

ACCOUNTANT'S GUIDE TO FINANCIAL MANAGEMENT



Delta Publishing Company

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PREFACE

Accountant's Guide to Financial Management is designed for the accountants who must have financial knowledge but has not had formal training in finance. The goals of the course are fourfold:

1. It provides an understanding and working knowledge of the fundamentals of finance that can be put to practical application in day-to-day jobs of managers.
2. It also concentrates on providing a working vocabulary for communication.
3. It uses the solved problems approach, with emphasis on the practical application of financial concepts, tools, and methodology.
4. It incorporates computer software demonstration and printouts. The course also includes checklists, guidelines, rules of thumb, diagrams, graphs, and tables to aid your comprehension of the subjects discussed.

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CHAPTER 1

AN OVERVIEW OF FINANCIAL MANAGEMENT

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Identify the goal of the firm.
 - Distinguish between profit maximization and stockholder wealth maximization.
 - Explain how agency problems may interfere with the goal of stockholder wealth maximization.
 - Describe the scope and role of finance.
 - Summarize the language and decision making of finance.
 - Explain the role of financial managers.
 - Describe the relationship between accounting and finance.
 - Explain the financial and operating environment in which financial managers operate.
 - Compare the various legal forms of business organization.
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Financial management is the process of planning decisions in order to maximize the shareholders' wealth (or the firm's market value). Financial managers have a major role in cash management, the acquisition of funds, and in all aspects of raising and allocating financial capital, and taking into account the trade-off between risk and return. Financial managers need accounting and financial information to carry out their responsibilities.

OBJECTIVES OF MANAGERIAL FINANCE

Company goals usually include (1) stockholder wealth maximization, (2) profit maximization, (3) managerial reward maximization, (4) behavioral goals, and (5) social responsibility. Modern managerial finance theory operates on the assumption that the primary goal of the business is to maximize the wealth of its stockholders, which translates into maximizing the price of the firm's common stock. The other goals mentioned above also influence the company's policy but are less important than stock price maximization. Note that the traditional goal frequently stressed by economists--profit maximization--is not sufficient for most companies today.

PROFIT MAXIMIZATION VS. STOCKHOLDER WEALTH MAXIMIZATION

Profit maximization is basically is a single-period or, at most, a short-term goal, to be achieved within one year; it is usually interpreted to mean the maximization of profits within a given period of time. A corporation may maximize its short-term profits at the expense of its long-term profitability. In contrast, stockholder wealth maximization is a long-term goal, since stockholders are interested in future as well as present profits.

Wealth maximization is generally preferred because it considers (1) wealth for the long term, (2) risk or uncertainty, (3) the timing of returns, and (4) the stockholders' return. Timing of returns is important; the earlier the return is received, the better, since a quick return reduces the uncertainty about receiving the return, and the money received can be

reinvested sooner. Table 1-1 summarizes the advantages and disadvantages of these two often conflicting goals.

TABLE 1-1
PROFIT MAXIMIZATION VERSUS
STOCKHOLDER WEALTH MAXIMIZATION

<i>Goal</i>	<i>Objective</i>	<i>Advantages</i>	<i>Disadvantages</i>
Profit maximization	Large profits	1. Easy to calculate profits. 2. Easy to determine the link between financial decisions and profits.	1. Emphasizes the short term. 2. Ignores risk or uncertainty. 3. Ignores the timing of returns. 4. Requires immediate resources.
Stockholder wealth maximization	Highest share price of common stock	1. Emphasizes the long term. 2. Recognizes risk or uncertainty. 3. Recognizes the timing of returns. 4. Considers stockholders' return.	1. Offers no clear relationship between financial decisions and stock price. 2. Can lead to management anxiety and frustration. 3. Can promote aggressive and <i>creative</i> accounting practices

Note: The policy decisions that by themselves are likely to affect the value of the firm (maximize stockholder wealth) include the:

- Investment in a project with a large net present value.
- Sale of a risky division that will now increase the credit rating of the entire company.
- Use of a more highly leveraged capital structure that resulted in lower cost of capital.

Let us now see how profit maximization may affect wealth maximization.

EXAMPLE 1-1

Profit maximization can be achieved in the short term at the expense of the long-term goal of wealth maximization. For example, a costly investment may create losses in the short term but yield substantial profits in the long term; a company that wants to show a short-term profit may postpone major repairs or replacement even though such postponement is likely to hurt its long-term profitability.

EXAMPLE 1-2

Profit maximization, unlike wealth maximization, does not consider risk or uncertainty. Consider two products, A and B, and their projected earnings over the next five years, as shown below.

<i>Year</i>	<i>Product A</i>	<i>Product B</i>
1	\$20,000	\$22,000
2	\$20,000	\$22,000
3	\$20,000	\$22,000
4	\$20,000	\$22,000
5	<u>\$20,000</u>	<u>\$22,000</u>
	<u>\$100,000</u>	<u>\$110,000</u>

A profit maximization approach favors product B over product A because its totals projected earnings after five years are higher. However, if product B is more risky than product A, then the decision is not as straightforward as the figures seem to indicate because of the trade-off between risk and return. Stockholders expect greater returns from investments with higher risk; they will demand a sufficiently large return to compensate for the comparatively greater level of risk of producing product B.

AGENCY PROBLEMS

Even though the goal of the firm is the maximization of shareholder wealth, the agency problem may interfere with the implementation of this goal. For example, managers will not work for the owners unless it is in their best interest. Major agency problems develop (1) between owners and managers and (2) between creditors and owners.

Shareholders versus Managers

The *agency problem* arises when a manager owns less than 100 percent of the company's ownership. As a result of the separation between the managers and owners, managers may make decisions that are not in line with the goal of maximizing stockholder wealth. For example, they may work less eagerly and benefit themselves in terms of salary and perks. The costs associated with the agency problem, such as a reduced stock price and various "perks", is called *agency costs*. Several mechanisms are used to ensure that managers act in the best interests of the shareholders: (1) golden parachutes or severance contracts, (2) performance-based stock option plans, and (3) the threat of takeover.

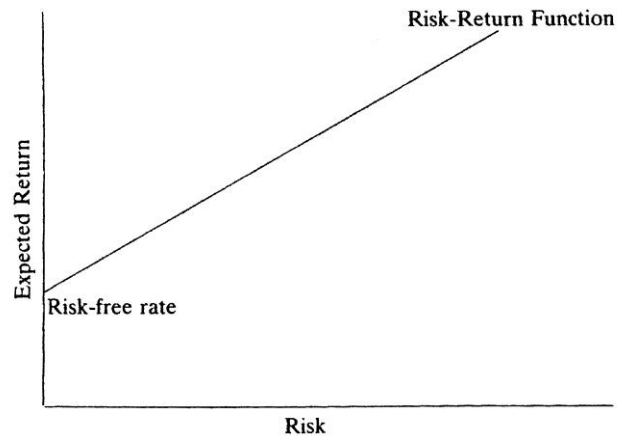
Creditors versus Shareholders

Conflicts develop if (1) managers, acting in the interest of it shareholders, take on projects with greater risk than creditors anticipated and (2) raise the debt level higher than was expected. These actions tend to reduce the value of the debt outstanding.

FINANCE DECISIONS AND RISK-RETURN TRADE-OFF

The concept of risk-return trade-off is integral to the theory of finance. We will not bear additional risk unless we expect to be compensated with additional return. Figure 1-1 illustrates this tradeoff.

FIGURE 1-1
RISK-RETURN FUNCTION



Risk refers to the variability of expected returns (sales, earnings, or cash flow) and is the probability that a financial problem will affect the company's operational performance or financial position. Typical forms of risk are economic risk, political uncertainties, and industry problems.

Risk analysis is a process of measuring and analyzing the risk associated with the financial and investment decisions. It is important to consider risk in making capital investment decisions because of the large amount of capital involved and the long-term nature of the investments. Analysts must also consider the rate of return in relation to the degree of risk involved. (Return, the reward for investing, consists of current income, in the form of either periodic cash payments or capital gain (or loss) from appreciation (or depreciation) in market value.)

Proper assessment and balance of the various risk-return trade-off is available is part of creating a sound stockholder wealth maximization plan. The risk-return trade-off is discussed in chapters 7, 10, and 12.

PORTFOLIO RISK AND RETURN

Not all risk is created equal. Some risk can be diversified away, and some cannot. There is an old saying, "don't put all your eggs in one basket." As we will see for most securities and projects, some risk can be reduced or eliminated through diversification. We will discuss this issue and how to measure portfolio return and risk in Chapter 7.

TIME VALUE OF MONEY

Today's dollars are not the same as tomorrow's. A dollar now is worth more than a dollar to be received later, because you can invest that dollar for a return and have more than a dollar at the

specified later date. Further, receiving a dollar in the future has uncertainty attached to it; inflation might make the dollar received at a later time worth less in buying power.

Time value of money is a critical consideration in financial and investment decisions. For example, compound interest calculations can help you determine your eventual return from an investment. Discounting, or the calculation of present value, which is inversely related to compounding, is used to evaluate future cash flow associated with long-term projects; the discounted value of receiving future cash flows from a proposal is an important consideration. Time value of money has many applications in finance; for example, it can help you determine the periodic payout or interest rate on a loan or decide between leasing and buying equipment. The time value of money is fully discussed in Chapter 6.

Let us now see why finance is important to know in order to optimally perform your responsibilities.

IMPORTANCE OF FINANCE

It's important for you to have a knowledge of finance and to know how to apply it successfully, whether you deal with production, marketing, personnel, operations, or any other aspect of corporate functioning. You should know where to look, what to ask, and where to get the answers to questions on your department or company operations. Financial knowledge aids in planning, problem solving, and decision making. Further, you must have financial and accounting knowledge in order to be able to understand the financial reports prepared by other segments of the organization.

Financial managers spend a good portion of their time planning, setting objectives, and developing efficient courses of action to achieve their objectives. As a financial manager, you may have to deal with a wide variety of plans, including production plans, financial plans, and personnel plans. Each of these is different, and all require some kind of financial knowledge.

Finance allows for better communication among departments. For example, the corporate budget (financial plan) communicates overall company goals to department managers so they know what is expected of them and what financial parameters exist for their operations. You must be able to identify any problems with the proposed budget before it is finalized and to make recommendations for subsequent budgets. Further, you need to be able to discuss the budget with other members of the company. Failure to understand the budget may mean failure to achieve corporate goals.

You have to present convincing information to upper management to obtain approval for activities and projects such as new product lines. Here, knowledge of forecasting and capital budgeting (selecting the most profitable project among long term alternatives) is essential. You must appraise your monetary and manpower requests before submitting them; if you are ill-prepared, you will create a negative impression and may well lose the chance to obtain approval of your request.

Financial knowledge is critical in a wide number of areas. You may be involved in a decision whether to use debt or equity financing and must have the knowledge to weigh the

benefits and costs of each in order to meet or maintain your company's capital goals. You may be called on their financial statements and should be able to understand and analyze such information and make intelligent financial decisions. Or you may have to plan and analyze project performance if your company invests in capital projects (property, plant, and equipment) that are tied to plans for product development, marketing, and production.

SCOPE AND ROLE OF FINANCE

In this section, we discuss the language of finance, the responsibilities of financial managers, and the relationship between accounting and finance.

The Language and Decision Making of Finance

You should master the finance vocabulary in order to comprehend financial information, know how to utilize that information effectively, and to communicate clearly about the quantitative aspects of performance and results. Further, you must be able to express in a clear, well-thought-out manner what you need in financial terms in order to perform your job effectively.

Accounting provides financial information and includes financial accounting and managerial accounting. *Financial accounting* records the financial history of the business and involves the preparation of reports for use by external parties, such as investors and creditors. *Managerial accounting* provides financial information to be used in making decisions about the future of the company. Financial and managerial accounting are more fully discussed later in this chapter.

Accounting information is used by financial managers to make decisions regarding the receipt and use of funds to meet corporate objectives and to forecast future financing needs. The finance function analyzes the accounting information to improve decisions affecting the company's wealth.

Why and What of Finance

Finance involves many interrelated functions, including obtaining funds, using funds, monitoring performance, and solving current and prospective problems.

Financial managers have to know product pricing, planning, and variance analysis (comparing actual to budgeted figures). They must know how to manage assets and optimize the rate of return. They have to be familiar with budgeting, effective handling of productive assets, and the financial strengths and weaknesses of the business.

