

Meir Kohn: *Financial Institutions and Markets*, 2nd edition, Oxford University Press, 2004, chapter 1, pp. 3–19.

# LENDING, PAYMENTS, AND TRADE IN RISK

*When you finish this chapter, you will understand:*

- Why people trade and how they benefit from it
- Why lending, insurance, and forward transactions are all forms of trade
- The underlying motivation for lending, insurance, and forward transactions
- The obstacles to these various forms of trade.

The financial system is changing rapidly. That change is driven by innovation. There are two main types of innovation. The first serves existing needs in new ways. An example is the credit card: this provided a new way to pay for goods and services. The second type of innovation uses existing technology to serve new needs. An example is the financial futures contract: this takes an instrument originally designed to serve the needs of grain dealers and adapts it to serve the needs of financial institutions.

To participate in this process of innovation and change, and perhaps to profit from it, you must understand the needs the financial system serves and the technology it uses. This chapter focuses on the needs; Chapter 2 focuses on the technology.

We must be careful not to define the needs too narrowly. If we do, innovation will leave us behind. So here is a broad definition: *The financial system makes it easier to trade.* Our goal in this chapter is to understand why there is a need to make trade easier.

The first part of the chapter looks at the nature of trade. We start with simple trade in goods and services and go on to more complicated forms—lending, insurance, and forward transactions. The second part of the chapter looks at the problems that stand in the way of trade—problems that the financial system can address.

## TRADE AND THE GAINS FROM TRADE

---

To understand the nature of trade, let us consider a simple example. Imagine that you and twenty others have just arrived at a national park where you will work as rangers for the summer. As you line up to be issued uniforms, you are surprised that no one asks you your size. Uniforms are handed out seemingly at random. However, trade soon sets things right. A frantic half-hour of comparing and swapping leaves everyone dressed in clothes that more or less fit. The gains from trade are obvious to see. As this example shows, people trade because they differ in what they have and in what they want. The basis of trade is diversity.

An important advantage of trade is that it allows specialization. The grassy meadows of New Zealand are a perfect place to raise sheep and cattle. So, New Zealand trades wool and cheese for automobiles and computers. Were it unable to trade, New Zealand would have to produce everything it needs itself. It would have to switch resources from raising sheep and cattle to producing automobiles and computers. But this would be highly inefficient. Because New Zealand is a small country, producing the limited number of cars and computers it needs would be very expensive. Without specialization and trade, New Zealanders would have less of everything.

Although self-sufficiency sounds appealing, it makes no economic sense. Many of your needs can be provided for more cheaply by others; what you have in abundance or can produce easily is often scarce and valuable for someone else. Trade benefits everyone.

## SAVING, INVESTMENT, AND LENDING

---

Lending is a form of trade. When you lend, you give up purchasing power now in exchange for purchasing power in the future. For example, when you put \$1,000 into a savings account for a year, you give up what the \$1,000 could buy today in exchange for what the \$1,000 plus interest will buy one year from now.

As with trade in uniforms in our first example, the basis for this type of trade is diversity. Some people have purchasing power now but want purchasing power later. Others expect to have purchasing power later but want purchasing power now. Let us look at some of the reasons for this diversity.

### Saving and Wealth

**Life-Cycle Saving.** You are probably looking forward to the day when you put aside your textbooks and start to earn a regular paycheck. Exhibit 1.1 shows the path your income will probably take over your lifetime. Initially it will rise rapidly, reaching a plateau in middle age. Then it will drop when you retire.

EXHIBIT 1.1 The Life-Cycle Pattern of Saving

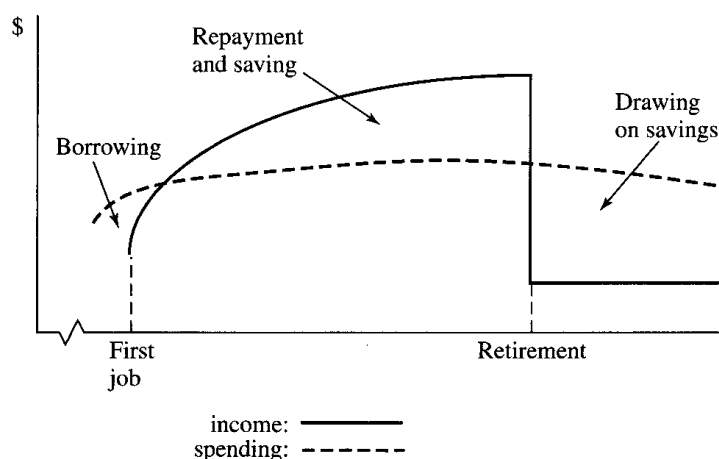


Exhibit 1.1 also shows the path your spending will take over your lifetime. As you can see, it differs substantially from the path of your income. You will likely spend more than your income while you are young, borrowing the difference. During your peak earning years you will repay what you have borrowed and save for your retirement. After you retire, you will spend more than your income, drawing on your savings. This pattern of borrowing, saving, and drawing on savings, which is very typical, is called the **life-cycle pattern of saving**.

