means it pays claims on average half a year *after* it receives premiums. So Gibraltar can earn half a year's interest, say 3%, on its \$240 million in premiums—a total of \$7.2 million.

Notice that by investing the premiums, Gibraltar acts as a financial intermediary: it raises funds by issuing claims on itself and uses the proceeds to make loans. In this respect, it differs from a bank only in that the claims it issues are insurance policies rather than deposits.

The Advantages of an Insurance Policy. What are the advantages to the farmer of an insurance policy over reciprocal insurance? First, the assessments required under reciprocal insurance are themselves a source of risk. Neither their size nor their timing can be known in advance. The farmer may be called upon to provide a lot of help just when it is particularly costly for him to do so. In contrast, the premiums on the insurance policy are fixed and certain.

Second, the reciprocal insurance is based a much smaller pool, so there is a greater chance that it will fail. A severe storm, or an arsonist, could cause more damage than the participants could handle. In contrast, the insurance policy is based on a much larger and better diversified group. And, in addition, it is backed by the capital of the insurance company itself: if losses exceed premiums, Gibraltar promises to cover the difference.

In much the same way that Gibraltar covers the loss of the farmer's barn, insurance companies cover a variety of risks. These include risks to homes, automobiles, and commercial property (collectively called **property-liability insurance**) as well as medical expenses or death due to illness or accident (**life insurance**). These various categories of insurance are based on the pooling of many similar risks of known probability (**actuarial risks**).

¹⁰ The calculations are similar to those in footnote 9. The mean number of claims is 2,000 and the standard deviation is $\sqrt{200,000 \times 0.99 \times 0.01} = 44.5$. The chance of an outcome 3.1 standard deviations above the mean ($3.1 \times 44.5 = 138$ claims) or more is 1 in 1,000.

Nonactuarial Risk and External Insurance. Many risks are not actuarial—for example, the risk that a satellite launch will fail. In such cases, the probability of loss is not known as it is with actuarial risks. Moreover, the pool of those exposed to the risk is small. So it is impossible to organize insurance for this sort of risk in the same way as for actuarial risks.

For nonactuarial risks, the financial system offers external insurance. Insurers not inherently exposed to the risk agree to bear part of it for a premium. If there is a loss, they pay their share of the loss; if not, they are ahead by the amount of the premium. External insurers cope with the risk through diversification: they take on many unrelated risks, each small relative to their capital.

Actuarial insurance is generally offered by insurance intermediaries, but there is an important *market* for external insurance—**Lloyd's of London**. This is an exchange where groups of wealthy individuals bid to accept nonactuarial risks for a premium.¹¹

Lloyd's of London

An exchange comprising groups of wealthy individuals who bid to accept non-actuarial risks for a premium.

Dealing with Incentive Problems. As we saw in Chapter 1, insurance faces the twin problems of moral hazard and adverse selection. These problems are more serious for an insurance company than they are for a system of mutual aid. With mutual aid, the farmer himself faces considerable costs if his barn is lost: he too must work on its reconstruction. This gives him an incentive to take care, reducing moral hazard.

deductible

Initial amount of a loss to be paid by the insured.

The insurance company can replicate this incentive structure by offering only partial coverage. With a **deductible**, an initial amount, say, \$1,000 of a loss is not covered. With **coinsurance**, the insurer pays only a part of the loss, say 90%. With a deductible or coinsurance, the insured still faces a cost if there is a loss, and therefore has an incentive to exercise care. The insurance company can also *require* care as a condition for coverage. For example, a condition of coverage might be that no combustible materials (except hay, of course!) be stored in the barn.

coinsurance

Percentage of a loss to be paid by the insured.

Adverse selection is not much of a problem for mutual aid, because participation is not voluntary. All members of the community are expected to participate. However, it is a problem for the insurance company. High-risk farmers will find the insurance a bargain and will buy a policy; low-risk farmers, finding the insurance too expensive, will not buy it. As a result, the frequency of claims will rise, and the insurance company may lose money. The best it can do is to gather as much information as possible to distinguish high-risk farmers from low, and to try to tailor its premiums to reflect risk.