What Do Financial Managers Do?

The financial manager plays an important role in the company's goal-setting, policy determination, and financial success. Unless the business is small, no one individual handles all the financial decisions; responsibility is dispersed throughout the organization. The financial manager's responsibilities include:

- *Financial analysis and planning* - Determining the amount of funds the company needs; a large company seeking a rapid growth rate will require more funds.

- *Making investment decisions* - Allocating funds to specific assets (things owned by the company). The financial manager makes decisions regarding the mix and type of assets acquired and the possible modification or replacement of assets, particularly when assets are inefficient or obsolete.
- *Making financing and capital structure decisions* - Raising funds on favorable terms, i.e., at a lower interest rate or with few restrictions. Deciding how to raise funds depends on many factors, including interest rate, cash position, and existing debt level; for example, a company with a cash-flow problem may be better off using long-term financing.
- *Managing financial resources* - Managing cash, receivables, and inventory to accomplish higher returns without undue risk.

The financial manager affects stockholder wealth maximization by influencing:

1. Current and future earnings per share (EPS), equal to net income divided by common shares outstanding.
2. Timing, duration, and risk of earnings.
3. Dividend policy.
4. Manner of financing.

CONTROLLER VERSUS TREASURER

If you are employed by a large company, the financial responsibilities are probably conducted by the controller, treasurer, and chief financial officer (CFO). The activities of the controller and treasurer fall under the umbrella of finance.

There is no precise distinction between the job of the controller and treasurer, and the functions may differ slightly between organizations because of company policy and the personality of the office holder.

The controller's functions are primarily of an *internal* nature and include record keeping, tracking, and controlling the financial effects of prior and current operations. The *internal* matters of importance to the controller include financial and managerial accounting, taxes, control, and audit functions. The controller is the chief accountant and is involved in the preparation of financial statements, tax returns, the annual report, and Securities and Exchange Commission (SEC) filing. The controller's function is primarily assuring that funds are used efficiently. He or she is primarily concerned with collecting and presenting financial information. The controller usually looks at what has occurred rather than what should or will happen.

Many controllers are involved with management information systems and review previous, current, and emerging patterns. They report their analysis of the financial implications of decisions to top management.

The treasurer's function, in contrast, is primarily external. The treasurer obtains and manages the corporation's capital and is involved with creditors (e.g., bank loan officers), stockholders, investors, underwriters of equity (stock) and bond issuances, and governmental regulatory bodies (e.g., the SEC). The treasurer is responsible for managing corporate assets

(e.g., accounts receivable, inventory) and debt, planning the finances and capital expenditures, obtaining funds, formulating credit policy, and managing the investment portfolio.

The treasurer concentrates on keeping the company afloat by obtaining cash to meet obligations and buying assets to achieve corporate objectives. While the controller concentrates on profitability, the treasurer emphasizes cash flow. Even though a company has been profitable, it may have a significant negative cash flow; for example, there may exist substantial long-term receivable (receivable having a maturity of greater than one year). Without adequate cash flow, even a profitable company may fail. By emphasizing cash flow, the treasurer strives to prevent bankruptcy and achieve corporate goals. The treasurer analyzes the financial statements, formulates additional data, and makes decisions based on the analysis.

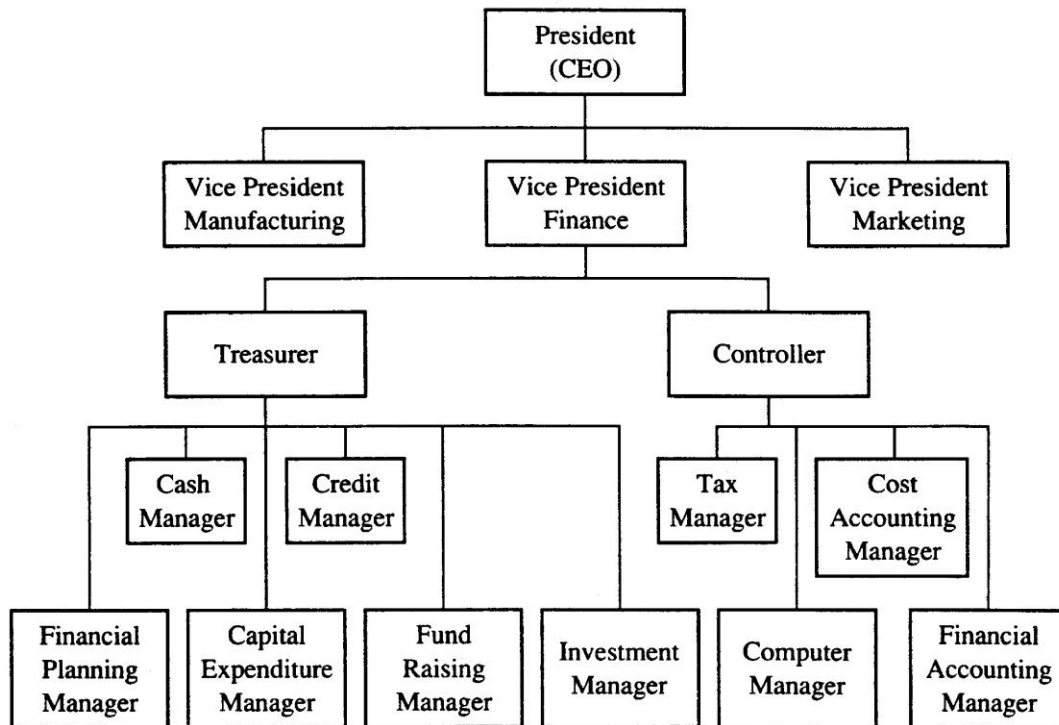
The major responsibilities of controllers and treasurers are shown in Table 1-2. The CFO is involved with financial policy making and planning. He or she has financial and managerial responsibilities, supervises all phases of financial activity, and serves as the financial adviser to the board of directors. *Note:* In the post-Enron era, the CFO's role has taken on a whole new level of importance -- nearly as important as the chief executive officer's (CEO's) job. The new reporting rules instituted by the Sarbanes-Oxley Act mandate that CFOs and CEOs sign off on their companies' financials not once, but twice. The certification puts CFOs at risk of criminal penalties for materially misrepresenting the numbers. That alone makes the CFO position more daunting.

TABLE 1-2
FUNCTIONS OF CONTROLLER AND TREASURER

Controller	Treasurer
Accounting	Obtaining Financing
Reporting of financial information	Banking relationship
Custody of records	Investment of funds
Interpretation of financial data	Investor relations
Budgeting	Cash management
Controlling operations	Insuring assets
Appraisal of results and making Recommendations	Fostering relationship with creditors and investors
Preparation of taxes	Credit appraisal and collecting
Managing assets	funds

Figure 1-2 shows an organizational chart of the financial structure within a company. Note that the controller and treasurer report to the vice-president of finance.

**FIGURE 1-2
FINANCIAL STRUCTURE**



RELATIONSHIP BETWEEN ACCOUNTING AND FINANCE

Accounting and finance have different focuses. The primary distinctions between accounting and finance involve the treatment of funds and decision making. Accounting is a necessary subfunction of finance.

The control features of the finance function are referred to as managerial accounting. Managerial accounting includes the preparation of reports used by management for internal decision making, such as budgeting, costing, pricing, capital budgeting, performance evaluation, break-even analysis, transfer pricing (pricing of goods or services transferred between departments), and rate-of-return analysis. Managerial accounting depends heavily on historical data obtained as part of the financial accounting, is future-oriented and emphasizes making the right decisions today to ensure future performance.

Managerial accounting information is important to the financial manager. For example, the break-even point analysis is useful in deciding whether to introduce a product line. Variance analysis is used to compare actual revenue and/or costs to standard revenue and/or costs for performance evaluation. Managerial accounting can help identify and suggest corrective action. Budgets provide manufacturing and marketing guidelines.

FINANCIAL AND OPERATING ENVIRONMENT

As a financial manager, you operate in the financial environment and are indirectly affected by it. In this section, we discuss financial institutions, markets, and corporations.

Financial Institutions and Markets

A healthy economy depends on the efficient transfer of funds from savers to individuals, businesses, and governments who need capital. Most transfers occur through specialized financial institutions that serve as intermediaries between suppliers and users of funds.

A financial transaction results in the simultaneous creation of a financial asset and a financial liability. Financial assets include money, stock (equity ownership of a company), or debt (evidence that someone owes you a debt). Financial liabilities are monies you owe someone else, such as loans payable. The creation and transfer of such assets and liabilities constitute *financial markets*.

In the financial markets, companies demanding funds are brought together with those having surplus funds. Financial markets provide a mechanism through which the financial manager obtains funds from a wide range of sources, including financial institutions in such forms as loans, bonds, and common stocks. The financial markets are composed of money markets and capital markets. Figure 1-3 depicts the general flow of funds among financial institutions and markets.

Money markets are the markets for *short-term* debt securities (those with maturities of less than one year). Examples of money market securities include U.S. Treasury bills, commercial paper, and negotiable certificates of deposit issued by government, business, and financial institutions. Federal funds borrowings between banks, bank borrowings from the Federal Reserve Bank, and various types of repurchase agreements are also elements of the money market. These instruments have in common safety and liquidity. The money market, which operates through dealers, money center banks, and the New York Federal Reserve Bank, represents an outlet for both shortages and surpluses of liquidity, including those due to fluctuations in business.

Capital markets are the markets for long-term debt (that with a maturity of more than year) and corporate stocks. The New York Stock Exchange, which handles the stocks of many large corporations, is a prime example of a capital market. The American Stock Exchange and the regional stock exchanges are other examples. In addition, securities are traded by thousands of brokers and dealers over-the-counter, a term used to denote all buying and selling activities in securities that do not occur in an organized stock exchange.

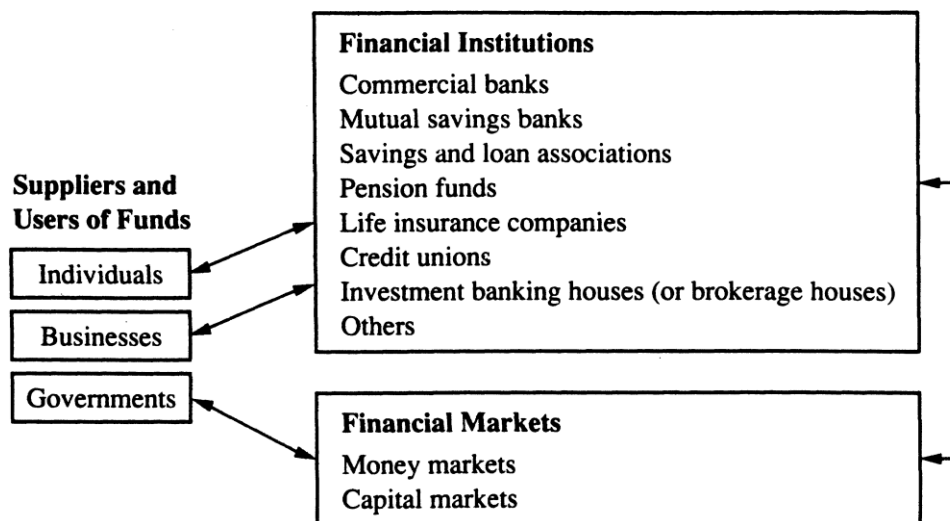
In the capital market, a distinction is made between the primary market, where new issues of securities are traded, and the secondary market, where previously issued securities are traded. The primary market is a source of new securities for the secondary market.

In practice, the boundaries between the money markets and capital markets are blurred, because most financial instruments deal with both kinds of financial instruments, both short and long term. In addition, revolving short-term loans become long-term loans in practice.

The financial manager has responsibility for obtaining funds and allocating them among alternative projects and specific uses, such as inventories and equipment. He or she must manage the cash flow cycle, make payments for expenses and the purchases of capital goods, and sell products and services to obtain cash inflows. In the management of cash flows, some cash is recycled and some is returned to financing sources as debt payment.

Financial market issues, including government regulation, are more fully discussed in Chapters 14 and 15.

FIGURE 1-3
GENERAL FLOW OF FUNDS AMONG FINANCIAL INSTITUTIONS
AND FINANCIAL MARKETS



CORPORATIONS

A corporation is a legal entity that exist apart from its owners (stockholders). Ownership is evidenced by possession of shares of stock. Among the various forms of business organization, the corporation, while not the most numerous, is the most important in total shares, assets, profits, and contribution to national income. In this course, our discussion applies to the corporate form of organization.