#### life-cycle pattern of saving

Pattern of borrowing and repayment, saving and dissaving, over a lifetime.

**Turning Wealth into Income.** Saving is not the only way to acquire wealth. You may win the state lottery. Or you may inherit a fortune from a long-lost uncle. Universities and museums acquire wealth through the gifts of alumni and benefactors. However wealth is acquired, it represents a command over purchasing power. Typically, the owners of wealth do not wish to exercise that purchasing power immediately. Rather, they wish to convert it into a flow of purchasing power over time. You will want to preserve most of your winnings or most of your inheritance to provide you, and perhaps your children, with income for a long time to come. The university or museum will want to preserve its endowment and use the income to fund its yearly operations.

#### precautionary reserve

Assets held as protection against fluctuations in income or spending.

**Precautionary Reserves.** While you can expect your income and spending to behave as shown in Exhibit 1.1, there may be setbacks. You may lose your job, or you may get sick. To protect yourself against such contingencies, you will probably want to accumulate a **precautionary reserve**. When times are good you will set aside some of your income for a “rainy day”.<sup>1</sup> A precautionary reserve has other advantages. Ready access to purchasing power allows you to take advantage of unexpected opportunities—for example, a “special” on a European vacation.

<sup>1</sup> Insurance is an alternative way of dealing with certain kinds of emergency. We will have more to say about insurance later in the chapter.

Even more than households, businesses need precautionary reserves. Their income is more uncertain. A temporary fall in income can force a firm under if it has no reserves to rely on. Businesses need ready access to purchasing power to be able to exploit profit opportunities as they come along.

## Investment

Savers and holders of wealth are potential lenders. Potential borrowers are businesses and households that need purchasing power now in order to invest.

**Business Investment.** To understand why businesses need to borrow, let us look at an example. You decide to fulfill your lifelong dream and open a bike shop. You rent some premises and hire some help—a sales assistant and a mechanic. You order a range of bikes and an assortment of accessories like helmets and clothing. All this is expensive. You must lay out a substantial sum of money—perhaps \$100,000—before you see any sales revenue. Even if the store is a great idea and it ultimately proves to be highly profitable, you cannot get started unless you have the \$100,000 to begin with.

Your problem is typical. All businesses make substantial outlays before they see any revenue. This is true even after a business has started. Revenue coming in pays for past production, but there are always new expenses for current production. The basic problem is that businesses incur expenses before they can sell their products. The funds required to finance the current expenses of producing and selling a product or service are known as **working capital**. The need for working capital is one reason why businesses borrow.

### working capital

Finance needed to cover the expense incurred in the production and sale of a product or service.

Meanwhile, back at your bike shop, talking to customers has given you a great idea for a new product—an automatic gear shifter, the EZ-Shift. Working with an engineer, you have developed a design. To produce the EZ-Shift, you need a small factory—a building and some machinery. Such a factory would cost about \$1 million. Even if the EZ-Shift is just what the market has been waiting for and future profits are sure to be enormous, you will be unable to go into production unless you can find the \$1 million.

Again, your situation is typical. Production often requires long-term investment in equipment and facilities. The resources required are known as **fixed capital**. The need for fixed capital is a second reason businesses borrow.

### fixed capital

Finance needed for investment in machinery or buildings.

Your investment in working capital and your investment in fixed capital are both productive. They will add to your future income more than they cost today. However, both investments involve a timing problem. Without the purchasing power now, you will be unable to make the investment, and you will not be able to reap the rewards.

**Household Investment.** Individuals and households make investments too. Some, like those of business, are productive. For example, your investment in a college education will increase your future income by substantially more than the cost of the investment.

Other types of household investment, like the purchase of a house or a car, are not productive in the sense of increasing future cash flow. Rather, they provide a stream of consumption services over time. That stream of services may be less expensive or preferable in other ways to what could be achieved otherwise. For example, it may be cheaper to buy a house than it is to rent, and the choice of houses may be better.

Households face the same timing problem in making investments as do businesses. Going to college or buying a house may be eminently worthwhile: the benefits in the future may well exceed the cost now. But unless you can obtain the necessary funds, you will be unable to make the investment.

## Gains to Trade in Borrowing and Lending

On the one hand, we have savers and wealth holders with an excess of purchasing power now that they wish to trade for purchasing power in the future. On the other, we have businesses and households needing purchasing power now to finance investments. Both groups stand to gain from trade.

The gain to borrowers is obvious. Borrowing allows you to open your bike shop and to set up a factory to produce the EZ-Shift. If these investments are sufficiently productive, you will be happy to pay interest on the loan—to pay back in the future more purchasing power than you received at the time you took out the loan.

Lenders, too, gain from trade. The interest you pay gives the lender a better return than he could achieve otherwise. What are his alternatives? He could hold cash, but this earns no interest at all. He could make a productive investment himself. But finding productive investments is difficult. Some people are much better at it than others. The typical saver does better by lending his money to someone with a highly productive use for it than by making an investment himself.

