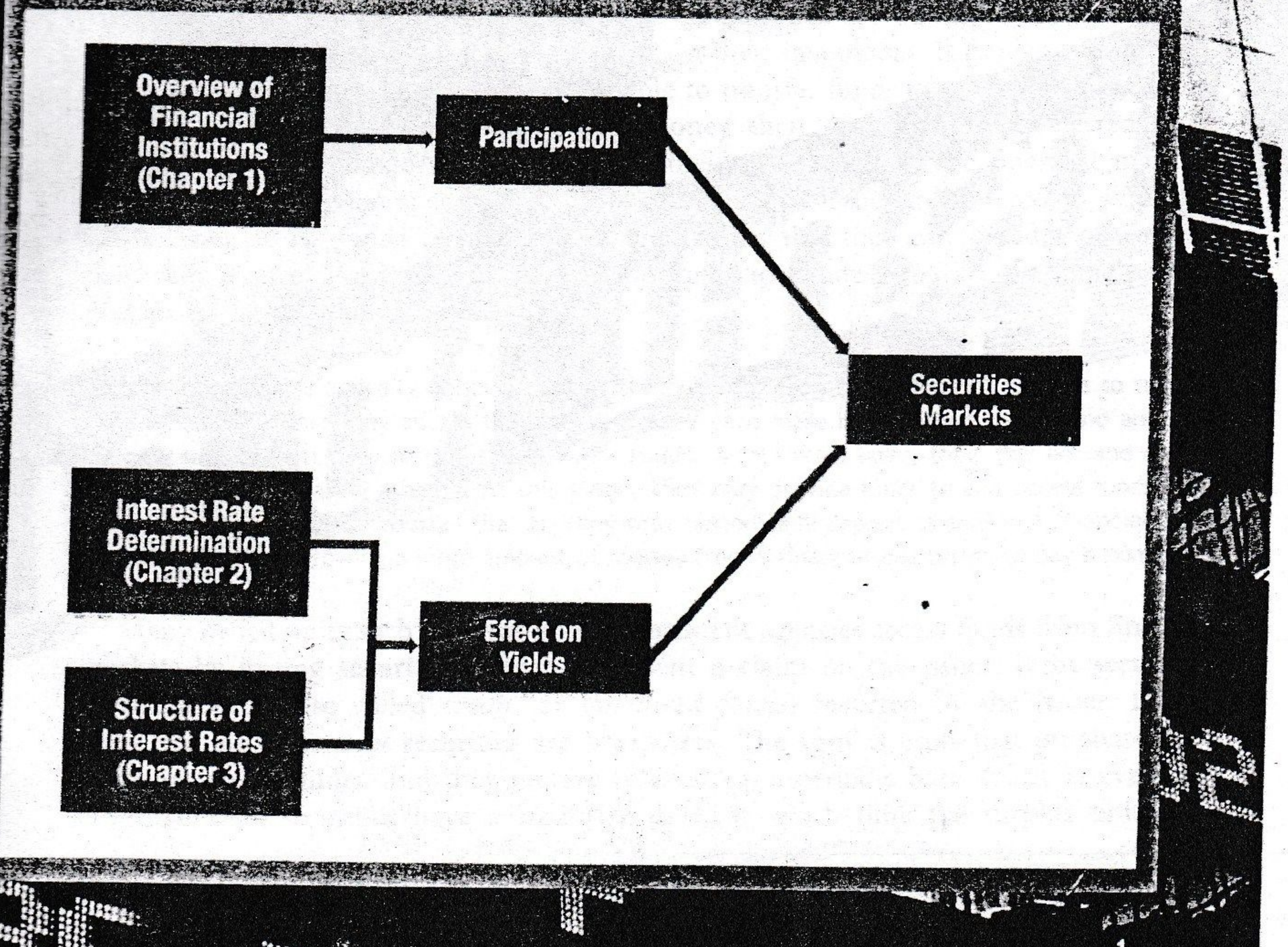
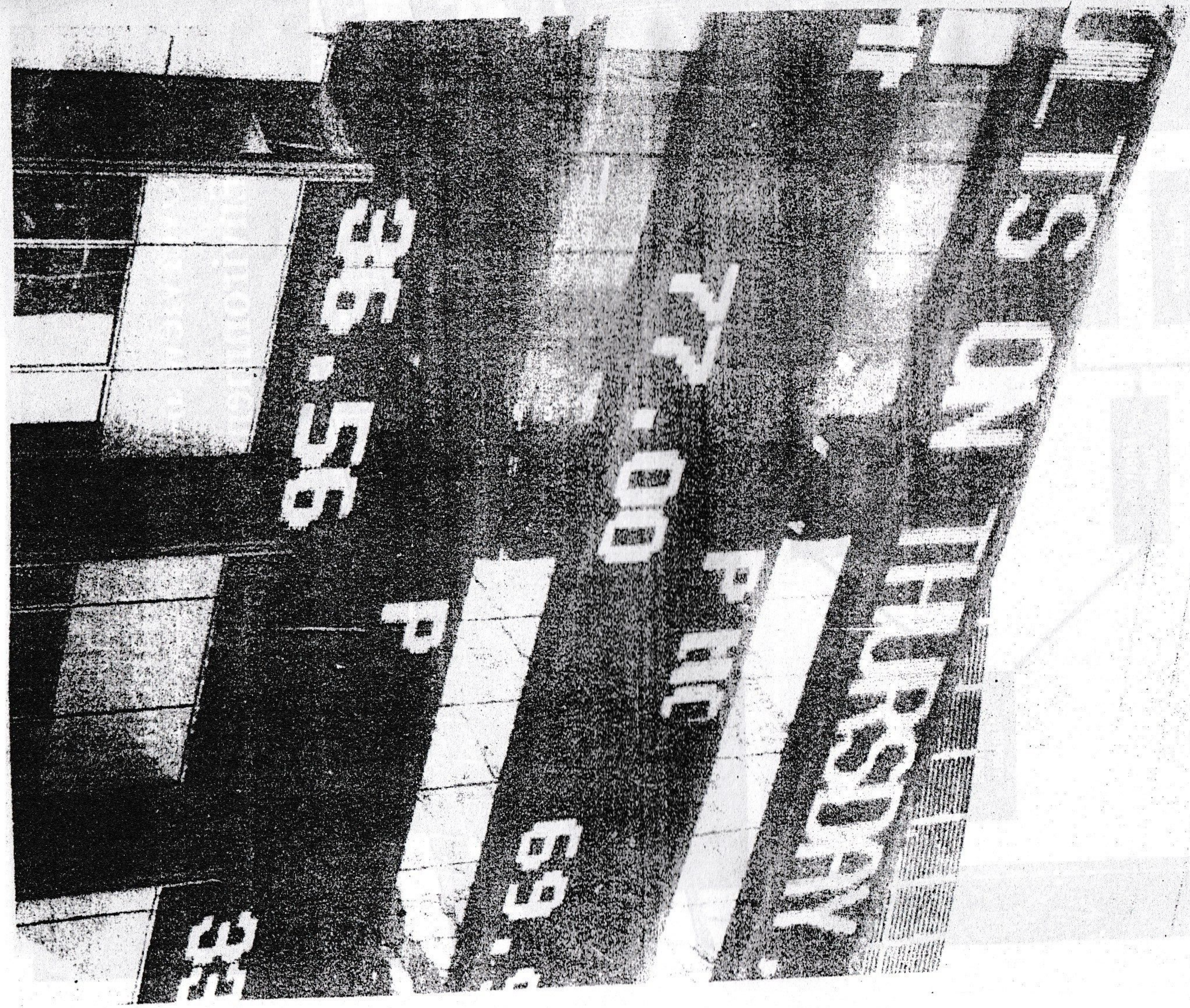
PART 1
Overview of the Financial Environment

Part 1 of this book focuses on the flow of funds across financial markets, interest rates, and security prices. Chapter 1 introduces the key financial markets and the financial institutions that participate in those markets. Chapter 2 explains how various factors influence interest rates and how interest rate movements in turn affect the values of securities purchased by financial institutions. Chapter 3 identifies factors other than interest rates that influence security prices. Participants in financial markets use this information to value securities and make investment decisions within financial markets.



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1
Role of Financial Markets and Institutions

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- describe the types of financial markets that facilitate the flow of funds,
- describe the types of securities traded within financial markets,
- describe the role of financial institutions within financial markets, and
- explain how financial institutions were exposed to the credit crisis.

A **financial market** is a market in which financial assets (securities) such as stocks and bonds can be purchased or sold. Funds are transferred in financial markets when one party purchases financial assets previously held by another party. Financial markets facilitate the flow of funds and thereby allow financing and investing by households, firms, and government agencies. This chapter provides some background on financial markets and on the financial institutions that participate in them.

1-1 Role of Financial Markets

Financial markets transfer funds from those who have excess funds to those who need funds. They enable college students to obtain student loans, families to obtain mortgages, businesses to finance their growth, and governments to finance many of their expenditures. Many households and businesses with excess funds are willing to supply funds to financial markets because they earn a return on their investment. If funds were not supplied, the financial markets would not be able to transfer funds to those who need them.

Those participants who receive more money than they spend are referred to as **surplus units** (or investors). They provide their net savings to the financial markets. Those participants who spend more money than they receive are referred to as **deficit units**. They access funds from financial markets so that they can spend more money than they receive. Many individuals provide funds to financial markets in some periods and access funds in other periods.

EXAMPLE

College students are typically deficit units, as they often borrow from financial markets to support their education. After they obtain their degree, they earn more income than they spend and thus become surplus units by investing their excess funds. A few years later, they may become deficit units again by purchasing a home. At this stage, they may provide funds to and access funds from financial markets simultaneously. That is, they may periodically deposit savings in a financial institution while also borrowing a large amount of money from a financial institution to buy a home. ●

Many deficit units such as firms and government agencies access funds from financial markets by issuing **securities**, which represent a claim on the issuer. **Debt securities** represent debt (also called *credit*, or *borrowed funds*) incurred by the issuer. Deficit units that issue the debt securities are borrowers. The surplus units that purchase debt securities are creditors, and they receive interest on a periodic basis (such as every six months). Debt securities have a maturity date, at which time the surplus units can

redeem the securities in order to receive the principal (face value) from the deficit units that issued them.

Equity securities (also called *stocks*) represent equity or ownership in the firm. Some large businesses prefer to issue equity securities rather than debt securities when they need funds but might not be financially capable of making the periodic interest payments required for debt securities.

1-1a Accommodating Corporate Finance Needs

A key role of financial markets is to accommodate corporate finance activity. Corporate finance (also called financial management) involves corporate decisions such as how much funding to obtain and what types of securities to issue when financing operations. The financial markets serve as the mechanism whereby corporations (acting as deficit units) can obtain funds from investors (acting as surplus units).

1-1b Accommodating Investment Needs

www.nyse.com
New York Stock Exchange market summary, quotes, financial statistics, and more.

www.nasdaq.com
Comprehensive historic and current data on all Nasdaq transactions.

Another key role of financial markets is accommodating surplus units who want to invest in either debt or equity securities. Investment management involves decisions by investors regarding how to invest their funds. The financial markets offer investors access to a wide variety of investment opportunities, including securities issued by the U.S. Treasury and government agencies as well as securities issued by corporations.

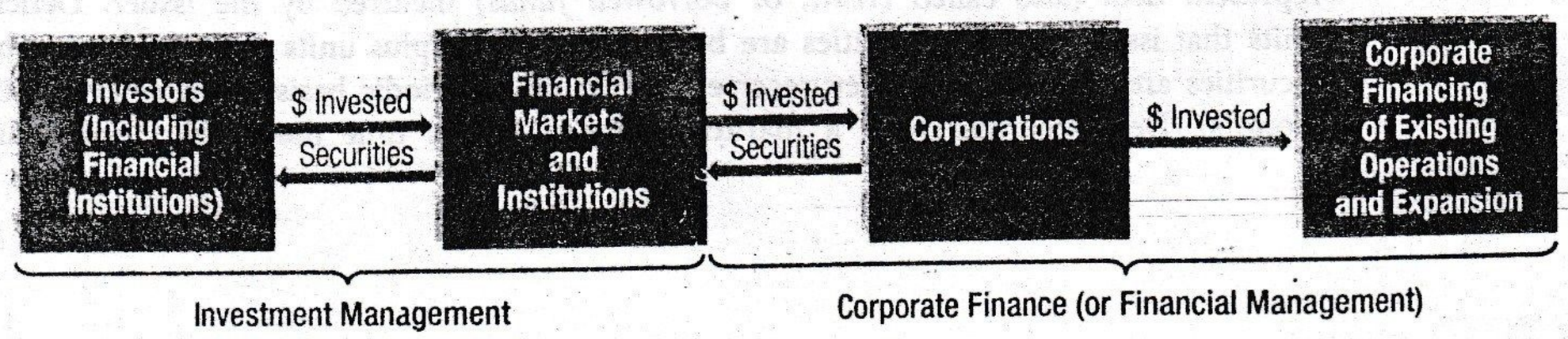
Financial institutions (discussed later in this chapter) serve as intermediaries within the financial markets. They channel funds from surplus units to deficit units. For example, they channel funds received from individuals to corporations. Thus they connect the investment management activity with the corporate finance activity, as shown in Exhibit 1.1. They also commonly serve as investors and channel their own funds to corporations.

1-1c Primary versus Secondary Markets

Primary markets facilitate the issuance of new securities. **Secondary markets** facilitate the trading of existing securities, which allows for a change in the ownership of the securities. Many types of debt securities have a secondary market, so that investors who initially purchased them in the primary market do not have to hold them until maturity. Primary market transactions provide funds to the initial issuer of securities; secondary market transactions do not.

EXAMPLE Last year, Riverto Co. had excess funds and invested in newly issued Treasury debt securities with a 10-year maturity. This year, it will need $15 million to expand its operations. The company decided to sell its holdings of Treasury debt securities in the secondary market even though those

Exhibit 1.1 How Financial Markets Facilitate Corporate Finance and Investment Management



securities will not mature for nine more years. It received $5 million from the sale. In also issued its own debt securities in the primary market today in order to obtain an additional $10 million. Riverto's debt securities have a 10-year maturity, so investors that purchase them can redeem them at maturity (in 10 years) or sell them before that time to other investors in the secondary market. ●

An important characteristic of securities that are traded in secondary markets is **liquidity**, which is the degree to which securities can easily be liquidated (sold) without a loss of value. Some securities have an active secondary market, meaning that there are many willing buyers and sellers of the security at a given moment in time. Investors prefer liquid securities so that they can easily sell the securities whenever they want (without a loss in value). If a security is illiquid, investors may not be able to find a willing buyer for it in the secondary market and may have to sell the security at a large discount just to attract a buyer.

Treasury securities are liquid because they are frequently issued by the Treasury, and there are many investors at any point in time who want to invest in them. Conversely, debt securities issued by a small firm may be illiquid, as there are not many investors who may want to invest in them. Thus investors who purchase these securities in the primary market may not be able to easily sell them in the secondary market.

1-2 Securities Traded in Financial Markets

Securities can be classified as money market securities, capital market securities, or derivative securities.

1-2a Money Market Securities

Money markets facilitate the sale of short-term debt securities by deficit units to surplus units. The securities traded in this market are referred to as **money market securities**, which are debt securities that have a maturity of one year or less. These generally have a relatively high degree of liquidity, not only because of their short-term maturity but also because they are desirable to many investors and therefore commonly have an active secondary market. Money market securities tend to have a low expected return but also a low degree of credit (default) risk. Common types of money market securities include Treasury bills (issued by the U.S. Treasury), commercial paper (issued by corporations), and negotiable certificates of deposit (issued by depository institutions).

1-2b Capital Market Securities

Capital markets facilitate the sale of long-term securities by deficit units to surplus units. The securities traded in this market are referred to as **capital market securities**. Capital market securities are commonly issued to finance the purchase of capital assets, such as buildings, equipment, or machinery. Three common types of capital market securities are bonds, mortgages, and stocks, which are described in turn.

WEB

www.investinginbonds.com
Data and other information about bonds.

Bonds Bonds are long-term debt securities issued by the Treasury, government agencies, and corporations to finance their operations. They provide a return to investors in the form of interest income (coupon payments) every six months. Since bonds represent debt, they specify the amount and timing of interest and principal payments to investors who purchase them. At maturity, investors holding the debt securities are paid the principal. Bonds commonly have maturities of between 10 and 20 years.

Treasury bonds are perceived to be free from default risk because they are issued by the U.S. Treasury. In contrast, bonds issued by corporations are subject to default risk

because the issuer could default on its obligation to repay the debt. These bonds must offer a higher expected return than Treasury bonds in order to compensate investors for that default risk.

Bonds can be sold in the secondary market if investors do not want to hold them until maturity. Because the prices of debt securities change over time, they may be worthless when sold in the secondary market than when they were purchased.

Mortgages Mortgages are long-term debt obligations created to finance the purchase of real estate. Residential mortgages are obtained by individuals and families to purchase homes. Financial institutions serve as lenders by providing residential mortgages in their role as a financial intermediary. They can pool deposits received from surplus units, and lend those funds to an individual who wants to purchase a home. Before granting mortgages, they assess the likelihood that the borrower will repay the loan based on certain criteria such as the borrower's income level relative to the value of the home. They offer prime mortgages to borrowers who qualify based on these criteria. The home serves as collateral in the event that the borrower is not able to make the mortgage payments.

Subprime mortgages are offered to some borrowers who do not have sufficient income to qualify for prime mortgages or who are unable to make a down payment. Subprime mortgages exhibit a higher risk of default, thus the lenders providing these mortgages charge a higher interest rate (and additional up-front fees) to compensate. Subprime mortgages received much attention in 2008 because of their high default rates, which led to the credit crisis. Many lenders are no longer willing to provide subprime mortgages, and recent regulations (described later in this chapter) raise the minimum qualifications necessary to obtain a mortgage.

Commercial mortgages are long-term debt obligations created to finance the purchase of commercial property. Real estate developers rely on commercial mortgages so they can build shopping centers, office buildings, or other facilities. Financial institutions serve as lenders by providing commercial mortgages. By channeling funds from surplus units (depositors) to real estate developers, they serve as a financial intermediary and facilitate the development of commercial real estate.

Mortgage-Backed Securities Mortgage-backed securities are debt obligations representing claims on a package of mortgages. There are many forms of mortgage-backed securities. In their simplest form, the investors who purchase these securities receive monthly payments that are made by the homeowners on the mortgages backing the securities.

EXAMPLE

Mountain Savings Bank originates 100 residential mortgages for home buyers and will service the mortgages by processing the monthly payments. However, the bank does not want to use its own funds to finance the mortgages. It issues mortgage-backed securities that represent this package of mortgages to eight financial institutions that are willing to purchase all of these securities. Each month, when Mountain Savings Bank receives interest and principal payments on the mortgages, it passes those payments on to the eight financial institutions that purchased the mortgage-backed securities and thereby provided the financing to the homeowners. If some of the homeowners default on their payments, the payments, and thus the return on investment earned by the financial institutions that purchased the mortgage-backed securities, will be reduced. The securities they purchased are backed (collateralized) by the mortgages.

In many cases, the financial institution that originates the mortgage is not accustomed to the process of issuing mortgage-backed securities. If Mountain Savings Bank is unfamiliar with the process, another financial institution may participate by bundling Mountain's 100 mortgages with mortgages originated by other institutions. Then the financial institution issues mortgage-backed

securities that represent all the mortgages in the bundle. Thus any investor that purchases these mortgage-backed securities is partially financing the 100 mortgages at Mountain Savings Bank and all the other mortgages in the bundle that are backing these securities. ●

As housing prices increased in the 2004–2006 period, many financial institutions used their funds to purchase mortgage-backed securities, some of which represented bundles of subprime mortgages. These financial institutions incorrectly presumed that the homes would serve as sufficient collateral if the mortgages defaulted. In 2008, many subprime mortgages defaulted and home prices plummeted, which meant that the collateral was not adequate to cover the credit provided. Consequently, the values of mortgage-backed securities also plummeted, and the financial institutions holding these securities experienced major losses.

Stocks Stocks (or equity securities) represent partial ownership in the corporations that issue them. They are classified as capital market securities because they have no maturity and therefore serve as a long-term source of funds. Investors who purchase stocks (referred to as stockholders) issued by a corporation in the primary market can sell the stocks to other investors at any time in the secondary market. However, stocks of some corporations are more liquid than stocks of others. More than a million shares of stocks of large corporations are traded in the secondary market on any given day, as there are many investors who are willing to buy them. Stocks of small corporations are less liquid, because the secondary market is not as active.

Some corporations provide income to their stockholders by distributing a portion of their quarterly earnings in the form of dividends. Other corporations retain and reinvest all of their earnings in their operations, which increase their growth potential.

As corporations grow and increase in value, the value of their stock increases; investors can then earn a capital gain from selling the stock for a higher price than they paid for it. Thus, investors can earn a return from stocks in the form of periodic dividends (if there are any) and in the form a capital gain when they sell the stock. However, stocks are subject to risk because their future prices are uncertain. Their prices commonly decline when the firm performs poorly, resulting in negative returns to investors.

1-2c Derivative Securities

WEB

www.cboe.com
Information about derivative securities.

In addition to money market and capital market securities, derivative securities are also traded in financial markets. **Derivative securities are financial contracts whose values are derived from the values of underlying assets (such as debt securities or equity securities). Many derivative securities enable investors to engage in speculation and risk management.**

Speculation Derivative securities allow an investor to speculate on movements in the value of the underlying assets without having to purchase those assets. Some derivative securities allow investors to benefit from an increase in the value of the underlying assets, whereas others allow investors to benefit from a decrease in the assets' value. Investors who speculate in derivative contracts can achieve higher returns than if they had speculated in the underlying assets, but they are also exposed to higher risk.

Risk Management Derivative securities can be used in a manner that will generate gains if the value of the underlying assets declines. Consequently, financial institutions and other firms can use derivative securities to adjust the risk of their existing investments in securities. If a firm maintains investments in bonds, it can take specific positions in derivative securities that will generate gains if bond values decline. In this way,

derivative securities can be used to reduce a firm's risk. The loss on the bonds is offset by the gains on these derivative securities.

1-2d Valuation of Securities

Each type of security generates a unique stream of expected cash flows to investors. The valuation of a security is measured as the present value of its expected cash flows, discounted at a rate that reflects the uncertainty surrounding the cash flows.

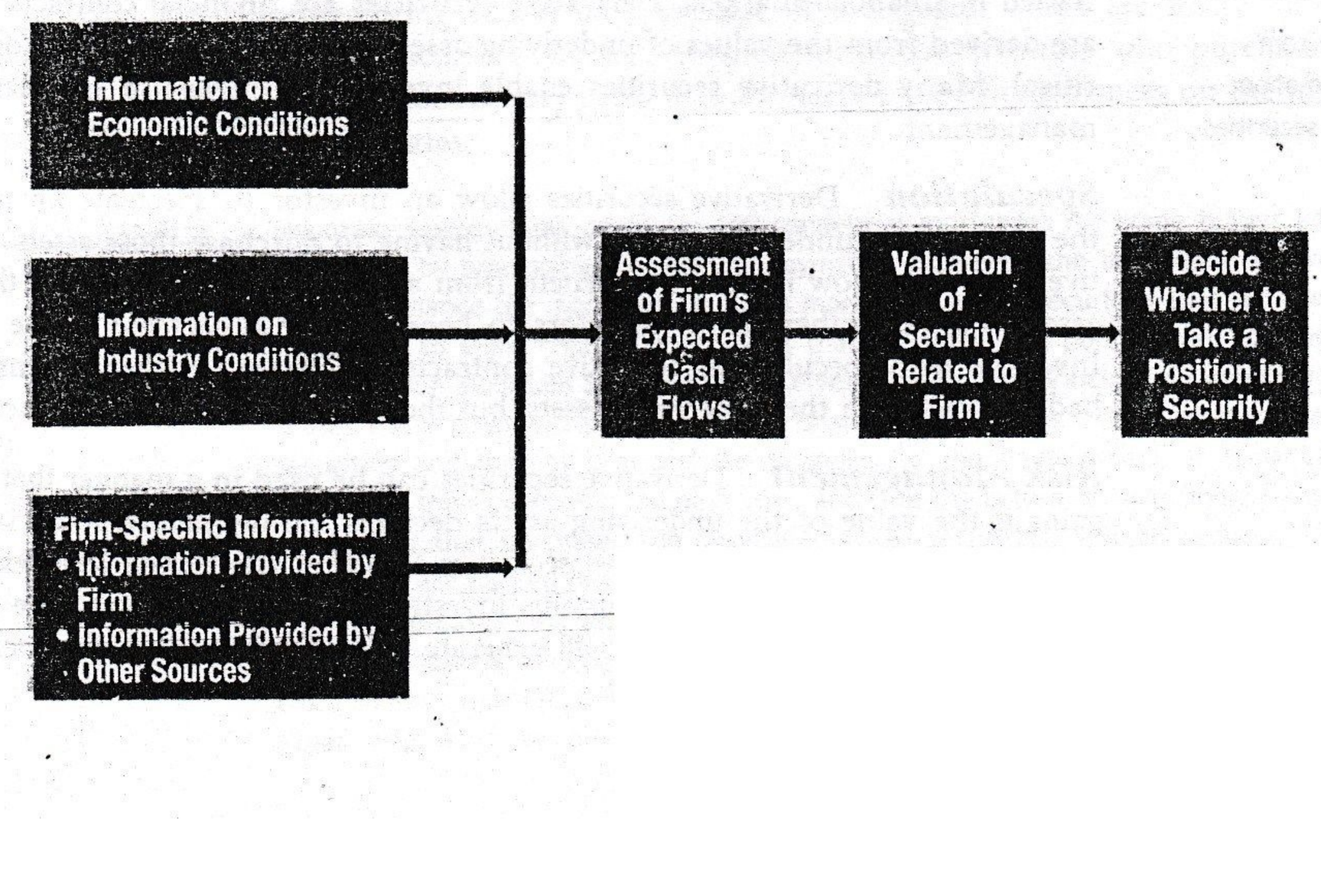
Debt securities are easier to value because they promise to investors specific payments (interest and principal) until they mature. The stream of cash flows generated by stocks is more difficult to estimate because some stocks do not pay dividends, and so investors receive cash flow only when they sell the stock. All investors sell the stock at different times. Thus some investors choose to value a stock by valuing the company and then dividing that value by the number of shares of stock.

Impact of Information on Valuation Investors can attempt to estimate the future cash flows that they will receive by obtaining information that may influence a security's future cash flows. The valuation process is illustrated in Exhibit 1.2.

Some investors rely mostly on economic or industry information to value a security, whereas others rely more on published opinions about the firm's management. When investors receive new information about a security that clearly indicates the likelihood of higher cash flows or less uncertainty surrounding the cash flows, they revise their valuations of that security upward. As a result, investors increase the demand for the security. In addition, investors that previously purchased that security and were planning to sell the security in the secondary market may decide not to sell. This results in a smaller supply of that security for sale (by investors who had previously purchased it) in the secondary market. Thus the market price of the security rises to a new equilibrium level.

Conversely, when investors receive unfavorable information, they reduce the expected cash flows or increase the discount rate used in valuation. The valuations of the security

Exhibit 1.2 Use of Information to Make Investment Decisions



are revised downward, which results in a lower demand and an increase in the supply of that security for sale in the secondary market. Consequently, there is a decline in the equilibrium price.

In an **efficient market**, securities are rationally priced. If a security is clearly undervalued based on public information, some investors will capitalize on the discrepancy by purchasing that security. This strong demand for the security will push the security's price higher until the discrepancy no longer exists. The investors who recognized the discrepancy will be rewarded with higher returns on their investment. Their actions to capitalize on valuation discrepancies typically push security prices toward their proper price levels, based on the information that is available.

WEB

finance.yahoo.com
Market quotations and overview of financial market activity.

Impact of the Internet on Valuation The Internet has improved the valuation of securities in several ways. Prices of securities are quoted online and can be obtained at any given moment by investors. For some securities, investors can track the actual sequence of transactions. Because much more information about the firms that issue securities is available online, securities can be priced more accurately. Furthermore, orders to buy or sell many types of securities can be submitted online, which expedites the adjustment in security prices to new information.

Impact of Behavioral Finance on Valuation In some cases, a security may be mispriced because of the psychology involved in the decision making. **Behavioral finance** is the application of psychology to make financial decisions. It offers a reason why markets are not always efficient.

EXAMPLE When Facebook issued stock to the public in May 2012, many critics suggested that the initial high stock price was influenced by market hype rather than fundamentals (such as its expected cash flows). Some of Facebook's customers may invest in Facebook's stock because they commonly use Facebook's services, without really considering whether the stock price was appropriate. Facebook's stock price declined by about 50 percent in a few months as the hype in the stock market wore off. ●

Behavioral finance can sometimes explain the movements of a security's price or even of the entire stock market. In some periods, investors seem to be excessively optimistic, and their stock-buying frenzy can push the prices of the entire stock market higher. This leads to a stock price bubble that bursts once investors consider fundamental characteristics (such as a firm's cash flows) rather than hype when valuing a stock.

Uncertainty Surrounding Valuation of Securities Even if markets are efficient, the valuation of a firm's security is subject to much uncertainty because investors have limited information available to value that security. Furthermore, the return from investing in a security over a particular period is typically uncertain because the cash flows to be received by investors over that period is uncertain. The higher the degree of uncertainty, the higher is the risk from investing in that security. From the perspective of an investor who purchases a security, risk represents the potential deviation of the security's actual return from what was expected. For any given type of security, risk levels among the issuers of that security can vary.

EXAMPLE Nike stock provides cash flows to investors in the form of quarterly dividends and when an investor sells the stock. Both the future dividends and the future stock price are uncertain. Thus the cash flows that Nike stock will provide to investors over a future period are uncertain, which means that the return from investing in Nike stock over that period is uncertain.

Yet the cash flow provided by Nike's stock is less uncertain than that provided by a small, young, publicly traded technology company. Because the return on the technology stock over a particular period is more uncertain than the return on Nike stock, the technology stock has more risk. ●

1-2e Securities Regulations

Much of the information that investors use to value securities issued by firms is provided in the form of financial statements by those firms. In particular, investors rely on accounting reports of a firm's revenue and expenses as a basis for estimating its future cash flows. Although firms with publicly traded stock are required to disclose financial information and financial statements, a firm's managers still possess information about its financial condition that is not necessarily available to investors. This situation is referred to as *asymmetric information*. Even when information is disclosed, an asymmetric information problem may still exist if some of the information provided by the firm's managers is intentionally misleading in order to exaggerate the firm's performance.

Required Disclosure Many regulations exist that attempt to ensure that businesses disclose accurate financial information. Similarly, when information is disclosed to only a small set of investors, those investors have a major advantage over other investors. Thus another regulatory goal is to provide all investors with equal access to disclosures by firms. The Securities Act of 1933 was intended to ensure complete disclosure of relevant financial information on publicly offered securities and to prevent fraudulent practices in selling these securities.