The advantages of corporations are:

- They have unlimited life.
- They carry only a limited liability for its owners. If the company fails, stockholders lose only what they invested.
- Ownership is easily transferred through the sale of stock
- They have the ability to raise large amounts of capital.
- They are professionally managed.
- Contracts can be entered into in the corporate name.

Disadvantages of corporations include the following:

- They are difficult and expensive to establish; a formal charter is required.
- They are subject to double taxation on earnings and dividends paid to stockholders.
- They are liable for state franchise taxes.
- They are subject to governmental regulations.
- They lack confidentiality because public disclosure of information is required.

Subchapter S Corporation

It is a form of corporation whose stockholders are taxed as partners. However, unlike a partnership, shareholders cannot receive allocations disproportionate to their interests. To qualify as an S corporation, the following is necessary:

- a. A corporation cannot have more than seventy-five shareholders.
- b. It cannot have any nonresident foreigners as shareholders.
- c. It cannot have more than one class of stock.
- d. It must properly elect Subchapter S status.

The S corporation can distribute its income directly to shareholders and avoid the corporate income tax while enjoying the other advantages of the corporate form.

CONCLUSION

Chapter 1 discussed the functions of finance, the environment in which finance operates, and how you fit into the corporate structure. The financial functions of the business involves recordkeeping, performance evaluation, variance analysis, budgeting, and utilization of resources. The financial manager must comprehend the goals, procedures, techniques, yardsticks, and functions of finance in order to perform his or her duties; a lack of knowledge of finance not only leads to incorrect analysis and decisions but also jeopardizes your future in the

organization. Without a good understanding of finance and accounting, you lack the tools needed for effective financial decision making. Decisions that make sense in terms of marketing and sales must also make financial sense; you must have the background to give sound input into the decision-making process.

CHAPTER 2

FINANCIAL STATEMENTS AND CASH FLOW

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Read and interpret the basic financial statements: the balance sheet, income statement, and statement of cash flows.
- Explain how the balance sheet portrays a company's financial position.
- Describe how the income statement reveals the entity's operating performance .
- Determine and assess a company's cash inflows and cash outflows.
- Outline the many types of accounts that may exist in the accounting system.
- Explain what the annual report is and read and list its components, including the financial statements, footnotes, review of operations, auditor's report, and supplementary schedules
- Describe what management's discussion and analysis (MD&A) involves.
- Summarize how the Sarbanes-Oxley 404 reporting differs from traditional reporting.

Knowing the financial health of your company is important. Such knowledge can help you allocate resources and pinpoint areas requiring development and problems needing correction. Do you know how your company is doing financially? Is it growing or contracting? Will it be around for a long time? How profitable is your department, and what can be done to improve the profitability picture? These questions and others can be answered if you understand corporate financial statements. On the other hand, if you do not know how your company is doing financially, you cannot provide the needed financial leadership.

This chapter looks at the corporate *annual report* that contains the key financial statements. These financial statements are the only financial information outsiders are likely to see. Other contents of the annual report, such as management discussion and analysis (MD&A) and audit reports are also discussed. The Sarbanes-Oxley 404 reporting requirements are also explained.

WHAT AND WHY OF FINANCIAL STATEMENTS

Financial decisions are typically based on information generated from the accounting system. Financial management, stockholders, potential investors, and creditors are concerned with how well the company is doing. The three reports generated by the accounting system and included in the company's annual report are the *balance sheet*, *income statement*, and *statement of cash flows*. Although the form of these financial statements may vary among different businesses or other economic units, their basic purposes do not change.

The balance sheet portrays the financial position of the organization at a particular point in time. It shows what you own (assets), how much you owe to vendors and lenders (liabilities), and what is left (assets minus liabilities, known as equity or net worth). A balance sheet is a

snapshot of the company's financial position as of a certain date. The balance sheet equation can be stated as: Assets - Liabilities = Stockholders' Equity.

The income statement, on the other hand, measures the operating performance for a specified period of time (e.g., for the year ended December 31, 20X1). If the balance sheet is a snapshot, the income statement is a motion picture. The income statement serves as the bridge between two consecutive balance sheets. Simply put, the balance sheet indicates the wealth of your company and the income statement tells you how your company did last year.

The balance sheet and the income statement tell different things about your company. For example, the fact the company made a big profit last year does not necessarily mean it is liquid (has the ability to pay current liabilities using current assets) or solvent (noncurrent assets are enough to meet noncurrent liabilities). (Liquidity and solvency are discussed in detail in Chapter 3.) A company may have reported a significant net income but still have a deficient net worth. In other words, to find out how your organization is doing, you need both statements. The income statement summarizes your company's operating results for the accounting period; these results are reflected in the equity (net worth) on the balance sheet. This relationship is shown in Figure 2-1. The third basic financial statement is the statement of cash flows. This statement provides useful information about the inflows and outflows of cash that cannot be found in the balance sheet and the income statement.

FIGURE 2-1
THE BALANCE SHEET AND INCOME STATEMENT

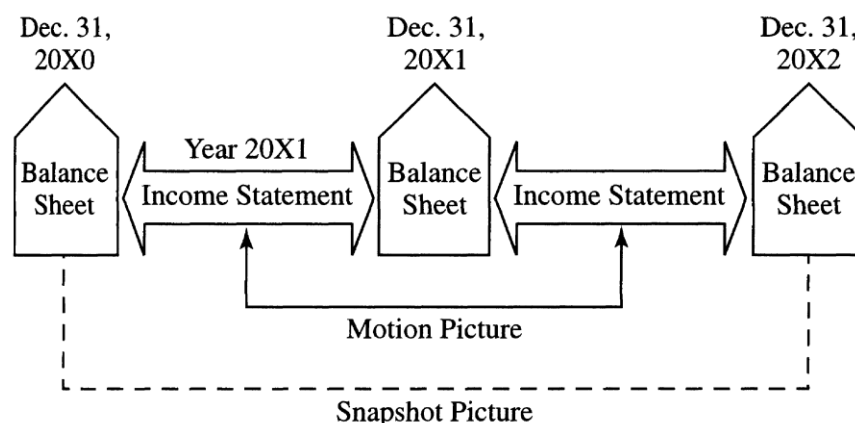
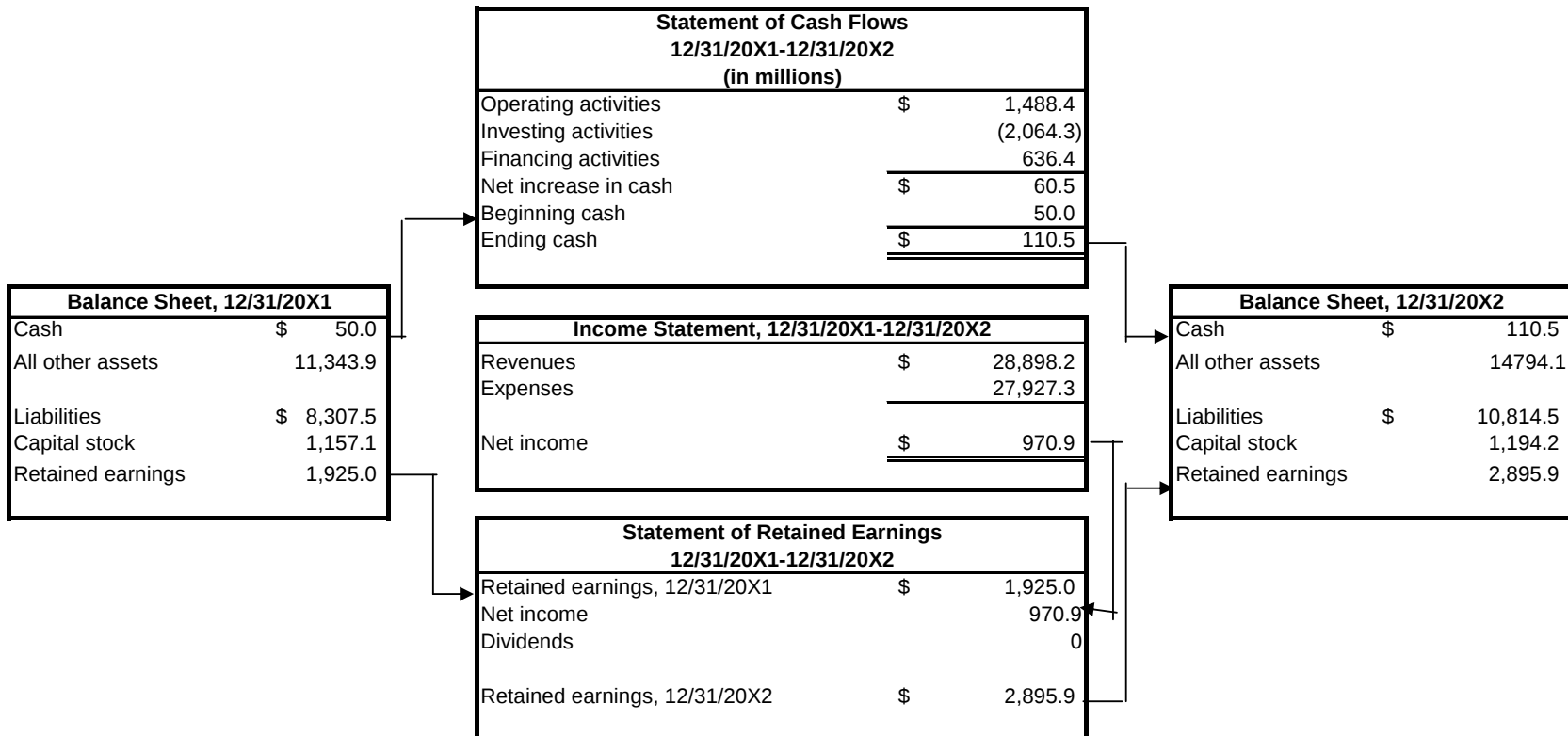


Figure 2-2 shows how these statements, including the statement of retained earnings (to be discussed later), tie together with numerical figures. *Note:* The beginning amount of cash (\$50 million) from the 20X1 balance sheet is added to the net increase or decrease in cash (from the statement of cash flows) to derive the cash balance (\$111 million) as reported on the 20X2 balance sheet. Similarly, the retained earnings balance as reported on the 20X2 balance sheet comes from the beginning retained earnings balance (20X1 balance sheet) plus net income for

the period (from the income statement) less dividends paid. As you study financial statements, these relationships will become clearer and you will understand the concept of articulation better.

FIGURE 2-2
HOW THE FINANCIAL STATEMENTS TIE TOGETHER



MORE ON THE INCOME STATEMENT

The income statement (profit and loss statement) shows the revenue, expenses, and net income (or net loss) for a period of time. A definition of each element follows.

Revenue is the increase in capital arising from the sale of merchandise or the performance of services. When revenue is earned, it results in an increase in either cash (money received) or accounts receivable (amounts owed to you by customers).

Expenses decrease capital and result from performing activities necessary to generate revenue. Expenses that reduce revenue can be categorized as the cost of goods sold and selling and general administrative expenditures necessary to conduct business operations (e.g., rent expense, salary expense, depreciation expense) during the period. (Depreciation is discussed in Chapter 10.)

Net income is the amount by which total revenue exceeds total expenses. The resulting profit is added to the *retained earnings* account (accumulated earnings of a company since its inception less dividends). If total expenses are greater than total revenue, a net loss results, decreasing retained earnings.

Revenue does not necessarily mean receipt of cash, and expense does not automatically imply a cash payment. Net income and net cash flow (cash receipts less cash payments) are different. For example, taking out a bank loan generates cash, but this cash is not revenue since no merchandise has been sold and no services have been provided. Further, owners' equity does not change as the loan represents a liability, rather than a stockholders' investment, and must be repaid.

Each revenue and expense item has its own account. Such a system enables you to better evaluate and control revenue and expense sources and to examine the relationships among account categories.

CLASSIFIED FINANCIAL STATEMENTS

Although companies differ in nature and therefore the specific transactions and accounts differ from business to business, it is useful to classify the entries in financial statements into major categories. Financial statements organized in such a fashion are called classified financial statements.