## TRADE IN RISK

---

The world is an uncertain place: businesses and households face a variety of risks. Trade can reduce significantly the economic burden of many of these risks. There are two principal forms of trade in risk—insurance and forward transactions.

### Insurance

Insurance is particularly useful in dealing with such events as accidents, illnesses, and natural disasters. Some examples will illustrate.

**Reciprocal Insurance.** In agricultural communities, mutual aid is common. If a farmer's barn burns down, neighbors contribute materials and labor to rebuild it. In primitive hunter-gatherer societies, a family's food supply is highly uncertain: a family that has more than it can eat one day may face starvation the next. A common way to deal with this uncertainty is gift exchange. A family with a surplus gives it away to the other members of the community; in return, it will at other times receive its share of the surplus of others.

Mutual aid and gift exchange are examples of **reciprocal insurance**. Those facing a particular kind of risk agree to share the losses. Reciprocal insurance is a form of trade. The farmer makes the relatively small sacrifice of helping neighbors as necessary if they lose their barns in exchange for a large amount of help from them in the less likely event that his own barn is lost. With gift exchange, a family gives up some of its food when it has plenty in exchange for food from others when it may have little.

#### reciprocal insurance

An agreement whereby those facing a particular risk agree to share their losses.

**External Insurance.** Some types of natural risk do not lend themselves to reciprocal insurance—for example, the risk that a ship will strike a reef or that a satellite will be destroyed on launch. In both cases, the number of potential participants in a scheme of reciprocal insurance is too small relative to the size of the potential losses.

In such cases it may be possible to make an arrangement with others who are not themselves inherently at risk. For example, a shipowner can pay a small amount to each of many individuals not themselves exposed to the risk of shipwreck. If the ship founders, these individuals will compensate the owner for the loss.

**external insurance**

An agreement whereby those who do not face a particular risk agree to share the losses of those who do.

We could call such an arrangement **external insurance**. External insurance too is a form of trade. The shipowner pays, and the insurers receive, a relatively small sum with certainty. In exchange, the insurers pay, and the shipowner receives, a large sum with relatively low probability if the ship is lost.

**Diversity and Gains from Trade in Insurance.** As with other forms of trade, the basis for insurance is diversity. With reciprocal insurance, some will be lucky after the event and others will not. With external insurance, the diversity lies in the *exposure* to risk. Those not inherently exposed are willing, in exchange for payment, to accept a small share of the exposure.

All parties gain from this trade in risk. For the participant in reciprocal insurance or the purchaser of external insurance, the insurance softens the blow of the loss. This benefit is worth more than the cost of the insurance. For the external insurer, the payment received for providing insurance is worth more than the expected cost of covering a loss.

## Forward Transactions

A second form of trade in risk is the forward transaction. The type of risk it addresses and how it does so are best illustrated with an example.

Imagine that you own a copper mine. You find that you can expand the mine to increase output over the coming year by one million pounds of metal. The cost of the additional output works out at about \$1.00 per pound. If you can sell the copper for more than \$1.00 you will make a profit. The price today is \$2.00, but the market price of copper fluctuates widely. It may be substantially lower over the next year.

**price risk**

The risk of an adverse change in market prices.

This sort of risk—call it **price risk**—is common in business. Some course of action requires the commitment of resources today. Its profitability depends on the value of some market price or prices in the future.

Price risk can be mitigated by a form of trade called a forward transaction. In a **forward transaction**, a price is set today for delivery and payment at a specific time in the future. For example, you can mitigate the price risk of your mine expansion by agreeing with someone today to deliver your copper to that person next year at a price of, say, \$1.80.

**forward transactions**

Transactions in which two parties agree in advance on the terms of a trade to be carried out at a specified future time.

Who would want to help you in this way by guaranteeing you a price for your copper? There are two possible candidates. The first is someone who will have to buy copper next year and is worried about the risk of the price rising. For example, American Electric wants to be able to quote prices for its electric motors for the coming year. It does not want to have to annoy its customers by changing prices in the middle of the year to compensate for a change in the price of copper. By buying the copper it will need from you

in a forward transaction, American Electric can protect itself from fluctuations in the market price of copper.

**speculator**

Traders who take a position in an asset solely to profit from a change in price.

Another potential buyer of your copper is a speculator. A **speculator** is someone who neither has copper nor needs it, but is willing nonetheless to take a position in the hope of profiting from it. For example, a trader who expected the price of copper to increase to \$3.00 next year might be willing to buy your output forward for \$1.80 in the hope of reselling it at a profit. A speculator is like an external insurer. He is not inherently exposed to price risk, but he is willing to take on some exposure in the hope of profiting from it.



## GAMBLING AND LOTTERIES

Outlays on all forms of legal gambling in the United States represent about 2% of personal income—comparable in amount to spending on restaurant meals. Net revenue to the industry, after winnings are paid, is about 0.4% of personal income—comparable in amount to spending on tobacco or newspapers and magazines.