WEB

www.sec.gov
Background on the Securities and Exchange Commission, and news releases about financial regulations.

The Securities Exchange Act of 1934 extended the disclosure requirements to secondary market issues. It also declared illegal a variety of deceptive practices, such as misleading financial statements and trading strategies designed to manipulate the market price. In addition, it established the Securities and Exchange Commission (SEC) to oversee the securities markets, and the SEC has implemented additional regulations over time. Securities laws do not prevent investors from making poor investment decisions; they seek only to ensure full disclosure of information and thereby protect against fraud.

Regulatory Response to Financial Reporting Scandals Financial scandals that occurred in the 2001–2002 period proved that the existing regulations were not sufficient to prevent fraud. Several well-known companies such as Enron and WorldCom misled investors by exaggerating their earnings. They also failed to disclose relevant information that would have adversely affected the prices of their stock and debt securities. Firms that have issued stock and debt securities must hire independent auditors to verify that their financial information is accurate. However, in some cases, the auditors who were hired to ensure accuracy were not meeting their responsibility.

In response to the financial scandals, the Sarbanes-Oxley Act (discussed throughout this text) was passed to require that firms provide more complete and accurate financial information. It also imposed restrictions to ensure proper auditing by auditors and proper oversight by the firm's board of directors. These rules were intended to regain the trust of investors who supply the funds to the financial markets. Through these measures, regulators tried to eliminate or at least reduce the asymmetric information problem.

However, the Sarbanes-Oxley Act did not completely eliminate questionable accounting methods. In 2011 and 2012, Groupon Inc. used accounting methods that inflated its reported earnings. As these accounting methods were criticized by the financial media during 2012, the stock price of Groupon declined by about 85 percent.



GLOBAL ASPECTS

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1-2f International Securities Transactions

Financial markets are continuously being developed throughout the world to improve the transfer of securities between surplus units and deficit units. The financial markets are much more developed in some countries than in others, and they also vary in terms of the volumes of funds transferred from surplus to deficit units. Some countries have more developed financial markets for specific securities, and other countries (in Eastern Europe and Asia, for example) have established financial markets recently.

Under favorable economic conditions, the international integration of securities markets allows governments and corporations easier access to funding from creditors or investors in other countries to support their growth. In addition, investors and creditors in any country can benefit from the investment opportunities in other countries. Yet, under unfavorable economic conditions, the international integration of securities markets allows one country's financial problems to adversely affect other countries. The U.S. financial markets allow foreign investors to pursue investment opportunities in the United States, but during the U.S. financial crisis, many foreign investors who invested in U.S. securities experienced severe losses. Thus the U.S. financial crisis spread beyond the United States.

Many European governments borrow funds from creditors in many different countries, but as the governments of Greece, Portugal, and Spain struggled to repay their loans, they caused financial problems for some creditors in other countries. Economic conditions are more closely connected because of the international integration of securities markets, and this causes each country to be more exposed to the economic conditions of other countries.

Foreign Exchange Market International financial transactions normally require the exchange of currencies. The **foreign exchange market** facilitates this exchange. Many commercial banks and other financial institutions serve as intermediaries in the foreign exchange market by matching up participants who want to exchange one currency for another. Some of these financial institutions also serve as dealers by taking positions in currencies to accommodate foreign exchange requests.

Like securities, most currencies have a market-determined price (exchange rate) that changes in response to supply and demand. If there is a sudden shift in the aggregate demand by corporations, government agencies, and individuals for a given currency, or a shift in the aggregate supply of that currency for sale (to be exchanged for another currency), the price of the currency (exchange rate) will change.

1-2g Government Intervention in Financial Markets

In recent years, the government has increased its role in financial markets. Consider the following examples.

1. During the credit crisis, the Federal Reserve purchased various types of debt securities. The intervention was intended to ensure more liquidity in the debt securities markets, and therefore encourage investors to purchase debt securities.
2. New government regulations changed the manner by which the credit risk of bonds were assessed. The new regulations occurred because of criticisms about the previous process used for rating bonds that did not effectively warn investors about the credit risk of bonds during the credit crisis.
3. The government increased its monitoring of stock trading, and prosecuted cases in which investors traded based on inside information about firms that was not available to other investors. The increased government efforts were intended to ensure that no investor had an unfair advantage when trading in financial markets.

These examples illustrate how the government has increased its efforts to ensure fair and orderly financial markets, which could encourage more investors to participate in the markets, and therefore could increase liquidity.

1-3 Role of Financial Institutions

Because financial markets are **imperfect**, securities buyers and sellers do not have full access to information. Individuals with available funds are not normally capable of identifying credit worthy borrowers to whom they could lend those funds. In addition, they do not have the expertise to assess the creditworthiness of potential borrowers. Financial institutions are needed to resolve the limitations caused by market imperfections. They accept funds from surplus units and channel the funds to deficit units. Without financial institutions, the information and transaction costs of financial market transactions would be excessive. Financial institutions can be classified as depository and nondepository institutions.

1-3a Role of Depository Institutions

Depository institutions accept deposits from surplus units and provide credit to deficit units through loans and purchases of securities. They are popular financial institutions for the following reasons.

- They offer deposit accounts that can accommodate the amount and liquidity characteristics desired by most surplus units.
- They repackage funds received from deposits to provide loans of the size and maturity desired by deficit units.
- They accept the risk on loans provided.
- They have more expertise than individual surplus units in evaluating the creditworthiness of deficit units.
- They diversify their loans among numerous deficit units and therefore can absorb defaulted loans better than individual surplus units could.

To appreciate these advantages, consider the flow of funds from surplus units to deficit units if depository institutions did not exist. Each surplus unit would have to identify a deficit unit desiring to borrow the precise amount of funds available for the precise time period in which funds would be available. Furthermore, each surplus unit would have to perform the credit evaluation and incur the risk of default. Under these conditions, many surplus units would likely hold their funds rather than channel them to deficit units. Hence, the flow of funds from surplus units to deficit units would be disrupted.

When a depository institution offers a loan, it is acting as a creditor, just as if it had purchased a debt security. The more personalized loan agreement is less marketable in the secondary market than a debt security, however, because the loan agreement contains detailed provisions that can differ significantly among loans. Potential investors would need to review all provisions before purchasing loans in the secondary market.

A more specific description of each depository institution's role in the financial markets follows.

Commercial Banks In aggregate, commercial banks are the most dominant depository institution. They serve surplus units by offering a wide variety of deposit accounts, and they transfer deposited funds to deficit units by providing direct loans or purchasing debt securities. Commercial bank operations are exposed to risk because their loans and many of their investments in debt securities are subject to the risk of default by the borrowers.

Commercial banks serve both the private and public sectors; their deposit and lending services are utilized by households, businesses, and government agencies. Some commercial banks (including Bank of America, J.P. Morgan Chase, Citigroup, and Sun Trust Banks) have more than $100 billion in assets.

Some commercial banks receive more funds from deposits than they need to make loans or invest in securities. Other commercial banks need more funds to accommodate customer requests than the amount of funds that they receive from deposits. The **federal funds market** facilitates the flow of funds between depository institutions (including banks). A bank that has excess funds can lend to a bank with deficient funds for a short-term period, such as one to five days. In this way, the federal funds market facilitates the flow of funds from banks that have excess funds to banks that are in need of funds.

WEB

www.fdic.gov
Information and news about banks and savings institutions.

Commercial banks are subject to regulations that are intended to limit their exposure to the risk of failure. In particular, banks are required to maintain a minimum level of capital, relative to their size, so that they have a cushion to absorb possible losses from defaults on some loans provided to households or businesses. The Federal Reserve ("the Fed") serves as a regulator of banks.

Savings Institutions Savings institutions, which are sometimes referred to as thrift institutions, are another type of depository institution. Savings institutions include savings and loan associations (S&Ls) and savings banks. Like commercial banks, savings institutions offer deposit accounts to surplus units and then channel these deposits to deficit units. Savings banks are similar to S&Ls except that they have more diversified uses of funds. Over time, however, this difference has narrowed. Savings institutions can be owned by shareholders, but most are mutual (depositor owned). Like commercial banks, savings institutions rely on the federal funds market to lend their excess funds or to borrow funds on a short-term basis.

Whereas commercial banks concentrate on commercial (business) loans, savings institutions concentrate on residential mortgage loans. Normally, mortgage loans are perceived to exhibit a relatively low level of risk, but many mortgages defaulted in 2008 and 2009. This led to the credit crisis and caused financial problems for many savings institutions.

Credit Unions Credit unions differ from commercial banks and savings institutions in that they (1) are nonprofit and (2) restrict their business to credit union members, who share a common bond (such as a common employer or union). Like savings institutions, they are sometimes classified as thrift institutions in order to distinguish them from commercial banks. Because of the "common bond" characteristic, credit unions tend to be much smaller than other depository institutions. They use most of their funds to provide loans to their members. Some of the largest credit unions (e.g., the Navy Federal Credit Union, the State Employees Credit Union of North Carolina, the Pentagon Federal Credit Union) have assets of more than $5 billion.

1-3b Role of Nondepository Financial Institutions

Nondepository institutions generate funds from sources other than deposits but also play a major role in financial intermediation. These institutions are briefly described here and are covered in more detail in Part 7.

Finance Companies Most finance companies obtain funds by issuing securities and then lend the funds to individuals and small businesses. The functions of finance companies and depository institutions overlap, although each type of institution concentrates on a particular segment of the financial markets (explained in the chapters devoted to these institutions).

finance.yahoo.com/funds
Information about mutual funds.

Mutual Funds Mutual funds sell shares to surplus units and use the funds received to purchase a portfolio of securities. They are the dominant nondepository financial institution when measured in total assets. Some mutual funds concentrate their investment in capital market securities, such as stocks or bonds. Others, known as **money market mutual funds**, concentrate in money market securities. Typically, mutual funds purchase securities in minimum denominations that are larger than the savings of an individual surplus unit. By purchasing shares of mutual funds and money market mutual funds, small savers are able to invest in a diversified portfolio of securities with a relatively small amount of funds.

Securities Firms Securities firms provide a wide variety of functions in financial markets. Some securities firms act as a **broker**, executing securities transactions between two parties. The broker fee for executing a transaction is reflected in the difference (or **spread**) between the **bid quote** and the **ask quote**. The markup as a percentage of the transaction amount will likely be higher for less common transactions, since more time is needed to match up buyers and sellers. The markup will also likely be higher for transactions involving relatively small amounts so that the broker will be adequately compensated for the time required to execute the transaction.

Furthermore, securities firms often act as **dealers**, making a market in specific securities by maintaining an inventory of securities. Although a broker's income is mostly based on the markup, the dealer's income is influenced by the performance of the security portfolio maintained. Some dealers also provide brokerage services and therefore earn income from both types of activities.

In addition to brokerage and dealer services, securities firms also provide underwriting and advising services. The underwriting and advising services are commonly referred to as *investment banking*, and the securities firms that specialize in these services are sometimes referred to as *investment banks*. Some securities firms place newly issued securities for corporations and government agencies; this task differs from traditional brokerage activities because it involves the primary market. When securities firms **underwrite** newly issued securities, they may sell the securities for a client at a guaranteed price or may simply sell the securities at the best price they can get for their client.

Some securities firms offer advisory services on mergers and other forms of corporate restructuring. In addition to helping a company plan its restructuring, the securities firm also executes the change in the client's capital structure by placing the securities issued by the company.

Insurance Companies Insurance companies provide individuals and firms with insurance policies that reduce the financial burden associated with death, illness, and damage to property. These companies charge premiums in exchange for the insurance that they provide. They invest the funds received in the form of premiums until the funds are needed to cover insurance claims. Insurance companies commonly invest these funds in stocks or bonds issued by corporations or in bonds issued by the government. In this way, they finance the needs of deficit units and thus serve as important financial intermediaries. Their overall performance is linked to the performance of the stocks and bonds in which they invest. Large insurance companies include State Farm Group, Allstate Insurance, Travelers Group, CNA Insurance, and Liberty Mutual.

Pension Funds Many corporations and government agencies offer pension plans to their employees. The employees and their employers (or both) periodically contribute funds to the plan. Pension funds provide an efficient way for individuals to save for their retirement. The pension funds manage the money until the individuals with draw the funds from their retirement accounts. The money that is contributed to individual

retirement accounts is commonly invested by the pension funds in stocks or bonds issued by corporations or in bonds issued by the government. Thus pension funds are important financial intermediaries that finance the needs of deficit units.

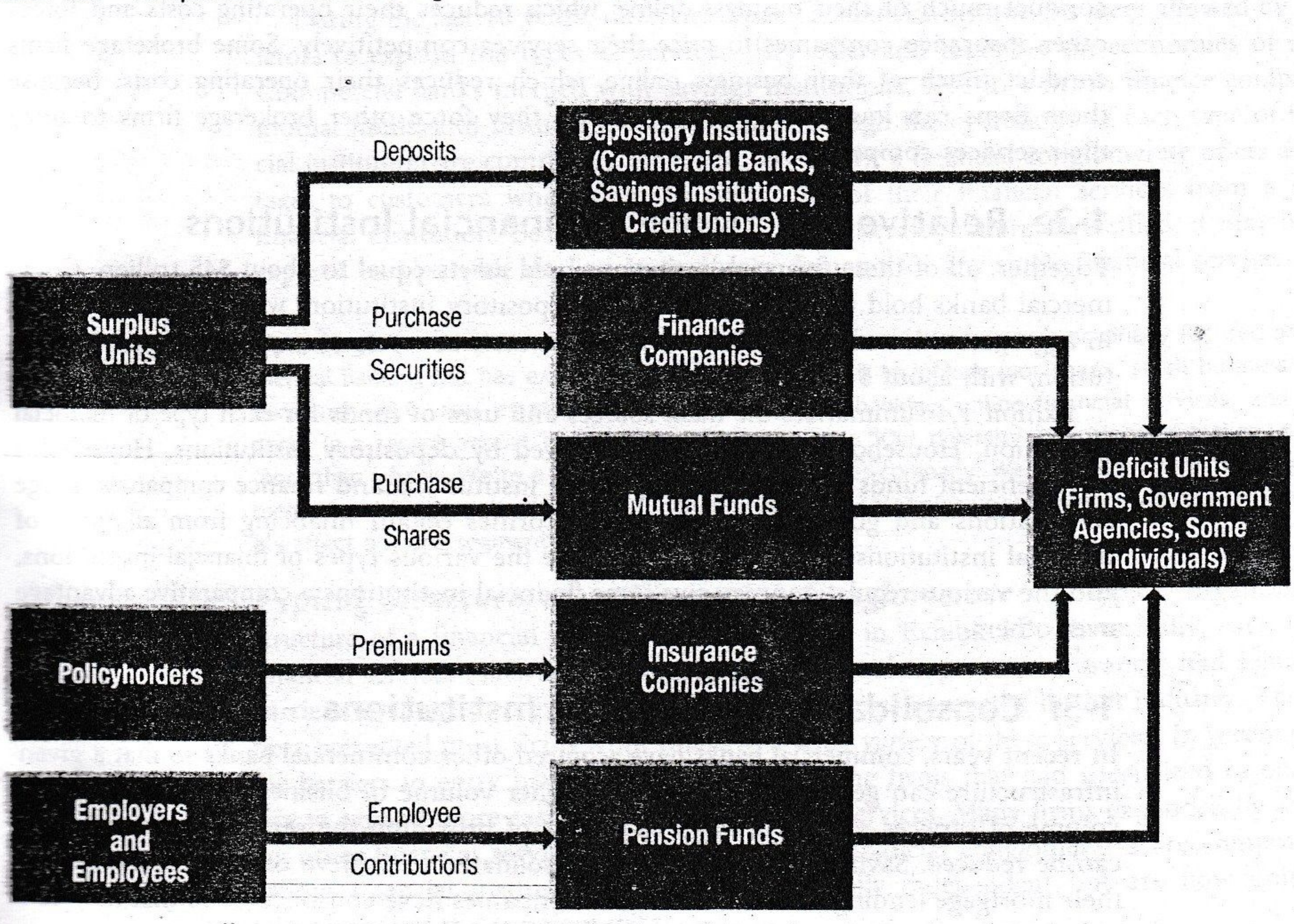
1-3c Comparison of Roles among Financial Institutions

The role of financial institutions in facilitating the flow of funds from individual surplus units (investors) to deficit units is illustrated in Exhibit 1.3. Surplus units are shown on the left side of the exhibit, and deficit units are shown on the right. Three different flows of funds from surplus units to deficit units are shown in the exhibit. One set of flows represents deposits from surplus units that are transformed by depository institutions into loans for deficit units. A second set of flows represents purchases of securities (commercial paper) issued by finance companies that are transformed into finance company loans for deficit units. A third set of flows reflects the purchases of shares issued by mutual funds, which are used by the mutual funds to purchase debt and equity securities of deficit units.

The deficit units also receive funding from insurance companies and pension funds. Because insurance companies and pension funds purchase massive amounts of stocks and bonds, they finance much of the expenditures made by large deficit units, such as corporations and government agencies. Financial institutions such as commercial banks, insurance companies, mutual funds, and pension funds serve the role of investing funds that they have received from surplus units, so they are often referred to as *institutional investors.*

Securities firms are not shown in Exhibit 1.3, but they play an important role in facilitating the flow of funds. Many of the transactions between the financial institutions and

Exhibit 1.3 Comparison of Roles among Financial Institutions



deficit units are executed by securities firms. Furthermore, some funds flow directly from surplus units to deficit units as a result of security transactions, with securities firms serving as brokers.

Institutional Role as a Monitor of Publicly Traded Firms In addition to the roles of financial institutions described in Exhibit 1.3, financial institutions also serve as monitors of publicly traded firms. Because insurance companies, pension funds, and some mutual funds are major investors in stocks, they can influence the management of publicly traded firms. In recent years, many large institutional investors have publicly criticized the management of specific firms, which has resulted in corporate restructuring or even the firing of executives in some cases. Thus institutional investors not only provide financial support to companies but also exercise some degree of corporate control over them. By serving as activist shareholders, they can help ensure that managers of publicly held corporations are making decisions that are in the best interests of the shareholders.

1-3d How the Internet Facilitates Roles of Financial Institutions

The Internet has also enabled financial institutions to perform their roles more efficiently. Some commercial banks have been created solely as online entities. Because they have lower costs, they can offer higher interest rates on deposits and lower rates on loans. Other banks and depository institutions also offer online services, which can reduce costs, increase efficiency, and intensify competition. Many mutual funds allow their shareholders to execute buy or sell transactions online. Some insurance companies conduct much of their business online, which reduces their operating costs and forces other insurance companies to price their services competitively. Some brokerage firms conduct much of their business online, which reduces their operating costs; because these firms can lower the fees they charge, they force other brokerage firms to price their services competitively.

1-3e Relative Importance of Financial Institutions

Together, all of these financial institutions hold assets equal to about $45 trillion. Commercial banks hold the most assets of any depository institution, with about $12 trillion in aggregate. Mutual funds hold the largest amount of assets of any nondepository institution, with about $11 trillion in aggregate.

Exhibit 1.4 summarizes the main sources and uses of funds for each type of financial institution. Households with savings are served by depository institutions. Households with deficient funds are served by depository institutions and finance companies. Large corporations and governments that issue securities obtain financing from all types of financial institutions. Several agencies regulate the various types of financial institutions, and the various regulations may give some financial institutions a comparative advantage over others.

1-3f Consolidation of Financial Institutions

In recent years, commercial banks have acquired other commercial banks so that a given infrastructure can generate and support a higher volume of business. By increasing the volume of services produced, the average cost of providing the services (such as loans) can be reduced. Savings institutions have consolidated to achieve economies of scale for their mortgage lending business. Insurance companies have consolidated so that they can reduce the average cost of providing insurance services.

Exhibit 1.4 Summary of Institutional Sources and Uses of Funds

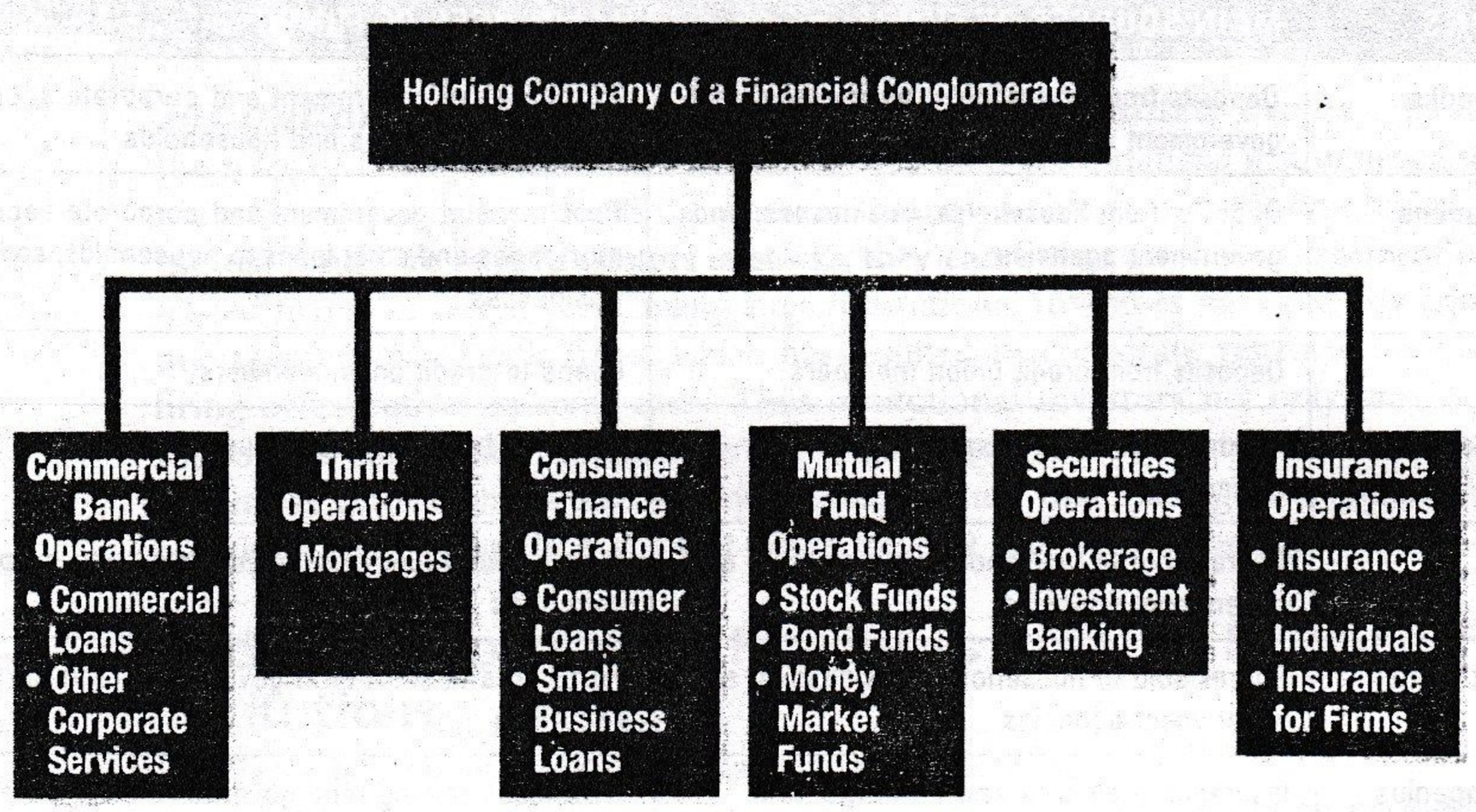
FINANCIAL INSTITUTIONS	MAIN SOURCES OF FUNDS	MAIN USES OF FUNDS
Commercial banks	Deposits from households, businesses, and government agencies	Purchases of government and corporate securities; loans to businesses and households
Savings institutions	Deposits from households, businesses, and government agencies	Purchases of government and corporate securities; mortgages and other loans to households; some loans to businesses
Credit unions	Deposits from credit union members	Loans to credit union members
Finance companies	Securities sold to households and businesses	Loans to households and businesses
Mutual funds	Shares sold to households, businesses, and government agencies	Purchases of long-term government and corporate securities
Money market funds	Shares sold to households, businesses, and government agencies	Purchases of short-term government and corporate securities
Insurance companies	Insurance premiums and earnings from investments	Purchases of long-term government and corporate securities
Pension funds	Employer/employee contributions	Purchases of long-term government and corporate securities

During the last 10 years, different types of financial institutions were allowed by regulators to expand the types of services they offer and capitalize on economies of scope. Commercial banks merged with savings institutions, securities firms, finance companies, mutual funds, and insurance companies. Although the operations of each type of financial institution are commonly managed separately, a financial conglomerate offers advantages to customers who prefer to obtain all of their financial services from a single financial institution. Because a financial conglomerate is more diversified, it may be less exposed to a possible decline in customer demand for any single financial service.

EXAMPLE Wells Fargo is a classic example of the evolution in financial services. It originally focused on commercial banking but has expanded its nonbank services to include mortgages, small business loans, consumer loans, real estate, brokerage, investment banking, online financial services, and insurance. In a recent annual report, Wells Fargo stated: "Our diversity in businesses makes us much more than a bank. We're a diversified financial services company. We're competing in a highly fragmented and fast growing industry: Financial Services. This helps us weather downturns that inevitably affect any one segment of our industry." ●

Typical Structure of a Financial Conglomerate A typical organizational structure of a financial conglomerate is shown in Exhibit 1.5. Historically, each of the financial services (such as banking, mortgages, brokerage, and insurance) had significant barriers to entry, so only a limited number of firms competed in that industry. The barriers prevented most firms from offering a wide variety of these services. In recent years, the barriers to entry have been reduced, allowing firms that had specialized in one service to expand more easily into other financial services. Many firms expanded by acquiring other financial services firms. Thus many financial conglomerates are composed of various financial institutions that were originally independent but are now units (or subsidiaries) of the conglomerate.

Exhibit 1.5 Organizational Structure of a Financial Conglomerate



Impact of Consolidation on Competition As financial institutions spread into other financial services, the competition for customers desiring the various types of financial services increased. Prices of financial services declined in response to the competition. In addition, consolidation has provided more convenience. Individual customers can rely on the financial conglomerate for convenient access to life and health insurance, brokerage, mutual funds, investment advice and financial planning, bank deposits, and personal loans. A corporate customer can turn to the financial conglomerate for property and casualty insurance, health insurance plans for employees, business loans, advice on restructuring its businesses, issuing new debt or equity securities, and management of its pension plan.

GLOBAL ASPECTS

Global Consolidation of Financial Institutions Many financial institutions have expanded internationally to capitalize on their expertise. Commercial banks, insurance companies, and securities firms have expanded through international mergers. An international merger between financial institutions enables the merged company to offer the services of both entities to its entire customer base. For example, a U.S. commercial bank may specialize in lending while a European securities firm specializes in services such as underwriting securities. A merger between the two entities allows the U.S. bank to provide its services to the European customer base (clients of the European securities firm) and allows the European securities firm to offer its services to the U.S. customer base. By combining specialized skills and customer bases, the merged financial institutions can offer more services to clients and have an international customer base.

The adoption of the euro by 17 European countries has increased business between those countries and created a more competitive environment in Europe. European financial institutions, which had primarily competed with other financial institutions based in their own country, recognized that they would now face more competition from financial institutions in other countries.

Many financial institutions have attempted to benefit from opportunities in emerging markets. For example, some large securities firms have expanded into many countries

to offer underwriting services for firms and government agencies. The need for this service has increased most dramatically in countries where businesses have been privatized. In addition, commercial banks have expanded into emerging markets to provide loans. Although this allows them to capitalize on opportunities in these countries, it also exposes them to financial problems in these countries.

1-4 Credit Crisis for Financial Institutions

Following the abrupt increase in home prices in the 2004–2006 period, many financial institutions increased their holdings of mortgages and mortgage-backed securities, whose performance was based on the timely mortgage payments made by homeowners. Some financial institutions (especially commercial banks and savings institutions) aggressively attempted to expand their mortgage business in order to capitalize on the strong housing market. They commonly applied liberal standards when originating new mortgages and often failed to verify the applicant's job status, income level, or credit history. Home prices were expected to continue rising over time, so financial institutions presumed (incorrectly) that the underlying value of the homes would provide adequate collateral to back the mortgage if homeowners could not make their mortgage payments.

In the 2007–2009 period, mortgage defaults increased, and there was an excess of unoccupied homes as homeowners who could not pay the mortgage left their homes. As a result, home prices plummeted, and the value of the property collateral backing many mortgages was less than the outstanding mortgage amount. By January 2009, at least 10 percent of all American homeowners were either behind on their mortgage payments or had defaulted on their mortgage. Many of the financial institutions that originated mortgages suffered major losses.

1-4a Systemic Risk during the Credit Crisis

The credit crisis illustrated how financial problems of some financial institutions spread to others. **Systemic risk** is defined as the spread of financial problems among financial institutions and across financial markets that could cause a collapse in the financial system. It exists because financial institutions invest their funds in similar types of securities and therefore have similar exposure to large declines in the prices of these securities. In this case, mortgage defaults affected financial institutions in several ways. First, many financial institutions that originated mortgages shortly before the crisis sold them to other financial institutions (i.e., commercial banks, savings institutions, mutual funds, insurance companies, securities firms, and pension funds); hence even financial institutions that were not involved in the mortgage origination process experienced large losses because they purchased the mortgages originated by other financial institutions.

Second, many other financial institutions that invested in mortgage-backed securities and promised payments on mortgages were exposed to the crisis. Third, some financial institutions (especially securities firms) relied heavily on short-term debt to finance their operations and used their holdings of mortgage-backed securities as collateral. But when the prices of mortgage-backed securities plummeted, large securities firms such as Bear Stearns and Lehman Brothers could not issue new short-term debt to pay off the principal on maturing debt.

Furthermore, the decline in home building activity caused a decrease in the demand for many related businesses, such as air-conditioning services, roofing, and landscaping. In addition, the loss of income by workers in these industries caused a decline in

spending in a wide variety of industries. The weak economy also created more concerns about the potential default on debt securities, causing further declines in bond prices. The financial markets were filled with sellers who wanted to dump debt securities, but there were not many buyers willing to buy securities. Consequently, the prices of debt securities plunged.

Systemic risk was a major concern during the credit crisis because the prices of most equity securities declined substantially, since the operating performance of most firms declined when the economy weakened. Thus most financial institutions experienced large losses on their investments during the credit crisis even if they invested solely inequity securities.

1-4b Government Response to the Credit Crisis

The government intervened in order to correct some of the economic problems caused by the credit crisis.

Emergency Economic Stabilization Act On October 3, 2008, Congress enacted the Emergency Economic Stabilization Act of 2008 (also referred to as the bail-out act), which was intended to resolve the liquidity problems of financial institutions and to restore the confidence of the investors who invest in them. The act directed the Treasury to inject $700 billion into the financial system, primarily by investing money into the banking system by purchasing the preferred stock of financial institutions. In this way, the Treasury provided large commercial banks with capital to cushion their losses, thereby reducing the likelihood that the banks would fail.