Classified Income Statement

In a *classified* income statement, each major revenue and expense function is listed separately to facilitate analysis. The entries in an income statement are usually classified into four major functions: revenue, cost of goods sold (cost of inventory sold), operating expenses, and other revenue or expenses. The entries in classified income statements covering different time periods are easily compared; the comparison over time of revenue sources, expense items, and the relationship between them can reveal areas that require attention and corrective action. For example, if revenue from services has been sharply declining over the past several months, you will want to know why and then take action to reverse the trend.

Revenue comprises the gross income generated by selling goods (sales) or performing services (professional fees, commission income). To determine *net* sales, gross sales are reduced by sales returns, allowances (discounts given for defective merchandise), and sales discounts.

Cost of goods sold is the cost of the merchandise or services sold. In a retail business, the cost of goods sold is the beginning inventory plus the cost of buying goods from the manufacturer minus ending inventory; in a service business, it is the cost of the employee services rendered. For a manufacturing company, cost of goods sold is the cost of goods manufactured plus the beginning finished goods inventory minus the ending finished goods inventory.

Operating expenses are expenses incurred or resources used in generating revenue. Two types of operating expenses are selling expenses and general and administrative expenses. *Selling expenses* are costs incurred in the sale of goods or services (e.g., advertising, salesperson salaries) and in distributing the merchandise (e.g., freight paid on shipments); they relate solely to the selling function. If a sales manager is responsible for generating sales, his or her performance is judged on the relationship between promotion costs and sales obtained. *General and administrative expenses* are the costs of running the business as a whole. The salaries of the office clerical staff, administrative executive salaries, and depreciation on office equipment are examples of general and administrative expenses.

Other revenue (expenses) covers incidental sources of revenue and expense that are *nonoperating* in nature and that do not relate to the major purpose of the business. Examples are interest income, dividend income, and interest expense.

Figure 2-3 shows a classified income statement.

FIGURE 2-3
A CLASSIFIED INCOME STATEMENT

X Company

Income Statement
for the Year Ended December 31, 20XX

Revenue		
Gross Sales		\$40,000
Less: Sales Returns and Allowances	\$1,000	
Sales Discounts	<u>500</u>	<u>1,500</u>
Net Sales		\$38,500
Cost of Goods Sold		
Inventory, January 1		\$ 1,000
Add: Purchases		<u>15,000</u>
Cost of Goods Available for Sale		\$16,000
Less: Inventory, December 31		<u>5,000</u>
Cost of Goods Sold		<u>11,000</u>
Gross Profit		\$27,500
Operating Expenses		
Selling Expenses		
Advertising	\$3,000	
Salespeople's Salaries	2,000	
Travel and Entertainment	1,000	
Depreciation on Delivery Truck	<u>500</u>	<u>6,500</u>
General and Administrative Expenses		
Officers' Salaries	\$4,000	
Depreciation	1,000	
Rent	2,000	
Insurance	<u>1,000</u>	<u>8,000</u>
Total Operating Expenses		<u>14,500</u>
Operating Income		\$13,000
Other Expenses (net)		
Interest Expense		\$2,000
Less: Interest Income	\$ 500	
Dividend Income	<u>1,000</u>	<u>1,500</u>
Other Expenses (net)		<u>500</u>
Net Income		<u><u>\$12,500</u></u>

Classified Balance Sheet

The balance sheet is classified into major groups of assets, liabilities, and owners' equity. An *asset* is something owned, such as land and automobile; a *liability* is something owed, such as loans payable and mortgage payable. Owners' equity is the residual interest remaining after assets have been reduced by liabilities.

Assets

A classified balance sheet generally breaks down assets into five categories: current assets, long-term investments, property, plant, and equipment (fixed assets), intangible assets, and deferred charges. This breakdown aids in analyzing the type and liquidity of the assets held.

Current assets are assets expected to be converted into cash or used up within *one year* or the normal operating cycle of the business, whichever is greater. (The operating cycle is the time period between the purchase of inventory merchandise for resale and the transfer of inventory through sales, listed as accounts receivable, or receipt of cash. In effect, the operating cycle takes you from paying cash to receiving it.) Examples of current assets are cash, short-term investments or short-term investments (investments with a maturity of more than 90 days but intended to be held only until cash is needed for current operations), accounts receivable, inventory, and prepaid expenses (expenditures that will expire within one year from the balance sheet date and that represent a prepayment for an expense that has not yet been incurred.)

Long-term investments refer to investments in other companies' stocks (common or preferred) or bonds where the *intent* is to hold them for a period greater than one year. Securities that may be held as short-term or long-term investments fall into three categories: held-to-maturity securities, trading securities, and available-for-sale securities. Trading securities are classified as *short-term investments*. Held-to-maturity securities and available-for-sale securities, depending on their length to maturity or management's intent to hold them, may be classified as either short-term or long-term investments.

Property, plant, and equipment (often called fixed assets) are assets employed in the production of goods or services that have a life greater than one year. They are *tangible*, meaning they have physical substance (you can physically see and touch them) and are actually being used in the course of business. Examples are land, buildings, machinery, and automobiles. Unlike inventory, these assets are not held for sale in the normal course of business.

Intangible assets are assets with a long-term life that lack physical substance and that arise from a right granted by the government, such as patents, copyrights, and trademarks, or by another company, such as a franchise license. An example of the latter is the right (acquired by paying a fee) to open a fast food franchise and use the name of McDonald's.

Deferred charges are certain expenditures that have already been incurred but that are deferred to the future either because they are expected to benefit future revenues or because they represent an appropriate allocation of costs to future operations. In other words, deferred charges are costs charged to an asset because future benefit exists; they are amortized as an expense in the year the related revenue is recognized and the benefit consumed in conformity with the accounting principle requiring matching of expense to revenue. Examples are plant

rearrangement costs and moving costs. No cash can be realized from such assets; for example, you cannot sell deferred moving costs to anyone because no one will buy them.

Liabilities and Stockholders' Equity

Liabilities are classified as either current or noncurrent. *Current liabilities* (those due in one year or less) will be satisfied out of current assets. Examples are accounts payable (amounts owed to creditors), short-term notes payable (written evidence of loans due within one year), and accrued expense liabilities (e.g., salaries payable).

Examples of *long-term liabilities*, which have a maturity of greater than one year, are bonds payable and mortgage payable. The current portion of a long-term liability (that part that is to be paid within one year) is shown under current liabilities. For example, if \$1,000 of a \$10,000 mortgage is to be paid within the year, that \$1,000 is listed as a current liability; the remaining \$9,000 is shown under noncurrent liabilities. The stockholders' equity section of the balance sheet consists of capital stock, paid-in-capital, retained earnings, and total stockholders' equity. These are defined below.

Capital stock describes the ownership of the corporation in terms of the number of shares outstanding. Each share is assigned a par value when it is first authorized by the state in which the business is incorporated. Capital stock is presented on the balance sheet at total par value. Therefore, the capital stock account, which is at *par value*, agrees with the stock certificates (imprinted with the par value) held by stockholders. Preferred stock is listed before common stock because it receives preference should the company be liquidated.

Paid-in capital shows the amount received by the company over the par value for the stock issued. This helps keep track of the par value of issued shares and the excess over par value paid for it.

Retained earnings represent the accumulated earnings of the company since its inception less dividends declared and paid to stockholders. There is usually a surplus in this account, but a deficit may occur if the business has been operating at a loss.

Total stockholders' equity is the sum of capital stock, paid-in capital, and retained earnings. In a corporation, owners' equity is referred to as stockholders' equity; in a sole proprietorship or partnership, owners' equity is referred to as capital.

A classified balance sheet is presented in Figure 2-4.

FIGURE 2-4
A CLASSIFIED BALANCE SHEET

X Company
Balance Sheet
December 31, 20XX

ASSETS	
Current Assets	
Cash	\$3,000
Marketable Securities	1,000
Accounts Receivable	6,000
Inventory	<u>5,000</u>
Total Current Assets	\$15,000
Long-Term Investments	
Investment in Y Company Stock	2,000
Property, Plant, and Equipment	
Land	\$20,000
Building (less accumulated depreciation)	30,000
Machinery (less accumulated depreciation)	7,000
Delivery Trucks (less accumulated depreciation)	<u>5,000</u>
Total Property, Plant, and Equipment	62,000
Intangible Assets	
Patents (less accumulated amortization)	3,000
Deferred Charges	
Deferred Moving Costs	<u>1,000</u>
Total Assets	<u><u>\$83,000</u></u>
LIABILITIES AND STOCKHOLDERS' EQUITY	
Current Liabilities	
Accounts Payable	\$8,000
Notes Payable (9 months)	4,000
Accrued Expense Liabilities	<u>2,000</u>
Total Current Liabilities	\$14,000
Noncurrent Liabilities	
Bonds Payable	<u>30,000</u>
Total Liabilities	\$44,000
Stockholders' Equity	
Capital Stock	\$20,000
Paid-in Capital	4,000
Retained Earnings*	<u>15,000</u>
Total Stockholders' Equity	<u>39,000</u>
Total Liabilities and Stockholders' Equity	<u><u>\$83,000</u></u>

* A schedule of retained earnings follows:

Retained earnings—January 1	\$10,000
Net income	12,500
Dividends	(7,500)
Retained earnings—December 31	<u>\$15,000</u>

STATEMENT OF CASH FLOWS

It is important to know your cash flow so that you may adequately plan your expenditures. Should there be a cut back on payments because of a cash problem? Is the organization getting most of your cash? What products or projects are cash drains or cash cows? Is there enough money to pay bills and buy needed machinery?

A company is required to prepare a statement of cash flows in its annual report. It contains useful information for external users, such as lenders and investors, who make economic decisions about a company. The statement presents the sources and uses of cash and is a basis for cash flow analysis. In this section, we discuss what the statement of cash flows is, how it looks, and how to analyze it.

CONTENTS OF THE STATEMENT OF CASH FLOWS

The statement of cash flows classifies cash receipts and cash payments arising from investing activities, financing activities, and operating activities.

Investing Activities

Investing activities include the results of the purchase or sale of debt and equity securities of other entities and fixed assets. Cash inflows from investing activities are comprised of (1) receipts from sales of equity and debt securities of other companies and (2) amounts received from the sale of fixed assets. Cash outflows for investing activities include (1) payments to buy equity or debt securities of other companies and (2) payments to buy fixed assets.

Financing Activities

Financing activities include the issuance of stock and the reacquisition of previously issued shares (treasury stock), as well as the payment of dividends to stockholders. Also included are debt financing and repayment. Cash inflows from financing activities are comprised of funds received from the sale of stock and the incurrence of debt. Cash outflows for financing activities include (1) repaying debt, (2) repurchasing of stock, and (3) issuing dividend payments.

Operating Activities

Operating activities are connected to the manufacture and sale of goods or the rendering of services. Cash inflows from operating activities include (1) cash sales or collections on receivable arising from the initial sale of merchandise or rendering of service and (2) cash receipts from debt securities (e.g., interest income) or equity securities (e.g., dividend income) of other entities. Cash outflows for operating activities include (1) cash paid for raw material or merchandise intended for resale, (2) payments on accounts payable arising from the initial purchase of goods, (3) payments to suppliers of operating expense items (e.g., office supplies, advertising, insurance), and (4) wages. Figure 2-5 shows an outline of the statement of cash flows.

FIGURE 2-5
THE STATEMENT OF CASH FLOWS

*FORMAT OF THE STATEMENT OF
CASH FLOWS
(INDIRECT METHOD)*

Net cash flow from operating activities:		
Net income	\$980,000	
Adjustments for noncash expenses, revenues, losses, and gains included in income:		
Depreciation	<u>20,000</u>	
Net cash flow from operating activities		\$1,000,000
Cash flows from investing activities:		
Purchase machinery	\$(630,000)	
Investments in other companies' stocks	(70,000)	
Sale of land	<u>200,000</u>	
Net cash flows provided (used) by investing activities		(500,000)
Cash flows from financing activities:		
Issuance of common stock	\$ 400,000	
Issuance of bonds payable	100,000	
Payment on long-term mortgage payable	(160,000)	
Payment of dividends	<u>(40,000)</u>	
Net cash provided (used) by financing activities		<u>300,000</u>
Net increase (decrease) in cash		<u><u>\$800,000</u></u>
Schedule of noncash investing and financing activities:		
Issuance of preferred stock for building		\$180,000
Conversion of bonds payable to common stock		100,000

CASH FLOW ANALYSIS

Along with financial ratio analysis (discussed in Chapter 3), cash flow analysis is a valuable tool. The cash flow statement provides information on how your company generated and used cash, that is, why cash flow increased or decreased. An analysis of the statement is helpful in appraising past performance, projecting the company's future direction, forecasting liquidity trends, and evaluating your company's ability to satisfy its debts at maturity. Because the statement lists the specific sources and uses of cash during the period, it can be used to answer the following:

- How was the expansion in plant and equipment financed?
- What use was made of net income?
- Where did you obtain funds?
- How much required capital is generated internally?
- Is the dividend policy in balance with its operating policy?
- How much debt was paid off?
- How much was received from the issuance of stock?
- How much debt financing was taken out?