Why do people gamble? Gambling that involving small prizes, like local bingo games, seems to be mainly for entertainment. Gambling that involves large prizes—state lotteries, for example—seems to have a more serious purpose—getting rich. The attraction of this type of gambling is that it offers people a chance, however small, of a significant move upward. The marked increased in popularity of gambling in times of social and economic upheaval, such as the Great Depression, seems to support this view.

Governments, while generally limiting commercial gambling, have not been above harnessing it to their own uses. Nero used a lottery to finance the rebuilding of Rome after the great fire. In the eighteenth and nineteenth centuries, European governments used lotteries extensively as a means of financing public works and of raising general revenue. In colonial America, governments used lotteries to finance the building of fortifications, churches, and colleges (Harvard, Yale, Princeton, and the future University of Pennsylvania among them).

By 1832, 420 regular lotteries in eight states grossed some \$66 million—five times the federal budget of that year. Trade in lottery tickets was a big business. Lottery contractors managed the lotteries. Brokers bought blocks of tickets at a discount and resold them to the public nationwide. Many of these lottery brokers later developed into banks, investment banks, and stockbrokers.

Lotteries, and most other forms of gambling, became illegal in the late nineteenth century, but they have made a comeback in recent years. New Hampshire, in 1963, was the first to reintroduce a state lottery. By 1985, nearly 60% of the U.S. population lived in a state with some form of legal lottery.

*Source:* Brenner and Brenner (1990).



**Diversity and Gains from Trade in Forward Transactions.** You can see that here too diversity is the basis for trade. You are worried about a fall in the price of copper. American Electric is worried about a rise. The speculator is not worried at all, unless he takes a position.

All of you will benefit from trade. You reduce your risk by selling your copper forward. American Electric reduces its risk by buying your copper forward. The speculator reduces your risk by taking it on himself; for him, the potential gain of this position outweighs the potential loss.

Of course, not all trade in risk is driven by the desire to reduce risk. See “Gambling and Lotteries” for a different perspective.

## THE DIFFICULTIES OF TRADE

---

Trade is beneficial. We have seen how trade in goods and services, as well as lending and trade in risk, all confer benefits on those involved. There are, however, obstacles. The role of the financial system is to overcome these obstacles. To understand how it does so, we need first to understand the nature of the obstacles. Let us begin with simple trade in goods and services.

### Trade and Trust

Our financial system is so good at facilitating trade in goods and services that we find it hard to imagine what the problems might be. You want to buy something? Write a check or hand over a credit card. But, of course, that is begging the question: the check and the credit card are two of the solutions the financial system has found to the problems of trade. To understand the nature of those problems, we need to look at trade in a society that lacks a sophisticated financial system. The republics of the former Soviet Union are in just such a position. Let us take as our example an imaginary composite, which we will call the Republic of Ruthenia.

The White Star furniture factory—formerly the Red Star furniture factory—is located in the small provincial city of Novograd. Boris, the manager of White Star, faces a problem. Hyperinflation has destroyed the value of the Ruthenian ruble, and his workers are no longer willing to be paid in rubles. Boris offers to pay them in furniture, but they are not interested. Bartering their “wages” for the food and clothing they need would take up so much time they would be unable to work. So Boris arranges a deal with a neighboring clothing factory. His workers will receive credit there for clothes; the garment workers will receive credit at White Star for an equivalent amount of furniture. He arranges similar deals with a farmers’ cooperative and with a number of other large enterprises.

This arrangement requires trust. When White Star hands over furniture to someone as part of the agreement, the firm receives nothing immediately in exchange. All it gets is a promise that a White Star worker will be compensated at some time in the future. If that promise is not kept, White Star will take a loss. For example, what is to stop the clothing factory from running up a significant tab at White Star and then renegeing on the agree-

ment? Given the chaos in the judicial system, taking the owner of the clothing factory to court is not an option.

Boris is not too worried about this, however, because he realizes the clothing factory has a strong interest in honoring its debts. The business community of Novograd is small and close-knit. Everyone knows everyone else. If the clothing factory reneges, its reputation will suffer, and no one will want to trade with it in the future.

Novograd's system of reciprocal credit works reasonably well, but it includes only the town's largest enterprises and covers only a small range of goods. Smaller businesses are excluded: their credit is not good enough, and the potential volume of trade does not justify the cost of setting up the credit agreement.

Smaller transactions are excluded too. Transactions in the reciprocal credit system involve a lot of paperwork to keep track of who owes what to whom: it is just too costly to handle the purchase of a newspaper or the payment of a bus fare in this way. Therefore, many transactions outside the reciprocal credit system are handled by barter or by payment in cash. With the ruble worthless, "cash" usually means foreign currency—primarily U.S. dollar bills.