Federal Reserve Actions In 2008, some large securities firms such as Bear Stearns and Lehman Brothers experienced severe financial problems. The Federal Reserve rescued Bear Stearns by financing its acquisition by a commercial bank (J.P. Morgan Chase) in order to calm the financial markets. However, when Lehman Brothers was failing six months later, it was not rescued by the government, and this caused much paranoia in financial markets.

At this time, the Fed also provided emergency loans to many other securities firms that were not subject to its regulation. Some major securities firms (such as Merrill Lynch) were acquired by commercial banks, while others (Goldman Sachs and Morgan Stanley) were converted into commercial banks. These actions resulted in the consolidation of financial institutions and also subjected more financial institutions to Federal Reserve regulations.



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Financial Reform Act of 2010 On July 21, 2010, President Obama signed the Financial Reform Act (also referred to as the Wall Street Reform Act or Consumer Protection Act), which was intended to prevent some of the problems that caused the credit crisis. The provisions of the act are frequently discussed in this text when they apply to specific financial markets or financial institutions.

One of the key provisions of the Financial Reform Act of 2010 is that mortgage lenders verify the income, job status, and credit history of mortgage applicants before approving mortgage applications. This provision is intended to prevent applicants from receiving mortgages unless they are creditworthy.

In addition, the Financial Reform Act called for the creation of the Financial Stability Oversight Council, which is responsible for identifying risks to financial stability in the United States and makes regulatory recommendations that could reduce any risks to the financial system. The council consists of 10 members who represent the heads of regulatory agencies that regulate key components of the financial system, including the

housing industry, securities trading, depository institutions, mutual funds, and insurance companies.

Furthermore, the act established the Consumer Financial Protection Bureau (housed within the Federal Reserve) to regulate specific financial services for consumers, including online banking, checking accounts, credit cards, and student loans. This bureau can set rules to ensure that information regarding endorsements of specific financial products is accurate and to prevent deceptive practices.

1-4c Conclusion about Government Response to the Credit Crisis

In general, the government response to the credit crisis was intended to enhance the safety of financial institutions. Since financial institutions serve as intermediaries for financial markets, the tougher regulations on financial institutions can stabilize the financial markets and encourage more participation by surplus and deficit units in these markets.

SUMMARY

- Financial markets facilitate the transfer of funds from surplus units to deficit units. Because funding needs vary among deficit units, various financial markets have been established. The primary market allows for the issuance of new securities, and the secondary market allows for the sale of existing securities.
- Securities can be classified as money market (short-term) securities or capital market (long-term) securities. Common capital market securities include bonds, mortgages, mortgage-backed securities, and stocks. The valuation of a security represents the present value of future cash flows that it is expected to generate. New information that indicates a change in expected cash flows or degree of uncertainty affects prices of securities in financial markets.
- Depository and nondepository institutions help to finance the needs of deficit units. The main depository institutions are commercial banks, savings institutions, and credit unions. The main nondepository institutions are finance companies, mutual funds, pension funds, and insurance companies. Many financial institutions have been consolidated (due to mergers) into financial conglomerates, where they serve as subsidiaries of the conglomerate while conducting their specialized services. Thus, some financial conglomerates are able to provide all types of financial services. Consolidation allows for economies of scale and scope, which can enhance cash flows and increase the financial institution's value. In addition, consolidation can diversify the institution's services and increase its value through the reduction in risk.
- The credit crisis in 2008 and 2009 had a profound effect on financial institutions. Those institutions that were heavily involved in originating or investing in mortgages suffered major losses. Many investors were concerned that the institutions might fail and therefore avoided them, which disrupted the ability of financial institutions to facilitate the flow of funds. The credit crisis led to concerns about systemic risk, as financial problems spread among financial institutions that were heavily exposed to mortgages.

POINT COUNTER-POINT

Will Computer Technology Cause Financial Intermediaries to Become Extinct?

Point Yes. Financial intermediaries benefit from access to information. As information becomes more accessible, individuals will have the information they need before investing or borrowing funds. They will not need financial intermediaries to make their decisions.

Counter-Point No. Individuals rely not only on information but also on expertise. Some financial intermediaries specialize in credit analysis so that they can make loans. Surplus units will continue to provide funds to financial intermediaries, rather than make direct loans, because they are not capable of credit analysis even if more information about prospective borrowers is available. Some financial intermediaries no longer have physical buildings for customer service, but they still require agents who have the expertise to assess the creditworthiness of prospective borrowers.

Who Is Correct? Use the Internet to learn more about this issue and then formulate your own opinion.

Questions And Applications

1. Surplus and Deficit Units Explain the meaning of surplus units and deficit units. Provide an example of each. Which types of financial institutions do you deal with? Explain whether you are acting as a surplus unit or a deficit unit in your relationship with each financial institution.

2. Types of Markets Distinguish between primary and secondary markets. Distinguish between money and capital markets.

3. Imperfect Markets Distinguish between perfect and imperfect security markets. Explain why the existence of imperfect markets creates a need for financial intermediaries.

4. Efficient Markets Explain the meaning of efficient markets. Why might we expect markets to be efficient most of the time? In recent years, several securities firms have been guilty of using inside information when purchasing securities, thereby achieving returns well above the norm (even when accounting for risk). Does this suggest that the security markets are not efficient? Explain.

5. Securities Laws What was the purpose of the Securities Act of 1933? What was the purpose of the Securities Exchange Act of 1934? Do these laws prevent investors from making poor investment decisions? Explain.

6. International Barriers If barriers to international securities markets are reduced, will a country's interest rate be more or less susceptible to foreign lending and borrowing activities? Explain.

7. International Flow of Funds In what way could the international flow of funds cause a decline in interest rates?

8. Securities Firms What are the functions of [illegible] securities firms employ brokers and dealers. Distinguish between the functions of a broker and those of a dealer, and explain how each is compensated.

9. Standardized Securities Why do you think securities are commonly standardized? Explain why some financial flows of funds cannot occur through the sale of standardized securities. If securities were not standardized, how would this affect the volume of financial transactions conducted by brokers?

10. Marketability Commercial banks use some funds to purchase securities and other funds to make loans. Why are the securities more marketable than loans in the secondary market?

11. Depository Institutions Explain the primary use of funds by commercial banks versus savings institutions.

12. Credit Unions With regard to the profit motive, how are credit unions different from other financial institutions?

13. Nondepository Institutions Compare the main sources and uses of funds for finance companies, insurance companies, and pension funds.

14. Mutual Funds What is the function of a mutual fund? Why are mutual funds popular among investors? How does a money market mutual fund differ from a stock or bond mutual fund?

15. Impact of Privatization on Financial Markets Explain how the privatization of companies in Europe can lead to the development of new securities markets.

Advanced Questions

16. Comparing Financial Institutions Classify the types of financial institutions mentioned in this chapter

as either depository or nondepository. Explain the general difference between depository and nondepository institution sources of funds. It is often said that all types of financial institutions have begun to offer services that were previously offered only by certain types. Consequently, the operations of many financial institutions are becoming more similar. Nevertheless, performance levels still differ significantly among types of financial institutions. Why?

17. Financial Intermediation Look in a business periodical for news about a recent financial transaction involving two financial institutions. For this transaction, determine the following:

a. How will each institution's balance sheet be affected?

b. Will either institution receive immediate income from the transaction?

c. Who is the ultimate user of funds?

d. Who is the ultimate source of funds?

18. Role of Accounting in Financial Markets Integrate the roles of accounting, regulation, and financial market participation. That is, explain how financial market participants rely on accounting and why regulatory oversight of the accounting process is necessary.

19. Impact of Credit Crisis on Liquidity Explain why the credit crisis caused a lack of liquidity in the secondary markets for many types of debt securities. Explain how such a lack of liquidity would affect the prices of the debt securities in the secondary markets.

20. Impact of Credit Crisis on Institutions Explain why mortgage defaults during the credit crisis adversely affected financial institutions that did not originate the mortgages. What role did these institutions play in financing the mortgages?

21. Regulation of Financial Institutions Financial institutions are subject to regulation to ensure that they do not take excessive risk and can safely facilitate the flow of funds through financial markets. Nevertheless, during the credit crisis, individuals were concerned about using financial institutions to facilitate their financial transactions. Why do you think the existing regulations were ineffective at ensuring a safe financial system?

22. Impact of the Greece Debt Crisis European debt markets have become integrated over time, so that institutional investors (such as commercial banks) commonly purchase debt issued in other European countries. When the government of Greece experienced problems in meeting its debt obligations in 2010, some investors became concerned that the crisis would spread to other European countries. Explain why integrated European financial markets might allow a debt crisis in one European country to spread to other countries in Europe.

23. Global Financial Market Regulations Assume that countries A and B are of similar size, that they have similar economies, and that the government debt levels of both countries are within reasonable limits. Assume that the regulations in country A require complete disclosure of financial reporting by issuers of debt in that country but that regulations in country B do not require much disclosure of financial reporting. Explain why the government of country A is able to issue debt at a lower cost than the government of country B.

24. Influence of Financial Markets Some countries do not have well-established markets for debt securities or equity securities. Why do you think this can limit the development of the country, business expansion, and growth in national income in these countries?

25. Impact of Systemic Risk Different types of financial institutions commonly interact. They provide loans to each other, and take opposite positions on many different types of financial agreements, whereby one will owe the other based on a specific financial outcome. Explain why their relationships cause concerns about systemic risk.

Interpreting Financial News

"Interpreting Financial News" tests your ability to comprehend common statements made by Wall Street analysts and portfolio managers who participate in the financial markets. Interpret the following statements.

a. "The price of IBM stock will not be affected by the announcement that its earnings have increased as expected."

b. "The lending operations at Bank of America should benefit from strong economic growth."

c. "The brokerage and underwriting performance at Goldman Sachs should benefit from strong economic growth."

Managing in Financial Markets

Utilizing Financial Markets As a financial manager of a large firm, you plan to borrow $70 million over the next year

a. What are the most likely ways in which you can borrow $70 million?

b. Assuming that you decide to issue debt securities, describe the types of financial institutions that may purchase these securities.

c. How do individuals indirectly provide the financing for your firm when they maintain deposits at depository institutions, invest in mutual funds, purchase insurance policies, or invest in pensions?

FLOW OF FUNDS EXERCISE

Roles of Financial Markets and Institutions

This continuing exercise focuses on the interactions of a single manufacturing firm (Carson Company) in the financial markets. It illustrates how financial markets and institutions are integrated and facilitate the flow of funds in the business and financial environment. At the end of every chapter, this exercise provides a list of questions about Carson Company that requires the application of concepts presented in the chapter as they relate to the flow of funds.

Carson Company is a large manufacturing firm in California that was created 20 years ago by the Carson family. It was initially financed with an equity investment by the Carson family and 10 other individuals. Over time, Carson Company obtained substantial loans from finance companies and commercial banks. The interest rate on the loans is tied to market interest rates and is adjusted every six months. Thus Carson's cost of obtaining funds is sensitive to interest rate movements. It has a credit line with a bank in case it suddenly needs additional funds for a temporary period. It has purchased Treasury securities that it could sell if it experiences any liquidity problems.

Carson Company has assets valued at about $50 million and generates sales of about $100 million per year. Some of its growth is attributed to its acquisitions of other firms. Because of its expectations of a strong U.S. economy, Carson plans to grow in the future by expanding its business and by making more acquisitions. It expects that it will need substantial long-term financing and plans to borrow additional funds either through loans or by issuing bonds. It is also considering issuing stock to raise funds in the next year. Carson closely monitors conditions in financial markets that could affect its cash inflows and cash outflows and thereby affect its value.

a. In what way is Carson a surplus unit?

b. In what way is Carson a deficit unit?

c. How might finance companies facilitate Carson's expansion?

d. How might commercial banks facilitate Carson's expansion?

e. Why might Carson have limited access to additional debt financing during its growth phase?

f. How might securities firms facilitate Carson's expansion?

g. How might Carson use the primary market to facilitate its expansion?

h. How might it use the secondary market?

i. If financial markets were perfect, how might this have allowed Carson to avoid financial institutions?

j. The loans that Carson has obtained from commercial banks stipulate that Carson must receive the bank's approval before pursuing any large projects. What is the purpose of this condition? Does this condition benefit the owners of the company?

INTERNET/EXCEL EXERCISES

1. Review the information for the common stock of IBM, using the website finance.yahoo.com. Insert the ticker symbol "IBM" in the box and click on "Get Quotes." The main goal at this point is to become familiar with the information that you can obtain at this website. Review the data that are shown for IBM stock. Compare the price of IBM based on its last trade with the price range for the year. Is the price near its high or low price? What is the total value of IBM stock (market capitalization)? What is the average daily

trading volume (Avg Vol) of IBM stock? Click on "5y"just below the stock price chart to see IBM's stock price movements over the last five years. Describe the trend in IBM's stock over this period. At what points was the stock price the highest and lowest?

2. Repeat the questions in exercise 1 for the Children's Place Retail Stores (symbol PLCE). Explain how the market capitalization and trading volume for PLCE differ from that for IBM.

WSJ Exercise

Differentiating between Primary and Secondary Markets

Review the different tables relating to stock markets and bond markets that appear in Section C of the *Wall Street Journal.* Explain whether each of these tables is focused on the primary or secondary markets.

Online Articles with Real-World Examples

Find a recent practical article available online that describes a real-world example regarding a specific financial institution or financial market that reinforces one or more concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary of the article there and provide a link to the article so that other students can access it. If your class is live, your professor may ask you to summarize your application of the article in class. Your professor may assign specific students to complete this assignment or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples related to this chapter, consider using the following search terms (be sure to include the prevailing year as a search term to ensure that the online articles are recent):

1. secondary market AND liquidity
2. secondary market AND offering
3. money market
4. bond offering
5. stock offering
6. valuation AND stock
7. market efficiency
8. financial AND regulation
9. financial institution AND operations
10. financial institution AND governance

Term Paper on the Credit Crisis

Write a term paper on one of the following topics or on a topic assigned by your professor. Details such as the due date and the length of the paper will be provided by your professor.

Each of the topics listed below can be easily researched because considerable media attention has been devoted to the subject. Although this text offers a brief summary of each topic, much more information is available at online sources that you can find by using a search engine and inserting a few key terms or phrases.

1. **Impact of Lehman Brothers' Bankruptcy on Individual Wealth** Explain how the bankruptcy of Lehman Brothers (the largest bankruptcy ever) affected the wealth and income of many different types of individuals whose money was invested by institutional investors (such as pension funds) in Lehman Brothers' debt.

2. **Impact of the Credit Crisis on Financial Market Liquidity** Explain the link between the credit crisis and the lack of liquidity in the debt markets. Offer some insight as to why the debt markets became inactive. How were interest rates affected? What happened to initial public offering (IPO) activity during the credit crisis? Why?

3. **Transparency of Financial Institutions during the Credit Crisis** Select a financial institution that had serious financial problems as a result of the credit crisis. Review the media stories about this institution during the six months before its financial problems were publicized. Were there any clues that the financial institution was having problems? At what point do you think that the institution recognized that it was having financial difficulties? Did its previous annual report indicate serious problems? Did it announce its problems, or did another media source reveal the problems?

4. **Cause of Problems for Financial Institutions during the Credit Crisis** Select a financial institution that had serious financial problems as a result of the credit crisis. Determine the main underlying causes of the problems experienced by that financial institution. Explain how these problems might have been avoided.

5. **Mortgage-Backed Securities and Risk Taking by Financial Institutions** Do you think that institutional investors that purchased mortgage-backed securities containing subprime mortgages were following reasonable investment guidelines? Address this issue for various types of financial institutions such as pension funds, commercial banks, insurance companies, and mutual funds (your answer might differ with the type

of institutional investor). If financial institutions are taking on too much risk, how should regulations be changed to limit such excessive risk taking?

6. Pension Fund Investments in Lehman Brothers' Debt At the time that Lehman Brothers filed for bankruptcy, financial institutions serving municipalities in California were holding more than $300 billion in debt issued by Lehman. Do you think that municipal pension funds that purchased commercial paper and other debt securities issued by Lehman Brothers were following reasonable investment guidelines? If a pension fund is taking on too much risk, how should regulations be changed to limit such excessive risk taking?

7. Future Valuation of Mortgage-Backed Securities Commercial banks must periodically "mark to market" their assets in order to determine the capital they need. Identify some advantages and disadvantages of this method, and propose a solution that would be fair to both commercial banks and regulators.

8. Future Structure of Fannie Mae Fannie Mae plays an important role in the mortgage market, but it suffered major problems during the credit crisis. Discuss the underlying causes of the problems at Fannie Mae beyond what has been discussed in the text. Should Fannie Mae be owned completely by the government? Should it be privatized? Offer your opinion on a structure for Fannie Mae that would avoid its previous problems and enable it to serve the mortgage market.

9. Future Structure of Ratings Agencies Rating agencies rated the so-called tranches of mortgage-backed securities that were sold to institutional investors. Explain why the performance of these agencies was criticized, and then defend against this criticism on behalf of the agencies. Was the criticism of the agencies justified? How could rating agencies be structured or regulated in a different manner in order to prevent the problems that occurred during the credit crisis?

10. Future Structure of Credit Default Swaps Explain how credit default swaps maybe partially responsible for the credit crisis. Offer a proposal for how they could be structured in the future to ensure that they are used to enhance the safety of the financial system.

11. Sale of Bear Stearns Review the arguments that have been made for the government-orchestrated sale of Bear Stearns. If Bear Stearns had been allowed to fail, what types of financial institutions would have been adversely affected? In other words, who benefited from the government's action to prevent the failure of Bear Stearns? Do you think Bear Stearns should have been allowed to fail? Explain your opinion.

12. Bailout of AIG Review the arguments that have been made for the bailout of American International Group (AIG). If AIG had been allowed to fail, what types of financial institutions would have been adversely affected? That is, who benefited from the bailout of AIG? Do you think AIG should have been allowed to fail? Explain your opinion.

13. Executive Compensation at Financial Institutions Discuss the compensation received by executives at some financial institutions that experienced financial problems (e.g., AIG, Bear Stearns, Lehman Brothers, Merrill Lynch, Washington Mutual). Should these executives be allowed to retain the bonuses that they received in the 2007–2008 period? Should executive compensation at financial institutions be capped?

14. Impact of the Credit Crisis on Commercial Banks versus Securities Firms Both commercial banks and securities firms were adversely affected by the credit crisis,

but for different reasons. Discuss the reasons for the adverse effects on commercial banks and securities firms and explain why the reasons were different.

15. Role of the Treasury and the Fed in the Credit Crisis Summarize the various ways in which the U.S. Treasury and the Federal Reserve intervened to resolve the credit crisis. Discuss the pros and cons of their interventions. Offer your own opinion regarding whether they should have intervened.

2 Determination of Interest Rates

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- apply the loanable funds theory to explain why interest rates change,
- identify the most relevant factors that affect interest rate movements, and
- explain how to forecast interest rates.

An interest rate reflects the rate of return that a creditor receives when lending money, or the rate that a borrower pays when borrowing money. Since interest rates change over time, so does the rate earned by creditors who provide loans or the rate paid by borrowers who obtain loans. Interest rate movements have a direct influence on the market values of debt securities, such as money market securities, bonds, and mortgages. They have an indirect influence on equity security values because they can affect the return by investors who invest in equity securities. Thus, participants in financial markets attempt to anticipate interest rate movements when restructuring their investment or loan positions.

Interest rate movements also affect the value of most financial institutions. They influence the cost of funds to depository institutions and the interest received on some loans by financial institutions. Since many financial institutions invest in securities (such as bonds), the market value of their investments is affected by interest rate movements. Thus managers of financial institutions attempt to anticipate interest rate movements and commonly restructure their assets and liabilities to capitalize on their expectations. Individuals attempt to anticipate interest rate movements so that they can monitor the potential cost of borrowing or the potential return from investing in various debt securities.

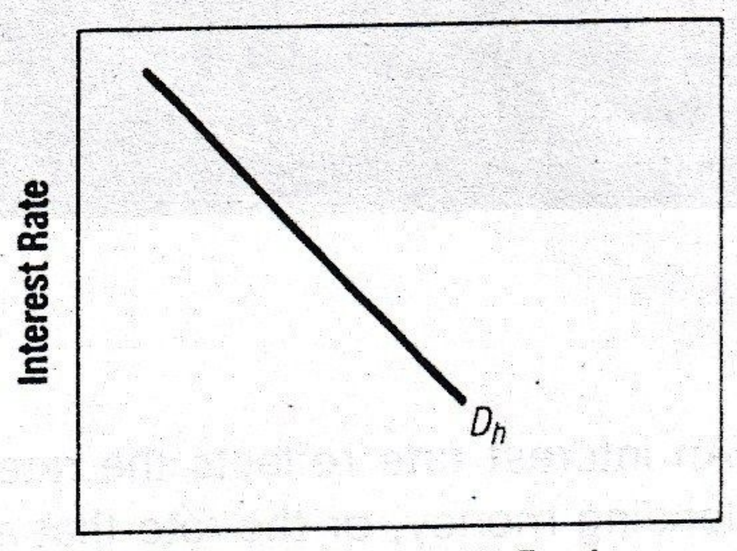
WEB

www.bloomberg.com
Information on interest rates in recent months.

2-1 Loanable Funds Theory

The **loanable funds theory**, commonly used to explain interest rate movements, suggests that the market interest rate is determined by factors controlling the supply of and demand for loanable funds. The theory is especially useful for explaining movements in the general level of interest rates for a particular country. Furthermore, it can be used (along with other concepts) to explain why interest rates among some debt securities of a given country vary, which is the focus of the next chapter. The phrase "demand for loanable funds" is widely used in financial markets to refer to the borrowing activities of households, businesses, and governments. This chapter describes the sectors that commonly affect the demand for loanable funds and then describes the sectors that supply

Exhibit 2.1 Relationship between Interest Rates and Household Demand (D_h) for Loanable Funds at a Given Point in Time



loanable funds to the markets. Finally, the demand and supply concepts are integrated to explain interest rate movements.

2-1a Household Demand for Loanable Funds

Households commonly demand loanable funds to finance housing expenditures. In addition, they finance the purchases of automobiles and household items, which results in installment debt. As the aggregate level of household income rises, so does installment debt. The level of installment debt as a percentage of disposable income has been increasing over time, although it is generally lower in recessionary periods.

If households could be surveyed at any given time to indicate the quantity of loanable funds they would demand at various interest rate levels, the results would reveal an inverse relationship between the interest rate and the quantity of loanable funds demanded. This simply means that, at any moment in time, households would demand a greater quantity of loanable funds at lower rates of interest; in other words, they are willing to borrow more money (in aggregate) at lower rates of interest.

EXAMPLE

Consider the household demand-for-loanable-funds schedule (also called the *demand curve*) in Exhibit 2.1, which shows how the amount of funds that would be demanded is dependent on the interest rate. Various events can cause household borrowing preferences to change and thereby shift the demand curve. For example, if tax rates on household income are expected to decrease significantly in the future, households might believe that they can more easily afford future loan repayments and thus be willing to borrow more funds. For any interest rate, the quantity of loanable funds demanded by households would be greater as a result of the tax rate change. This represents an outward shift (to the right) in the demand curve. ●

2-1b Business Demand for Loanable Funds

Businesses demand loanable funds to invest in long-term (fixed) and short-term assets. The quantity of funds demanded by businesses depends on the number of business projects to be implemented. Businesses evaluate a project by comparing the present value of its cash flows to its initial investment, as follows:

$$NPV = -INV + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t}$$

where

NPV = net present value of project
INV = initial investment
CF_t = cash flow in period t
k = required rate of return on project

Projects with a positive net present value (NPV) are accepted because the present value of their benefits outweighs the costs. The required return to implement a given project will be lower if interest rates are lower because the cost of borrowing funds to support the project will be lower. Hence more projects will have positive NPVs, and businesses will need a greater amount of financing. This implies that, all else being equal, businesses will demand a greater quantity of loanable funds when interest rates are lower; this relation is illustrated in Exhibit 2.2.

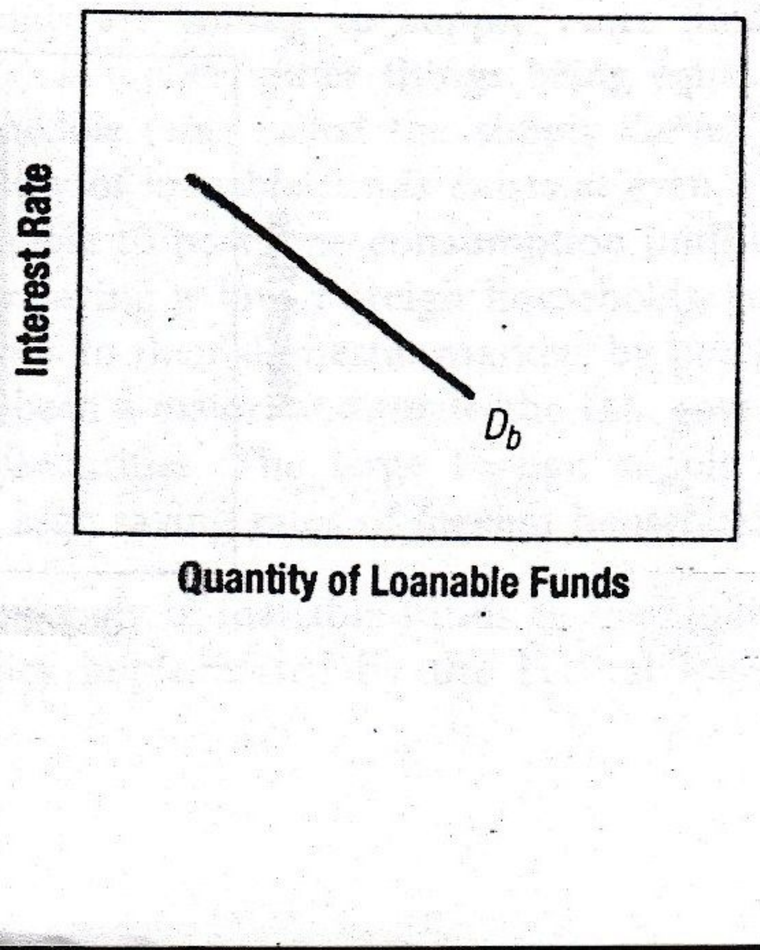
In addition to long-term assets, businesses also need funds to invest in their short-term assets (such as accounts receivable and inventory) in order to support ongoing operations. Any demand for funds resulting from this type of investment is positively related to the number of projects implemented and thus is inversely related to the interest rate. The opportunity cost of investing in short-term assets is higher when interest rates are higher. Therefore, firms generally attempt to support ongoing operations with fewer funds during periods of high interest rates. This is another reason that a firm's total demand for loanable funds is inversely related to prevailing interest rates. Although the demand for loanable funds by some businesses may be more sensitive to interest rates than others, all businesses are likely to demand more funds when interest rates are lower.

Shifts in the Demand for Loanable Funds The business demand-for-loanable-funds schedule (as reflected by the demand curve in Exhibit 2.2) can change in reaction to any events that affect business borrowing preferences. If economic conditions become more favorable, the expected cash flows on various proposed projects will increase. More proposed projects will then have expected returns that exceed a particular required rate of return (sometimes called the *hurdle rate*). Additional projects will be acceptable as a result of more favorable economic forecasts, causing an increased demand for loanable funds. The increase in demand will result in an outward shift (to the right) in the demand curve.

WEB

www.treasurydirect.gov
Information on the U.S. government's debt.

Exhibit 2.2 Relationship between Interest Rates and Business Demand (D_b) for Loanable Funds at a Given Point in Time



2-1c Government Demand for Loanable Funds

Whenever a government's planned expenditures cannot be completely covered by its incoming revenues from taxes and other sources, it demands loanable funds. Municipal (state and local) governments issue municipal bonds to obtain funds; the federal government and its agencies issue Treasury securities and federal agency securities. These securities constitute government debt.

The federal government's expenditure and tax policies are generally thought to be independent of interest rates. Thus the federal government's demand for funds is referred to as **interest-inelastic**, or insensitive to interest rates. In contrast, municipal governments sometimes postpone proposed expenditures if the cost of financing is too high, implying that their demand for loanable funds is somewhat sensitive to interest rates.

Like household and business demand, government demand for loanable funds can shift in response to various events.

EXAMPLE

The federal government's demand-for-loanable-funds schedule is represented by D_{g1} in Exhibit 2.3. If new bills are passed that cause a net increase of $200 billion in the deficit, the federal government's demand for loanable funds will increase by that amount. In the graph, this new demand schedule is represented by D_{g2}. ●

2-1d Foreign Demand for Loanable Funds

GLOBAL ASPECTS

The demand for loanable funds in a given market also includes foreign demand by foreign governments or corporations. For example, the British government may obtain financing by issuing British Treasury securities to U.S. investors; this represents British demand for U.S. funds. Because foreign financial transactions are becoming so common, they can have a significant impact on the demand for loanable funds in any given country. A foreign country's demand for U.S. funds (i.e., preference to borrow U.S. dollars) is influenced by, among other factors, the difference between its own interest rates and U.S. rates. Other things being equal, a larger quantity of U.S. funds will be demanded by foreign governments and corporations if their domestic interest rates are high relative to U.S. rates. As a result, for a given set of foreign interest rates, the quantity of U.S. loanable funds demanded by foreign governments or firms will be inversely related to U.S. interest rates.

www.bloomberg.com/markets
Interest rate information.