The cash flow per share equals net cash flow divided by the number of shares. A high ratio is desirable because it indicates a liquid position, that is, that the company has ample cash on hand .

Operating Section

An analysis of the operating section of the statement of cash flows determines the adequacy of cash flow from operating activities. For example, an operating cash outlay for refunds given to customers for deficient goods indicates a quality problem with the merchandise, while payments of penalties, fines, and lawsuit damages reveal poor management practices that result in nonbeneficial expenditures.

Investing Section

An analysis of the investing section can identify investments in other companies. These investments may lead to an attempt to assume control of another company for purposes of diversification. The analysis may also indicate a change in future direction or a change in business philosophy.

An increase in fixed assets indicates capital expansion and future growth. A contraction in business arising from the sale of fixed assets without adequate replacement is a negative sign.

Financing Section

An evaluation of the financing section reveals the company's ability to obtain financing in the money and capital markets as well as its ability to meet obligations. The financial mixture of bonds, long-term loans from banks, and equity instruments affects risk and the cost of financing. Debt financing carries greater risk because the company must generate adequate funds to pay the interest costs and to retire the obligation at maturity; thus, a very high percent of debt to equity is generally not advisable. The problem is acute if earnings and cash flow are declining. On the other hand, reducing long-term debt is desirable because it points to lowered risk.

The ability to obtain financing through the issuance of common stock at attractive terms (high stock price) indicates that the investing public is optimistic about the financial well-being of the business. The issuance of preferred stock may be a negative sign, since it may mean the company is having difficulty selling its common stock. Perhaps investors view the company as very risky and will invest only in preferred stock since preferred stock has a preference over common stock in the event of the company's liquidation. Evaluate the company's ability to pay dividends. Stockholders who rely on a fixed income, such as a retired couple, may be unhappy when dividends are cut or eliminated.

PREPARING AND ANALYZING THE STATEMENT OF CASH FLOWS

In this section, we do an analysis of a hypothetical statement of cash flows, prepared from sample balance sheet and income statement figures.

EXAMPLE 2-1 X Company provides the following financial statements:

X Company		
Comparative Balance Sheets		
December 31		
(in millions)		
ASSETS	20X1	20X0
Cash	\$ 40	\$ 47
Accounts receivable	30	35
Prepaid expenses	4	2
Land	50	35
Building	100	80
Accumulated depreciation	(9)	(6)
Equipment	50	42
Accumulated depreciation	(11)	(7)
Total assets	<u>\$254</u>	<u>\$228</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Accounts payable	\$ 20	\$ 16
Long-term notes payable	30	20
Common stock	100	100
Retained earnings	<u>104</u>	<u>92</u>
Total liabilities and stockholders' equity	<u>\$254</u>	<u>\$228</u>

X Company
Income Statement
for the Year Ended December 31, 20X1
(in millions)

Revenue	\$300
Operating expenses (excluding depreciation)	\$200
Depreciation	<u>7</u>
Income from operations	\$ 93
Income tax expense	<u>32</u>
Net income	<u>\$ 61</u>

X Company
Statement of Cash Flows
for the Year Ended December 31, 20X1
(in millions)

Operating activities:		
Net income		\$61
Adjustments to reconcile net income to cash provided by operating activities:		
Depreciation	\$ 7	
Changes in operating assets and liabilities:		
Decrease in accounts receivable	5	
Increase in prepaid items	(2)	
Increase in accounts payable	<u>4</u>	
Cash provided by operating activities		75
Cash flow from investing activities		
Purchase of land	(\$15)	
Purchase of building	(20)	
Purchase of equipment	(8)	(43)
Cash flow from financing activities		
Issuance of long-term notes payable	\$10	
Payment of cash dividends	(49)	(39)
Net decrease in cash		<u>\$ 7</u>

Assume the company has a policy of paying very high dividends.

Information for 20X0 follows: Net income, \$32; cash flow from operations, \$20.

A financial analysis of the statement of cash flows reveals that the profitability and operating cash flow of X Company improved from 20X0 to 20X1. The company's earnings performance was good, and the \$61 earnings resulted in cash inflow from operations of \$75. Thus, compared to 20X0, 20X1 showed better results.

The decrease in accounts receivable may reveal better collection efforts. The increase in accounts payable is a sign that suppliers are confident they will be paid and are willing to give interest-free financing. The acquisition of land, building, and equipment points to a growing business undertaking capital expansion. The issuance of long-term notes payable indicates that the company is financing part of its assets through debt. Stockholders will be happy with the significant dividend payout of 80.3 percent (dividends divided by net income, or \$49/\$61). Overall, there was a decrease in cash on hand of \$7, but this should not cause alarm because of the company's profitability and the fact that cash was used for capital expansion and dividend payments. We recommend that the dividend payout be reduced from its high level and that the funds be reinvested in the business; the reduction of dividends by more than \$7 would result in a positive net cash flow for the year, which is needed for immediate liquidity.

EXAMPLE 2-2 Y Company presents the following statement of cash flows.

Y Company
Statement of Cash Flows
for the Year Ended December 31, 20X0

Operating activities:		
Net income		\$134,000
Adjustments to reconcile net income to cash provided by operating activities:		
Depreciation	\$21,000	
Changes in operating assets and liabilities:		
Decrease in accounts receivable	10,000	
Increase in prepaid items	(6,000)	
Increase in accounts payable	35,000	60,000
Cash provided by operating activities		\$194,000
Cash flows from investing activities		
Purchase of land	(\$70,000)	
Purchase of building	(200,000)	
Purchase of equipment	(68,000)	
Cash used by investing activities		(338,000)
Cash flows from financing activities		
Issuance of bonds	150,000	
Payment of cash dividends	(18,000)	
Cash provided by financing activities		132,000
Net decrease in cash		<u><u>\$(12,000)</u></u>

An analysis of the statement of cash flows reveals that the company is profitable and that cash flow from operating activities exceeds net income, which indicates good internal cash generation. The ratio of cash flow from operating activities to net income is a solid 1.45 (\$194,000/\$134,000). A high ratio is desirable because it shows that earnings are backed up by cash. The decline in accounts receivable may indicate better collection efforts; the increase in accounts payable shows the company can obtain interest-free financing. The company is definitely in the process of expanding for future growth, as demonstrated by the purchase of land, building, and equipment. The debt position of the company has increased, indicating greater risk for investors. The dividend payout was 13.4 percent (\$18,000/\$134,000), which is good news for stockholders, who look positively on companies that pay dividends. The decrease of \$12,000 in cash flow for the year is a negative sign.

STATEMENT OF CASH FLOWS AND CORPORATE PLANNING

Current profitability is only one important factor in predicting corporate success; current and future cash flows are also essential. In fact, it is possible for a profitable company to have a cash crisis; for example, a company with significant credit sales but a very long collection period may show a profit without actually having the cash from those sales.

Financial managers are responsible for planning how and when cash will be used and obtained. When planned expenditures require more cash than planned activities are likely to produce, financial managers must decide what to do. They may decide to obtain debt or equity funds or to dispose of some fixed assets or a whole business segment. Alternatively, they may decide to cut back on planned activities by modifying operational plans, such as ending a special

advertising campaign or delaying new acquisitions, or to revise planned payments to financing sources, such as bondholders or stockholders. Whatever is decided, the financial manager's goal is to balance the cash available and the needs for cash over both the short and the long term.

Evaluating the statement of cash flows is essential if you are to appraise accurately an entity's cash flows from operating, investing, and financing activities and its liquidity and solvency positions. Inadequacy in cash flow has possible serious implications, including declining profitability, greater financial risk, and even possible bankruptcy.

OTHER SECTIONS OF THE ANNUAL REPORT

Other sections in the annual report in addition to the financial statements are helpful in understanding the company's financial health. These sections include the highlights, review of operations, footnotes, supplementary schedules, auditor's report, and management discussion and analysis (MD&A).

Highlights

The highlights section provides comparative financial statement information and covers important points such as profitability, sales, dividends, market price of stock, and asset acquisitions. At a minimum, the company provides sales, net income, and earnings per share figures for the last two years.

Review of Operations

The review of operations section discusses the company's products, services, facilities, and future directions in both numbers and narrative form.

AUDITOR'S REPORT

The independent accountant is a certified public accountant (CPA) in public practice who has no financial or other interest in the client whose financial statements are being examined. In this part of the annual report, he or she expresses an opinion on the fairness of the financial statement numbers.

CPAs render four types of audit opinions: an unqualified opinion, a qualified opinion, a disclaimer of opinion, and an adverse opinion. The auditor's opinion is heavily relied on since he or she is knowledgeable, objective, and independent.

Unqualified Opinion. An unqualified opinion means the CPA is satisfied that the company's financial statements present fairly its financial position and results of operations and gives the financial manager confidence that the financial statements are an accurate reflection of the company's financial health and operating performance.

A typical standard report presenting an unqualified opinion follows.

Independent Auditor's Report

Board of Directors and Shareholders:

We have audited the accompanying Consolidated Balance Sheet of PepsiCo, Inc. and Subsidiaries as of December 25, 2004 and December 27, 2003 and the related Consolidated Statements of Income, Cash Flows and Common Shareholders' Equity for each of the years in the three-year period ended December 25, 2004. We have also audited management's assessment, included in the accompanying Management's Report on Internal Control over Financial Reporting, that PepsiCo, Inc. and Subsidiaries maintained effective internal control over financial reporting as of December 25, 2004, based on criteria established in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). PepsiCo, Inc.'s management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting. Our responsibility is to express an opinion on these consolidated financial statements, an opinion on management's assessment, and an opinion on the effectiveness of PepsiCo, Inc.'s internal control over financial reporting based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audit of financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, evaluating management's assessment, testing and evaluating the design and operating effectiveness of internal control, and performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

If the company is facing a situation with an uncertain outcome that may substantially affect its financial health, such as a lawsuit, the CPA may still give an unqualified opinion. However, there will probably be an explanatory paragraph describing the material uncertainty; this uncertainty will undoubtedly affect readers' opinions of the financial statement information. As a financial manager, you are well advised to note the contingency (potential problem, such as a dispute with the government) and its possible adverse financial effects on the company.

Qualified Opinion. The CPA may issue a qualified opinion if your company has placed a "scope limitation" on his or her work. A scope limitation prevents the independent auditor from doing one or more of the following: (1) gathering enough evidential matter to permit the expression of an unqualified opinion; (2) applying a required auditing procedure; or (3) applying one or more auditing procedures considered necessary under the circumstances.

If the scope limitation is fairly minor, the CPA may issue an "except for" qualified opinion. This may occur, for example, if the auditor is unable to confirm accounts receivable or observe inventory.

Disclaimer of Opinion. When a severe scope limitation exists, the auditor may decide to offer a disclaimer of opinion. A disclaimer indicates that the auditor was unable to form an opinion on the fairness of the financial statements.

Adverse Opinion. The auditor may issue an adverse opinion when the financial statements do *not* present the company's financial position, results of operations, retained earnings, and cash flows fairly and in conformity with generally accepted accounting principles. By issuing an adverse opinion, the CPA is stating that the financial statements may be misleading.

Obviously, the financial manager wants the independent auditor to render an unqualified opinion. Disclaimers and adverse opinions are viewed very negatively by readers such as investors and creditors, who then put little if any faith in the company's financial statements.

Note: Management has the responsibility to adopt sound accounting policies and to establish and maintain internal controls that will record, process, summarize, and report transactions, events, and conditions consistent with the assertions in the financial statements. The fairness of the representations made therein is the responsibility of management alone because the transactions and the related assets, liabilities, and equity reflected are within management's direct knowledge and control.

NOTES TO THE FINANCIAL STATEMENTS (FOOTNOTES)

Notes to the financial statements, or footnotes for short, are the means of amplifying or explaining the items presented in the main body of the statements. Financial statements themselves are concise and condensed, and any explanatory information that cannot readily be abbreviated is added in greater detail in the footnotes. In such cases, the report contains a statement similar to this: "The accompanying footnotes are an integral part of the financial statements."