The reciprocal credit system is limited in other ways too. White Star's machinery is breaking down and needs to be replaced. Boris cannot buy spare parts or new machines locally, so he travels to the capital, Borodino. In the big, impersonal market of the capital, reciprocal credit is not available. Boris's reputation counts for little: no one there has even heard of White Star. To buy new machinery, Boris must pay in dollars. Unfortunately, Boris has no dollars. Since White Star's business is mostly local, it has no opportunity to acquire foreign currency. So Boris returns to Novograd disappointed.

Our little parable illustrates some of the important principles and problems of trading goods and services. We see that there are basically two possible ways to trade—credit trading and cash trading. **Credit trading** involves the exchange of value for a promise—for example, the Novograd reciprocal credit system. **Cash trading** involves the exchange of value for value—for example, barter or payment in U.S. dollars. Credit trading is limited by the need for trust and by large setup costs. Cash trading requires no trust or setup costs, but trade is impossible if prospective buyers do not have the cash.

In Chapter 2 we shall see how the financial system addresses the problems of trade by providing means of payment that make trade easier.

## The Problems Involved in Lending

While trade in goods and services may or may not involve promises, lending always does. A lender gives up purchasing power today in exchange for a promise of purchasing power tomorrow. The basic problem is that the promise may not be kept. The borrower may default.

**The Need for Information.** The risk of default need not deter you from lending. If the chance of default is small, and if the potential reward is great, you may want to go ahead anyhow. The key to your decision is information. You need to know exactly what the risks and prospects are.

For example, suppose you are considering lending some money to Origen, a promising biotech company. Before you hand over your money, you will want to know something

### credit trading

The exchange of value for a promise.

### cash trading

The exchange of value for value.

about the company. Has it ever defaulted in the past? What are its prospects? What other debts does it owe? Will its earnings enable it to service its loans? If it does default, what are the assets that can be liquidated to repay its debts?

Getting answers to these questions is costly. Origen will have to prepare accounts for you to see and write up a prospectus explaining its plans. You will have to digest this information and check its reliability. You may have trouble believing everything you are told: you expect Origen to stress the positive. On the other hand, Origen may be reluctant to tell you everything. For example, it will not wish to disclose to you its ideas for new products for fear they will fall into the hands of its competitors.

**Writing a Contract.** These problems notwithstanding, suppose you have the information you need and decide to go ahead with the loan. You will need to work out an agreement with Origen's owner, Joanna Jones. The agreement will be a formal contract that can, if necessary, be enforced in a court of law. Negotiating and drawing up this contract will be expensive in time and in lawyers' fees.

**Incentive Effects of Debt and Equity Contracts.** You will need to be careful about the terms of the contract. They may change Joanna's incentives in ways that harm your own interests. For example, suppose you write an **equity contract**: you put up \$1 million in exchange for a 50% share of Origen's profits. From Joanna's point of view, this arrangement imposes a "tax" of 50% on every extra dollar the company earns. As a result, she may not work as hard as you had expected, and the firm's profits—and your return—may suffer. Moreover, she may get herself a bigger office and take more trips on her expense account. Because of the "tax" on profits, each dollar of expenses costs her only \$0.50. If she responds to these incentives, Joanna will not be alone: see "Ownership Stakes and Executive Perks."

**equity contract**  
Contract representing a claim to a share in the net income and in the assets of a business.

An alternative to an equity contract that avoids these particular incentive problems is a **debt contract**. For example, you put up \$1 million now in exchange for a fixed payment of \$5 million in 10 years' time. The "tax" effect is gone: every dollar Origen earns beyond the \$5 million is Joanna's to keep. This contract gives her an incentive to work hard and to keep costs down.

**debt contract**  
Contract stating agreement by the borrower to pay the lender fixed dollar amounts.

However, this type of contract has incentive problems of its own. They are illustrated in Exhibit 1.2. Suppose Joanna is pondering two business strategies. At the end of 10 years, strategy A pays off either \$5 million or \$8 million, each with equal probability. Strategy B pays off either zero or \$10 million, again each with equal probability. From your point of view, strategy A is preferable: it guarantees that Origen's debt to you will be paid. From Joanna's point of view, strategy B is preferable. With strategy A, she gets either zero or \$3 million. With strategy B, she gets either zero or \$5 million.

**Safeguards and the Costs of Monitoring.** Because all lending contracts—debt and equity—create undesirable incentives of one kind or another, they typically include provisions that safeguard the interests of the lender. In the case of equity, the contract might give you some say in how Joanna runs the company. This would enable you to monitor her effort and perhaps to veto wasteful expenditures. In the case of debt, the contract

**EXHIBIT 1.2** Payoffs from Two Alternative Business Strategies

		Total payoff	Payoff to you	Payoff to Joanna
Strategy A	50%	\$5 million	\$5 million	Zero
	50%	\$8 million	\$5 million	\$3 million
Strategy B	50%	Zero	Zero	Zero
	50%	\$10 million	\$5 million	\$5 million

**loan covenants**

Clauses in a loan contract that restrict the borrower's behavior in various ways.

might include clauses, called **loan covenants**, that impose certain conditions. For example, the contract might prohibit Origen from taking on any more debt until the debt to you has been repaid.<sup>2</sup>

Such interference with the management of the company may be necessary to protect the interests of the lender. But it does have its costs. First, outside interference and restrictions may prevent Joanna from doing some things that would be of benefit both to the company and to you. For example, the loan covenant prohibiting Origen from taking on any additional debt might prevent it from exploiting a promising new discovery.