Exhibit 2.3 Impact of Increased Government Deficit on the Government Demand for Loanable Funds

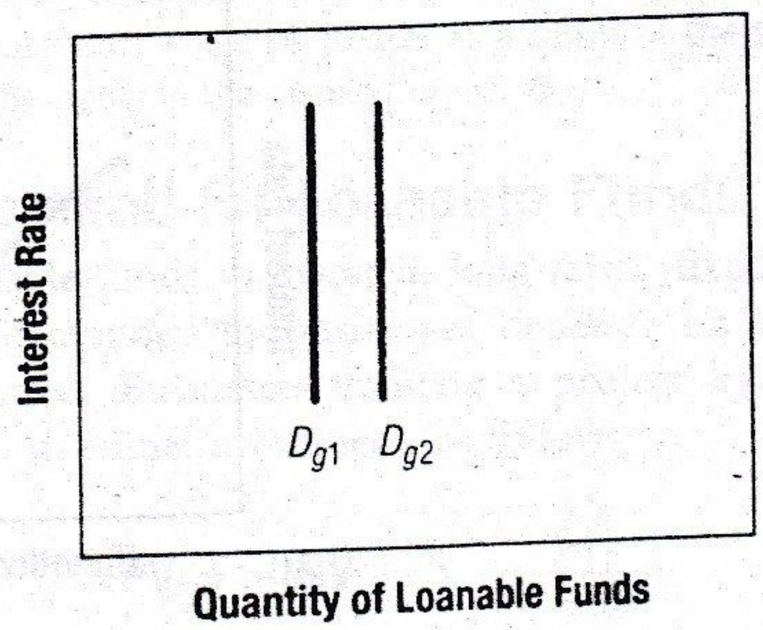
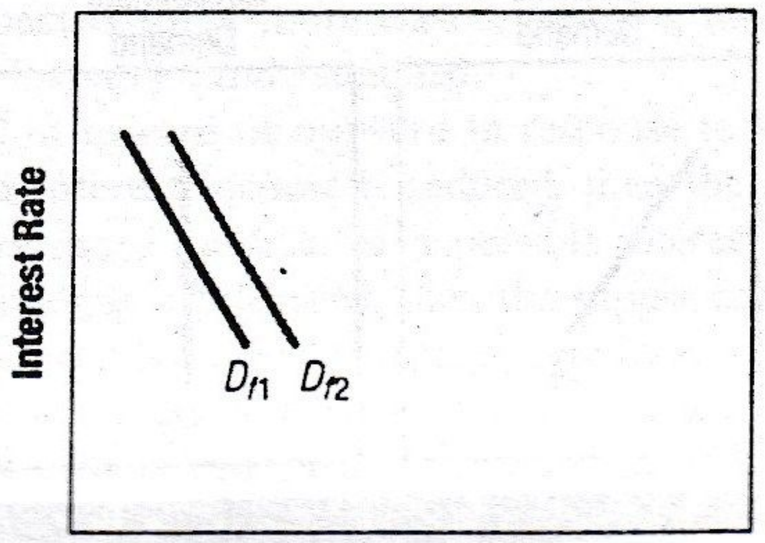


Exhibit 2.4 Impact of Increased Foreign Interest Rates on the Foreign Demand for U.S. Loanable Funds



The foreign demand curve can shift in response to economic conditions. For example, assume the original foreign demand schedule is represented by D_{f1} in Exhibit 2.4. If foreign interest rates rise, foreign firms and governments will likely increase their demand for U.S. funds, as represented by the shift from D_{f1} to D_{f2}.

2-1e Aggregate Demand for Loanable Funds

The aggregate demand for loanable funds is the sum of the quantities demanded by the separate sectors at any given interest rate, as shown in Exhibit 2.5. Because most of these sectors are likely to demand a larger quantity of funds at lower interest rates (other things being equal), it follows that the aggregate demand for loanable funds is inversely related to the prevailing interest rate. If the demand schedule of any sector changes, the aggregate demand schedule will also be affected.

2-1f Supply of Loanable Funds

The term "supply of loanable funds" is commonly used to refer to funds provided to financial markets by savers. The household sector is the largest supplier, but loanable funds are also supplied by some government units that temporarily generate more tax revenues than they spend or by some businesses whose cash inflows exceed outflows. Yet households as a group are a net supplier of loanable funds, whereas governments and businesses are net demanders of loanable funds.

Suppliers of loanable funds are willing to supply more funds if the interest rate (reward for supplying funds) is higher, other things being equal. This means that the supply-of-loanable-funds schedule (also called the supply curve) is upward sloping, as shown in Exhibit 2.6. A supply of loanable funds exists at even a very low interest rate because some households choose to postpone consumption until later years, even when the reward (interest rate) for saving is low. Foreign households, governments, and businesses commonly supply funds to their domestic markets by purchasing domestic securities. In addition, they have been a major creditor to the U.S. government by purchasing large amounts of Treasury securities. The large foreign supply of funds to the U.S. market is due in part to the high saving rates of foreign households.

Effects of the Fed The supply of loanable funds in the United States is also influenced by the monetary policy implemented by the Federal Reserve System. The Fed

Exhibit 2.5 Determination of the Aggregate Demand Curve for Loanable Funds

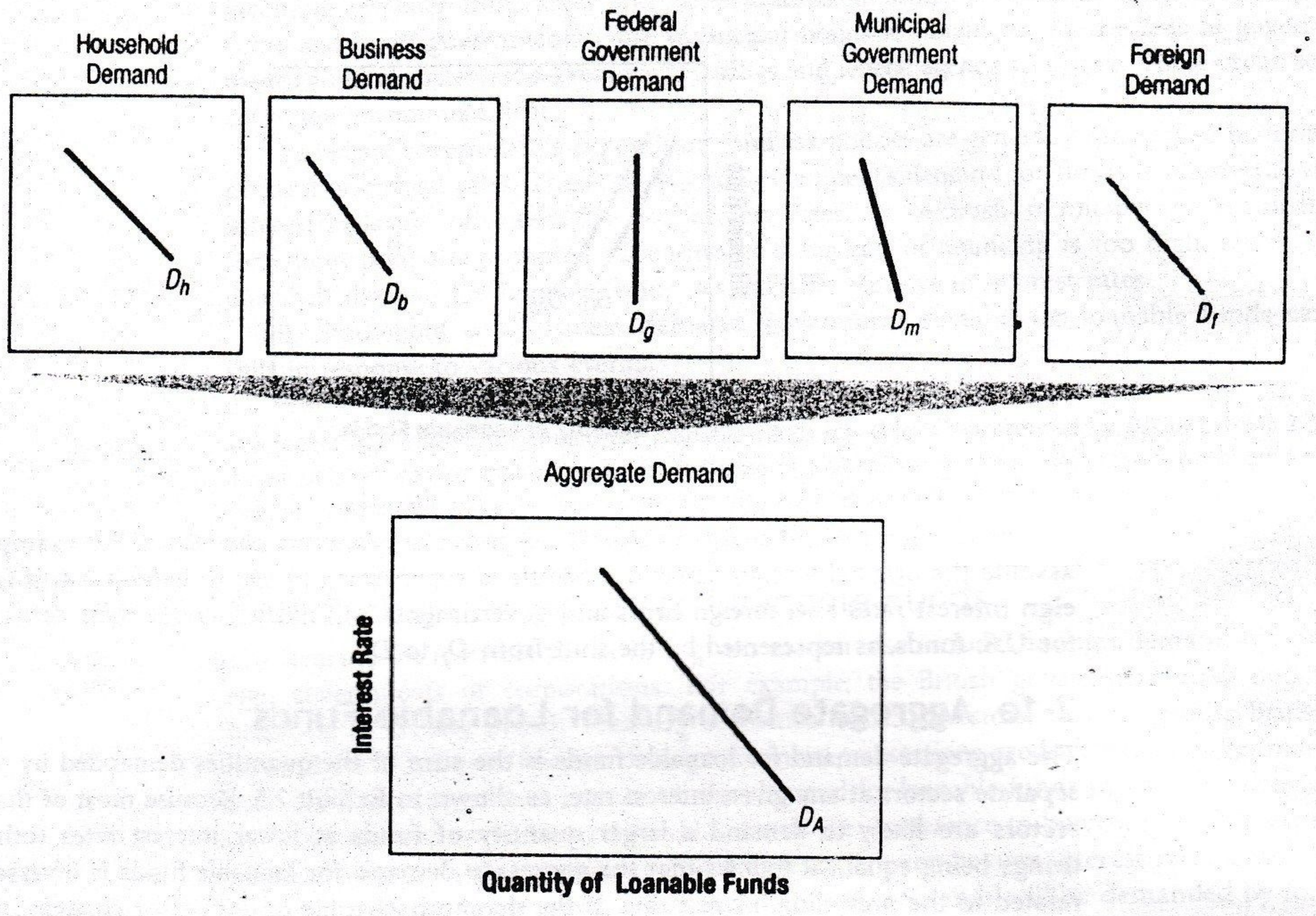
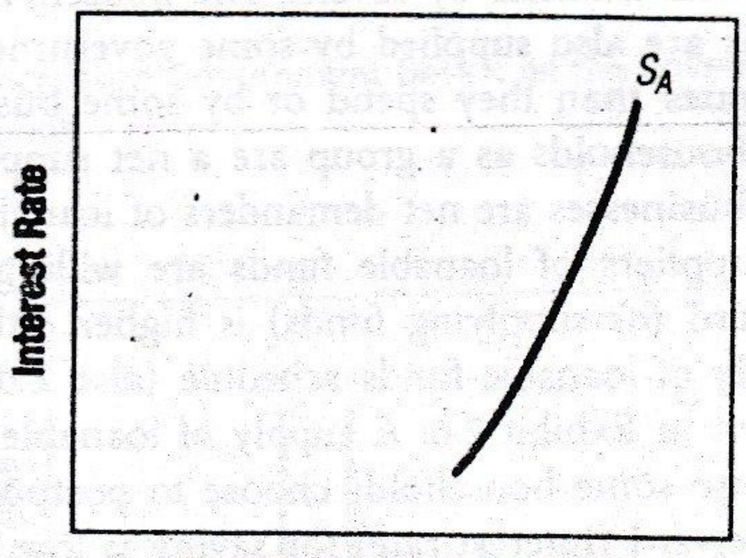


Exhibit 2.6 Aggregate Supply Curve for Loanable Funds



conducts monetary policy in an effort to control U.S. economic conditions. By affecting the supply of loanable funds, the Fed's monetary policy affects interest rates (as will be described shortly). By influencing interest rates, the Fed is able to influence the amount of money that corporations and households are willing to borrow and spend.

Aggregate Supply of Funds The aggregate supply schedule of loanable funds represents the combination of all sector supply schedules along with the supply of funds provided by the Fed's monetary policy. The steep slope of the aggregate supply curve in Exhibit 2.6 means that it is interest-inelastic. The quantity of loanable funds demanded is normally expected to be more elastic, meaning more sensitive to interest rates, than the quantity of loanable funds supplied.

The supply curve can shift inward or outward in response to various conditions. For example, if the tax rate on interest income is reduced, then the supply curve will shift outward as households save more funds at each possible interest rate level. Conversely, if the tax rate on interest income is increased, then the supply curve will shift inward as households save fewer funds at each possible interest rate level.

In this section, minimal attention has been given to financial institutions. Although financial institutions play a critical intermediary role in channeling funds, they are not the ultimate suppliers of funds. Any change in a financial institution's supply of funds results only from a change in habits of the households, businesses, or governments that supply those funds.

2-1g Equilibrium Interest Rate

An understanding of equilibrium interest rates is necessary to assess how various events can affect interest rates. In reality, there are several different interest rates because some borrowers pay a higher rate than others. At this point, however, the focus is on the forces that cause the general level of interest rates to change, since interest rates across borrowers tend to change in the same direction. The determination of an equilibrium interest rate is presented first from an algebraic perspective and then from a graphical perspective. Following this presentation, several examples are offered to reinforce the concept.

Algebraic Presentation The equilibrium interest rate is the rate that equates the aggregate demand for funds with the aggregate supply of loanable funds. The aggregate demand for funds (D_A) can be written as

$$D_A = D_h + D_b + D_g + D_m + D_f$$

where

D_h = household demand for loanable funds
D_b = business demand for loanable funds
D_g = federal government demand for loanable funds
D_m = municipal government demand for loanable funds
D_f = foreign demand for loanable funds

The aggregate supply of funds (SA) can likewise be written as

$$S_A = S_h + S_b + S_g + S_m + S_f$$

where

S_h = household supply of loanable funds
S_b = business supply of loanable funds
S_g = federal government supply of loanable funds
S_m = municipal government supply of loanable funds
S_f = foreign supply of loanable funds

In equilibrium, $D_A = S_A$. If the aggregate demand for loanable funds increases without a corresponding increase in aggregate supply, there will be a shortage of loanable funds. In this case, interest rates will rise until an additional supply of loanable funds is available to accommodate the excess demand. Conversely, an increase in the aggregate supply of loanable funds without a corresponding increase in aggregate demand will result in a surplus of loanable funds. In this case, interest rates will fall until the quantity of funds supplied no longer exceeds the quantity of funds demanded.

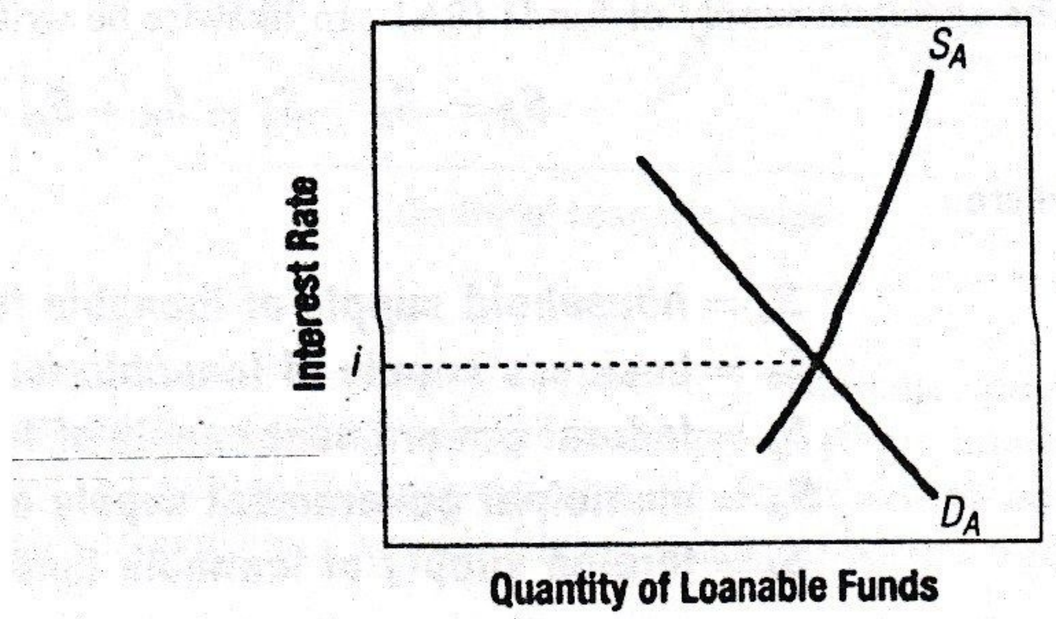
In many cases, both supply and demand for loanable funds are changing. Given an initial equilibrium situation, the equilibrium interest rate should rise when $D_A > S_A$ and fall when $D_A S_A$.

Graphical Presentation By combining the aggregate demand and aggregate supply curves of loanable funds (refer to Exhibits 2.5 and 2.6), it is possible to compare the total amount of funds that would be demanded to the total amount of funds that would be supplied at any particular interest rate. Exhibit 2.7 illustrates the combined demand and supply schedules. At the equilibrium interest rate of i, the supply of loanable funds is equal to the demand for loanable funds.

At any interest rate above i, there is a surplus of loanable funds. Some potential suppliers of funds will be unable to successfully supply their funds at the prevailing interest rate. Once the market interest rate decreases to i, the quantity of funds supplied is sufficiently reduced and the quantity of funds demanded is sufficiently increased such that there is no longer a surplus of funds. When a disequilibrium situation exists, market forces should cause an adjustment in interest rates until equilibrium is achieved.

If the prevailing interest rate is below i, there will be a shortage of loanable funds; borrowers will not be able to obtain all the funds that they desire at that rate. The shortage of funds will cause the interest rate to increase, resulting in two reactions. First, more savers will enter the market to supply loanable funds because the reward (interest rate) is now higher. Second, some potential borrowers will decide not to demand loanable funds at the higher interest rate. Once the interest rate rises to i, the quantity of loanable funds supplied has increased and the quantity of loanable funds demanded has decreased to the extent that a shortage no longer exists. Thus an equilibrium position is achieved once again.

Exhibit 2.7 Interest Rate Equilibrium



2-2 Factors That Affect Interest Rates

Although it is useful to identify those who supply or demand loanable funds, it is also necessary to recognize the underlying economic forces that cause a change in either the supply of or the demand for loanable funds. The following economic factors influence this supply and demand and thereby influence interest rates.

2-2a Impact of Economic Growth on Interest Rates

Changes in economic conditions cause a shift in the demand curve for loanable funds, which affects the equilibrium interest rate.

EXAMPLE

When businesses anticipate that economic conditions will improve, they revise upward the cash flows expected for various projects under consideration. Consequently, businesses identify more projects that are worth pursuing, and they are willing to borrow more funds. Their willingness to borrow more funds at any given interest rate reflects an outward shift (to the right) in the demand curve.

The supply-of-loanable-funds schedule may also change in response to economic growth, but it is difficult to know in which direction it will shift. It is possible that the increased expansion by businesses will lead to more income for construction crews and others who service the expansion. In this case, the quantity of savings (loanable funds supplied) could increase regardless of the interest rate, causing an outward shift in the supply schedule. However, there is no assurance that the volume of savings will actually increase. Even if such a shift does occur, it will likely be of smaller magnitude than the shift in the demand schedule.

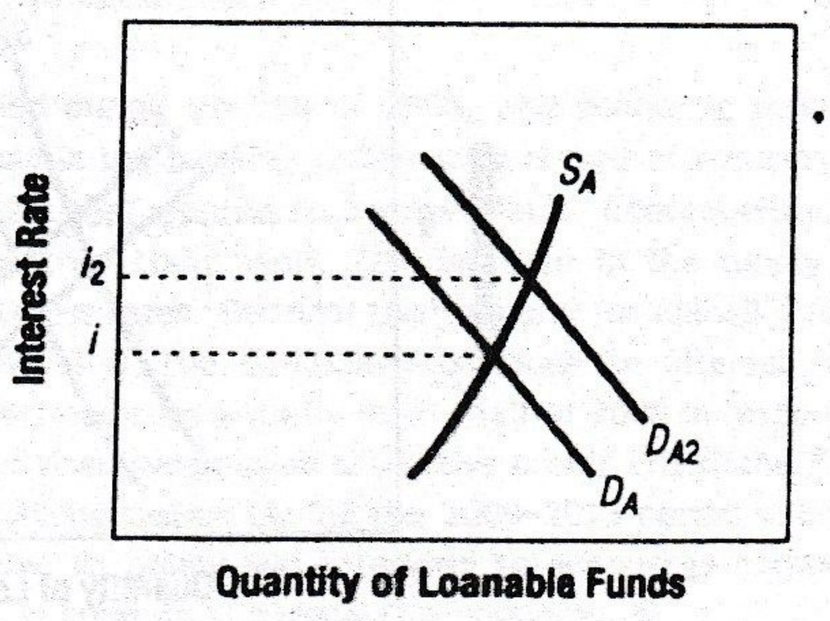
Overall, the expected impact of the increased expansion by businesses is an outward shift in the demand curve but no obvious change in the supply schedule; see Exhibit 2.8. Note that the shift in the aggregate demand curve to $DA2$ causes an increase in the equilibrium interest rate to i_2. ●

Just as economic growth puts upward pressure on interest rates, an economic slowdown puts downward pressure on the equilibrium interest rate.

EXAMPLE

A slowdown in the economy will cause the demand curve to shift inward (to the left), reflecting less demand for loanable funds at any given interest rate. The supply curve may shift a little, but the direction of its shift is uncertain. One could argue that a slowdown should cause increased saving (regardless of the interest rate) as households prepare for possible layoffs. At the same time, the gradual reduction in labor income that occurs during an economic slowdown could reduce

Exhibit 2.8 Impact of Increased Expansion by Firms



households' ability to save. Historical data support this latter expectation. Once again, any shift that does occur will likely be minor relative to the shift in the demand schedule. The equilibrium interest rate is therefore expected to decrease, as illustrated in Exhibit 2.9. ●

2-2b Impact of Inflation on Interest Rates

Changes in inflationary expectations can affect interest rates by affecting the amount of spending by households or businesses. Decisions to spend affect the amount saved (supply of funds) and the amount borrowed (demand for funds).

EXAMPLE

Assume the U.S. inflation rate is expected to increase. Households that supply funds may reduce their savings at any interest rate level so that they can make more purchases now before prices rise. This shift in behavior is reflected by an inward shift (to the left) in the supply curve of loanable funds. In addition, households and businesses may be willing to borrow more funds at any interest rate level so that they can purchase products now before prices increase. This is reflected by an outward shift (to the right) in the demand curve for loanable funds. These shifts are illustrated in Exhibit 2.10. The new equilibrium interest rate is higher because of these shifts in saving and borrowing behavior. ●

Exhibit 2.9 Impact of an Economic Slowdown

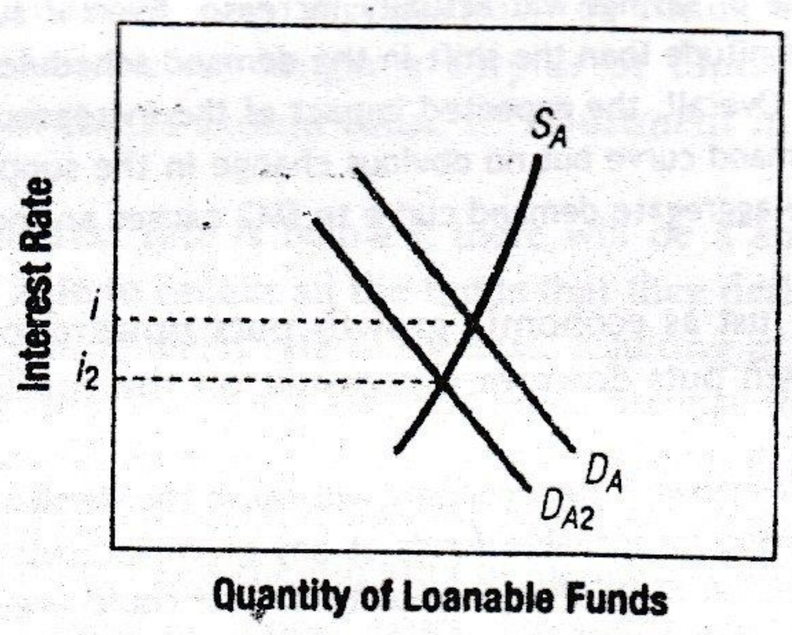
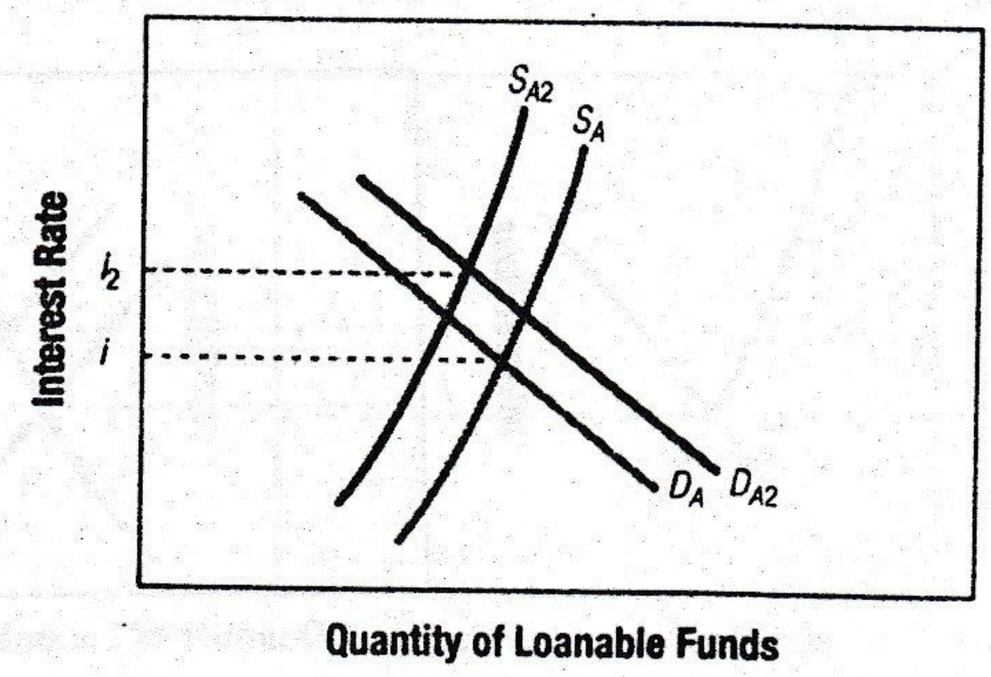


Exhibit 2.10 Impact of an Increase in Inflationary Expectations on Interest Rates



Fisher Effect More than 70 years ago, Irving Fisher proposed a theory of interest rate determination that is still widely used today. It does not contradict the loanable funds theory but simply offers an additional explanation for interest rate movements. Fisher proposed that nominal interest payments compensate savers in two ways. First, they compensate for a saver's reduced purchasing power. Second, they provide an additional premium to savers for forgoing present consumption. Savers are willing to forgo consumption only if they receive a premium on their savings above the anticipated rate of inflation, as shown in the following equation:

$$i = E(\text{INF}) + i_R$$

where

i = **nominal or quoted rate of interest**
$E(\text{INF})$ = **expected inflation rate**
i_R = **real interest rate**

This relationship between interest rates and expected inflation is often referred to as the Fisher effect. The difference between the nominal interest rate and the expected inflation rate is the real return to a saver after adjusting for the reduced purchasing power over the time period of concern. It is referred to as the **real interest rate** because, unlike the nominal rate of interest, it adjusts for the expected rate of inflation. The preceding equation can be rearranged to express the real interest rate as

$$i_R = i - E(\text{INF})$$

When the inflation rate is higher than anticipated, the real interest rate is relatively low. Borrowers benefit because they were able to borrow at a lower nominal interest rate than would have been offered if inflation had been accurately forecasted. When the inflation rate is lower than anticipated, the real interest rate is relatively high and borrowers are adversely affected.

Throughout the text, the term "interest rate" will be used to represent the *nominal*, or *quoted*, rate of interest. Keep in mind, however, that inflation may prevent purchasing power from increasing during periods of rising interest rates.

WEB

www.federalreserve.gov/monetarypolicy/fomc.htm
Information on how the Fed controls the money supply.

2-2c Impact of Monetary Policy on Interest Rates

The Federal Reserve can affect the supply of loanable funds by increasing or reducing the total amount of deposits held at commercial banks or other depository institutions. The process by which the Fed adjusts the money supply is described in Chapter 4. When the Fed increases the money supply, it increases the supply of loanable funds and this places downward pressure on interest rates.

EXAMPLE

The credit crisis intensified during the fall of 2008, and economic conditions weakened. The Fed increased the money supply in the banking system as a means of ensuring that funds were available for households or businesses that wanted to borrow funds. Consequently, financial institutions had more funds available that they could lend. The increase in the supply of loanable funds placed downward pressure on interest rates. Because the demand for loanable funds decreased during this period (as explained previously), the downward pressure on interest rates was even more pronounced. Interest rates declined substantially in the fall of 2008 in response to these two forces.

Since the economy remained weak even after the credit crisis, the Fed continued its policy of injecting funds into the banking system during the 2009–2013 period in order to keep interest rates (the cost of borrowing) low. Its policy was intended to encourage corporations and households to borrow and spend money, in order to stimulate the economy. ●

If the Fed reduces the money supply, it reduces the supply of loanable funds. Assuming no change in demand, this action places upward pressure on interest rates.

2-2d Impact of the Budget Deficit on Interest Rates

When the federal government enacts fiscal policies that result in more expenditures than tax revenue, the budget deficit is increased. Because of large budget deficits in recent years, the U.S. government is a major participant in the demand for loanable funds. A higher federal government deficit increases the quantity of loanable funds demanded at any prevailing interest rate, which causes an outward shift in the demand curve. Assuming that all other factors are held constant, interest rates will rise. Given a finite amount of loanable funds supplied to the market (through savings), excessive government demand for these funds tends to "crowd out" the private demand (by consumers and corporations) for funds. The federal government may be willing to pay whatever is necessary to borrow these funds, but the private sector may not. This impact is known as the **crowding-out effect**. Exhibit 2.11 illustrates the flow of funds between the federal government and the private sector.

There is a counterargument that the supply curve might shift outward if the government creates more jobs by spending more funds than it collects from the public (this is what causes the deficit in the first place). If this were to occur, then the deficit might not place upward pressure on interest rates. Much research has investigated this issue and has generally shown that, when holding other factors constant, higher budget deficits place upward pressure on interest rates.

2-2e Impact of Foreign Flows of Funds on Interest Rates

GLOBAL ASPECTS

The interest rate for a specific currency is determined by the demand for funds denominated in that currency and the supply of funds available in that currency.

EXAMPLE

The supply and demand curves for the U.S. dollar and for Brazil's currency, the *real*, are compared for a given point in time in Exhibit 2.12. Although the demand curve for loanable funds should be downward sloping for every currency and the supply schedule should be upward sloping, the actual positions of these curves vary among currencies. First, notice that the demand and supply curves are farther to the right for the dollar than for the Brazilian real. The amount of U.S. dollar-denominated loanable funds supplied and demanded is much greater than the amount of Brazilian real-denominated loanable funds because the U.S. economy is much larger than Brazil's economy.