Forward Transactions. Like lending, forward transactions involve promises. They are therefore subject to the same kinds of problem. As with lending, the financial system helps in two ways: the first is to make direct trading easier; the second is to offer indirect trading through intermediaries. Direct forward transactions are made easier by futures markets—the analog of markets for stocks and bonds. Indirect forward transactions are offered by banks, much as they offer indirect lending.

Futures Markets. Let us return to the forward transaction example we used in Chapter 1. Remember, you were thinking of expanding your copper mine, but were concerned about taking on the consequent price risk. If the price of copper were to fall, you

¹¹ See Chapter 9 for more on Lloyd's of London.

would take a loss. We saw that you could reduce this risk by selling your copper forward to American Electric. We saw, too, that such promises to buy and to sell in the future are subject to default risk (replacement risk). Dealing with this risk imposes significant costs on both parties to the transaction.

futures market
A market in standardized contracts for future delivery of various goods.

The financial system offers you an alternative to selling forward to American Electric. You could instead protect yourself from a fall in the price of copper by trading in the **futures market**. For example, you could sell copper futures on COMEX, a commodities exchange in New York that specializes in metals. Each contract commits you to deliver for an agreed price a certain quantity of copper at a specified time—say, next December. Your broker goes onto the floor of the exchange and finds traders willing to buy contracts for the 1 million pounds you wish to sell. The price, determined by supply and demand, is \$1.80 a pound.

Both parties to a futures contract are guaranteed against default by the exchange. If a buyer fails to keep his part of the bargain, COMEX will buy the copper from you at the contract price. If you default, the exchange will provide the buyer with copper at the contract price. While this arrangement makes things much easier for buyer and seller, it does expose the exchange itself to risk. We shall see in Chapter 16 that the exchange handles this risk by requiring traders to post collateral and by organizing trading in ways that minimize the risk.

The futures exchange solves another problem of forward transactions—the difficulty and cost of finding trading partners. It does this by providing an organized market in which buyers and sellers can easily find one another. To increase the number of potential traders, contracts are standardized. Each contract specifies a standard amount of a standard grade of the commodity, to be delivered at a standard time and place. The large number of traders and the large volume of trading ensure that you get a fair price for your contracts and that transactions costs are low.

Continuous trading in each contract up to the date of delivery provides you with liquidity. For example, suppose the financing for your planned mine expansion falls through, so that you will not have the copper to sell after all. You would like to get out of your contract. No problem. All you need do is ask your broker to *buy* contracts for 1 million pounds of copper to offset the contracts you have already sold. Since you will then be obliged both to deliver and to accept delivery of 1 million pounds of copper next December, your original obligation is effectively canceled.¹²

Futures contracts exist not only in metals, but also in agricultural commodities, oil products, foreign currencies, and a variety of financial instruments. We shall discuss the futures market in detail in Chapter 16.

Forward Intermediaries. To illustrate how banks act as forward intermediaries, let us look at another example. Valley Motors of Los Angeles imports Kamikaze cars from Japan. It does not have to pay for each shipment immediately: it has 90 days to pay. Although this credit is useful, it exposes Valley to a type of price risk.

¹² If the price of December contracts has changed since you sold them, you will make a gain or a loss. For example, suppose the price has fallen to \$1.75. You are obliged under the new contracts to pay \$1.75 million for 1 million pounds of copper in December. Under the contracts you sold earlier, you are to receive \$1.80 million for 1 million pounds of copper. Your profit in this case is \$50,000. If the price of copper had risen, you would have taken a loss.

**exchange
rate risk**

Risk associated
with fluctuations
in exchange rates.