A second cost of these safeguards is the time and effort of monitoring. Once the contract has been signed, you cannot just assume that its conditions will be fulfilled. You will be obliged to check periodically to make sure. Origen will have to hire accountants to audit its books. You will have to read their reports and, perhaps, attend board meetings.

**Liquidity.** These incentive problems are not the only way in which your interest's and Joanna's may diverge. Suppose that soon after you lend Origen the \$1 million, something comes up and you need your money back in a hurry. You could deal with such a contingency by writing into the contract a clause that requires Joanna's company to repay you on demand. But Origen needs the money to invest in new equipment. Once the money has been spent, the company cannot easily repay it ahead of schedule. If you require that it does so, the loan will be of little use and Joanna will not take it.

**liquid**

Describing an asset that can be turned into cash rapidly without loss.

You would like your loan to be as **liquid** as possible—as easy as possible to turn back into cash. On the other hand, Origen needs the funds to be committed for a reasonable period of time. As a result, you may have to make a loan that is less liquid than you would like. Of course, you might be willing to accept less liquidity if you were offered a higher return. Origen, on the other hand, may have to take a loan that is more liquid than Joanna would like, or you may ask for a return so high that the whole proposition becomes unattractive.

<sup>2</sup> The reason for such a covenant is that the claims of the new lenders might compete with your own if the company got into trouble.



## OWNERSHIP STAKES AND EXECUTIVE PERKS

Two extreme examples of the incentive effects of a small ownership stake are provided by Armand Hammer, CEO of Occidental Petroleum until his death in 1990, and F. Ross Johnson, CEO of RJR Nabisco until its buyout in 1988. Hammer, although he had once owned nearly half the company, held less than 0.5% of the stock of Occidental. Johnson held 0.02% of the stock of RJR Nabisco.

Armand Hammer managed Occidental seemingly more for his own glory than for the profits of the shareholders. He pursued a variety of grandiose money-losing ventures in the Soviet Union and China, hobnobbing with generations of Communist leaders. He had Occidental fund the construction of the Armand Hammer Museum of Art in Los Angeles to house his personal art collection at a cost of \$120 million. In the 1980s, while oil company shares on average tripled in value, Occidental's value fell by a third.

F. Ross Johnson was known as a lavish spender even before he rose to the top at RJR Nabisco. As head of Standard Brands, he had provided executives—including himself—with company apartments, a private box at Madison Square Garden, and multiple country club memberships. The pattern continued when he took over RJR Nabisco. He gave away \$1,500 watches. He hired former U.S. president Gerald Ford to play in a company-sponsored golf tournament and Frank Sinatra and Bob Hope to entertain guests. He provided executives with chauffeured Cadillacs, Mercedes Benzes, and Rolls-Royces. He hired 36 pilots for the company's fleet of corporate jets—the "RJR Air Force." All this, of course, at company expense.

*Source:* Milgrom and Roberts (1992).

The difficulties involved in your lending to Origen are quite typical of lending in general. As we have seen, these difficulties include:

- the cost of acquiring and processing information
- the costs of negotiating and writing a contract
- the incentive problems inherent in all lending arrangements
- the costs of establishing safeguards and of monitoring borrower compliance
- conflicting interests over liquidity

In Chapter 2, we shall see how the financial system addresses these difficulties by reducing the costs of lending and by improving the liquidity of loans.

### The Problems of Trade in Risk

Trade in risk has many of the same problems as lending, because it too inevitably involves promises. Let us look in turn at the problems of insurance and those of forward transactions.

**The Problems of Insurance.** We looked at three simple insurance arrangements—mutual aid among farmers, gift exchange among hunter-gatherers (both examples of reciprocal insurance), and simple marine insurance (external insurance). In all three cases, promises are involved. Farmers provide assistance in exchange for a promise that they too will receive help if they need it. Tribesmen give away their surplus on the understanding that they will receive gifts from others. The owner of a ship makes payments to other merchants in exchange for a promise that if a shipwreck occurs, they will cover the loss.

As we have seen, the problem with promises is that they may not be kept. In our simple examples of reciprocal insurance, this problem is dealt with informally and at relatively low cost. Everyone knows everyone else, and social pressure ensures that promises are kept. Initially, simple marine insurance, too, relied on reputation: the insurers and the insured were all members of a small circle of merchants who knew each other well.

Limiting insurance to a small circle of acquaintances reduces the costs associated with promises, but it also limits the effectiveness of the insurance. For example, as ships grew in size and value it became increasingly difficult to purchase external insurance from a small circle of insurers of limited means. Insurance is more effective and cheaper if the risk can be broken down among a larger group with greater total resources. The problem with a larger group, however, is the cost of dealing with the promises of strangers. As we have seen, this requires costly information gathering, contracting, and monitoring.