Exhibit 2.11 Flow of Funds between the Federal Government and the Private Sector

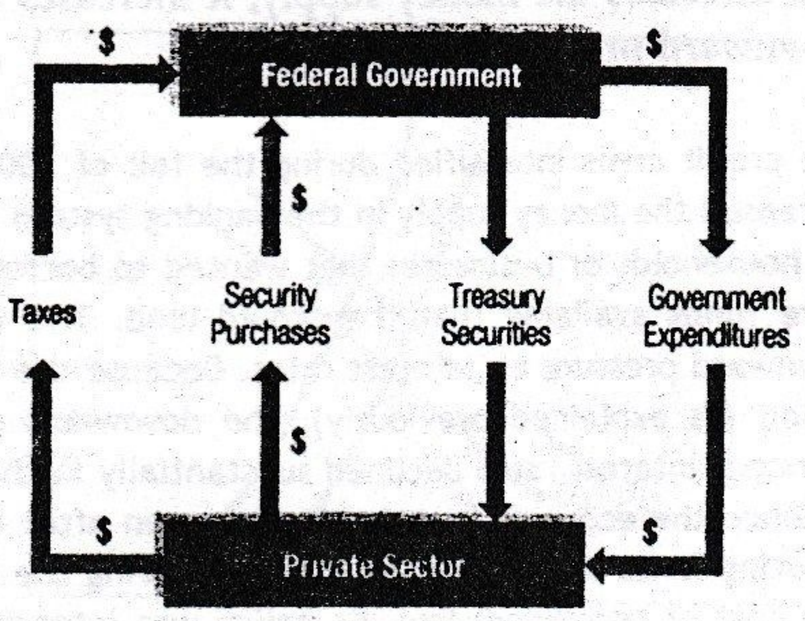
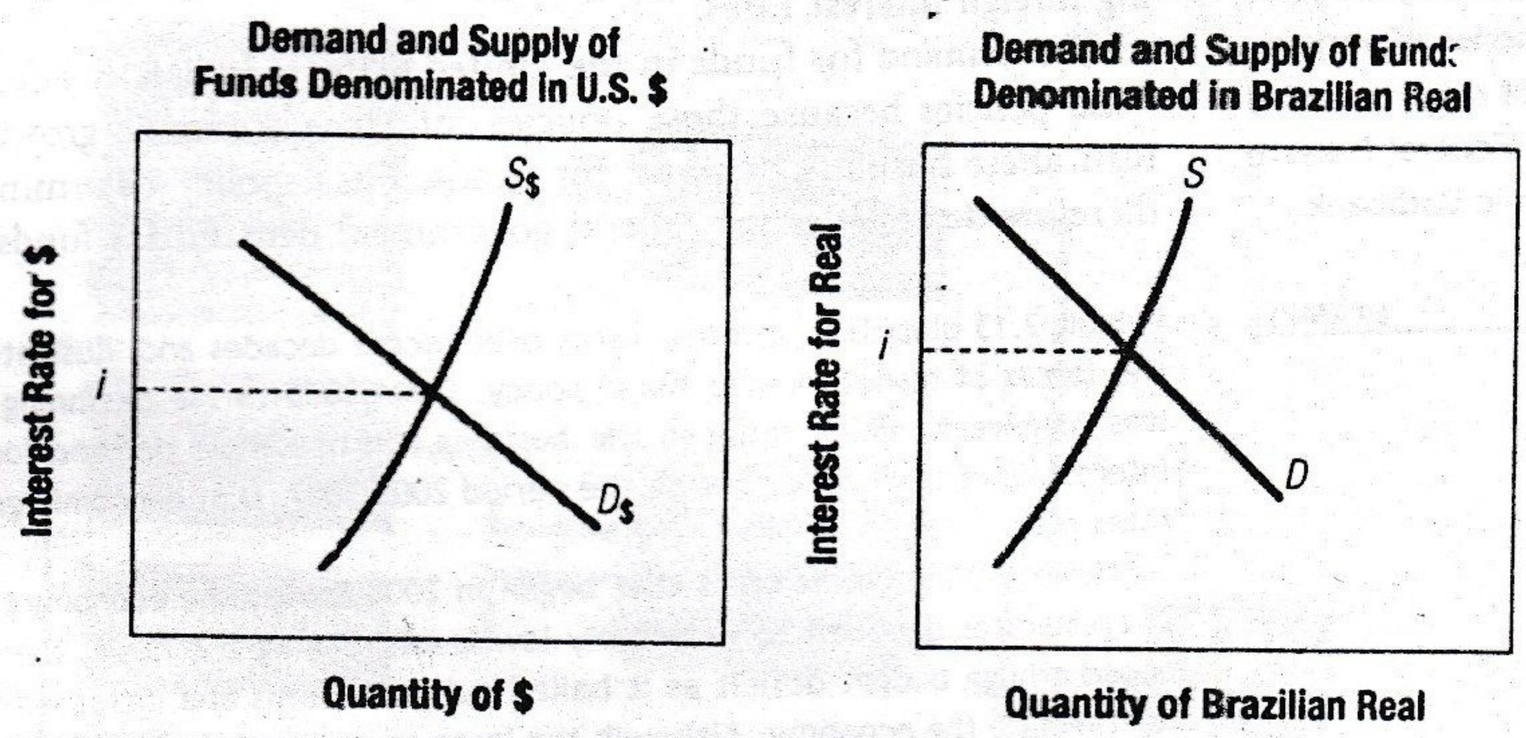


Exhibit 2.12 Demand and Supply Curves for Loanable Funds Denominated in U.S. Dollars and Brazilian Real



Observe also that the positions of the demand and supply curves for loanable funds are much higher for the Brazilian real than for the dollar. The supply schedule for loanable funds denominated in Brazilian real shows that hardly any amount of savings would be supplied at low interest rate levels because the relatively high inflation in Brazil encourages households to spend more of their disposable income before prices increase. This discourages households from saving unless the interest rate is sufficiently high. In addition, the demand for loanable funds denominated in Brazilian real shows that borrowers are willing to borrow even at relatively high rates of interest because they want to make purchases now before prices increase. Firms are willing to pay 15 percent interest on a loan to purchase machines whose prices may increase 20 percent by the following year.

Because of the different positions of the demand and supply curves for the two currencies shown in Exhibit 2.12, the equilibrium interest rate is much higher for the Brazilian real than for the dollar. As the demand and supply schedules change over time for a specific currency, so will the equilibrium interest rate. For example, if Brazil's government could substantially reduce local inflation, then the supply curve of loanable funds denominated in the Brazilian real would shift out (to the right) while the demand schedule of loanable funds would shift in (to the left). The result would be a lower equilibrium interest rate.

In recent years, massive flows of funds have shifted between countries, causing abrupt adjustments in the supply of funds available in each country and thereby affecting interest rates. In general, the shifts are driven by large institutional investors seeking a high return on their investments. These investors commonly attempt to invest funds in debt securities in countries where interest rates are high. However, many countries that typically have relatively high interest rates also tend to have high inflation, which can weaken their local currencies. Since the depreciation (decline in value) of a currency can more than offset a high interest rate in some cases, investors tend to avoid investing in countries with high interest rates if the threat of inflation is very high.

2-2f Summary of Forces That Affect Interest Rates

In general, economic conditions are the primary forces behind a change in the supply of savings provided by households or a change in the demand for funds by households, businesses, or the government. The saving behavior of the households that supply funds in the United States is partially influenced by U.S. fiscal policy, which determines the

taxes paid by U.S. households and thus determines the level of disposable income. The Federal Reserve's monetary policy also affects the supply of funds in the United States because it determines the U.S. money supply. The supply of funds provided to the United States by foreign investors is influenced by foreign economic conditions, including foreign interest rates.

WEB

http://research.stlouisfed.org/fred2
Time series of various interest rates provided by the Federal Reserve Economic Databank.

The demand for funds in the United States is indirectly affected by U.S. monetary and fiscal policies because these policies influence economic growth and inflation, which in turn affect business demand for funds. Fiscal policy determines the budget deficit and therefore determines the federal government demand for funds.

EXAMPLE

Exhibit 2.13 plots U.S. interest rates over recent decades and illustrates how they are affected by the forces of monetary and fiscal policy. From 2000 to the beginning of 2003, the U.S. economy was very weak, which reduced the business and household demand for loanable funds and caused interest rates to decline. During the period 2005-2007, U.S. economic growth increased and interest rates rose.

However, the credit crisis that began in 2008 caused the economy to weaken substantially, and interest rates declined to extremely low levels. During the crisis, the federal government experienced a huge budget deficit as it bailed out some firms and increased its spending in various ways to stimulate the economy. Although the large government demand for funds placed upward pressure on interest rates, this pressure was offset by a weak demand for funds by firms (as businesses canceled their plans to expand). In addition, the Federal Reserve increased the money supply at this time in order to push interest rates lower in an attempt to encourage businesses and households to borrow and spend money. The weak economy and the Fed's monetary policy continued during the next four years, which allowed interest rates to remain at very low levels. The Fed's monetary policy had more influence on U.S. interest rates than any other factor during the 2008-2013 period. In some other periods, the monetary policy is not as pronounced, and other factors have more influence on interest rates. ●

Exhibit 2.13 Interest Rate Movements over Time

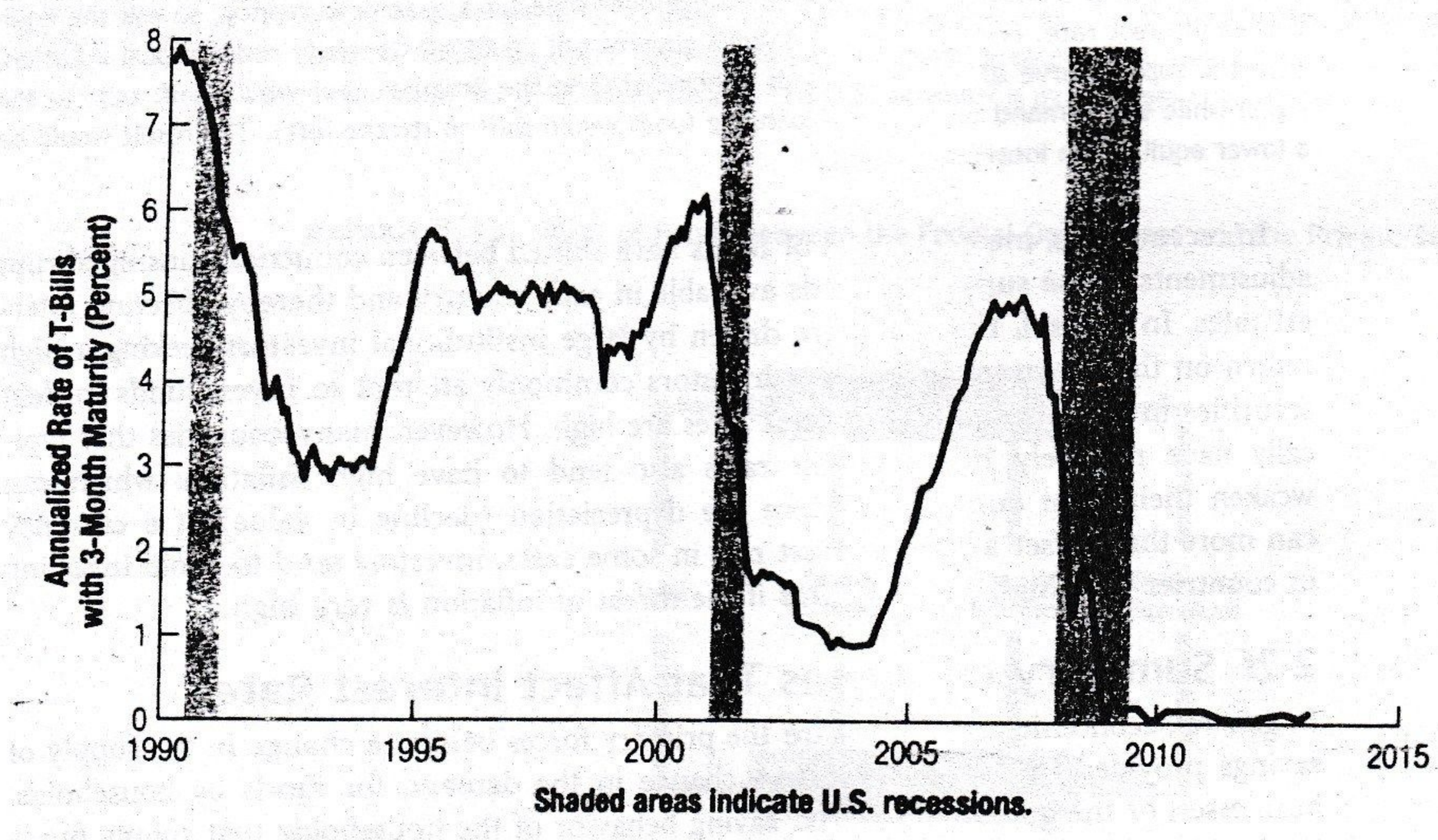
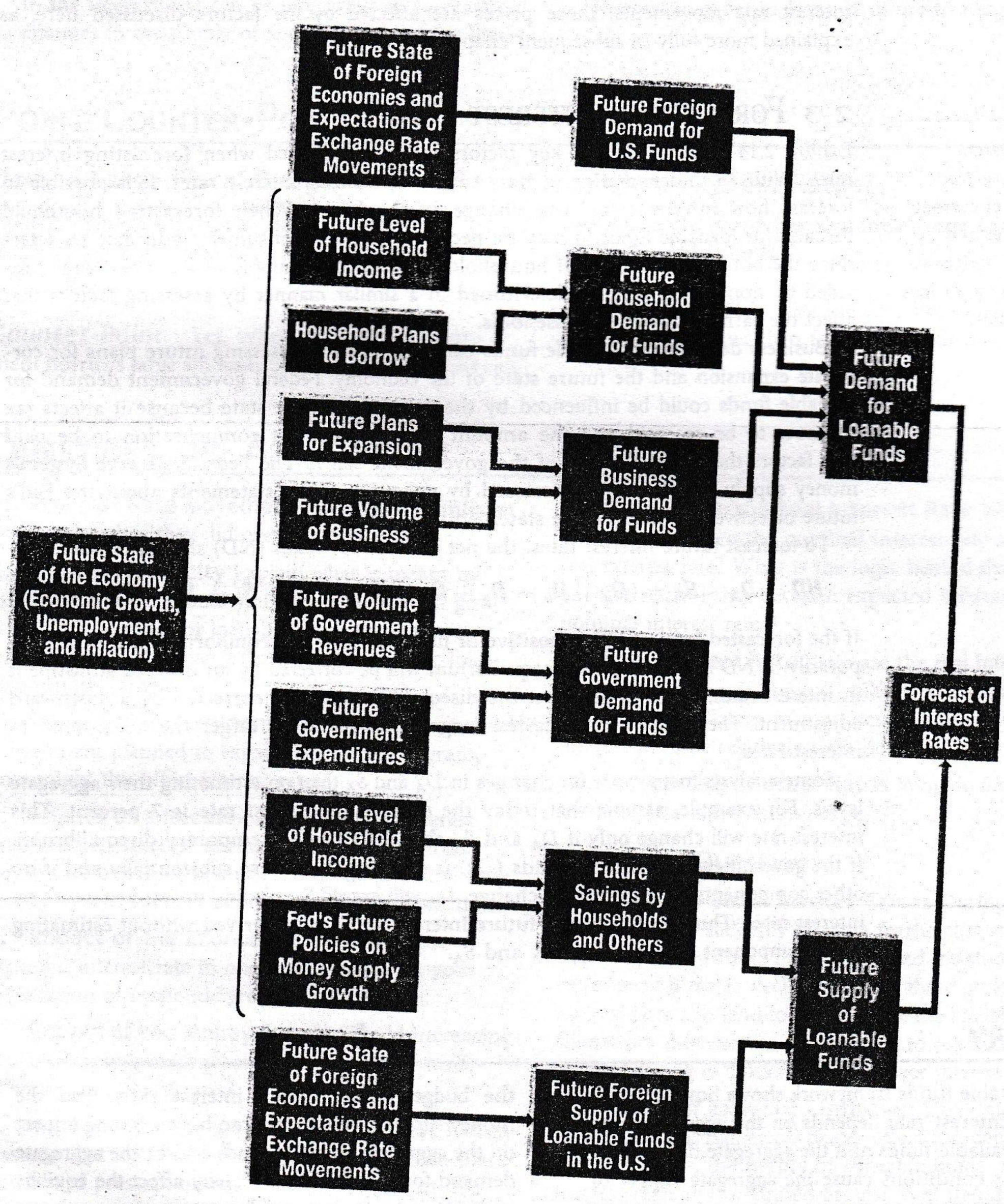


Exhibit 2.14 Framework for Forecasting Interest Rates



This summary does not cover every possible interaction among the forces that can affect interest rate movements, but it does illustrate how some key factors have an influence on interest rates over time. Because the prices of some securities are influenced by interest rate movements, those prices are affected by the factors discussed here, as explained more fully in subsequent chapters.

2-3 Forecasting Interest Rates

http://research.stlouisfed.org/fred2
Quotations of current interest rates and trends of historical interest rates for various debt securities.

Exhibit 2.14 summarizes the key factors that are evaluated when forecasting interest rates. With an understanding of how each factor affects interest rates, it is possible to forecast how interest rates may change in the future. When forecasting household demand for loanable funds, it may be necessary to assess consumer credit data to determine the borrowing capacity of households. The potential supply of loanable funds provided by households may be determined in a similar manner by assessing factors that affect the earning power of households.

Business demand for loanable funds can be forecast by assessing future plans for corporate expansion and the future state of the economy. Federal government demand for loanable funds could be influenced by the economy's future state because it affects tax revenues to be received and the amount of unemployment compensation to be paid out, factors that affect the size of the government deficit. The Federal Reserve System's money supply targets may be assessed by reviewing public statements about the Fed's future objectives, although those statements are rather vague.

To forecast future interest rates, the net demand for funds (ND) should be forecast:

$$ND = D_A - S_A = (D_h + D_b + D_g + D_m + D_f) - (S_h + S_b + S_g + S_m + S_f)$$

If the forecasted level of *ND* is positive or negative, then a disequilibrium will exist temporarily. If *ND* is positive, the disequilibrium will be corrected by an upward adjustment in interest rates; if *ND* is negative, the disequilibrium will be corrected by a downward adjustment. The larger the forecasted magnitude of *ND*, the larger the adjustment in interest rates.

Some analysts focus more on changes in D_A and S_A than on estimating their aggregate levels. For example, assume that today the equilibrium interest rate is 7 percent. This interest rate will change only if D_A and S_A change to create a temporary disequilibrium. If the government demand for funds (Dg) is expected to increase substantially and if no other components are expected to change, D_A will exceed S_A, placing upward pressure on interest rates. Thus the forecast of future interest rates can be derived without estimating every component comprised by D_A and S_A.

Summary

- The loanable funds framework shows how the equilibrium interest rate depends on the aggregate supply of available funds and the aggregate demand for funds. As conditions cause the aggregate supply or demand schedules to change, interest rates gravitate toward a new equilibrium.
- The relevant factors that affect interest rate movements include changes in economic growth, inflation, the budget deficit, foreign interest rates, and the money supply. These factors can have a strong impact on the aggregate supply of funds and/or the aggregate demand for funds and can thereby affect the equilibrium interest rate. In particular, economic growth has a strong influence on the demand for loanable funds, and changes in the money supply have a strong impact on the supply of loanable funds.

- Given that the equilibrium interest rate is determined by supply and demand conditions, changes in the interest rate can be forecasted by forecasting changes in the supply of and the demand for loanable funds. Thus, the factors that influence the supply of funds and the demand for funds must be forecast in order to forecast interest rates.

Point Counter-Point

Does a Large Fiscal Budget Deficit Result in Higher Interest Rates?

Point No. In some years (such as 2008), the fiscal budget deficit was large but interest rates were very low.

Counter-Point Yes. When the federal government borrows large amounts of funds, it can crowd out other potential borrowers, and the interest rates are bid up by the deficit units.

Who Is Correct? Use the Internet to learn more about this issue and then formulate your own opinion.

Questions and Applications

1. Interest Rate Movements Explain why interest rates changed as they did over the past year.

2. Interest Elasticity Explain what is meant by interest elasticity. Would you expect the federal government's demand for loanable funds to be more or less interest-elastic than household demand for loanable funds? Why?

3. Impact of Government Spending If the federal government planned to expand the space program, how might this affect interest rates?

4. Impact of a Recession Explain why interest rates tend to decrease during recessionary periods. Review historical interest rates to determine how they reacted to recessionary periods. Explain this reaction.

5. Impact of the Economy Explain how the expected interest rate in one year depends on your expectation of economic growth and inflation.

6. Impact of the Money Supply Should increasing money supply growth place upward or downward pressure on interest rates?

7. Impact of Exchange Rates on Interest Rates Assume that if the U.S. dollar strengthens it can place downward pressure on U.S. inflation. Based on this information, how might expectations of a strong dollar affect the demand for loanable funds in the United States and U.S. interest rates? Is there any reason to think that expectations of a strong dollar could also affect the supply of loanable funds? Explain.

8. Nominal versus Real Interest Rate What is the difference between the nominal interest rate and the real interest rate? What is the logic behind the implied positive relationship between expected inflation and nominal interest rates?

9. Real Interest Rate Estimate the real interest rate over the last year. If financial market participants overestimate inflation in a particular period, will real interest rates be relatively high or low? Explain.

10. Forecasting Interest Rates Why do forecasts of interest rates differ among experts?

Advanced Questions

11. Impact of Stock Market Crises During periods when investors suddenly become fearful that stocks are overvalued, they dump their stocks and the stock market experiences a major decline. During these periods, interest rates also tend to decline. Use the loanable funds framework discussed in this chapter to explain how the massive selling of stocks leads to lower interest rates.

12. Impact of Expected Inflation How might expectations of higher oil prices affect the demand for loanable funds, the supply of loanable funds, and interest rates in the United States? Will the interest rates of other countries be affected in the same way? Explain.

13. Global Interaction of Interest Rates Why might you expect interest rate movements of various

industrialized countries to be more highly correlated in recent years than in earlier years?

14. Impact of War War tends to cause significant reactions in financial markets. Why would a war in Iraq place upward pressure on U.S. interest rates? Why might some investors expect a war like this to place downward pressure on U.S. interest rates?

15. Impact of September 11 Offer an argument for why the terrorist attack on the United States on September 11, 2001, could have placed downward pressure on U.S. interest rates. Offer an argument for why that attack could have placed upward pressure on U.S. interest rates.

16. Impact of Government Spending Jayhawk Forecasting Services analyzed several factors that could affect interest rates in the future. Most factors were expected to place downward pressure on interest rates. Jayhawk also expected that, although the annual budget deficit was to be cut by 40 percent from the previous year, it would still be very large. Thus, Jayhawk believed that the deficit's impact would more than offset the effects of other factors, so it forecast interest rates to increase by 2 percentage points. Comment on Jayhawk's logic.

17. Decomposing Interest Rate Movements The interest rate on a one-year loan can be decomposed into a one-year, risk-free (free from default risk) component and a risk premium that reflects the potential for default on the loan in that year. A change in economic conditions can affect the risk-free rate and the risk premium. The risk-free rate is normally affected by changing economic conditions to a greater degree than is the risk premium. Explain how a weaker economy will likely affect the risk-free component, the risk premium, and the overall cost of a one-year loan obtained by (a) the Treasury and (b) a corporation. Will the change in the cost of borrowing be more pronounced for the Treasury or for the corporation? Why?

18. Forecasting Interest Rates Based on Prevailing Conditions Consider the prevailing conditions for inflation (including oil prices), the economy, the budget deficit, and the Fed's monetary policy that could affect interest rates. Based on these conditions, do you think interest rates will likely increase or decrease during this semester? Offer some logic to support your answer. Which factor do you think will have the greatest impact on interest rates?

19. Impact of Economic Crises on Interest Rates When economic crises in countries are due to a weak economy, local interest rates tend to be very low. However, if the crisis was caused by an unusually high rate of inflation, interest rates tend to be very high. Explain why.

20. U.S. Interest Rates during the Credit Crisis During the credit crisis, U.S. interest rates were extremely low, which enabled businesses to borrow at a low cost. Holding other factors constant, this should result in a higher number of feasible projects, which should encourage businesses to borrow more money and expand. Yet many businesses that had access to loanable funds were unwilling to borrow during the credit crisis. What other factor changed during this period that more than offset the potentially favorable effect of the low interest rates on project feasibility, thereby discouraging businesses from expanding?

21. Political Influence on Interest Rates Offer an argument for why a political regime that favors a large government will cause interest rates to be higher. Offer at least one example of why a political regime that favors a large government will cause interest rates to be lower. [Hint: Recognize that the government intervention in the economy can influence other factors that affect interstates.]

22. Impact of Stock Market Uncertainty Consider a period in which stock prices are very high, such that investors begin to think that stocks are overvalued and their valuations are very uncertain. If investors decide to move their money into much safer investments, how do you think this would affect general interest rate levels? In your answer, use the loanable funds framework by explaining how the supply or demand for loanable funds would be affected by the investor actions, and how this force would affect interest rates.

23. Impact of the European Economy In 2012, some economists suggested that U.S. interest rates are dictated by the weak economic conditions in Europe. Use the loanable funds framework to explain how European economic conditions might affect U.S. interest rates.

Interpreting Financial News

Interpret the following comments made by Wall Street analysts and portfolio managers.

a. "The flight of funds from bank deposits to U.S. stocks will pressure interest rates."

b. "Since Japanese interest rates have recently declined to very low levels, expect a reduction in U.S. interest rates."

c. "The cost of borrowing by U.S. firms is dictated by the degree to which the federal government spends more than it taxes."

Managing in Financial Markets

Forecasting Interest Rates As the treasurer of a manufacturing company, your task is to forecast the direction of interest rates. You plan to borrow funds and may use the forecast of interest rates to determine whether you should obtain a loan with a fixed interest rate or a floating interest rate. The following information can be considered when assessing the future direction of interest rates.

- Economic growth has been high over the last two years, but you expect that it will be stagnant over the next year.
- Inflation has been 3 percent over each of the last few years, and you expect that it will be about the same over the next year.
- The federal government has announced major cuts in its spending, which should have a major impact on the budget deficit.
- The Federal Reserve is not expected to affect the existing supply of loanable funds over the next year.
- The overall level of savings by households is not expected to change.

a. Given the preceding information, assess how the demand for and the supply of loanable funds would be affected, if at all, and predict the future direction of interest rates.

b. You can obtain a one-year loan at a fixed rate of 8 percent or a floating-rate loan that is currently at 8 percent but would be revised every month in accordance with general interest rate movements. Which type of loan is more appropriate based on the information provided?

c. Assume that Canadian interest rates have abruptly risen just as you have completed your forecast of future U.S. interest rates. Consequently, Canadian interest rates are now 2 percentage points above U.S. interest rates. How might this specific situation place pressure on U.S. interest rates? Considering this situation along with the other information provided, would you change your forecast of the future direction of U.S. interest rates?

PROBLEMS

1. Nominal Rate of Interest Suppose the real interest rate is 6 percent and the expected inflation rate is 2 percent. What would you expect the nominal rate of interest to be?

2. Real Interest Rate Suppose that Treasury bills are currently paying 9 percent and the expected inflation rate is 3 percent. What is the real interest rate?

FLOW OF FUNDS EXERCISE

How the Flow of Funds Affects Interest Rates

Recall that Carson Company has obtained substantial loans from finance companies and commercial banks. The interest rate on the loans is tied to market interest rates and is adjusted every six months. Thus, Carson's cost of obtaining funds is sensitive to interest rate movements. Given its expectations that the U.S. economy will strengthen, Carson plans to grow in the future by expanding and by making acquisitions. Carson expects that it will need substantial long-term financing to pay for this growth, and it plans to borrow additional funds either through existing loans or by issuing bonds. The company is also considering the possibility of issuing stock to raise funds in the next year.

a. Explain why Carson should be very interested in future interest rate movements.

b. Given Carson's expectations, do you think the company anticipates that interest rates will increase or decrease in the future? Explain.

c. If Carson's expectations of future interest rates are correct, how would this affect its cost of borrowing on its existing loans and on its future loans?

d. Explain why Carson's expectations about future interest rates may affect its decision about when to borrow funds and whether to obtain floating-rate or fixed-rate loans.

INTERNET/EXCEL EXERCISES

1. Go to http://research.stlouisfed.org/fred2. Under "Categories," select "Interest rates" and then select the three-month Treasury-bill series (secondary market). Describe how this rate has changed in recent months. Using the information in this chapter, explain why the interest rate changed as it did.

2. Using the same website, retrieve data at the beginning of the last 20 quarters for interest rates (based on the three-month Treasury-bill rate) and the producer price index for all commodities and place the data in two columns of an Excel spreadsheet. Derive the change in interest rates on a quarterly basis. Then derive the percentage change in the producer price index on a quarterly basis, which serves as a measure of inflation. Apply regression analysis in which the change in interest rates is the dependent variable and inflation is the independent variable (see Appendix B for information about applying regression analysis). Explain the relationship that you find. Does it appear that inflation and interest rate movements are positively related?

WSJ EXERCISE

Forecasting Interest Rates

Review information about the credit markets in a recent issue of the *Wall Street Journal*. Identify the factors that are given attention because they may affect future interest rate movements. Then create your own forecasts as to whether interest rates will increase or decrease from now until the end of the school term, based on your assessment of any factors that affect interest rates. Explain your forecast.

ONLINE ARTICLES WITH REAL-WORLD EXAMPLES

Find a recent practical article available online that describes a real-world example regarding a specific financial institution or financial market that reinforces one or more concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary of the article there and provide a link to the article so that other students can access it. If your class is live, your professor may ask you to summarize your application of the article in class. Your professor may assign specific students to complete this assignment or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples related to this chapter, consider using the following search terms (be sure to include the prevailing year as a search term to ensure that the online articles are recent):

1. budget deficit AND interest rate
2. flow of funds AND interest rate
3. Federal Reserve AND interest rate
4. economic growth AND interest rate
5. inflation AND interest rate
6. monetary policy AND interest rate
7. supply of savings AND interest rate
8. business expansion AND interest rate
9. demand for credit AND interest rate
10. interest rate AND forecast

3
Structure of Interest Rates

CHAPTER OBJECTIVES

The specific objectives of this chapter are to:

- describe how characteristics of debt securities cause their yields to vary,
- demonstrate how to estimate the appropriate yield for any particular debt security, and
- explain the theories behind the term structure of interest rates (relationship between the term to maturity and the yield of securities).

The annual interest rate offered by debt securities at any given time varies among debt securities. Individual and institutional investors must understand why quoted yields vary so that they can determine whether the extra yield on a given security outweighs any unfavorable characteristics. Financial managers of corporations or government agencies in need of funds must understand why quoted yields of debt securities vary so that they can estimate the yield they would have to offer in order to sell new debt securities.

3-1 Why Debt Security Yields Vary

Debt securities offer different yields because they exhibit different characteristics that influence the yield to be offered. In general, securities with unfavorable characteristics will offer higher yields to entice investors. Some debt securities have favorable features; therefore, they can offer relatively low yields and still attract investors. The yields on debt securities are affected by the following characteristics:

- Credit (default) risk
- Liquidity
- Tax status
- Term to maturity

The yields on bonds may also be affected by special provisions, as described in Chapter 7.

3-1a Credit (Default) Risk

Because most securities are subject to the risk of default, investors must consider the creditworthiness of the security issuer. Although investors always have the option of purchasing risk-free Treasury securities, they may prefer other securities if the yield compensates them for the risk. Thus, if all other characteristics besides credit (default) risk are equal, securities with a higher degree of default risk must offer higher yields before investors will purchase them.

EXAMPLE

Investors can purchase a Treasury bond with a 10-year maturity that presently offers an annualized yield of 7 percent if they hold the bond until maturity. Alternatively, investors can purchase bonds that are being issued by Zanstell Co. Although Zanstell is in good financial condition, there is a small possibility that it could file for bankruptcy during the next 10 years, in which case it would

discontinue making payments to investors who purchased the bonds. Thus there is a small possibility that investors could lose most of their investment in these bonds. The only way in which investors would even consider purchasing bonds issued by Zanstell Co. is if the annualized yield offered on these bonds is higher than the Treasury bond yield. Zanstell's bonds presently offer a yield of 8 percent, which is 1 percent higher than the yield offered on Treasury bonds. At this yield, some investors are willing to purchase Zanstell's bonds because they think Zanstell Co. should have sufficient cash flows to repay its debt over the next 10 years. ●

Credit risk is especially relevant for longer-term securities that expose creditors to the possibility of default for a longer time. Credit risk premiums of 1 percent, 2 percent, or more may not seem significant. But for a corporation borrowing $30 million through the issuance of bonds, an extra percentage point as a premium reflects $300,000 in additional interest expenses per year.

Investors can personally assess the creditworthiness of corporations that issue bonds, but they may prefer to rely on bond ratings provided by rating agencies. These ratings are based on a financial assessment of the issuing corporation, with a focus on whether the corporation will receive sufficient cash flows over time to cover its payments to bondholders. The higher the rating on the bond, the lower the perceived credit risk.