To understand the nature of this risk, suppose that Valley has just received a shipment of cars. Each car costs ¥2.5 million, which is \$20,000 at the current exchange rate of 125¥/\$. Over the next 90 days, Valley sells the cars to dealers for \$22,000 each. At the end of 90 days, Valley's treasurer goes to the bank to arrange payment. He is stunned to find that the yen has risen to 105 to the dollar (the fewer yen to the dollar, the higher the value of the yen). For each car, Valley now has to pay ¥2.5 million/105 = \$22,900. The rise in the value of the yen has turned an expected profit of \$2,000 per car into an actual loss of \$900. This type of price risk, due to a change in the exchange rate, is called **exchange rate risk**.

Valley can avoid exchange rate risk by buying yen forward. Fortunately, its bank, First National, offers to buy and sell foreign exchange forward. So next time Valley receives a shipment of cars, the treasurer goes to First National and buys forward the yen Valley will need 90 days later. For example, suppose First National's 90-day forward price is 123¥/\$. By buying forward, Valley can lock in a price per car of ¥2.5 million/123 = \$20,325. If the cars sell for \$22,000, this guarantees Valley a profit of \$1,675 per car whatever happens to the exchange rate over the next 90 days.

But doesn't this just pass on the risk to First National? Not at all. First National is acting as an intermediary. While some customers, like Valley, want to buy yen forward, others—say, exporters who are owed payment in yen—want to *sell* yen forward. So First National can offset its forward commitments to sell yen with forward commitments to buy yen.

As is the case with lending, trading with an intermediary lowers the costs to buyers and sellers. Rather than check each other's credit, all they have to worry about is the credit of the bank. Because the bank has an interest in being safe and in being seen to be safe, its credit is relatively good and easily verified.

Of course, the bank must check the credit of buyers and sellers of its forward exchange. However it has many of the same advantages here as it did in the case of lending:

- It has good information about its customers (the same information it gathers when making loans).
- It is a specialist in assessing credit and in monitoring performance.
- It has a continuing relationship with its customers that gives them an interest in meeting their obligations.

Because of pooling, the bank is able to offer its customers liquidity. For a fee, it will allow them to cancel forward commitments.

THE TECHNOLOGY OF THE FINANCIAL SYSTEM

We have seen how the financial system makes different types of trade easier. Looking back, some common patterns emerge that shed light on the basic technology of the financial system. This technology consists of a number of techniques that are used in various combinations in everything the financial system does. These basic techniques are:

- Delegation
- Credit substitution
- Pooling
- Netting

Delegation

To trade you need to find a trading partner and negotiate terms. If the trade involves a promise, you must gather and process information, write up a contract, and monitor compliance. It may be less costly to delegate this work than to do it all yourself.

delegation

Appointing of someone to act for others in a transaction.

The most obvious example of **delegation** is indirect lending: a depositor delegates to a bank or some other intermediary the work of making a loan. But there is delegation too in direct lending: lenders delegate to an underwriter the task of setting up a loan and to a trustee the task of monitoring compliance with the contract. With insurance, the insured delegates to the insurance company setting up the risk pool and dealing with moral hazard and adverse selection. With forward transactions, traders delegate to futures exchanges and to forward intermediaries the work of dealing with promises.

Delegation reduces transactions costs for a number of reasons. For concreteness, we discuss them in terms of delegated lending, but they apply to other forms of delegation as well.

1. Many of the costs of a transaction are *indivisible*. A loan of \$10,000 involves much the same work as a loan of \$10 million. When many lenders lend to a single borrower, the delegate can do the work once for all of them, rather than each having to do the work independently.
2. Delegation allows *specialization*. An individual lender may lend only occasionally, and so acquire little expertise. The delegate, representing many lenders and lending often, acquires experience and know-how.
3. The delegate is in a *stronger bargaining position*. Because lending is concentrated in his hands, the delegate can negotiate better terms. Because the borrower is more likely to do repeat business with the delegate than with a single small lender, the borrower has more of an incentive to behave well.
4. *Revealing information* to a single delegate may be more acceptable to the borrower than a more general disclosure to the public at large.

bonding

The putting up of assets to guarantee performance.

Of course, delegation involve a fundamental problem of its own: *How is the delegate to be trusted?* There are two possible solutions—**bonding** and **reputation**.