Like lending, insurance creates incentive problems. There are two types of problem. The first is **moral hazard**. This is the tendency of an insured to take greater risks because he is insured. For example, a shipowner may face the choice between two routes—one safe but slow, the other fast but risky. Without insurance, the shipowner chooses the safe route; with insurance, he chooses the fast route.

The second type of incentive problem associated with insurance is **adverse selection**. This is the tendency of worse risks to buy insurance and better risks not to. For example, suppose the price of insurance is the same for all ships. Then owners of ships that are in poor shape will find insurance more attractive, and will be more likely to purchase it, than owners of sound ships.

Moral hazard and adverse selection are problems because they raise the cost of claims to the insurer. Dealing with them, like dealing with the incentive problems of a loan, requires safeguards. For example, the insurance contract might require the ship to take the safe route; insurers might inspect a ship before writing insurance. Of course, safeguards are costly, and they require costly monitoring.

In Chapter 2 we shall see how the financial system addresses the problems of insurance and reduces its cost.

**Forward Transactions.** A forward transaction is an exchange of one promise for another: one party promises to buy, the other promises to sell. The danger, of course, is default. Either party might fail to keep its promise. The nature of default risk in such a two-sided promise differs from that in a one-sided promise such as a loan. To see why, let us return to our example of a forward transaction in copper.

You have promised to supply one million pounds of copper to American Electric next December; it has promised to pay you \$1.8 million. Suppose American Electric defaults: it goes out of business and cannot accept delivery. You must now find a new buyer for your copper. What is your loss? That depends on how much you get for your copper. If you sell

**moral hazard**

The tendency of an insured to take more risk because he has insurance.

**adverse selection**

The tendency of worse risks to buy insurance and better risks not to.

it for \$1.6 million, your loss is the amount you were promised less the amount you actually received: \$1.8 million – \$1.6 million = \$200,000. However, you might be able to sell it for \$2 million. In this case, you actually *gain* \$200,000 from the default.

Your loss from American Electric's default, therefore, is not generally the full \$1.8 million it has promised to pay you. The reason is that American Electric's default on its promise to you automatically releases you from your promise to it. Consequently, your cost is the cost of replacing American Electric as your trading partner. The risk associated with default on a forward transaction is therefore known as **replacement risk**.

**replacement risk**  
The risk that a counterparty to a forward transaction will default and have to be replaced.

The risks of a forward transaction are mutual. American Electric, too, faces replacement risk. If you default on your promise to deliver the copper, it will have to fill its needs elsewhere. If the cost turns out to be more than \$1.8 million, American Electric will take a loss.

Because each party to a forward transaction is exposed to replacement risk by the potential default of the other, each party must take the necessary precautions. These are much like the precautions required in making a loan—information gathering, contracting, and monitoring. These precautions are, of course, costly.

A forward transaction involves a commitment. Changing circumstances may make it desirable for one of the parties to escape that commitment. For example, suppose the finance required for the expansion of your mine falls through. Unable to expand your mine, you will be unable to produce the copper you have promised to deliver. You would like to cancel your agreement with American Electric. American Electric, on the other hand, is counting on the firmness of the deal.

There is the same conflict here that we saw in connection with the liquidity of a loan. Each side would like to be able to get out of its commitment if circumstances change. But the forward transaction is worthless unless the commitment is firm.

In Chapter 2, we shall see how the financial system reduces the costs of forward transactions and improves their liquidity.

## The Common Pattern

We have looked at three different types of trade—trade in goods and services, lending, and trade in risk. We have seen that they face similar problems. We can group these problems into three categories—reliance on promises, incentive problems, and illiquidity. Exhibit 1.3 shows for each type of trade the problems it involves.

**Reliance on Promises.** In all cases except cash trading in goods and services, trade involves promises. Promises are a problem because they may not be kept. So before a promise can be accepted, information must be gathered on the promiser's credit. Then a contract must be drawn up specifying the exact nature of the promise.

**Incentive Problems.** The terms of the contract may create undesirable incentives that alter the behavior of one party to the detriment of the other. This is true for all lending contracts and for insurance. Dealing with these undesirable incentives requires that specific safeguards be built into the contract. It also requires monitoring to ensure compliance.

**EXHIBIT 1.3 The Problems with Different Types of Trade**

Type of Trade	PROBLEMS			
	Promises	Incentive Problems	Liquidity	Other
Goods and services				
Credit trading	Yes	No	No	
Cash trading	No	No	No	Restrictive
Lending				
Equity	Yes	Reduced effort	Yes	
Debt	Yes	Excessive risk-taking	Yes	
Trade in risk				
Insurance	Yes	Moral hazard; Adverse selection	No	
Forward transactions (two-sided)	Yes	No	Yes	

**Liquidity.** Lending and forward transactions involve commitments. In each case, commitment is an essential feature of the transaction: a loan is more useful if it assures a borrower the use of the funds for a definite period; a forward transaction is valuable because it relieves the contracting parties of price risk. However, because of a change of circumstances, parties may want to be relieved of their commitments. The lender may want his money back; the forward transactor may want to cancel the transaction. The ability or inability to undo commitments affects greatly the appeal of the transaction.