As time passes, economic conditions can change, which can influence the ability of a corporation to repay its debt. Thus bonds previously issued by a firm may be rated at one level, whereas a subsequent issue from the same firm is rated at a different level. The ratings can also differ if the collateral provisions differ among the bonds. Rating agencies can also change bond ratings over time in response to changes in the issuing firm's financial condition or to changes in economic conditions.

3-1b Assessing Credit Risk

To assess the credit risk of a corporation that issues bonds, investors can evaluate the corporation's financial statements. Specifically, investors use financial statements to predict the level of cash flows a corporation will generate over future periods, which helps determine if the company will have sufficient cash flows to cover its debt payments. However, financial statements might not indicate how a corporation will perform in the future. Many corporations that were in good financial condition just before they issued debt failed before they repaid their debt.

Rating Agencies Many investors rely heavily on the ratings of debt securities assigned by rating agencies, so that they do not have to assess the financial statements of corporations. The rating agencies charge the issuers of debt securities a fee for assessing the credit risk of those securities. The ratings are then provided through various financial media outlets at no cost to investors. The most popular rating agencies are Moody's Investors Service and Standard & Poor's Corporation. A summary of their rating classification schedules is provided in Exhibit 3.1. The ratings issued by Moody's range from Aaa for the highest quality to C for the lowest quality, and those issued by Standard & Poor's range from AAA to D. Because these rating agencies use different methods to assess the creditworthiness of firms and state governments, a particular bond could be rated at a different quality level by each agency. However, the differences are usually small.

WEB

www.moodys.com
Credit rating information.

Commercial banks typically invest only in **investment-grade bonds**, which are bonds rated as Baa or better by Moody's and as BBB or better by Standard & Poor's. Other financial institutions, such as pension funds and insurance companies, invest in bonds that are rated lower and offer the potential for higher returns.

Exhibit 3.1 Rating Classification by Rating Agencies

DESCRIPTION OF SECURITY	RATINGS ASSIGNED BY:	
	MOODY'S	STANDARD & POOR'S
Highest quality	Aaa	AAA
High quality	Aa	AA
High-medium quality	A	A
Medium quality	Baa	BBB
Medium-low quality	Ba	BB
Low quality (speculative)	B	B
Poor quality	Caa	CCC
Very poor quality	Ca	CC
Lowest quality (in default)	C	DDD, D

Accuracy of Credit Ratings The ratings issued by the agencies are opinions, not guarantees. Bonds that are assigned a low credit rating experience default more frequently than bonds assigned a high credit rating, which suggests that the rating can be a useful indicator of credit risk. However, credit rating agencies do not always detect firms' financial problems.

Credit rating agencies were criticized for being too liberal in their assignment of ratings on debt issued shortly before the credit crisis, as many highly rated debt issues defaulted over the next few years. The credit rating agencies might counter that they could not have anticipated the credit crisis and that they used all the information available to them when assigning ratings to new securities. Yet because credit rating agencies are paid by the issuers of debt securities and not the investors who purchase those securities, agencies may have a natural incentive to assign a high rating. Doing so facilitates a firm's issuing of debt securities, which in turn should attract more business from other issuers of debt securities.

In response to the criticism, credit rating agencies made some changes to improve their rating process and their transparency. They now disclose more information about how they derived their credit ratings. In addition, employees of each credit rating agency that promote the services of the agency are not allowed to influence the ratings assigned by the rating agency. They are giving more attention to sensitivity analysis in which they assess how creditworthiness might change in response to abrupt changes in the economy.

FINANCIAL REFORM

Oversight of Credit Rating Agencies The Financial Reform Act of 2010 established an Office of Credit Ratings within the Securities and Exchange Commission in order to regulate credit rating agencies. The act also mandated that credit rating agencies establish internal controls to ensure that their process of assigning ratings is more transparent. The agencies must disclose their rating performance over time, and they are to be held accountable if their ratings prove to be inaccurate. The Financial Reform Act also allows investors to sue an agency for issuing credit ratings that the agency should have known were inaccurate.

3-1c Liquidity

Investors prefer securities that are *liquid*, meaning that they could be easily converted to cash without a loss in value. Thus, if all other characteristics are equal, securities with less liquidity will have to offer a higher yield to attract investors. Debt securities with a short-term maturity or an active secondary market have greater liquidity. Investors that need a high degree of liquidity (because they may need to sell their securities for cash at any moment) prefer liquid securities, even if it means that they will have to accept a lower return on their investment. Investors who will not need their funds until the securities mature are more willing to invest in securities with less liquidity in order to earn a slightly higher return.

3-1d Tax Status

Investors are more concerned with after-tax income than before-tax income earned on securities. If all other characteristics are similar, taxable securities must offer a higher before-tax yield than tax-exempt securities. The extra compensation required on taxable securities depends on the tax rates of individual and institutional investors. Investors in high tax brackets benefit most from tax-exempt securities.

When assessing the expected yields of various securities with similar risk and maturity, it is common to convert them into an after-tax form, as follows:

$$Y_{at} = Y_{bt}(1 - T)$$

where

Y_{at} = after-tax yield
Y_{bt} = before-tax yield
T = investor's marginal tax rate

Investors retain only a percentage $(1 - T)$ of the before-tax yield once taxes are paid.

EXAMPLE

Consider a taxable security that offers a before-tax yield of 8 percent. When converted into after-tax terms, the yield will be reduced by the tax percentage. The precise after-tax yield is dependent on the tax rate T. If the tax rate of the investor is 20 percent, then the after-tax yield will be

$$\begin{aligned} Y_{at} &= Y_{bt}(1 - T) \\ &= 8\%(1 - 0.2) \\ &= 6.4\% \end{aligned}$$

Exhibit 3.2 presents after-tax yields based on a variety of tax rates and before-tax yields. For example, a taxable security with a before-tax yield of 6 percent will generate an after-tax yield of 5.4 percent to an investor in the 10 percent tax bracket, 5.10 percent to an investor in the

Exhibit 3.2 After-Tax Yields Based on Various Tax Rates and Before-Tax Yields

	BEFORE-TAX YIELD				
TAX RATE	6%	8%	10%	12%	14%
10%	5.40%	7.20%	9.00%	10.80%	12.60%
15	5.10	6.80	8.50	10.20	11.90
25	4.50	6.00	7.50	9.00	10.50
28	4.32	5.76	7.20	8.64	10.08
35	3.90	5.20	6.50	7.80	9.10

15 percent tax bracket, and so on. This exhibit shows why investors in high tax brackets are attracted to tax-exempt securities. ●

Computing the Equivalent Before-Tax Yield In some cases, investors wish to determine the before-tax yield necessary to match the after-tax yield of a tax-exempt security that has a similar risk and maturity. This can be done by rearranging the terms of the previous equation:

$$Y_{bt} = \frac{Y_{at}}{1 - T}$$

For instance, suppose that a firm in the 20 percent tax bracket is aware of a tax-exempt security that is paying a yield of 8 percent. To match this after-tax yield, taxable securities must offer a before-tax yield of

$$Y_{bt} = \frac{Y_{at}}{1 - T} = \frac{8\%}{1 - 0.2} = 10\%$$

State taxes should be considered along with federal taxes in determining the after-tax yield. Treasury securities are exempt from state income tax, and municipal securities are sometimes exempt as well. Because states impose different income tax rates, a particular security's after-tax yield may vary with the location of the investor.

3-1e Term to Maturity

WEB

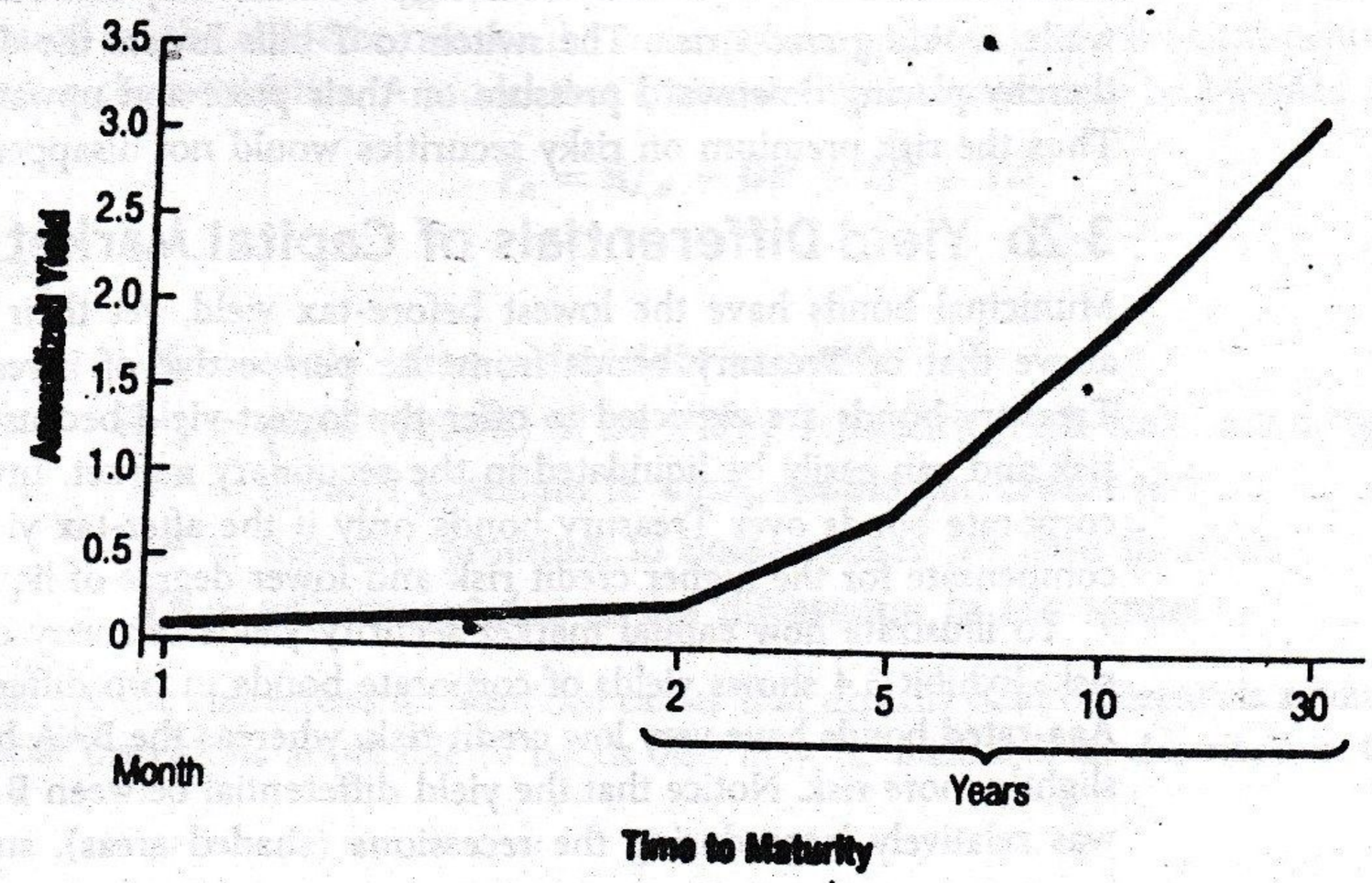
www.treasury.gov
Treasury yields among different maturities.

Maturity differs among debt securities and is another reason that debt security yields differ. The **term structure of interest rates** defines the relationship between the term to maturity and the annualized yield of debt securities at a specific moment in time while holding other factors, such as risk, constant.

EXAMPLE

Assume that, as of today, the annualized yields for federal government securities (which are free from credit risk) of varied maturities are as shown in Exhibit 3.3. The curve created by connecting

Exhibit 3.3 Example of Relationship between Maturity and Yield of Treasury Securities (as of March 2013)



the points plotted in the exhibit is commonly referred to as a *yield curve*. Notice that the yield curve exhibits an upward slope.

The term structure of interest rates in Exhibit 3.3 shows that securities that are similar in all ways except their term to maturity may offer different yields. Because the demand and supply conditions for securities may vary among maturities, so may the price (and therefore the yield) of securities. A comprehensive explanation of the term structure of interest rates is provided later in this chapter. ●

WEB

www.bloomberg.com
The section on market interest rates and bonds presents the most recent yield curve.

Since the yield curve in Exhibit 3.3 is based on Treasury securities, the curve is not influenced by credit risk. The yield curve for AA-rated corporate bonds would typically have a slope similar to that of the Treasury yield curve, but the yield of the corporate issue at any particular term to maturity would be higher to reflect the risk premium.

3-2 Explaining Actual Yield Differentials

Even small differentials in yield can be relevant to financial institutions that are borrowing or investing millions of dollars. Yield differentials are sometimes measured in basis points; a basis point equals 0.01 percent, so 100 basis points equals 1 percent. If a security offers a yield of 4.3 percent while the a risk-free security offers a yield of 4.0 percent, then the yield differential is 0.30 percent or 30 basis points. Yield differentials are described for money market securities next, followed by differentials for capital market securities.

3-2a Yield Differentials of Money Market Securities

The yields offered on commercial paper (short-term securities offered by creditworthy firms) are typically just slightly higher than Treasury-bill rates, since investors require a slightly higher return (10 to 40 basis points on an annualized basis) to compensate for credit risk and less liquidity. Negotiable certificates of deposit offer slightly higher rates than yields on Treasury bills ("T-bills") with the same maturity because of their lower degree of liquidity and higher degree of credit risk.

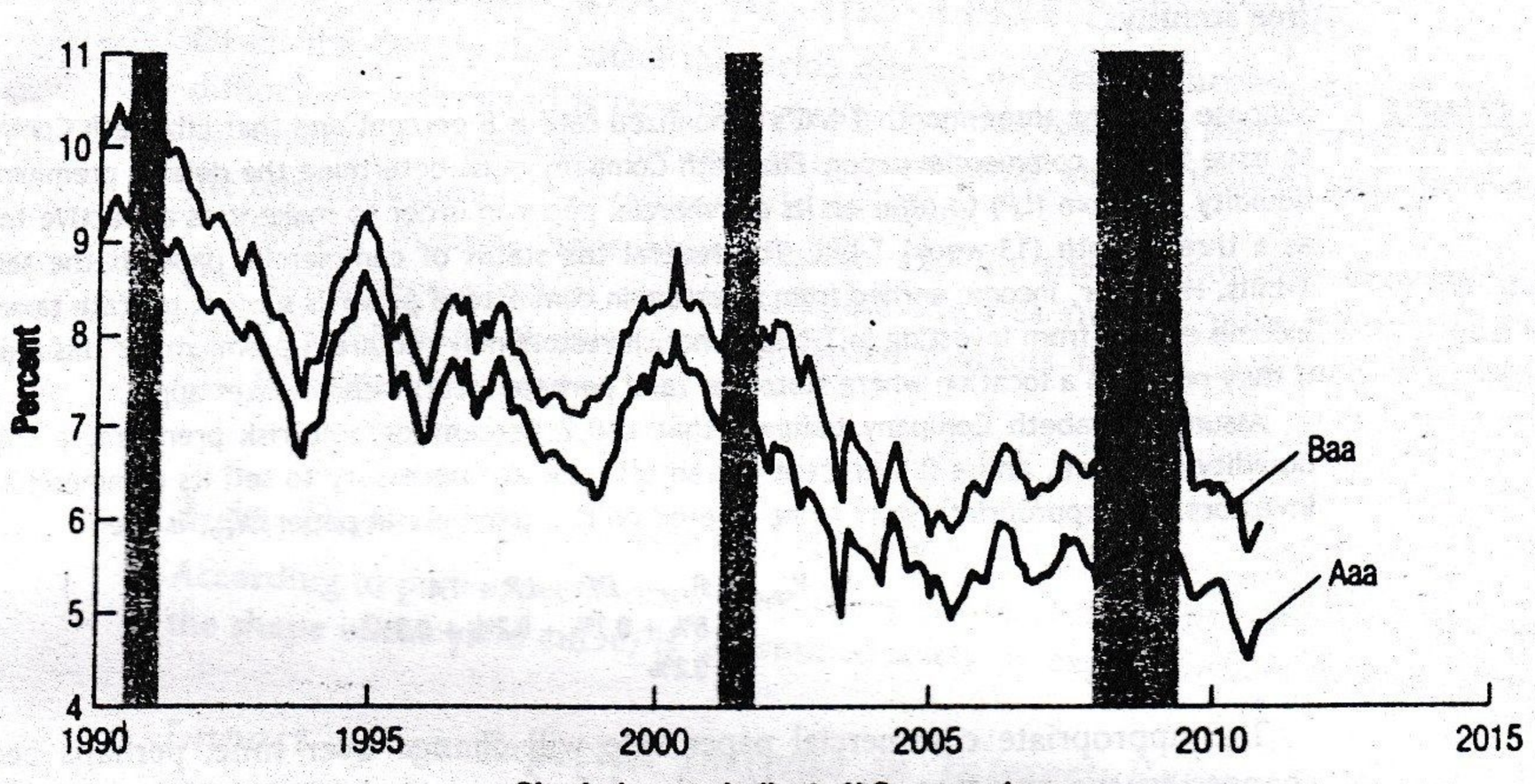
Market forces cause the yields of all securities to move in the same direction. To illustrate, assume that the budget deficit increases substantially and that the Treasury issues a large number of T-bills to finance the increased deficit. This action creates a large supply of T-bills in the market, placing downward pressure on the price and upward pressure on the T-bill yield. As the yield begins to rise, it approaches the yield of other short-term securities. Businesses and individual investors are now encouraged to purchase T-bills rather than these risky securities because they can achieve about the same yield while avoiding credit risk. The switch to T-bills lowers the demand for risky securities, thereby placing downward pressure on their price and upward pressure on their yields. Thus the risk premium on risky securities would not disappear completely.

3-2b Yield Differentials of Capital Market Securities

Municipal bonds have the lowest before-tax yield, yet their after-tax yield is typically above that of Treasury bonds from the perspective of investors in high tax brackets. Treasury bonds are expected to offer the lowest yield because they are free from credit risk and can easily be liquidated in the secondary market. Investors prefer municipal or corporate bonds over Treasury bonds only if the after-tax yield is sufficiently higher to compensate for the higher credit risk and lower degree of liquidity.

To illustrate how capital market security yields can vary over time because of credit risk, Exhibit 3.4 shows yields of corporate bonds in two different credit risk classes. The Aaa-rated bonds have very low credit risk, whereas the BAA bonds are perceived to have slightly more risk. Notice that the yield differential between BAA bonds and AAA bonds was relatively large during the recessions (shaded areas), such as in 1991 and in the

Exhibit 3.4 Yield Differentials of Corporate Bonds



Source: *Federal Reserve.*

2000–2003 period when economic conditions were weak. During these periods, corporations had to pay a relatively high premium if their bonds were rated Baa. The yield differential narrowed during 2004–2007, when economic conditions improved. However, during the credit crisis of 2008–2009, the yield differential increased substantially. At one point during the credit crisis, the yield differential was about 3 percentage points.

Many corporations whose bonds are rated Baa or below were unwilling to issue bonds because of the high credit risk premium they would have to pay to bondholders. This illustrates why the credit crisis restricted access of corporations to credit.

3-3 Estimating the Appropriate Yield

The discussion so far suggests that the appropriate yield to be offered on a debt security is based on the risk-free rate for the corresponding maturity, with adjustments to capture various characteristics. A model that captures this estimate may be specified as follows:

$$Y_n = R_{f,n} + DP + LP + TA$$

where

Y_n = yield of an n-day debt security
$R_{f,n}$ = yield (return) of an n-day Treasury (risk-free) security
DP = default premium to compensate for credit risk
LP = liquidity premium to compensate for less liquidity
TA = adjustment due to the difference in tax status

These are the characteristics identified earlier that explain yield differentials among securities (special provisions applicable to bonds also may be included, as described in Chapter 7).

Although maturity is another characteristic that can affect the yield, it is not included here because it is controlled for by matching the maturity of the security with that of a risk-free security.

EXAMPLE

Suppose that the three-month T-bill's annualized rate is 8 percent and that Elizabeth Company plans to issue 90-day commercial paper. Elizabeth Company must determine the default premium (*DP*) and liquidity premium (*LP*) to offer on its commercial paper in order to make it as attractive to investors as a three-month (13-week) T-bill. The federal tax status of commercial paper is the same as for T-bills. However, income earned from investing in commercial paper is subject to state taxes whereas income earned from investing in T-bills is not. Investors may require a premium for this reason alone if they reside in a location where state and (and perhaps local) income taxes apply.

Assume Elizabeth Company believes that a 0.7 percent default risk premium, a 0.2 percent liquidity premium, and a 0.3 percent tax adjustment are necessary to sell its commercial paper to investors. The appropriate yield to be offered on the commercial paper, Y_{cp}, is then

$$\begin{aligned} Y_{cp,n} &= R_{f,n} + DP + LP + TA \\ &= 8\% + 0.7\% + 0.2\% + 0.3\% \\ &= 9.2\% \end{aligned}$$

●

The appropriate commercial paper rate will change over time, perhaps because of changes in the risk-free rate and/or the default premium, liquidity premium, and tax adjustment factors.

Some corporations may postpone plans to issue commercial paper until the economy improves and the required premium for credit risk is reduced. Even then, however, the market rate of commercial paper may increase if interest rates increase.

EXAMPLE

If the default risk premium decreases from 0.7 percent to 0.5 percent but $R_{f,n}$ increases from 8 percent to 8.7 percent, the appropriate yield to be offered on commercial paper (assuming no change in the previously assumed liquidity and tax adjustment premiums) would be

$$\begin{aligned} Y_{cp} &= R_{f,n} + DP + LP + TA \\ &= 8.7\% + 0.5\% + 0.2\% + 0.3\% \\ &= 9.7\% \end{aligned}$$

The strategy of postponing the issuance of commercial paper would backfire in this example. Even though the default premium decreased by 0.2 percent, the general level of interest rates rose by 0.7 percent, so the net change in the commercial paper rate is +0.5 percent. ●

As this example shows, the increase in a security's yield over time does not necessarily mean that the default premium has increased. The assessment of yields as described here could also be applied to long-term securities. If, for example, a firm desires to issue a 20-year corporate bond, it will use the yield of a new 20-year Treasury bond as the 20-year risk-free rate and add on the premiums for credit risk, liquidity risk, and so on when determining the yield at which it can sell corporate bonds.

A simpler and more general relationship is that the yield offered on a debt security is positively related to the prevailing risk-free rate and the security's risk premium (RP). This risk premium captures any risk characteristics of the security, including credit risk and liquidity risk. A more detailed model for the yield of a debt security could be applied by including additional characteristics that can vary among bonds, such as whether the bond is convertible into stock and whether it contains a call premium. The conversion option is favorable for investors, so it could reduce the yield that needs to be offered on a bond. The call premium is unfavorable for investors, so it could increase the yield that needs to be offered on a bond.

3-4 A Closer Look at the Term Structure

Of all the factors that affect the yields offered on debt securities, the one that is most difficult to understand is *term to maturity*. For this reason, a more comprehensive explanation of the relationship between term to maturity and annualized yield (referred to as the term structure of interest rates) is necessary.

Various theories have been used to explain the relationship between maturity and annualized yield of securities. These theories include pure expectations theory, liquidity premium theory, and segmented markets theory, and each is explained in this section.

3-4a Pure Expectations Theory

According to pure expectations theory, the term structure of interest rates (as reflected in the shape of the yield curve) is determined solely by expectations of interest rates.

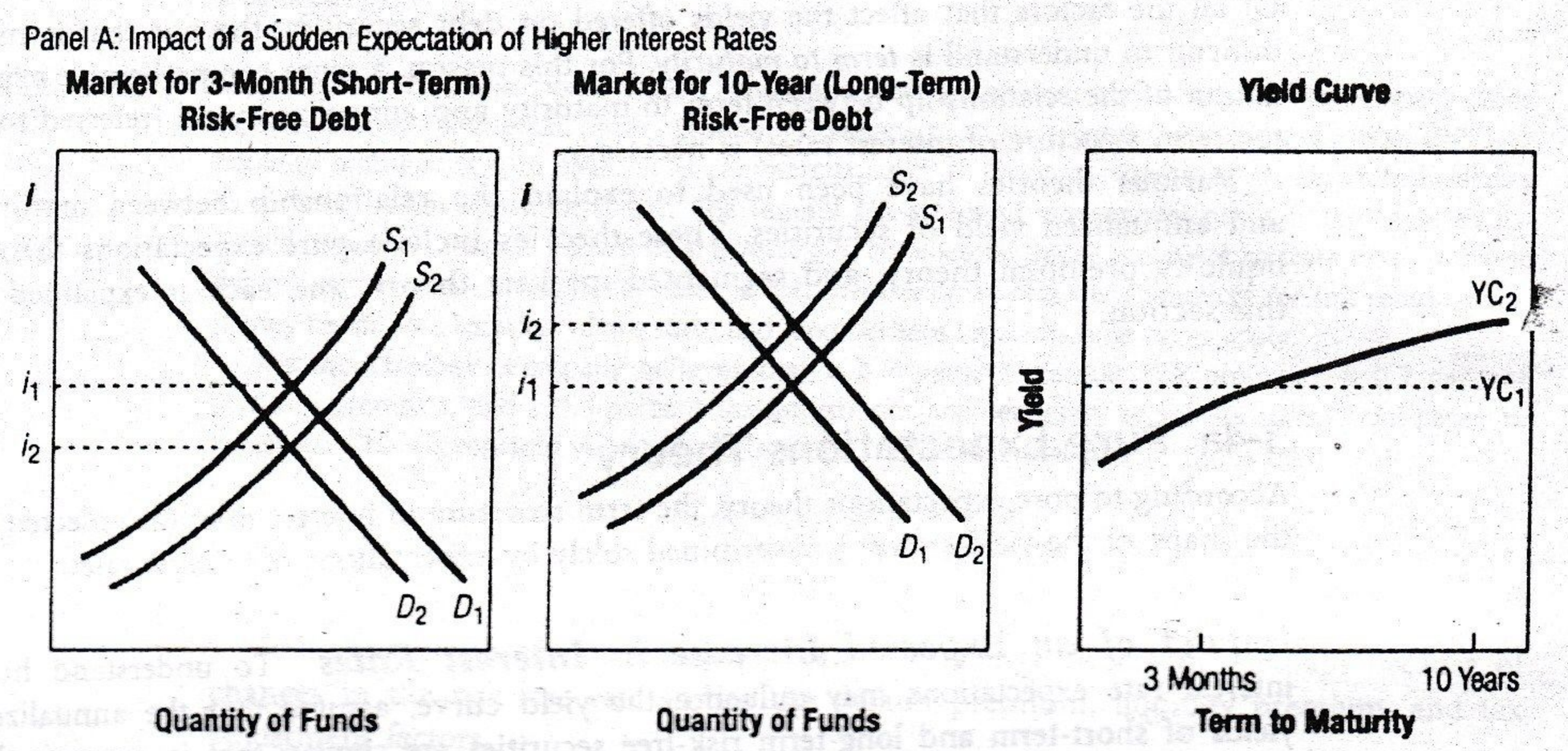
Impact of an Expected Increase in Interest Rates To understand how interest rate expectations may influence the yield curve, assume that the annualized yields of short-term and long-term risk-free securities are similar; that is, suppose the yield curve is flat. Then assume that investors begin to believe that interest rates will rise. Investors will respond by investing their funds mostly in the short term so that they can soon reinvest their funds at higher yields after interest rates increase. When investors flood the short-term market and avoid the long-term market, they may cause the yield curve to adjust as shown in Panel A of Exhibit 3.5. The large supply of funds in the short-term markets will force annualized yields down. Meanwhile, the reduced supply of long-term funds forces long-term yields up.

Even though the annualized short-term yields become lower than annualized long-term yields, investors in short-term funds are satisfied because they expect interest rates to rise. They will make up for the lower short-term yield when the short-term securities mature, and they reinvest at a higher rate (if interest rates rise) at maturity.

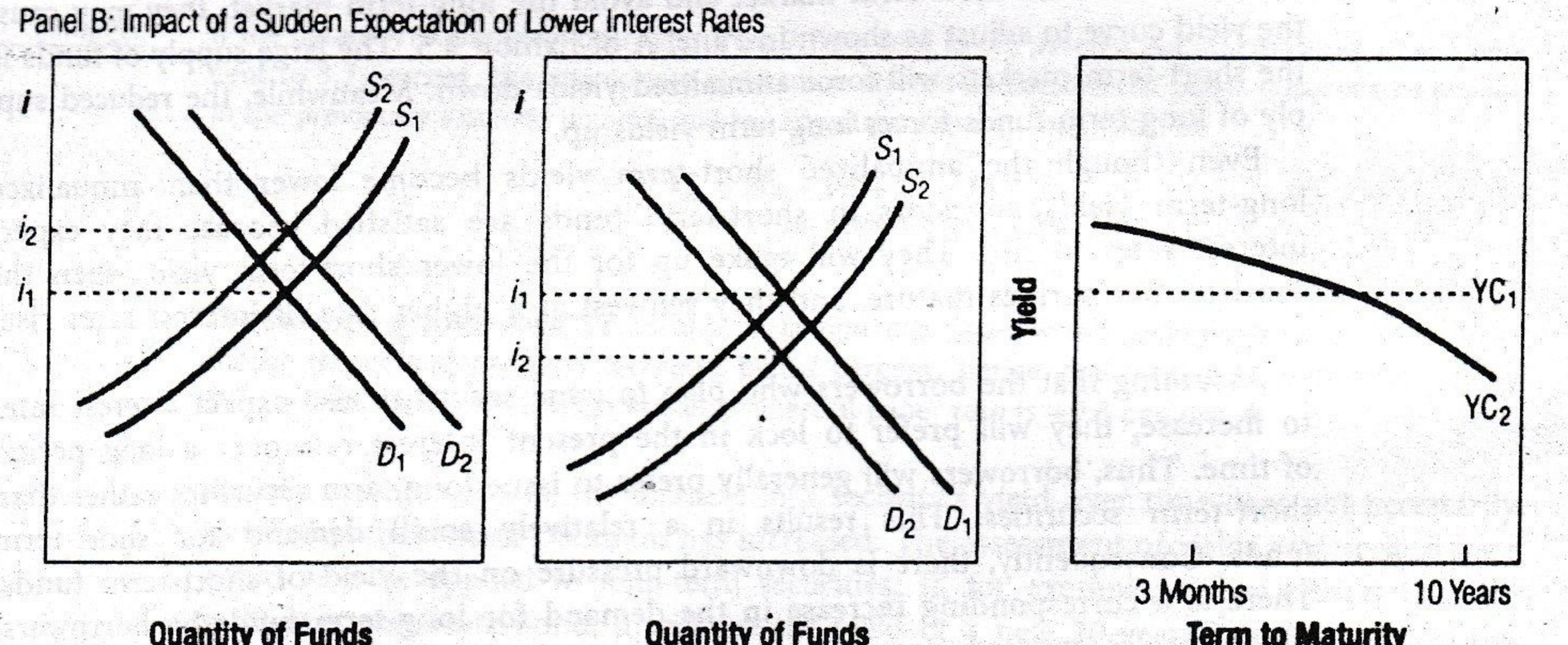
Assuming that the borrowers who plan to issue securities also expect interest rates to increase, they will prefer to lock in the present interest rate over a long period of time. Thus, borrowers will generally prefer to issue long-term securities rather than short-term securities. This results in a relatively small demand for short-term funds. Consequently, there is downward pressure on the yield of short-term funds. There is a corresponding increase in the demand for long-term funds by borrowers, which places upward pressure on long-term funds. Overall, the expectation of higher interest rates changes the demand for funds and the supply of funds in different maturity markets, which forces the original flat yield curve (labeled YC_1 in the two rightmost graphs) to pivot upward (counterclockwise) and become upward sloping (YC_2).