Footnotes provide detailed information on financial statement figures, accounting policies, explanatory data such as mergers and stock options, and any additional disclosure.

Footnote disclosures usually include accounting methods, estimated figures such as pension fund, and profit-sharing arrangements, terms and characteristics of long-term debt, particulars of lease agreements, contingencies, and tax matters. The Summary of Significant Accounting Policies answers such questions as: What method of depreciation is used on plant assets? What valuation method is employed on inventories? What amortization policy is followed in regard to intangible assets? How are marketing costs handled for financial reporting purposes?

The footnotes appear at the end of the financial statements and explain the figures in those statements both in narrative form and in numbers. It is essential that the financial manager evaluate footnote information to arrive at an informed opinion about the company's financial stature and earning potential.

Supplementary Schedules and Tables

Supplementary schedules and tables enhance the financial manager's comprehension of the company's financial position. Some of the more common schedules are five-year summary of operations, two-year quarterly data, and segmental information. This summary provides income statement information for the past five years, including dividends on preferred stock and common stock. It also reveals operating trends. Some companies provide ten-year comparative data.

Two-Year Quarterly Data. This schedule gives a quarterly breakdown of sales, profit, high and low stock price, and the common stock dividend. Quarterly operating information is particularly useful for a seasonal business, because it helps readers to track the business's highs and lows more accurately. The quarterly market price reveals fluctuations in the market price of stock, while the dividend quarterly information reveals how regularly the company pays dividends.

Segmental Disclosure. This important supplementary schedule presents financial figures for the segments of the business, enabling readers to evaluate each segment's profit potential and risk. Segmental data may be organized by industry, foreign area, major customer, or government contract.

A segment is reportable if any *one* of the following conditions exists:

- Revenue is 10 percent or more of total corporate revenue.
- Operating profit is 10 percent or more of total corporate operating profit.
- Identifiable assets are 10 percent or more of total corporate assets.

The company must also disclose if foreign operations, sales to a major customer, or domestic contract revenue provide 10 percent or more of total sales. The percentage derived and the source of the sales must be stated.

Useful segment information that may be disclosed includes sales, operating profit, total assets, fixed assets, intangible assets, inventory, cost of sales, depreciation, and amortization.

Figure 2-6 presents a sample segmented income statement.

FIGURE 2-6 SEGMENTED INCOME STATEMENT

OFFICE EQUIPMENT AND AUTO PARTS COMPANY INCOME STATEMENT DATA (IN MILLIONS)			
	<u>Consolidated</u>	<u>Office Equipment</u>	<u>Auto Parts</u>
Net sales	<u>\$78.8</u>	<u>\$18.0</u>	<u>\$60.8</u>
Manufacturing costs			
Inventories, beginning	12.3	4.0	8.3
Materials and services	38.9	10.8	28.1
Wages	12.9	3.8	9.1
Inventories, ending	<u>(13.3)</u>	<u>(3.9)</u>	<u>(9.4)</u>
	50.8	14.7	36.1
Selling and administrative expense	<u>12.1</u>	<u>1.6</u>	<u>10.5</u>
Total operating expenses	<u>62.9</u>	<u>16.3</u>	<u>46.6</u>
Income before taxes	15.9	1.7	14.2
Income taxes	<u>(9.3)</u>	<u>(1.0)</u>	<u>(8.3)</u>
Net income	<u>\$ 6.6</u>	<u>\$ 0.7</u>	<u>\$ 5.9</u>

History of Market Price

While this information is optional, many companies provide a brief history of the market price of stock, such as quarterly highs and lows. This information reveals the variability and direction in market price of stock.

HOW TO READ A QUARTERLY REPORT

In addition to the annual report, publicly-held companies issue quarterly reports that provide updated information on sales and earnings and describe any material¹ changes that have occurred in the business or its operations. These quarterly reports may provide unaudited financial statements or updates on operating highlights, changes in outstanding shares, compliance with debt restrictions, and pending lawsuits.

At a minimum, quarterly reports must provide data on sales, net income, taxes, nonrecurring revenue and expenses, accounting changes, contingencies (e.g., tax disputes), additions or deletions of business segments, and material changes in financial position.

The company may provide financial figures for the quarter itself (e.g., the third quarter, from July 1 to September 30) or cumulatively from the beginning of the year (cumulative up to the third quarter, or January 1 to September 30). Prior-year data must be provided in a form that allows for comparisons. The financial manager should read the quarterly report in conjunction with the annual report.

¹ The Securities and Exchange Commission defines materiality as a change in an account of 10 percent or more relative to the prior year. However, many CPA firms use 5 percent as a materiality guideline.

SEC REPORTING REQUIREMENTS — INTEGRATED DISCLOSURE SYSTEM

The SEC adopted the Integrated Disclosure System, which requires the Basic Information Package (BIP).

The BIP consists of the following:

- Audited balance sheets for the last two years and audited statements of income, retained earnings, and cash flows for the most recent three years.
- A five-year summary containing certain selected financial data.
- Management's discussion and analysis (MD&A) of the entity's financial condition and results of operations.

S FORMS

Form S-1 Form S-1 is normally used by any entity that desires to issue a public offering and that has been subject to the SEC reporting requirements for less than three years. Some of the more common items required to be disclosed in Form S-1 are:

- A synopsis of the business, including relevant industry and segment information, cash flows, liquidity, and capital resources.
- A listing of properties and risk factors.
- Background and financial information pertaining to the entity's directors and officers, including pending litigation involving management, and compensation arrangements.
- A description of the securities being registered.
- Identification of major underwriters.

Form S-1 also requires the disclosure of a five-year summary of selected financial data, which need not be audited by the independent certified public accountant. The data to be presented include the following items:

- Net sales or revenues.
- Total income or loss from continuing operations.
- Per-share income or loss from continuing operations.
- Total assets of the entity.
- Long-term debt, including capital leases and redeemable preferred stock.
- Declared cash dividends on a per-common-share basis.
- Disagreements with the independent certified public accounting firm.

S-1 is presented in textual form in two parts: the first is the prospectus, and the second contains supplementary and procedural information.

Form S-2 Form S-2 is a short form normally used by issuers that have been reporting to the SEC for at least three years but have voting stock held by nonaffiliates of less than \$150 million. If an entity elects to deliver to its shareholders its latest annual report along with its prospectus, information can be incorporated by reference from the annual report into the prospectus. Information that may be incorporated by reference includes (1) the most recent Form 10-K and (2) all reports submitted to the SEC after the end of the last year. If the annual report is not so

delivered, incorporation of information is not allowed and the information must be included in the prospectus. In addition, the latest Form 10-Q financial information must also be submitted.

Form S-3 Form S-3 may generally be used by a company that passes the “float test.” In other words, at least \$150 million of voting stock is owned by nonaffiliates. Form S-3 may also be used if the entity has a float of \$100 million accompanied by an annual trading volume of 3 million shares. Annual trading volume is the number of shares traded during a recurring 12-month period culminating within 60 days before the filing.

Form S-3 is an abbreviated form, because the public already has much of the information that would normally be required to be included. Accordingly, Form S-3 provides for incorporation by reference.

Form S-4 Form S-4 is applicable in registrations of securities in connection with such business combinations as mergers, consolidations, and asset acquisitions. Form S-4 also provides for incorporation by reference to the 1934 Act reports.

Form S-8 When registering securities to be offered to employees pursuant to an employee benefit plan, Form S-8 should be filed. Information presented in Form S-8 is normally limited to a description of the securities and the employee benefit plan. Disclosure is also made about the registrant, although this information is made available through other reports required by the 1934 Act.

Form S-18 A company whose objective is to raise capital of \$7.5 million or less may file a registration statement using Form S-18. Disclosures presented in Form S-18 are quite similar to those required in Form S-1. One difference between the two forms is that management’s discussion and analysis is not required. Additionally, only one year’s audited balance sheet and two years’ audited statements of income and cash flows are required.

MANAGEMENT'S DISCUSSION AND ANALYSIS (MD&A)

The Management's Discussion and Analysis (MD&A) section of an annual report must be included in SEC filings. The content of the MD&A section is required by regulations of the SEC. The MD&A contains standard financial statements and summarized financial data for at least 5 years. Other matters must be included in annual reports to shareholders and in Form 10-K filed with the SEC. It addresses in a nonquantified manner the prospects of the company. The SEC examines it with care to determine that management has disclosed material information affecting the company's future results.

To accomplish this, the following items must be disclosed:

- Liquidity.
- Capital resources.
- Results of operations.
- Positive and negative trends.
- Significant uncertainties.
- Events of an unusual or infrequent nature.
- Underlying causes of material changes in financial statement items.
- A narrative discussion of the material effects of inflation.

Forward-looking information (a forecast) is encouraged but not required. The SEC's *safe harbor rule* protects a company that issues an erroneous forecast if it is prepared on a reasonable basis and in good faith.

The information required by the SEC to be reported in Part II of Form 10-K and in the annual report includes a 5-year summary of selected financial data. If trends are relevant, management's discussion and analysis should emphasize the summary. Favorable and unfavorable trends and significant events and uncertainties should be identified. *Note:* The SEC has authority to regulate external financial reporting. Nevertheless, its traditional role has been to promote disclosure rather than to exercise its power to establish accounting recognition and measurement principles. Its objective is to allow the accounting profession (through the FASB) to establish principles and then to ensure that corporations abide by those principles. This approach allows investors to evaluate investments for themselves.

Figure 2-7 presents Eastman Kodak's MD&A.

FIGURE 2-7 **MANAGEMENT'S DISCUSSION AND ANALYSIS** **EASTMAN KODAK COMPANY**

Outlook

The Company expects 2002 to be another difficult economic year, with full year revenues level with 2001 and some earnings improvement in the second half of 2002. We do not expect to see any real upturn in the economy until 2003, with a very gradual return to consumer spending habits and behavior that will positively affect our business growth. The Company will continue to take actions to minimize the financial impact of this slowdown. These actions include efforts to better manage production and inventory levels and reduce capital spending, while at the same time reducing discretionary spending to further hold down costs. The Company will also complete the implementation of the restructuring programs announced in 2001 to make its operations more cost competitive and improve margins, particularly in its health imaging and consumer digital camera businesses.

During 2000, the Company completed an ongoing program of real estate divestitures and portfolio rationalization that contributed to other income (charges) reaching an annual average of \$100 million over the past three years. Now that this program is largely complete, the other income (charges) category is expected to run in the negative \$50 million to negative \$100 million range annually.

The Company expects its effective tax rate to approximate 29% in 2002. The lower rate is attributable to favorable tax benefits from the elimination of goodwill amortization and expected increased earnings from operations in certain lower-taxed jurisdictions outside the U.S.

From a liquidity and capital resource perspective, the Company expects to generate \$6 billion in cash flow after dividends during the next six years, with approximately \$400 million of this being achieved in 2002. This will enable the Company to maintain its dividend, pay down debt and make acquisitions that promote profitable growth. Cash flow is defined as net cash flows (after dividends), excluding the impacts from debt and transactions in the Company's own equity, such as stock repurchases and proceeds from the exercise of stock options.

THE SARBANES-OXLEY ACT

Section 404 of the Sarbanes-Oxley Act — "Enhanced Financial Disclosures, Management Assessment of Internal Control" — mandates sweeping changes. Section 404, in conjunction with the related SEC rules and Auditing Standard (AS) No. 5, An Audit of Internal Control Over Financial Reporting Performed in Conjunction with an Audit of Financial Statements (Auditing Standard No. 2), established by the Public Company Accounting Oversight Board (PCAOB), requires management of a public company and the company's independent auditor to issue two new reports at the end of every fiscal year. These reports must be included in the company's annual report filed with the Securities and Exchange Commission (SEC).

- *Management must report annually on the effectiveness of the company's internal control over financial reporting.*
- *In conjunction with the audit of the company's financial statements, the company's independent auditor must issue a report on internal control over financial reporting, which includes both an opinion on management's assessment and an opinion on the effectiveness of the company's internal control over financial reporting.*

In the past, a company's internal controls were considered in the context of planning the audit but were not required to be reported publicly, except in response to the SEC's Form 8-K requirements when related to a change in auditor. The new audit and reporting requirements have drastically changed the situation and have brought the concept of internal control over financial reporting to the forefront for audit committees, management, auditors, and users of financial statements.