A delegate can post a surety or performance bond. For example, banks fund a part of their lending with their own capital. If loans go bad, the bank is first to bear the loss. Having its own money at stake gives the bank an incentive to do its work well.

reputation

The general estimation in which someone is held by the public.

Reputation is valuable. A bank with a reputation for soundness attracts more deposits and has to pay less for them. An underwriter with a reputation for floating only sound issues, finds it easier to sell a new issue and attracts more business from borrowers. The value of its reputation gives the delegate an incentive to be conscientious. A violation of trust damages its reputation and costs it business in the future (see “Adam Smith on Reputation”).

credit

substitution

Replacement of the credit of one party to a transaction with the (superior) credit of a financial institution.

Credit Substitution

In many cases delegation is combined with **credit substitution**. A bank substitutes its own credit for the credit of the borrower: depositors lend to the bank rather than to the ultimate borrower. An insurance company substitutes its own credit for the credit of members of the



ADAM SMITH ON REPUTATION

“Of all the nations in Europe, the Dutch, the most commercial, are the most faithful to their word. The English are more so than the Scotch, but much inferior to the Dutch. . . . This is not at all to be imputed to national character, as some pretend; there is no natural reason why an Englishman or a Scotchman should not be as punctual in performing agreements as a Dutchman. It is far more reducible to self-interest, . . . [which] is as deeply implanted in an Englishman as a Dutchman. A dealer is afraid of losing his character, and is scrupulous in observing every engagement. When a person makes perhaps twenty contracts a day, he cannot gain so much by endeavoring to impose on his neighbours, as the very appearance of a cheat would make him lose. When people seldom deal with one another, we find that they are somewhat disposed to cheat, because they can gain more by a smart trick than they can lose by the injury which it does their character.”

Source: Smith (1964).

risk pool. The futures exchange substitutes its own credit for the credit of individual traders.

Delegation and credit substitution do not always go together. Underwriters do not guarantee the issues they float: there is delegation but not credit substitution. When bank money is used in payment, the bank substitutes its own credit for the credit of the buyer: there is credit substitution but no delegation.

Credit substitution works because the promise of the bank, insurance company, or futures exchange is more acceptable than the promise of the ultimate trading partner. This is so for two reasons. The first is reputation: the financial institution’s reputation for keeping its promises is essential to its business. The second reason is that the financial institution may be better *able* to keep its promises. The principal reason for this is pooling.

pooling

Combination of assets or liabilities in ways that reduce risk or improve liquidity.

netting

Offsetting of one transaction against another to reduce the number of transactions that actually need be executed.

Pooling

Pooling makes the liabilities of a financial intermediary (the promises it makes) safer and more liquid than its assets (the promises to it). For example, we have seen how pooling makes bank deposits safer and more liquid than bank assets. One reason pooling works is *diversification*. Another is netting.

Netting

Executing a transaction is costly. **Netting** lowers costs by offsetting one transaction against another, so that fewer transactions need actually be executed. The clearing of checks is an

EXHIBIT 2.4 Institutions, Technologies, and Types of Trading

Type of Trade	Institution	TECHNIQUES			
		Delegation	Credit Substitution	Pooling	Netting
Payments					
Cash trading	Warehouse bank			✓	✓
	Clearinghouse				✓
Credit trading	Fractional reserve bank		✓	✓	✓
Lending					
Direct	Underwriter	✓			
	Trustee	✓			
	Secondary market (dealer, broker, exchange)				✓
Indirect	Lending intermediary (bank and others)	✓	✓	✓	✓
Trade in risk					
Insurance	Insurance company	✓	✓	✓	
Forward transactions	Futures exchange	✓	✓		✓
	Forward intermediary (bank and others)	✓	✓	✓	✓

example. The physical transfer of currency is costly: the netting of banks' obligations to one another reduces the need for physical transfer and so reduces costs.

Netting also creates liquidity. For example, a bank can hold relatively illiquid assets because it can meet withdrawals out of new deposits, without having to liquidate the underlying assets. By netting new deposits and withdrawals, it reduces the need to buy and sell the underlying assets.