Impact of an Expected Decline in Interest Rates If investors expect interest rates to decrease in the future, they will prefer to invest in long-term funds rather than short-term funds because they could lock in today's interest rate before interest rates fall. Borrowers will prefer to borrow short-term funds so that they can refinance at a lower interest rate once interest rates decline.

Exhibit 3.5 How Interest Rate Expectations Affect the Yield Curve



$E(\uparrow i) \rightarrow$ Supply of funds provided by investors ↑ in short-term (such as 3-month) markets, and ↓ in long-term (such as 10-year) markets. Demand for funds by borrowers ↑ in long-term markets and ↓ in short-term markets. Therefore, the yield curve becomes upward sloping as shown here.



$E(\downarrow i) \rightarrow$ Supply of funds provided by investors ↑ in long-term (such as 10-year) markets, and ↓ in short-term (such as 3-month) markets. Demand for funds by borrowers ↑ in short-term markets and ↓ in long-term markets. Therefore, the yield curve becomes downward sloping as shown here.

Based on the expectation of lower interest rates in the future, the supply of funds provided by investors will be low for short-term funds and high for long-term funds. This will place upward pressure on short-term yields and downward pressure on long-term yields, as shown in Panel B of Exhibit 3.5. Overall, the expectation of lower interest rates causes the shape of the yield curve to pivot downward (clockwise).

Algebraic Presentation Investors monitor the yield curve to determine the rates that exist for securities with various maturities. They can either purchase a security with a maturity that matches their investment horizon or purchase a security with a shorter term and then reinvest the proceeds at maturity. They may select the strategy that they believe will generate a higher return over the entire investment horizon. This could affect the prices and yields of securities with different maturities, so that the expected return over the investment horizon is similar regardless of the strategy used. If investors were indifferent to maturities, the return of any security should equal the compounded yield of consecutive investments in shorter-term securities. That is, a two-year security should offer a return that is similar to the anticipated return from investing in two consecutive one-year securities. A four-year security should offer a return that is competitive with the expected return from investing in two consecutive two-year securities or four consecutive one-year securities, and so on.

EXAMPLE To illustrate these equalities, consider the relationship between interest rates on a two-year security and a one-year security as follows:

$$(1 + {}_t i_2)^2 = (1 + {}_t i_1)(1 + {}_{t+1} r_1)$$

where

$${}_t i_2 = \text{known annualized interest rate of a two-year security as of time } t$$
$${}_t i_1 = \text{known annualized interest rate of a one-year security as of time } t$$
$${}_{t+1} r_1 = \text{one-year interest rate that is anticipated as of time } t + 1 \text{ (one year ahead)}$$

The term i represents a quoted rate, which is therefore known, whereas r represents a rate to be quoted at some point in the future, so its value is uncertain. The left side of the equation represents the compounded yield to investors who purchase a two-year security, and the right side represents the anticipated compounded yield from purchasing a one-year security and reinvesting the proceeds in a new one-year security at the end of one year. If time t is today, then ${}_{t+1} r_1$ can be estimated by rearranging terms:

$$1 + {}_{t+1} r_1 = \frac{(1 + {}_t i_2)^2}{1 + {}_t i_1}$$

$${}_{t+1} r_1 = \frac{(1 + {}_t i_2)^2}{1 + {}_t i_1} - 1$$

The term ${}_{t+1} r_1$, referred to as the **forward rate**, is commonly estimated in order to represent the market's forecast of the future interest rate. Here is a numerical example. Assume that, as of today (time t), the annualized two-year interest rate is 10 percent and the one-year interest rate is 8 percent. The forward rate is then estimated as follows:

$${}_{t+1} r_1 = \frac{(1 + 0.10)^2}{1 + 0.08} - 1$$
$$= 0.1203704$$

This result implies that, one year from now, a one-year interest rate must equal about 12.037 percent in order for consecutive investments in two one-year securities to generate a return similar to that of a two-year investment. If the actual one-year rate beginning one year from now (i.e., at time $t + 1$) is above 12.037 percent, the return from two consecutive one-year investments will exceed the return on a two-year investment. ●

The forward rate is sometimes used as an approximation of the market's consensus interest rate forecast. The reason is that, if the market had a different perception, the demand and supply of today's existing two-year and one-year securities would adjust to

capitalize on this information. Of course, there is no guarantee that the forward rate will forecast the future interest rate with perfect accuracy.

The greater the difference between the implied one-year forward rate and today's one-year interest rate, the greater the expected change in the one-year interest rate. If the term structure of interest rates is solely influenced by expectations of future interest rates, the following relationships hold:

SCENARIO	STRUCTURE OF YIELD CURVE	EXPECTATIONS ABOUT THE FUTURE INTEREST RATE
1. ${}_{t+1}r_1 > {}_ti_1$	Upward slope	Higher than today's rate
2. ${}_{t+1}r_1 = {}_ti_1$	Flat	Same as today's rate
3. ${}_{t+1}r_1 < {}_ti_1$	Downward slope	Lower than today's rate

Forward rates can be determined for various maturities. The relationships described here can be applied when assessing the change in the interest rate of a security with any particular maturity.

The previous example can be expanded to solve for other forward rates. The equality specified by the pure expectations theory for a three-year horizon is

$$(1 + {}_ti_3)^3 = (1 + {}_ti_1)(1 + {}_{t+1}r_1)(1 + {}_{t+2}r_1)$$

where

${}_ti_3$ = annualized interest rate on a three-year security as of time t
${}_{t+2}r_1$ = one-year interest that is anticipated as of time $t + 2$ (two years)

All other terms were defined previously. By rearranging terms, we can isolate the forward rate of a one-year security beginning two years from now:

$$1 + {}_{t+2}r_1 = \frac{(1 + {}_ti_3)^3}{(1 + {}_ti_1)(1 + {}_{t+1}r_1)}$$

$${}_{t+2}r_1 = \frac{(1 + {}_ti_3)^3}{(1 + {}_ti_1)(1 + {}_{t+1}r_1)} - 1$$

If the one-year forward rate beginning one year from now (${}_{t+1}r_1$) has already been estimated, then this estimate can be combined with actual one-year and three-year interest rates to estimate the one-year forward rate two years from now. Recall that our previous example assumed ${}_ti_1 = 8$ percent and estimated ${}_{t+1}r_1$ to be about 12.037 percent.

EXAMPLE Assume that a three-year security has an annualized interest rate of 11 percent (i.e., ${}_ti_3 = 11$ percent). Given this information, the one-year forward rate two years from now can be calculated as follows:

$${}_{t+2}r_1 = \frac{(1 + {}_ti_3)^3}{(1 + {}_ti_1)(1 + {}_{t+1}r_1)} - 1$$

$$= \frac{(1 + 0.11)^3}{(1 + 0.08)(1 + 0.12037)} - 1$$

$$= \frac{1.367631}{1.21} - 1$$

$$= 13.02736\%$$

Thus, the market anticipates that, two years from now, the one-year interest rate will be 13.02736 percent. ●

The yield curve can also be used to forecast annualized interest rates for periods other than one year. For example, the information provided in the last example could be used to determine the two-year forward rate beginning one year from now.

According to pure expectations theory, a one-year investment followed by a two-year investment should offer the same annualized yield over the three-year horizon as a three-year security that could be purchased today. This relation is expressed as follows:

$$(1 + {}_{t+1}i_3)^3 = (1 + {}_{t}i_1)(1 + {}_{t+1}r_2)^2$$

where ${}_{t+1}r_2$ is the annual interest rate of a two-year security anticipated as of time $t + 1$. By rearranging terms, ${}_{t+1}r_2$ can be isolated:

$$(1 + {}_{t+1}r_2)^2 = \frac{(1 + {}_{t}i_3)^3}{1 + {}_{t}i_1}$$

EXAMPLE Recall that today's annualized yields for one-year and three-year securities are 8 percent and 11 percent, respectively. With this information, ${}_{t+1}r_2$ is estimated as follows:

$$\begin{aligned}(1 + {}_{t+1}r_2)^2 &= \frac{(1 + {}_{t}i_3)^3}{1 + {}_{t}i_1} \\ &= \frac{(1 + 0.11)^3}{1 + 0.08} \\ &= 1.266325 \\ 1 + {}_{t+1}r_2 &= \sqrt{1.266325} \\ &= 1.1253 \\ {}_{t+1}r_2 &= 0.1253\end{aligned}$$

Thus, the market anticipates an annualized interest rate of about 12.53 percent for two-year securities beginning one year from now. ●

Pure expectations theory is based on the premise that forward rates are unbiased estimators of future interest rates. If forward rates are biased, investors can attempt to capitalize on the bias.

EXAMPLE In the previous numerical example, the one-year forward rate beginning one year ahead was estimated to be about 12.037 percent. If the forward rate was thought to contain an upward bias, the expected one-year interest rate beginning one year ahead would actually be less than 12.037 percent. Therefore, investors with funds available for two years would earn a higher yield by purchasing two-year securities rather than purchasing one-year securities for two consecutive years. However, their actions would cause an increase in the price of two-year securities and a decrease in that of one-year securities, and the yields of these securities would move inversely with the price movements. Hence any attempt by investors to capitalize on the forward rate bias would essentially eliminate the bias. ●

If forward rates are unbiased estimators of future interest rates, financial market efficiency is supported and the information implied by market rates about the forward rate cannot be used to generate abnormal returns. In response to new information, investor preferences would change, yields would adjust, and the implied forward rate would adjust as well.

If a long-term rate is expected to equal a geometric average of consecutive short-term rates covering the same time horizon (as is suggested by pure expectations theory), long-term rates would likely be more stable than short-term rates. As expectations about consecutive short-term rates change over time, the average of these rates is less volatile than the individual short-term rates. Thus long-term rates are much more stable than short-term rates.

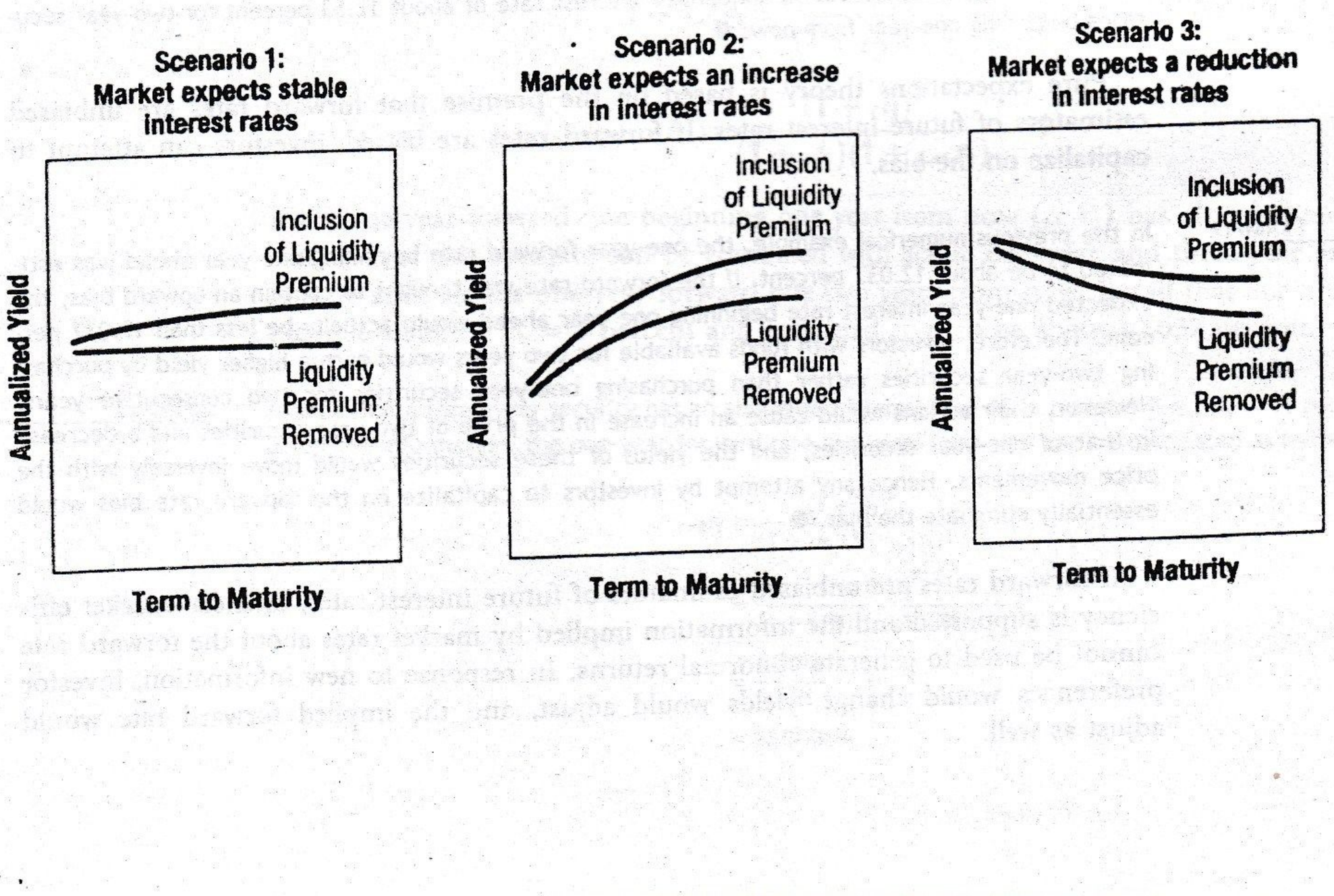
3-4b Liquidity Premium Theory

Some investors may prefer to own short-term rather than long-term securities because a shorter maturity represents greater liquidity. In this case, they may be willing to hold long-term securities only if compensated by a premium for the lower degree of liquidity. Although long-term securities can be liquidated prior to maturity, their prices are more sensitive to interest rate movements. Short-term securities are normally considered to be more liquid because they are more likely to be converted to cash without a loss in value.

The preference for the more liquid short-term securities places upward pressure on the slope of a yield curve. Liquidity may be a more critical factor to investors at some times than at others, and the liquidity premium will accordingly change over time. As it does, the yield curve will change also. This is the liquidity premium theory (sometimes referred to as the liquidity preference theory).

Exhibit 3.6 contains three graphs that reflect the existence of both expectations theory and a liquidity premium. Each graph shows different interest rate expectations by the market. Regardless of the interest rate forecast, the yield curve is affected in a similar manner by the liquidity premium.

Exhibit 3.6 Impact of Liquidity Premium on the Yield Curve under Three Different Scenarios



Estimation of the Forward Rate Based on a Liquidity Premium When expectations theory is combined with liquidity theory, the yield on a security will not necessarily be equal to the yield from consecutive investments in shorter-term securities over the same investment horizon. For example, the yield on a two-year security is now determined as

$$(1 + {}_{t}i_2)^2 = (1 + {}_{t}i_1)(1 + {}_{t+1}r_1) + LP_2$$

where LP_2 denotes the liquidity premium on a two-year security. The yield generated from the two-year security should exceed the yield from consecutive investments in one-year securities by a premium that compensates the investor for less liquidity. The relationship between the liquidity premium and term to maturity can be expressed as follows:

$$0 < LP_1 < LP_2 < LP_3 < \cdots < LP_{20}$$

where the subscripts represent years to maturity. This implies that the liquidity premium would be more influential on the difference between annualized interest rates on one-year and 20-year securities than on the difference between one-year and two-year securities.

If liquidity influences the yield curve, the forward rate overestimates the market's expectation of the future interest rate. A more appropriate formula for the forward rate would account for the liquidity premium. By rearranging terms in the previous equation for forward rates, the one-year forward rate can be derived as follows:

$${}_{t+1}r_1 = \frac{(1 + {}_{t}i_2)^2}{1 + {}_{t}i_1} - 1 - \frac{LP_2}{1 + {}_{t}i_1}$$

EXAMPLE Reconsider the example where $i_1 = 8$ percent and $i_2 = 10$ percent, and assume that the liquidity premium on a two-year security is 0.5 percent. The one-year forward rate can then be derived from this information as follows:

$$\begin{aligned} {}_{t+1}r_1 &= \frac{(1 + {}_{t}i_2)^2}{1 + {}_{t}i_1} - 1 - \frac{LP_2}{1 + {}_{t}i_1} \\ &= \frac{(1.10)^2}{1.08} - 1 - \frac{0.005}{1 + 0.08} \\ &= 0.11574 \end{aligned}$$

This estimate of the one-year forward rate is lower than the estimate derived in the previous related example in which the liquidity premium was not considered. The previous estimate (12.037 percent) of the forward rate probably overstates the market's expected interest rate because it did not account for a liquidity premium. Thus forecasts of future interest rates implied by a yield curve are reduced slightly when accounting for the liquidity premium. ●

Even with the existence of a liquidity premium, yield curves could still be used to interpret interest rate expectations. A flat yield curve would be interpreted to mean that the market is expecting a slight decrease in interest rates (without the effect of the liquidity premium, the yield curve would have had a slight downward slope). A slight upward slope would be interpreted as no expected change in interest rates: if the liquidity premium were removed, this yield curve would be flat.

3-4c Segmented Markets Theory

According to the segmented markets theory, investors and borrowers choose securities with maturities that satisfy their forecasted cash needs. Pension funds and life insurance companies may generally prefer long-term investments that coincide with their long-term liabilities. Commercial banks may prefer more short-term investments to coincide with their short-term liabilities. If investors and borrowers participate only in the maturity market that satisfies their particular needs, then markets are segmented. That is, investors (or borrowers) will shift from the long-term market to the short-term market, or vice versa, only if the timing of their cash needs changes. According to segmented markets theory, the choice of long-term versus short-term maturities is determined more by investors' needs than by their expectations of future interest rates.

EXAMPLE

Assume that most investors have funds available to invest for only a short period of time and therefore desire to invest primarily in short-term securities. Also assume that most borrowers need funds for a long period of time and therefore desire to issue mostly long-term securities. The result will be downward pressure on the yield of short-term securities and upward pressure on the yield of long-term securities. Overall, the scenario described would create an upward-sloping yield curve.

Now consider the opposite scenario in which most investors wish to invest their funds for a long period of time while most borrowers need funds for only a short period of time. According to segmented markets theory, this situation will cause upward pressure on the yield of short-term securities and downward pressure on the yield of long-term securities. If the supply of funds provided by investors and the demand for funds by borrowers were better balanced between the short-term and long-term markets, the yields of short-and long-term securities would be more similar. ●

The preceding example distinguished maturity markets as either short-term or long-term. In reality, several maturity markets may exist. Within the short-term market, some investors may prefer maturities of one month or less whereas others may prefer maturities of one to three months. Regardless of how many maturity markets exist, the yields of securities with various maturities should be influenced in part by the desires of investors and borrowers to participate in the maturity market that best satisfies their needs. A corporation that needs additional funds for 30 days would not consider issuing long-term bonds for such a purpose. Savers with short-term funds would avoid some long-term investments (e.g., 10-year certificates of deposit) that cannot be easily liquidated.

Limitation of the Theory A limitation of segmented markets theory is that some borrowers and savers have the flexibility to choose among various maturity markets. Corporations that need long-term funds may initially obtain short-term financing if they expect interest rates to decline, and investors with long-term funds may make short-term investments if they expect interest rates to rise. Moreover, some investors with short-term funds may be willing to purchase long-term securities that have an active secondary market.

Some financial institutions focus on a particular maturity market, but others are more flexible. Commercial banks obtain most of their funds in short-term markets but spread their investments into short-, medium-, and long-term markets. Savings institutions have historically focused on attracting short-term funds and lending funds for long-term periods. Note that if maturity markets were completely segmented, then an interest rate

adjustment in one market would have no impact on other markets. However, there is clear evidence that interest rates among maturity markets move nearly in concert over time. This evidence indicates that there is some interaction among markets, which implies that funds are being transferred across markets. Note also that the theory of segmented markets conflicts with the general presumption of pure expectations theory that maturity markets are perfect substitutes for one another.

Implications Although markets are not completely segmented, the preference for particular maturities can affect the prices and yields of securities with different maturities and thereby affect the yield curve's shape. For this reason, the theory of segmented markets seems to be a partial explanation for the yield curve's shape but not the sole explanation.

A more flexible variant of segmented markets theory, known as preferred habitat theory, offers a compromise explanation for the term structure of interest rates. This theory proposes that, although investors and borrowers may normally concentrate on a particular maturity market, certain events may cause them to wander from their "natural" market. For example, commercial banks that obtain mostly short-term funds may select investments with short-term maturities as a natural habitat. However, if they wish to benefit from an anticipated decline in interest rates, they may select medium- and long-term maturities instead. Preferred habitat theory acknowledges that natural maturity markets may influence the yield curve, but it also recognizes that interest rate expectations could entice market participants to stray from their natural, preferred markets.

3-4d Research on Term Structure Theories

Much research has been conducted on the term structure of interest rates and has offered considerable insight into the various theories. Researchers have found that interest rate expectations have a strong influence on the term structure of interest rates. However, the forward rate derived from a yield curve does not accurately predict future interest rates, and this suggests that other factors may be relevant. The liquidity premium, for example, could cause consistent positive forecasting errors, meaning that forward rates tend to overestimate future interest rates. Studies have documented variation in the yield–maturity relationship that cannot be entirely explained by interest rate expectations or liquidity. The variation could therefore be attributed to different supply and demand conditions for particular maturity segments.

General Research Implications Although the results of research differ, there is some evidence that expectations theory, liquidity premium theory, and segmented markets theory all have some validity. Thus, if term structure is used to assess the market's expectations of future interest rates, then investors should first "net out" the liquidity premium and any unique market conditions for various maturity segments.

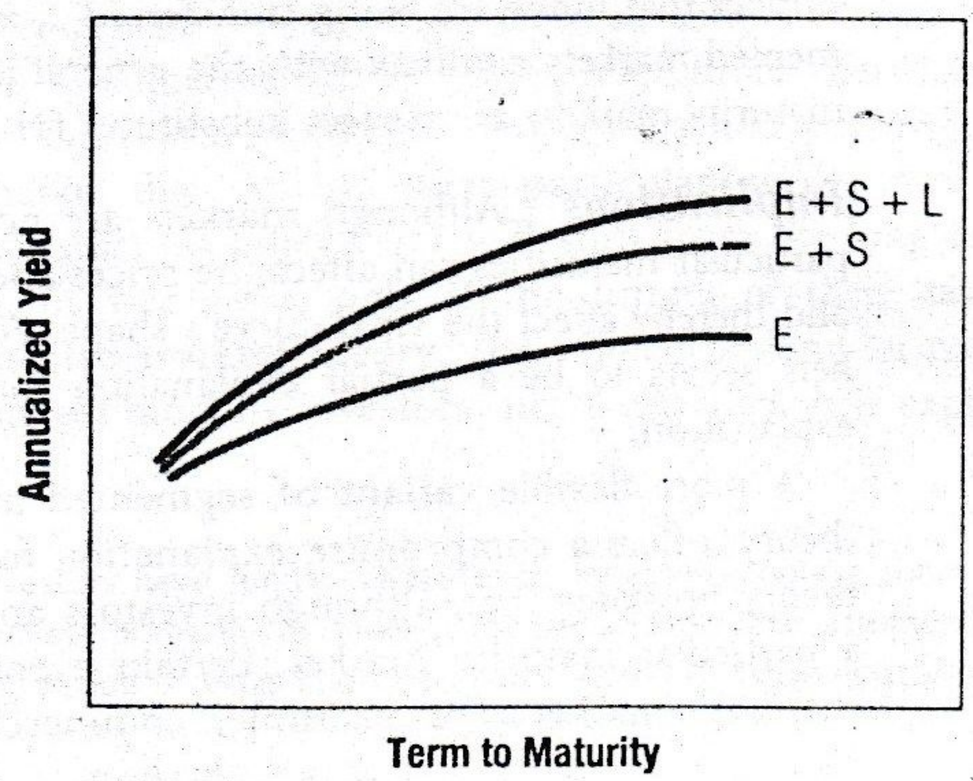
3-5 Integrating the Theories of Term Structure

In order to understand how all three theories can simultaneously affect the yield curve, first assume the following conditions.

1. Investors and borrowers who select security maturities based on anticipated interest rate movements currently expect interest rates to rise.

B.F.M.I-11th - 7 A

Exhibit 3.7 Effect of Conditions in Example of Yield Curve



2. Most borrowers are in need of long-term funds, while most investors have only short-term funds to invest.
3. Investors prefer more liquidity to less.

The first condition, which is related to expectations theory, suggests the existence of an upward-sloping yield curve (other things being equal); see curve E in Exhibit 3.7. The segmented markets information (condition 2) also favors the upward-sloping yield curve. When conditions 1 and 2 are considered simultaneously, the appropriate yield curve may look like curve E + S in the graph. The third condition (regarding liquidity) would then place a higher premium on the longer-term securities because of their lower degree of liquidity. When this condition is included with the first two, the yield may be represented by curve E + S + L.

In this example, all conditions placed upward pressure on long-term yields relative to short-term yields. In reality, there will sometimes be offsetting conditions: one condition may put downward pressure on the slope of the yield curve while other conditions cause upward pressure. If condition 1 in the example here were revised so that future interest rates were expected to decline, then this condition (by itself) would result in a downward-sloping yield curve. So when combined with the other conditions, which imply an upward-sloping curve, the result would be a partial offsetting effect. The actual yield curve would exhibit a downward slope if the effect of the interest rate expectations dominated the combined effects of segmented markets and a liquidity premium. In contrast, there would be an upward slope if the liquidity premium and segmented markets effects dominated the effects of interest rate expectations.

3-5a Use of the Term Structure

The term structure of interest rates is used to forecast interest rates, to forecast recessions, and to make investment and financing decisions.

Forecasting Interest Rates At any point in time, the shape of the yield curve can be used to assess the general expectations of investors and borrowers about future interest rates. Recall from expectations theory that an upward-sloping yield curve generally results from the expectation of higher interest rates whereas a downward-sloping yield curve

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generally results from the expectation of lower interest rates. Expectations about future interest rates must be interpreted cautiously, however, because liquidity and specific maturity preferences could influence the yield curve's shape. Still, it is generally believed that interest rate expectations are a major contributing factor to the yield curve's shape. Thus the curve's shape should provide a reasonable indication (especially once the liquidity premium effect is accounted for) of the market's expectations about future interest rates.

Although they can use the yield curve to interpret the market's consensus expectation of future interest rates, investors may have their own interest rate projections. By comparing their projections with those implied by the yield curve, they can attempt to capitalize on the difference. For example, if an upward-sloping yield curve exists, investors expecting stable interest rates could benefit from investing in long-term securities. From their perspective, long-term securities are undervalued because they reflect the market's (presumed incorrect) expectation of higher interest rates. Strategies such as this are effective only if the investor can consistently forecast better than the market.

Forecasting Recessions Some analysts believe that flat or inverted yield curves indicate a recession in the near future. The rationale for this belief is that, given a positive liquidity premium, such yield curves reflect the expectation of lower interest rates. This in turn is commonly associated with expectations of a reduced demand for loanable funds, which could be attributed to expectations of a weak economy.

The yield curve became flat or slightly inverted in 2000. At that time, the shape of the curve indicated expectations of a slower economy, which would result in lower interest rates. In 2001, the economy weakened considerably. And in March 2007, the yield curve exhibited a slight negative slope that caused some market participants to forecast a recession. During the credit crisis in 2008 and in the following two years, yields on Treasury securities with various maturities declined. The short-term interest rates experienced the most pronounced decline, which resulted in an upward-sloping yield curve in 2010.

Making Investment Decisions If the yield curve is upward sloping, some investors may attempt to benefit from the higher yields on longer-term securities even though they have funds to invest for only a short period of time. The secondary market allows investors to implement this strategy, which is known as *riding the yield curve*. Consider an upward-sloping yield curve such that some one-year securities offer an annualized yield of 7 percent while 10-year bonds offer an annualized yield of 10 percent. An investor with funds available for one year may decide to purchase the bonds and sell them in the secondary market after one year. The investor earns 3 percent more than was possible on the one-year securities, but only if the bonds can be sold (after one year) at the price for which they were purchased. The risk of this strategy is the uncertainty in the price for which the security can be sold in the near future. If the upward-sloping yield is interpreted as the market's consensus of higher interest rates in the future, then the price of a security would be expected to decrease in the future.

The yield curve is commonly monitored by financial institutions whose liability maturities are distinctly different from their asset maturities. Consider a bank that obtains much of its funds through short-term deposits and uses the funds to provide long-term loans or purchase long-term securities. An upward-sloping yield curve is favorable to the bank because annualized short-term deposit rates are significantly lower than annualized long-term investment rates. The bank's spread is higher than it would be if the yield curve were flat. However, if it believes that the upward slope of the yield curve indicates higher interest rates in the future (as predicted by expectations theory), then the bank will expect its cost of liabilities to increase over time because future deposits would be obtained at higher interest rates.

Making Decisions about Financing The yield curve is also useful for firms that plan to issue bonds. By assessing the prevailing rates on securities for various maturities, firms can estimate the rates to be paid on bonds with different maturities. This may enable them to determine the maturity of the bonds they issue. If they need funds for a two-year period, but notice from the yield curve that the annualized yield on one-year debt is much lower than that of two-year debt, they may consider borrowing for a one-year period. After one year when they pay off this debt, they will need to borrow funds for another one-year period.