The Auditing Standard No. 5 highlight the concept of a significant deficiency in internal control over financial reporting, and mandate that both management and the independent auditor must publicly report any material weaknesses in internal control over financial reporting that exist as of the fiscal year-end assessment date. Under both PCAOB Auditing Standard No. 2 and the SEC rules implementing Section 404, the existence of a single material weakness requires management and the independent auditor to conclude that internal control over financial reporting is not effective. The main features of the AS No. 5 are summarized later in the chapter.

5. How will the new reporting model differ from historical reporting?

In the past, the independent auditor provided an opinion on whether the company's financial statements were presented fairly in all material respects, in accordance with GAAP. The new reporting model maintains this historical requirement for the auditor to express an opinion on the financial statements. Section 404 also institutes additional requirements for management and the independent auditor to report on the effectiveness of internal control over financial reporting, as shown in the table below:

Historical Reporting

Independent auditor's opinion on 'whether the financial statements are presented fairly in all material respects, in accordance with GAAP

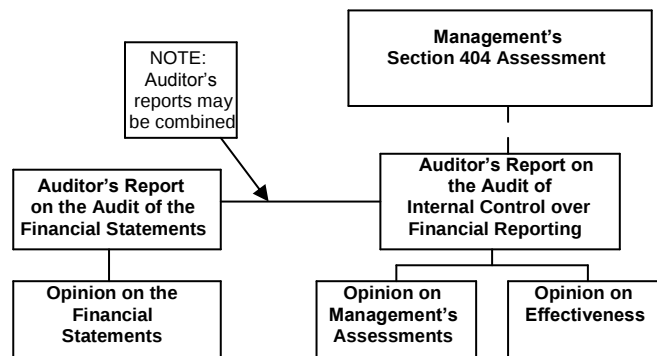
New Reporting

Management's report on its assessment of the effectiveness of the company's internal control over financial reporting

Independent auditor's report on internal control over financial reporting, including the auditor's opinions on: (1) whether management's assessment is fairly stated in all material respects (i.e., whether the auditor concurs with management's conclusions about the effectiveness of internal control, over financial reporting), and (2) the effectiveness of the company's internal control over financial reporting

The independent auditor's opinions on the financial statements and on internal control over financial reporting may be issued in a combined report or in separate reports. Figure 2-8 identifies the various reports, and reflects the fact that management's assessment of internal control over financial reporting constitutes the starting point for the auditor's reporting.

FIGURE 2-8
SECTION 404 REPORTING



What will management's report include?

Neither the SEC nor the PCAOB has issued a standard or illustrative management report on internal control over financial reporting; thus, there may be differences in the nature and extent of the information companies provide. We advise companies to consult with legal counsel on these matters. At a minimum, management's report on internal control over financial reporting should include the following information:

- *Statement of management's responsibility for establishing and maintaining adequate internal control over financial reporting.*
- *Statement identifying the framework used by management to evaluate the effectiveness of internal control over financial reporting.*

- *Management's assessment of the effectiveness of the company's internal control over financial reporting as of the end of the company's most recent fiscal year, including an explicit statement as to whether that internal control is effective and disclosing any material weaknesses identified by management in that control.*
- *Statement that the registered public accounting firm that audited the financial statements included in the annual report has issued an attestation report on management's internal control assessment.*

Management's report must indicate that internal control over financial reporting is either:

- **Effective** - *Internal control over financial reporting is effective (i.e., no material weaknesses in internal control over financial reporting existed as of the assessment date); or*
- **Ineffective** — *Internal control is not effective because one or more material weaknesses existed as of management's assessment date.*

Management is required to watch *whether or not* the company's internal control over financial reporting is effective. A negative assurance statement, such as "nothing has come to management's attention to suggest internal control is ineffective" is not acceptable. If a material weakness exists as of the assessment date, management is required to conclude that internal control over financial reporting is not effective and to disclose all material weaknesses that may have been identified. The SEC Chief Accountant has stated publicly that he expects management's report to disclose the nature of any material weakness in sufficient detail to enable investors and other financial statement users to understand the weakness and evaluate the circumstances underlying it.

Management may not express a qualified conclusion, such as stating that internal control is effective except to the extent certain problems have been identified. If management is unable to assess certain aspects of internal control that are material to overall control effectiveness, management must conclude that internal control over financial reporting is ineffective. Although management cannot issue a report with a scope limitation, under specific conditions newly acquired businesses or certain other consolidated entities may be excluded from the assessment.

Figure 2-9 shows PepsiCo.'s Management's Report on Internal Control over Financial Reporting.

CONCLUSION

The financial manager should have a good understanding of the financial statements of the company in order to make an informed judgment on the financial position and operating performance of the entity. The balance sheet reveals the company's financial status as of a given date, while the income statement reports the earnings components for the year. The statement of cash flows allows readers to analyze the company's sources and uses of cash. These financial statements are included in the annual report, along with other vital information including footnote disclosures, the auditor's report, management's discussion of operations, and supplementary schedules. *Note:* You can find these documents in the quarterly financial

statements called the 10-Q, and annual financial statements, the 10-K, which the company files with the SEC. The SEC has authority to regulate external financial reporting. Nevertheless, its traditional role has been to promote disclosure rather than to exercise its power to establish accounting recognition and measurement principles. Its objective is to allow the accounting profession (through the FASB) to establish principles and then to ensure that corporations abide by those principles. This approach allows investors to evaluate investments for themselves. Go to the SEC's EDGAR Web site, www.edgar-online.com

FIGURE 2-9
PepsiCo.'S MANAGEMENT'S REPORT ON
INTERNAL CONTROL OVER FINANCIAL REPORTING

To Our Shareholders:

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Rule 13a-15(f) of the Exchange Act. Under the supervision and with the participation of our management, including our Chief Executive Officer and Chief Financial Officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based upon the framework in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on that evaluation, our management concluded that our internal control over financial reporting is effective as of December 25, 2004.

KPMG LLP, an independent registered public accounting firm, has audited the consolidated financial statements included in this Annual Report and, as part of their audit, has issued their report, included herein, (1) on our management's assessment of the effectiveness of our internal controls over financial reporting and (2) on the effectiveness of our internal control over financial reporting.



Peter A. Bridgman
Senior Vice President and Controller



Indra K. Nooyi
President and Chief Financial Officer



Steven S. Reinemund
Chairman of the Board and Chief Executive Officer

KEY POINTS OF AUDITING STANDARD NO. 5

1. Focus the audit of internal control over financial reporting on the most important matters

AS5 articulates a key principle that a direct relationship exists between the risk of material weakness and the amount of auditor attention given to that area. It requires auditors to use a top-down, risk-based approach, beginning with the financial statements and company-level controls, and requires the auditor to perform a walk-through for each significant process before selecting the controls to test. Using this assessment, the auditor selects the controls to test based on the risk of a material weakness. AS5 emphasizes the integration of the financial statement audit with the audit of internal control over financial reporting.

2. Provide explicit and practical guidance on scaling the audit to fit the size and complexity of the company

These provisions do not create a separate standard for smaller companies. Instead, AS5 explicitly requires the auditor to tailor the nature, extent and timing of testing to meet the unique characteristics of smaller companies.

3. Eliminate procedures that are unnecessary to achieve the intended benefits

AS5 links the testing of specific controls to a risk assessment of that control. This means that the risk of a specific control not being effective should drive the nature, extent and timing of testing performed and evidence of effectiveness obtained for that control.

4. Require auditors to consider whether and how to use the work of others

AS5 allows auditors to place greater reliance on testing completed by management and the internal audit function. The scope of the new Auditing Standard applies to both the audit of internal control over financial reporting as well as the audit of financial statements -- eliminating a barrier to the integrated audit.

4. Incorporate guidance on efficiency

Many of the audit efficiency practices outlined in its May 16, 2005, guidance are contained in the new Standard. AS5 specifically includes the language from the May 16 guidance regarding the baselining of IT controls. As a result, companies can leverage this guidance to reduce compliance costs on a year-over-year basis.

5 A simplified standard

AS5 changes the definitions of material weakness from “more than remote” to “reasonably possible” and significant deficiency from “more than inconsequential” to “significant.” AS5 defines “significant” as “less than material but merits the attention of those with the responsibility for the oversight of financial reporting.” In other words, significant deficiencies are not material weaknesses but items that those responsible for oversight need to know about

CHAPTER 3

EVALUATING A FIRM'S FINANCIAL PERFORMANCE

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Explain what financial statement analysis is and why it is important.
 - Compare horizontal analysis and vertical analysis.
 - List the basic components of ratio analysis.
 - Distinguish between trend analysis and industry comparison.
 - Calculate a comprehensive set of financial ratios and interpret them.
 - Explain the limitations of ratio analysis.
-

This chapter covers how to analyze a company's financial statements comprising of the balance sheet and income statement. Financial statement analysis attempts to answer the following basic questions:

1. How well is the business doing?
2. What are its strengths?
3. What are its weaknesses?
4. How does it fare in the industry?
5. Is the business improving or deteriorating?

A complete set of financial statements, as explained in the previous chapter, will include the balance sheet, income statement, and statement of cash flows. The first two are vital in financial statement analysis. We will discuss the various financial statement analysis tools that you will use in evaluating the firm's present and future financial condition. These tools include horizontal, vertical, and ratio analysis, which give relative measures of the performance and financial condition of the company.

WHAT AND WHY OF FINANCIAL STATEMENT ANALYSIS?

The analysis of financial statements means different things to different people. It is of interest to creditors, present and prospective investors, and the firm's own management.

A *creditor* is primarily interested in the firm's debt-paying ability. A short-term creditor, such as a vendor or supplier is ultimately concerned with the firm's ability to pay its bills and therefore wants to be assured that the firm is liquid. A long-term creditor such as a bank or bondholder, on the other hand, is interested in the firm's ability to repay interest and principal on borrowed funds.

An *investor* is interested in the present and future level of return (earnings) and risk (liquidity, debt, and activity). You, as an investor, evaluate a firm's stock based on an examination

of its financial statements. This evaluation considers overall financial health, economic and political conditions, industry factors, and future outlook of the company. The analysis attempts to ascertain whether the stock is overpriced, underpriced, or priced in proportion to its market value. A stock is valuable to you only if you can predict the future financial performance of the business. Financial statement analysis gives you much of the data you will need to forecast earnings and dividends.

Management must relate the analysis to all of the questions raised by creditors and investors, since these interested parties must be satisfied for the firm to obtain capital as needed.

HORIZONTAL ANALYSIS

Horizontal analysis is used to evaluate the trend in the accounts over the years. A \$3 million profit year looks very good following a \$1 million profit year, but not after a \$4 million profit year. Horizontal analysis is usually shown in comparative financial statements (see Figures 3-2 and 3-4). Companies often show comparative financial data for 5 years in annual reports.

Because horizontal analysis stresses the trends of the various accounts, it is relatively easy to identify areas of wide divergence that require further attention. In the income statement shown in Figure 3-3, the large increase in sales returns and allowances coupled with the decrease in sales for the period 20x5 to 20x6 should cause concern. One might compare these results with those of competitors to determine whether the problem is industrywide or just within the company.

Note that it is important to show both the dollar amount of change and the percentage of change, because either one alone might be misleading. For example, although the interest expense from 20x5 to 20x6 increased 100 percent (Figure 3-3), it probably does not require further investigation since the dollar amount of increase is only \$1,000. Similarly, a large change in dollar amount might result in only a small percentage change and therefore not be a cause for concern.

When an analysis covers a span of many years comparative financial statements may become cumbersome. To avoid this, the results of horizontal analysis may be presented by showing trends relative to a base year. In this method, a year representative of the firm's activity is chosen as the base. Each account of the base year is assigned an index of 100. The index for each respective account in succeeding years is found by dividing the account's amount by the base year amount and multiplying by 100. For example, if we let 20x5 be the base year in the balance sheet of Figure 3-2, Accounts Receivable would be given an index of 100. In 20x6, the index would be 150 $[(15/10) \times 100]$, and in 20x6 it would be 200 $[(20/10) \times 100]$. A condensed form of the balance sheet using trend analysis is shown in Figure 3-2

VERTICAL ANALYSIS

In vertical analysis, a significant item on a financial statement is used as a base value, and all other items on the financial statement are compared to it. In performing vertical analysis for the balance sheet, total assets is assigned 100 percent. Each asset account is expressed as a percentage of total assets. Total liabilities and stockholders' equity is also assigned 100 percent. Each liability and equity account is then expressed as a percentage of total liabilities and stockholders' equity. In the income statement, net sales is given the value of 100 percent and all other accounts are evaluated in comparison to net sales. The resulting figures are then given in a common size statement. The common size analysis of the Delta Company's income statement is shown in Figure 3-5.