Secondary markets function in much the same way. A security is a claim on an illiquid asset (a factory, say). The holder can liquidate the claim by selling it to someone else. In this way, the market nets sales of claims against purchases of claims, providing liquidity without touching the underlying asset.

How Different Institutions Use the Basic Techniques

Exhibit 2.4 shows how different financial institutions apply the basic techniques to make the different types of trade easier.

SUMMARY

- Warehouse banks reduce the costs of cash payment.
- Fractional reserve deposits are IOUs rather than claims on specific amount of cash. Fractional reserve banks create additional money. Payment with the deposits of a fractional reserve bank is a form of credit trading, relying on the credit of the bank.

- Organized financial markets make direct lending easier. Different institutions provide information, negotiate and write the loan contract, and monitor compliance. These institutions have a reputational stake in doing their work well.
- Dealers and brokers create secondary markets to provide liquidity for direct loans.
- Financial intermediaries offer the alternative of indirect lending. Their credit is good and easy for lenders to check, and they have advantages in dealing with borrowers. Pooling enables them to offer lenders improved liquidity.
- Indirect lending has advantages for borrowers, too—lower costs for small loans and better treatment of repayment problems.
- The advantages of an insurance policy over private arrangements such as mutual aid include sure premiums and greater reliability. The reason for these advantages is pooling over a larger number of insureds.
- Futures markets and forward intermediaries make forward transactions easier. They offer low transactions costs, guaranteed delivery, and greater liquidity.
- All these different institutions rely on the same four basic techniques—delegation, credit substitution, pooling, and netting.

DISCUSSION QUESTIONS

1. A fractional reserve bank creates money. Are there any limits to how much it can create? Does a large bank face the same limits as a small bank? What would be the limits for a large bank that was the only bank in the country?
2. How do financial markets and financial intermediaries provide liquidity. What are the differences from the point of view of the lender? The borrower? In each case, could the mechanism providing liquidity fail? What would happen if it did?
3. What are the risks of being a dealer? A broker? Which would you expect to charge a larger fee?
4. A bank, an underwriter, a securities dealer—what are the similarities in what they do? What are the differences?
5. Describe the different ways that pooling is used by various financial intermediaries.
6. Give three examples of actuarial risks not mentioned in the chapter. Give three examples of nonactuarial risks. Does insurance exist for each? If it does not, why not?
7. Find five types of contract from the list of traded futures contracts in *The Wall Street Journal*. Against what type of price risk does each provide protection? Who are the potential traders in each type of contract?
8. Gambling is a form of trade in risk.
 - a. What is the nature of gambling transaction? How does it differ from insurance?
 - b. What are the obstacles to this form of trade? What institutions exist to overcome these obstacles? Compare their methods with those of financial intermediaries (say, insurance companies).

BIBLIOGRAPHY

Federal Reserve Bulletin, September 2001, Table L. 100.
 Jennings, R. W., H. March. *Securities Regulation: Cases and Materials*. 6th ed. Mineola, NY: Foundation Press, 1987.
 Smith, Adam. "The Influence of Commerce on Manners." In *Lectures On Justice, Police, Revenue,*

And Arms. Edited by Edwin Cannan. New York: Augustus M. Kelley, 1964, pp. 253–254.
 Soderquist, Larry D. *Securities Regulation: A Problem Approach*. Mineola, NY: Foundation Press, 1982.
 The World Bank. Quoted in *The Economist*, August 18, 1989.

KEY TERMS

warehouse bank
check
clearing
clearinghouse
fractional reserve bank
loan indenture (trust deed)
underwriter
trustee
transferable security
secondary market
primary market
dealer
broker
bid price

asked price
over-the-counter (OTC) market
exchange
direct lending
financial intermediary
indirect lending
diversification
bank run
bankruptcy
assessment
insurance policy
premium
property-liability insurance
life insurance

actuarial risks
Lloyd's of London
deductible
coinsurance
futures market
exchange rate risk
delegation
bonding
reputation
credit substitution
pooling
netting