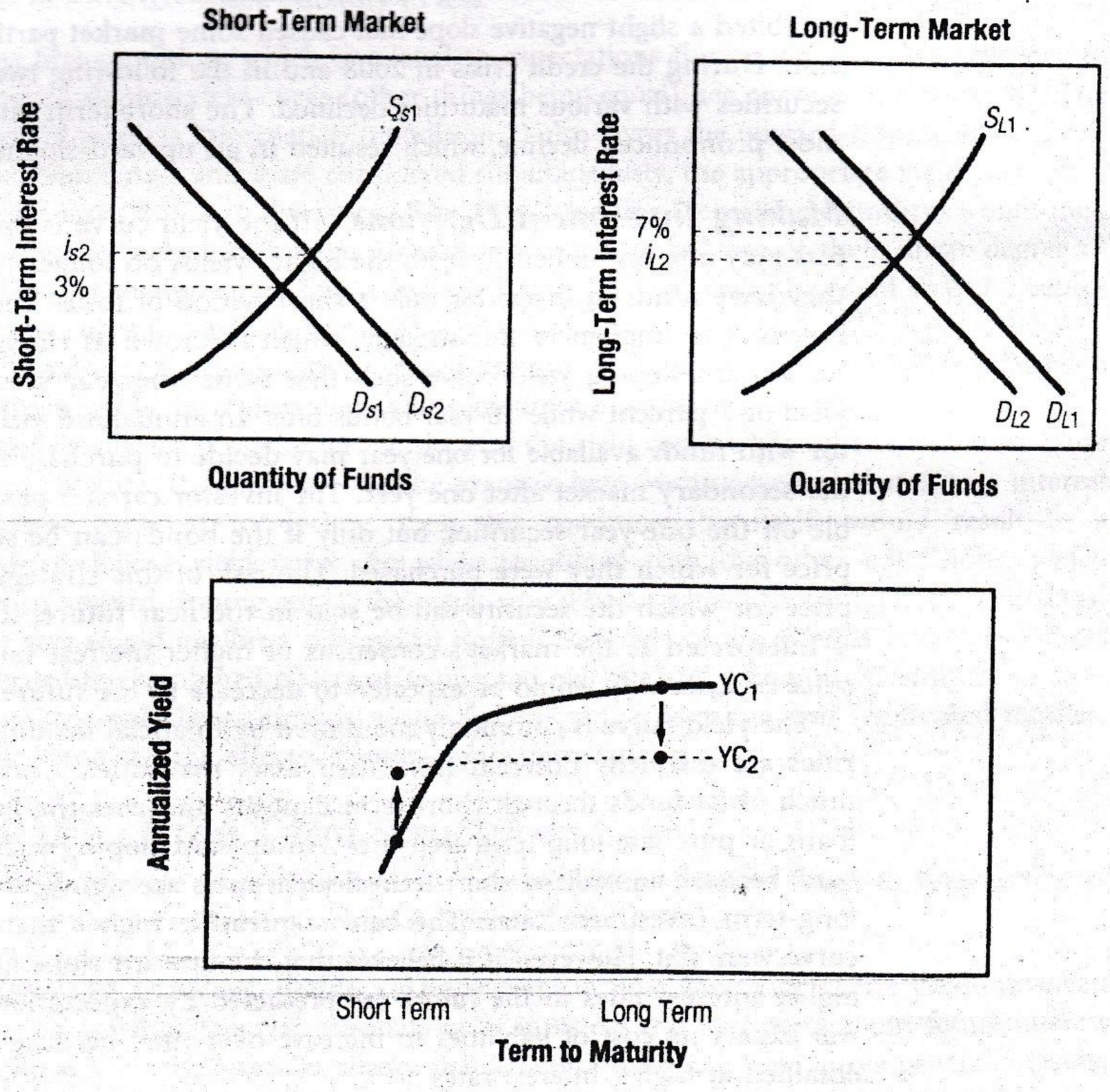
3-5b Why the Slope of the Yield Curve Changes

If interest rates at all maturities were affected in the same manner by existing conditions, then the slope of the yield curve would remain unchanged. However, conditions may cause short-term yields to change in a manner that differs from the change in long-term yields.

EXAMPLE

Suppose that last July the yield curve had a large upward slope, as shown by yield curve YC1 in Exhibit 3.8. Since then, the Treasury decided to restructure its debt by retiring $300 billion of long-term Treasury securities and increasing its offering of short-term Treasury securities. This caused a large increase in the demand for short-term funds and a large decrease in the demand for long-term funds. The increase in the demand for short-term funds caused an increase in short-term

Exhibit 3.8 Potential Impact of Treasury Shift from Long-term to Short-term Financing



interest rates and thereby increased the yields offered on newly issued short-term securities. Conversely, the decline in demand for long-term funds caused a decrease in long-term interest rates and thereby reduced the yields offered on newly issued long-term securities. Today, the yield curve is YC2 and is much flatter than it was last July. ●

3-5c How the Yield Curve Has Changed over Time

Yield curves at various dates are illustrated in Exhibit 3.9. The yield curve is usually upward sloping, but a slight downward slope has sometimes been evident (see the exhibit's curve for March 21, 2007). Observe that the yield curve for March 18, 2013, is below the other yield curves shown in the exhibit, which means that the yield to maturity was relatively low regardless of the maturity considered. This curve existed during the credit crisis, when economic conditions were extremely weak.



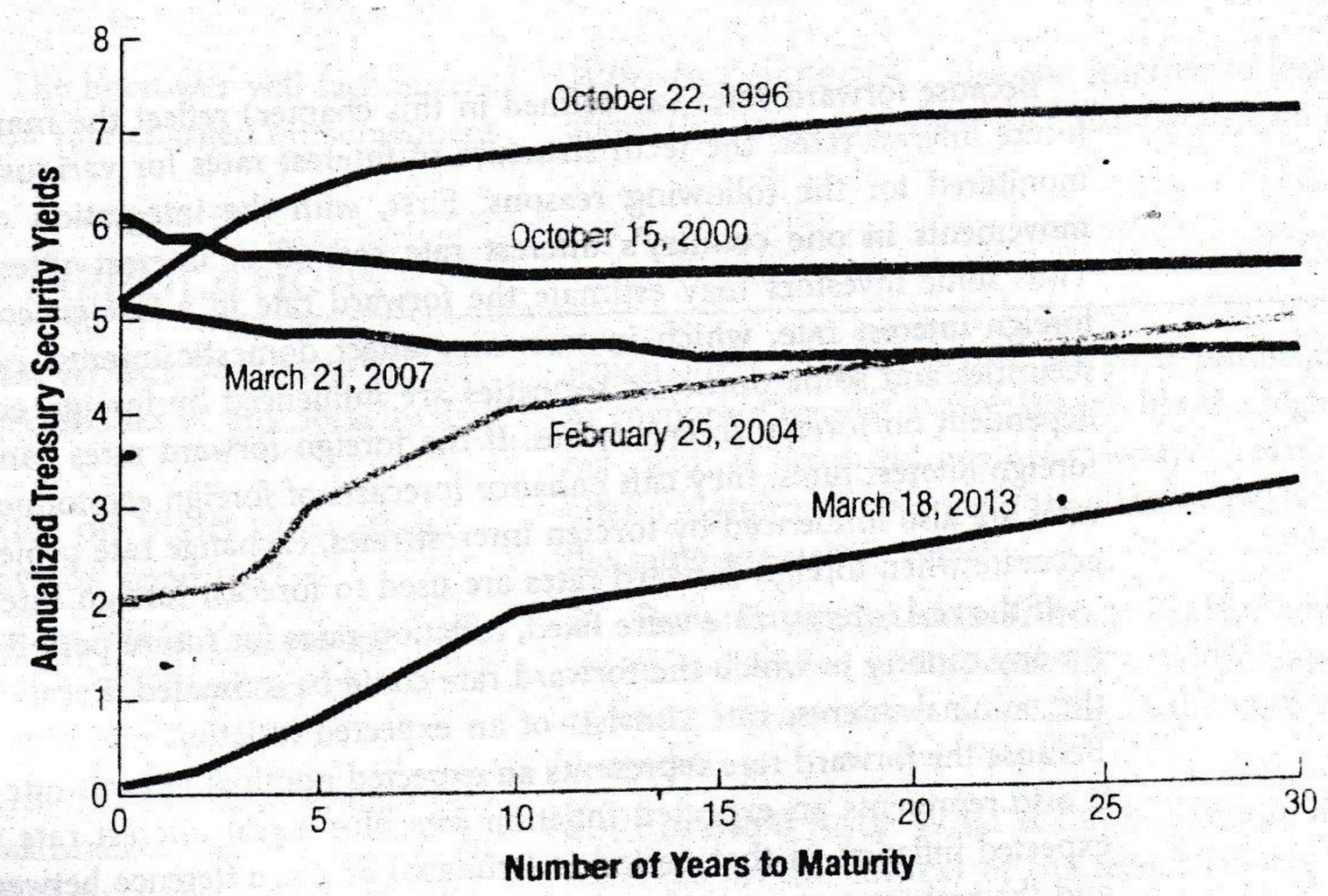
GLOBAL ASPECTS

3-5d International Structure of Interest Rates

Because the factors that affect the shape of the yield curve can vary among countries, the yield curve's shape at any given time also varies among countries. Exhibit 3.10 plots the yield curve for six different countries in July 2013. Each country has a different currency with its own interest rate levels for various maturities, and each country's interest rates are based on conditions of supply and demand.

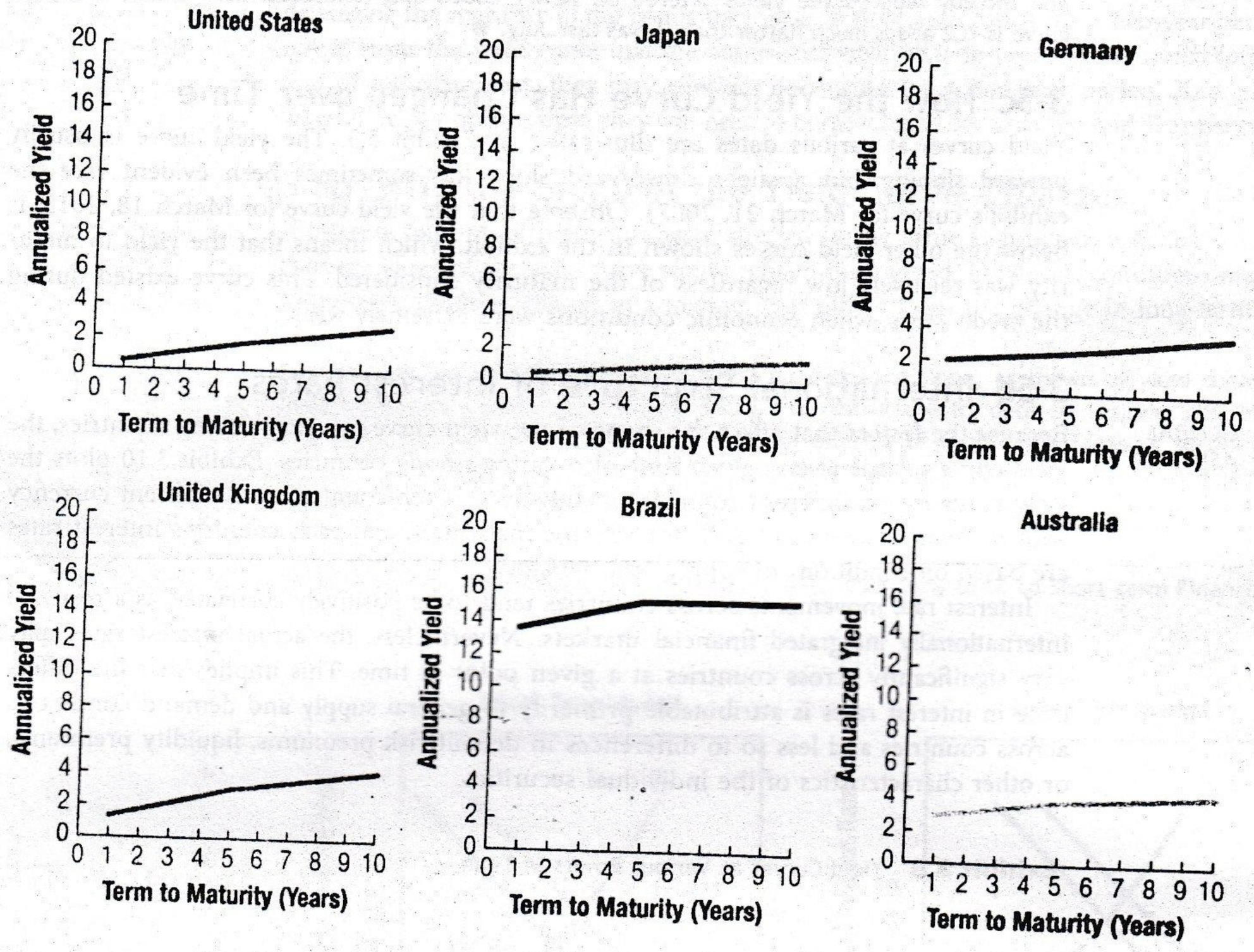
Interest rate movements across countries tend to be positively correlated as a result of internationally integrated financial markets. Nevertheless, the actual interest rates may vary significantly across countries at a given point in time. This implies that the difference in interest rates is attributable primarily to general supply and demand conditions across countries and less so to differences in default risk premiums, liquidity premiums, or other characteristics of the individual securities.

Exhibit 3.9 Yield Curves at Various Points in Time



Source: *Federal Reserve.*

Exhibit 3.10 Yield Curves among Foreign Countries (as of July 2013)



Because forward rates (as defined in this chapter) reflect the market's expectations of future interest rates, the term structure of interest rates for various countries should be monitored for the following reasons. First, with the integration of financial markets, movements in one country's interest rate can affect interest rates in other countries. Thus some investors may estimate the forward rate in a foreign country to predict the foreign interest rate, which in turn may affect domestic interest rates. Second, foreign securities and some domestic securities are influenced by foreign economies, which are dependent on foreign interest rates. If the foreign forward rates can be used to forecast foreign interest rates, they can enhance forecasts of foreign economies. Because exchange rates are also influenced by foreign interest rates, exchange rate projections may be more accurate when foreign forward rates are used to forecast foreign interest rates.

If the real interest rate were fixed, inflation rates for future periods could be predicted for any country in which the forward rate could be estimated. Recall from Chapter 2 that the nominal interest rate consists of an expected inflation rate plus a real interest rate. Because the forward rate represents an expected nominal interest rate for a future period, it also represents an expected inflation rate plus a real interest rate in that period. The expected inflation in that period is estimated as the difference between the forward rate and the real interest rate.

SUMMARY

- Quoted yields of debt securities at any given time may vary for the following reasons. First, securities with higher credit (default) risk must offer a higher yield. Second, securities that are less liquid must offer a higher yield. Third, taxable securities must offer a higher before-tax yield than tax-exempt securities. Fourth, securities with longer maturities offer a different yield (not consistently higher or lower) than securities with shorter maturities.
- The appropriate yield for any particular debt security can be estimated by first determining the risk-free yield that is currently offered by a Treasury security with a similar maturity. Then adjustments are made that account for credit risk, liquidity, tax status, and other provisions.
- The term structure of interest rates can be explained by three theories. The pure expectations theory suggests that the shape of the yield curve is dictated by interest rate expectations. The liquidity premium theory suggests that securities with shorter maturities have greater liquidity and therefore should not have to offer as high a yield as securities with longer terms to maturity. The segmented markets theory suggests that investors and borrowers have different needs that cause the demand and supply conditions to vary across different maturities; in other words, there is a segmented market for each term to maturity, which causes yields to vary among these maturity markets. Consolidating the theories suggests that the term structure of interest rates depends on interest rate expectations, investor preferences for liquidity, and the unique needs of investors and borrowers in each maturity market.

POINT COUNTER-POINT

Should a Yield Curve Influence a Borrower's Preferred Maturity of a Loan?

Point Yes. If there is an upward-sloping yield curve, then a borrower should pursue a short-term loan to capitalize on the lower annualized rate charged for a short-term period. The borrower can obtain a series of short-term loans rather than one loan to match the desired maturity.

Counter-Point No. The borrower will face uncertainty regarding the interest rate charged on subsequent loans that are needed. An upward-sloping yield curve suggests that interest rates may rise in the future, which will cause the cost of borrowing to increase. Overall, the cost of borrowing may be higher when using a series of loans than when matching the debt maturity to the time period in which funds are needed.

Who Is Correct? Use the Internet to learn more about this issue and then formulate your own opinion.

QUESTIONS AND APPLICATIONS

1. Characteristics That Affect Security Yields Identify the relevant characteristics of any security that can affect its yield.

2. Impact of Credit Risk on Yield What effect does a high credit risk have on securities?

3. Impact of Liquidity on Yield Discuss the relationship between the yield and liquidity of securities.

4. Tax Effects on Yields Do investors in high tax brackets or those in low tax brackets benefit more from tax-exempt securities? Why? At a given point in time, which offers a higher before-tax yield: municipal bonds or corporate bonds? Why? Which has the higher after-tax yield? If taxes did not exist, would Treasury bonds offer a higher or lower yield than municipal bonds with the same maturity? Why?

5. Pure Expectations Theory Explain how a yield curve would shift in response to a sudden expectation of rising interest rates, according to the pure expectations theory.

6. Forward Rate What is the meaning of the forward rate in the context of the term structure of

interest rates? Why might forward rates consistently overestimate future interest rates? How could such a bias be avoided?

7. Pure Expectations Theory Assume there is a sudden expectation of lower interest rates in the future. What would be the effect on the shape of the yield curve? Explain.

8. Liquidity Premium Theory Explain the liquidity premium theory.

9. Impact of Liquidity Premium on Forward Rate Explain how consideration of a liquidity premium affects the estimate of a forward interest rate.

10. Segmented Markets Theory If a downward-sloping yield curve is mainly attributed to segmented markets theory, what does that suggest about the demand for and supply of funds in the short-term and long-term maturity markets?

11. Segmented Markets Theory If the segmented markets theory causes an upward-sloping yield curve, what does this imply? If markets are not completely segmented, should we dismiss the segmented markets theory as even a partial explanation for the term structure of interest rates? Explain.

12. Preferred Habitat Theory Explain the preferred habitat theory.

13. Yield Curve What factors influence the shape of the yield curve? Describe how financial market participants use the yield curve.

Advanced Questions

14. Segmented Markets Theory Suppose that the Treasury decides to finance its deficit with mostly long-term funds. How could this decision affect the term structure of interest rates? If short-term and long-term markets were segmented, would the Treasury's decision have a more or less pronounced impact on the term structure? Explain.

15. Yield Curve Assuming that liquidity and interest rate expectations are both important for explaining the shape of a yield curve, what does a flat yield curve indicate about the market's perception of future interest rates?

16. Global Interaction among Yield Curves Assume that the yield curves in the United States, France, and Japan are flat. If the U.S. yield curve suddenly becomes positively sloped, do you think the yield curves in France and Japan would be affected? If so, how?

17. Multiple Effects on the Yield Curve Assume that (1) investors and borrowers expect that the economy will weaken and that inflation will decline, (2) investors require a small liquidity premium, and (3) markets are partially segmented and the Treasury currently has a preference for borrowing in short-term markets. Explain how each of these forces would affect the term structure, holding other factors constant. Then explain the effect on the term structure overall.

18. Effect of Crises on the Yield Curve During some crises, investors shift their funds out of the stock market and into money market securities for safety, even if they do not fear rising interest rates. Explain how and why these actions by investors affect the yield curve. Is the shift best explained by expectations theory, liquidity premium theory, or segmented markets theory?

19. How the Yield Curve May Respond to Prevailing Conditions Consider how economic conditions affect the default risk premium. Do you think the default risk premium will likely increase or decrease during this semester? How do you think the yield curve will change during this semester? Offer some logic to support your answers.

20. Assessing Interest Rate Differentials among Countries In countries experiencing high inflation, the annual interest rate may exceed 50 percent; in other countries, such as the United States and many European countries, annual interest rates are typically less than 10 percent. Do you think such a large difference in interest rates is due primarily to the difference between countries in the risk-free rates or in the credit risk premiums? Explain.

21. Applying the Yield Curve to Risky Debt Securities Assume that the yield curve for Treasury bonds has a slight upward slope, starting at 6 percent for a 10-year maturity and slowly rising to 8 percent for a 30-year maturity. Create a yield curve that you believe would exist for A-rated bonds and a corresponding one for B-rated bonds.

22. Changes to Credit Rating Process Explain how credit raters have changed their process following criticism of their ratings during the credit crisis.

Interpreting Financial News

Interpret the following comments made by Wall Street analysts and portfolio managers.

a. "An upward-sloping yield curve persists because many investors stand ready to jump into the stock market."

b. "Low-rated bond yields rose as recession fears caused a flight to quality."

c. "The shift from an upward-sloping yield curve to a downward-sloping yield curve is sending a warning about a possible recession."?

Managing in Financial Markets

Monitoring Yield Curve Adjustments As an analyst of a bond rating agency, you have been asked to interpret the implications of the recent shift in the yield curve. Six months ago, the yield curve exhibited a slight downward slope. Over the last six months, long-term yields declined while short-term yields remained the same. Analysts said that the shift was due to revised expectations of interest rates.

a. Given the shift in the yield curve, does it appear that firms increased or decreased their demand for long-term funds over the last six months?

b. Interpret what the shift in the yield curve suggests about the market's changing expectations of future interest rates.

c. Recently, an analyst argued that the underlying reason for the yield curve shift is that many large U.S. firms anticipate a recession. Explain why an anticipated recession could force the yield curve to shift as it has.

d. What could the specific shift in the yield curve signal about the ratings of existing corporate bonds? What types of corporations would be most likely to experience a change in their bond ratings as a result of this shift in the yield curve?

PROBLEMS

1. Forward Rate

a. Assume that, as of today, the annualized two-year interest rate is 13 percent and the one-year interest rate is 12 percent. Use this information to estimate the one-year forward rate.

b. Assume that the liquidity premium on a two-year security is 0.3 percent. Use this information to estimate the one-year forward rate.

2. Forward Rate Assume that, as of today, the annualized interest rate on a three-year security is 10 percent and the annualized interest rate on a two-year security is 7 percent. Use this information to estimate the one-year forward rate two years from now.

3. Forward Rate If ${}_t i_1 > {}_t i_2$, what is the market consensus forecast about the one-year forward rate one year from now? Is this rate above or below today's one-year interest rate? Explain.

4. After-Tax Yield You need to choose between investing in a one-year municipal bond with a 7 percent yield and a one-year corporate bond with an 11 percent yield. If your marginal federal income tax rate is 30 percent and no other differences exist between these two securities, which would you invest in?

5. Deriving Current Interest Rates Assume that interest rates for one-year securities are expected to be 2 percent today, 4 percent one year from now, and 6 percent two years from now. Using only pure expectations theory, what are the current interest rates on two-year and three-year securities?

6. Commercial Paper Yield

a. A corporation is planning to sell its 90-day commercial paper to investors by offering an 8.4 percent yield. If the three-month T-bill's annualized rate is 7 percent, the default risk premium is estimated to be 0.6 percent, and there is a 0.4 percent tax adjustment, then what is the appropriate liquidity premium?

b. Suppose that, because of unexpected changes in the economy, the default risk premium increases to 0.8 percent. Assuming that no other changes occur, what is the appropriate yield to be offered on the commercial paper?

7. Forward Rate

a. Determine the forward rate for various one-year interest rate scenarios if the two-year interest rate is 8 percent, assuming no liquidity premium. Explain the relationship between the one-year interest rate and the one-year forward rate while holding the two-year interest rate constant.

b. Determine the one-year forward rate for the same one-year interest rate scenarios described in question

(a) while assuming a liquidity premium of 0.4 percent. Does the relationship between the one-year interest rate and the forward rate change when the liquidity premium is considered?

c. Determine how the one-year forward rate would be affected if the quoted two-year interest rate rises; hold constant the quoted one-year interest rate as well as the liquidity premium. Explain the logic of this relationship.

d. Determine how the one-year forward rate would be affected if the liquidity premium rises and if the quoted one-year interest rate is held constant. What if the quoted two-year interest rate is held constant? Explain the logic of this relationship.

8. After-Tax Yield Determine how the after-tax yield from investing in a corporate bond is affected by higher tax rates, holding the before-tax yield constant. Explain the logic of this relationship.

9. Debt Security Yield

a. Determine how the appropriate yield to be offered on a security is affected by a higher risk-free rate. Explain the logic of this relationship.

b. Determine how the appropriate yield to be offered on a security is affected by a higher default risk premium. Explain the logic of this relationship.

Flow of Funds Exercise

Influence of the Structure of Interest Rates

Recall that Carson Company has obtained substantial loans from finance companies and commercial banks. The interest rate on the loans is tied to the six-month Treasury bill rate (and includes a risk premium) and is adjusted every six months. Therefore, Carson's cost of obtaining funds is sensitive to interest rate movements. The company expects that the U.S. economy will strengthen, so it plans to grow in the future by expanding its business and by making acquisitions. Carson anticipates needing substantial long-term financing to pay for its growth and plans to borrow additional funds, either through loans or by issuing bonds; it is also considering issuing stock to raise funds in the next year.

a. Assume that the market's expectations for the economy are similar to Carson's expectations. Also assume that the yield curve is primarily influenced by interest rate expectations. Would the yield curve be upward sloping or downward sloping? Why?

b. If Carson could obtain more debt financing for 10-year projects, would it prefer to obtain credit at a long-term fixed interest rate or at a floating rate? Why?

c. If Carson attempts to obtain funds by issuing 10-year bonds, explain what information would help in estimating the yield it would have to pay on 10-year bonds. That is, what are the key factors that would influence the rate Carson would pay on its 10-year bonds?

d. If Carson attempts to obtain funds by issuing loans with floating interest rates every six months, explain what information would help in estimating the yield it would have to pay over the next 10 years. That is, what are the key factors that would influence the rate Carson would pay over the 10-year period?

e. An upward-sloping yield curve suggests that the initial rate financial institutions could charge on a long-term loan to Carson would be higher than the initial rate they could charge on a loan that floats in accordance with short-term interest rates. Does this imply that creditors should prefer offering Carson a fixed-rate loan to offering them a floating-rate loan? Explain why Carson's expectations of future interest rates are not necessarily the same as those of some financial institutions.

Internet/Excel Exercises

1. Assess the shape of the yield curve by using the website www.bloomberg.com. Click on "Market data" and then on "Rates & bonds." Is the Treasury yield curve upward or downward sloping? What is the yield of a 90-day Treasury bill? What is the yield of a 30-year Treasury bond?

2. Based on the various theories attempting to explain the yield curve's shape, what could explain the difference between the yields of the 90-day Treasury bill and the 30-year Treasury bond? Which theory, in your opinion, is the most reasonable? Why?

WSJ EXERCISE

Interpreting the Structure of Interest Rates

a. Explaining Yield Differentials Using the most recent issue of the *Wall Street Journal*, review the yields for the following securities:

TYPE	MATURITY	YIELD
Treasury	10-year	—
Corporate: high-quality	10-year	—
Corporate: medium-quality	10-year	—
Municipal (tax-exempt)	10-year	—

If credit (default) risk is the only reason for the yield differentials, then what is the default risk premium on the corporate high-quality bonds? On the medium-quality bonds?

During a recent recession, high-quality corporate bonds offered a yield of 0.8 percent above Treasury bonds while medium-quality bonds offered a yield of about 3.1 percent above Treasury bonds. How do these yield differentials compare to the differentials today? Explain the reason for any change.

Using the information in the previous table, complete the following table. In Column 2, indicate the before-tax yield necessary to achieve the existing after-tax yield of tax-exempt bonds. In Column 3, answer this question: If the tax-exempt bonds have the same risk and other features as high-quality corporate bonds, which type of bond is preferable for investors in each tax bracket?

MARGINAL TAX BRACKET OF INVESTORS	EQUIVALENT BEFORE-TAX YIELD	PREFERRED BOND
10%	—	—
15%	—	—
20%	—	—
28%	—	—
34%	—	—

b. Examining Recent Adjustments in Credit Risk Using the most recent issue of the *Wall Street Journal*, review the corporate debt section showing the high-yield issue with the biggest price decrease.

- Why do you think there was such a large decrease in price?
- How does this decrease in price affect the expected yield for any investors who buy bonds now?

c. Determining and Interpreting Today's Term Structure Using the most recent issue of the *Wall Street Journal*, review the yield curve to determine the approximate yields for the following maturities:

TERM TO MATURITY	ANNUALIZED YIELD
1 year	—
2 years	—
3 years	—

Assuming that the differences in these yields are due solely to interest rate expectations, determine the one-year forward rate as of one year from now and the one-year forward rate as of two years from now.

d. The *Wall Street Journal* provides a "Treasury Yield Curve." Use this curve to describe the market's expectations about future interest rates. If a liquidity premium exists, how would this affect your perception of the market's expectations?

Online Articles with Real-World Examples

Find a recent practical article available online that describes a real-world example regarding a specific financial institution or financial market that reinforces one or more concepts covered in this chapter.

If your class has an online component, your professor may ask you to post your summary of the article there and provide a link to the article so that other students can access it. If your class is live, your professor may ask you to summarize your application of the article in class. Your professor may assign specific students to complete this assignment or may allow any students to do the assignment on a volunteer basis.

For recent online articles and real-world examples related to this chapter, consider using the following search terms (be sure to include the prevailing year as a search term to ensure that the online articles are recent):

1. credit risk
2. credit ratings AND risk
3. risk premium
4. yield curve
5. yield curve AND interest rate
6. interest rate AND liquidity premium
7. interest rate AND credit risk
8. rating agency AND risk
9. term structure AND maturity
10. yield curve AND financing

PART 1 INTEGRATIVE PROBLEM

Interest Rate Forecasts and Investment Decisions

This problem requires an understanding of how economic conditions affect interest rates and bond yields (Chapters 1, 2, and 3).

Your task is to use information about existing economic conditions to forecast U.S. and Canadian interest rates. The following information is available to you.

1. Over the past six months, U.S. interest rates have declined and Canadian interest rates have increased.
2. The U.S. economy has weakened over the past year while the Canadian economy has improved.
3. The U.S. saving rate (proportion of income saved) is expected to decrease slightly over the next year; the Canadian saving rate will remain stable.
4. The U.S. and Canadian central banks are not expected to implement any policy changes that would have a significant impact on interest rates.
5. You expect the U.S. economy to strengthen considerably over the next year but still be weaker than it was two years ago. You expect the Canadian economy to remain stable.
6. You expect the U.S. annual budget deficit to increase slightly from last year but be significantly less than the average annual budget deficit over the past five years. You expect the Canadian budget deficit to be about the same as last year.
7. You expect the U.S. inflation rate to rise slightly but still remain below the relatively high levels of two years ago; you expect the Canadian inflation rate to decline.
8. Based on some events last week, most economists and investors around the world (including yourself) expect the U.S. dollar to weaken against the Canadian dollar and against other foreign currencies over the next year. This expectation was already accounted for in your forecasts of inflation and economic growth.
9. The yield curve in the United States currently exhibits a consistent downward slope. The yield curve in Canada currently exhibits an upward slope. You believe that the liquidity premium on securities is quite small.

Questions

1. Using the information available to you, forecast the direction of U.S. interest rates.
2. Using the information available to you, forecast the direction of Canadian interest rates.
3. Assume that the perceived risk of corporations in the United States is expected to increase. Explain how the yield of newly issued U.S. corporate bonds will change to a different degree than will the yield of newly issued U.S. Treasury bonds.