**Transactions Costs.** Dealing with all these problems is costly. The steps that must be taken before a promise can be accepted, the measures necessary to control incentive problems, the arrangements required to provide liquidity or to accommodate illiquidity—all these take time and effort.

These costs, as well as the problems themselves, are an obstacle to trade. A trade may be mutually beneficial. However, if the problems are too serious or the costs of dealing with them too high, the trade will not be worthwhile, and it will not take place.

Think of the economy as an engine. The potential gains from trade are the fuel that drives it. The obstacles to trade and the costs of dealing with them are friction. As we shall see in Chapter 2, the financial system provides the lubrication.

## SUMMARY

- Innovations serve existing needs in new ways or use existing technology to serve new needs. This chapter looks at the needs that the financial system serves. Chapter 2 looks at the technology.
- People trade because they differ in what they have and in what they want. The basis of trade is diversity.
- Lending, insurance, and forward transactions are all forms of trade. As with simple trade in goods and services, the basis for these forms of trade is diversity, and all involved gain from trade.



- The difference between the typical profile of income over a lifetime and the typical profile of spending gives rise to the life-cycle pattern of spending.
- Owners of wealth tend to convert their command over purchasing power today into a stream of income in the future.
- Households and businesses accumulate precautionary reserves to protect themselves against fluctuations in income or spending.
- Businesses and households borrow to finance investment. Businesses invest in working capital and in fixed capital. Households invest in education, housing, and durables.
- Insurance provides protection against the risk of losses due to accidents, illnesses, and natural disasters. Insurance can be reciprocal or external.
- Forward transactions provide protection against adverse changes in future market prices. Users include those wishing to protect themselves against a rise or a fall in price and speculators.
- There are two ways of trading goods and services—credit trading and cash trading. Credit trading is limited by the need for trust and by large setup costs. Cash trading requires no trust or setup costs, but it is limited by the availability of cash.
- Because of the danger of default, lenders need to gather and process information on the borrower, negotiate and write a contract, and monitor compliance.
- Lending contracts may create incentives for the borrower to behave in ways that harm the interests of the lender. Safeguards built into the contract can help, but they may also hinder the operations of the borrower.
- Lenders prefer their loans to be as liquid as possible. Borrowers prefer the funds to be committed as solidly as possible.
- Trade in risk involves promises and so suffers from many of the same problems as lending.
- Insurance involves two types of incentive problem—moral hazard and adverse selection.
- Like loans, forward transactions are subject to default risk (replacement risk), and they involve the same sort of conflict over liquidity.
- Dealing with the difficulties of trade is costly. The difficulties and the costs of dealing with them may make otherwise beneficial trades unattractive. The financial system mitigates the difficulties and reduces the costs of dealing with them. In so doing it increases the extent of trade and the benefits therefrom.

## DISCUSSION QUESTIONS

1. **Both** partners to a trade gain from it. Explain the **gains from trade** in the different types of trade: **trade in goods** and services, borrowing and **lending**, and trade in risk. In each case, how would **people manage** in the absence of trade? How are **things better** as a result of trade?
2. **Insurance** involves incentive problems. Suppose you were **offering** automobile insurance. What clauses would you write into the contract to protect yourself? How would these clauses address the incentive problems?
3. Compare the incentive problems in lending to those in insurance. How are they similar? How do they differ?
4. You need to accumulate assets for your retirement, and you also need assets as a precautionary reserve. Would you want the same type of assets for both purposes? For example, how important would the return be in each case? Liquidity?
5. Suppose you wished to save for your retirement but lived in an economy where lending was impossible. What sort of assets could you accumulate? Why might this be less desirable than lending?
6. From what you know of the financial system already, describe some of the ways in which it deals with the problems of lending, insurance,

and forward transactions mentioned in the chapter.

7. It would seem that a simple way to deal with the incentive problems of lending and insurance would be to monitor closely the actions of the borrower

or the insured. Why might this not be a perfect solution?

8. List and explain five situations in which forward transactions would be beneficial.

## BIBLIOGRAPHY

Brenner, Reuven, and Gabrielle A. Brenner. *Gambling and Speculation: A Theory, a History, and a Future of Some Human Decisions*. Cambridge, U.K.: Cambridge University Press, 1990.

Milgrom, Paul, and John Roberts. *Economics, Organization, and Management*. Englewood Cliffs, NJ: Prentice-Hall, 1992.

## KEY TERMS

life-cycle pattern of saving  
precautionary reserve  
working capital  
fixed capital  
reciprocal insurance  
external insurance

price risk  
forward transaction  
speculator  
credit trading  
cash trading  
equity contract

debt contract  
loan covenants  
liquid  
moral hazard  
adverse selection  
replacement risk