Vertical analysis is used to disclose the internal structure of an enterprise. It indicates the existing relationship between each income statement account and revenue. It shows the mix of assets that produces the income and the mix of the sources of capital, whether by current or long-term liabilities or by equity funding. In addition to making such internal evaluation possible, the results of vertical analysis are also used to further assess the firm's relative position in the industry. As with horizontal analysis, vertical analysis is not the end of the process. The financial analyst must be prepared to probe deeper into those areas that either horizontal or vertical analysis, or both, indicates to be possible problem areas.

RATIO ANALYSIS

Horizontal and vertical analysis compares one figure to another within the same category. It is also vital to compare two figures applicable to different categories. This is accomplished by ratio analysis. In this section, you will learn how to calculate the various financial ratios and how to interpret them. The results of the ratio analysis will allow you:

1. To appraise the position of a business,
2. To identify trouble spots that need attention, and
3. To provide the basis for making projections and forecasts about the course of future operations.

Think of ratios as measures of the relative health or sickness of a business. Just as a doctor takes readings of a patient's temperature, blood pressure, heart rate, etc., you will take readings of a business's liquidity, profitability, leverage, efficiency in using assets, and market value. Where the doctor compares the readings to generally accepted guidelines such as a temperature of 98.6 degrees as normal, you make some comparisons to the norms.

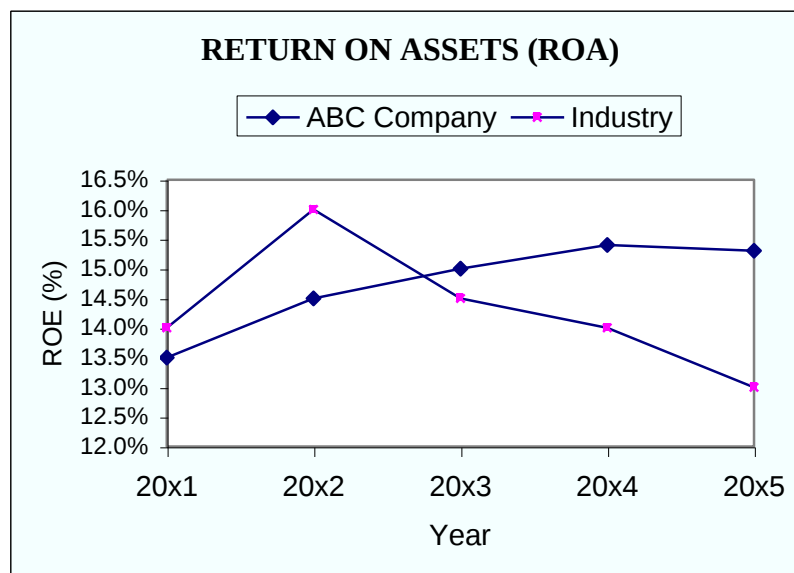
To obtain useful conclusions from the ratios, you must make two comparisons:

- *Industry (benchmark) comparison.* This will allow you to answer the question "how does a business fare in the industry?" You must compare the company's ratios to those of competing companies in the industry or with industry standards (averages). You can obtain industry norms from financial services such as:
 1. *Risk Management Association (RMA).* RMA, also known as *Robert Morris Associates*, has been compiling statistical data on financial statements for more than 75 years. The *RMA Annual Statement Studies* provide statistical data from more than 150,000 actual companies on many key financial ratios, such as gross margin, operating margins and return on equity and assets. If you're looking to put real authority into the "industry average" numbers that your company is beating, the Statement Studies are the way to go. They're organized by SIC codes, and you can buy the financial statement studies for your industry for \$59.95 in report form or over the Internet (www.rmahq.org).
 2. *Dun and Bradstreet.* Dun and Bradstreet publishes *Industry Norms and Key Business Ratios*, which covers over 1 million firms in over 800 lines of business.
 3. *Value Line.* *Value Line Investment Service* provides financial data and rates stocks of over 1,700 firms.

4. *The Department of Commerce.* The Department of Commerce Financial Report provides financial statement data and includes a variety of ratios and industry-wide common-size vertical financial statements.
 5. *Others*
Standard and Poor's, Moody's Investment Service, and various brokerage compile industry studies. Further, numerous online services such as AOL and MSN Money Central, to name a few, also provide these data.
- *Trend analysis.* To see how the business is doing over time, you will compare a given ratio for one company over several years to see the direction of financial health or operational performance. To do a trend analysis, one simply plots a ratio over time, as shown in Figure 3-1.

Note: This graph also shows the rate of return on total assets (ROA) of ABC Company versus the industry average. All the other ratios could be analyzed similarly.

FIGURE 3-1
RETURN ON ASSETS (ROA) OF ABC COMPANY —
INDUSTRY COMPARISON AND TREND ANALYSIS



Financial ratios can be classified broadly into five groups:

- Liquidity ratios
- Activity (asset utilization, turnover) ratios
- Solvency (leverage, debt service, long-term debt) ratios
- Profitability ratios
- Market value ratios

LIQUIDITY RATIOS

Liquidity is a firm's ability to meet its maturing short-term obligations. Liquidity is essential to conducting business activity, particularly in times of adversity, such as when a business is shut down by a strike or when operating losses ensue due to an economic recession or a steep rise in the price of a raw material or part. If liquidity is insufficient to cushion such losses, serious financial difficulty may result. Poor liquidity is analogous to a person having a fever—it is a symptom of a fundamental health problem. Poor liquidity might lead to higher cost of financing and inability to pay bills and dividends.

Analyzing corporate liquidity is especially important to creditors. If a company has a poor liquidity position, it may be a poor credit risk, perhaps unable to make timely interest and principal payments.

Liquidity ratios are static in nature as of year-end. Therefore, it is also important for management to look at expected future cash flows. If future cash outflows are expected to be high relative to inflows, the liquidity position of the company will deteriorate.

A description of various liquidity measures follows.

Throughout our discussion, keep referring to Figures 3-2 and 3-4 to make sure you understand where the numbers come from.

FIGURE 3-2

The Delta Company
Comparative Balance Sheet (In Thousands of Dollars)
December 31, 20x6, 20x5, 20x4

	20x6	20x5	20x4	Incr. or 20x6-20x5	Decr. 20x5-20x4	% Incr. 20x6-20x5	or Decr. 20x5-20x4
ASSETS							
Current Assets:							
Cash	\$30.0	\$35.0	\$35.0	(5.00)	0.00	(0.1)	0.0
Short-term Investments	\$20.0	\$15.0	\$5.0	5.00	10.00	0.3	2.0
Accounts Receivable	\$20.0	\$15.0	\$10.0	5.00	5.00	0.3	0.5
Inventory	\$50.0	\$45.0	\$50.0	5.00	(5.00)	0.1	(0.1)
Total Current Assets	\$120.0	\$110.0	\$100.0	10.00	10.00	0.1	0.1
Plant Assets, gross	\$110.0	\$97.0	\$91.0	13.00	6.00	0.1	0.1
Accumulated Depreciation	(\$10.0)	(\$7.0)	(\$6.0)	(3.00)	(1.00)	0.4	0.2
Plant Assets, net	\$100.0	\$90.0	\$85.0	10.00	5.00	0.1	0.1
Total Assets	\$220.0	\$200.0	\$185.0	20.00	15.00	0.1	0.1
LIABILITIES							
Current Liabilities-Accounts Payable	\$55.4	\$50.0	\$51.0	5.40	(1.00)	0.1	(0.0)
Long-term debt	\$80.0	\$75.0	\$70.0	5.00	5.00	0.1	0.1
Total Liabilities	\$135.4	\$125.0	\$121.0	10.40	4.00	0.1	0.0
STOCKHOLDERS' EQUITY							
Common Stock, \$10 par, 4,600 shares	\$45.0	\$45.0	\$45.0	0.00	0.00	0.0	0.0
Retained Earnings	\$39.6	\$30.0	\$18.0	9.60	12.00	0.3	0.7
Total Stockholders' Equity	\$84.6	\$75.0	\$63.0	9.60	12.00	0.1	0.2
Total Liab. and Stockholders' Equity	\$220.0	\$200.0	\$184.0	\$20.00	\$16.00	0.1	0.1

FIGURE 3-3

The Delta Company
Trend Analysis of the Balanced Sheet
(Expressed as Percent)
December 31, 20x4, 20x2, 20x1

	20x4	20x2	20x1
ASSETS			
Current Assets:	120.0	110.0	100.0
Plant Assets, net	117.6	105.9	100.0
Total Assets	118.9	108.1	100.0
LIABILITIES			
Current Liabilities	106.5	96.2	100.0
Long-term debt	114.3	107.1	100.0
Total Liabilities	111.0	102.5	100.0
STOCKHOLDERS' EQUITY			100.0
Common Stock, \$10 par, 4,600 shares	100.0	100.0	100.0
Retained Earnings	220.0	166.7	100.0
Total Stockholders' Equity	134.3	119.0	100.0
Total Liab. and Stockholders' Equity	118.9	108.1	100.0

FIGURE 3-4

The Delta Company
Comparative Income Statement (In Thousands of Dollars)
December 31, 20x6, 20x5, 20x4

	20x6	20x5	20x4	Incr. or 20x6-20x5	Decr. 20x5-20x4	% Incr. 20x6-20x5	or Decr. 20x5-20x4
Sales	\$100.0	\$110.0	\$50.0	(10.0)	60.0	-9.1%	120.0%
Sales Return & Allowances	\$20.0	\$8.0	\$3.0	12.0	5.0	150.0%	166.7%
Net Sales	\$80.0	\$102.0	\$47.0	(22.0)	55.0	-21.6%	117.0%
Cost of Goods Sold	\$50.0	\$60.0	\$25.0	(10.0)	35.0	-16.7%	140.0%
Gross Profit	\$30.0	\$42.0	\$22.0	(12.0)	20.0	-28.6%	90.9%
Operating Expenses							
Selling Expenses	\$5.0	\$12.0	\$7.0	(7.0)	5.0	-58.3%	71.4%
General Expenses	\$4.0	\$7.0	\$4.0	(3.0)	3.0	-42.9%	75.0%
Total Operating Expenses	\$9.0	\$19.0	\$11.0	(10.0)	8.0	-52.6%	72.7%
Earnings before Interest, Taxes and Depreciation (EBITD)	\$21.0	\$23.0	\$11.0	(2.0)	12.0	-8.7%	109.1%
Depreciation	\$3.0	\$1.0	\$0.0	2.0	1.0	200.0%	
Earnings before Interest & Taxes (EBIT) =Operating Income	\$18.0	\$22.0	\$11.0	(4.0)	11.0	-18.2%	100.0%
Interest Expense	\$2.0	\$2.0	\$1.0	0.0	1.0	0.0%	100.0%
Earnings before Taxes (EBT)	\$16.0	\$20.0	\$10.0	(4.0)	10.0	-20.0%	100.0%
Income Taxes (40%)	\$6.4	\$8.0	\$4.0	(1.6)	4.0	-20.0%	100.0%
Net Income	\$9.6	\$12.0	\$6.0	(2.4)	6.0	-20.0%	100.0%

FIGURE 3-5

The Delta Company
Income Statement and Common Size Analysis
(In Thousands of Dollars)
For the Years Ended December 31, 20x6 & 20x5

	20x6		20x5	
	<i>Amount</i>	<i>%</i>	<i>Amount</i>	<i>%</i>
Sales	\$100.00	100.00%	\$110.00	100.00%
Sales Return & Allowances	\$20.00	20.00%	\$8.00	7.27%
Net Sales	\$80.00	80.00%	\$102.00	92.73%
Cost of Goods Sold	\$50.00	50.00%	\$60.00	54.55%
Gross Profit	\$30.00	30.00%	\$42.00	38.18%
Operating Expenses				
Selling Expenses	\$5.00	5.00%	\$12.00	10.91%
General Expenses	\$4.00	4.00%	\$7.00	6.36%
Total Operating Expenses	\$9.00	9.00%	\$19.00	17.27%
Earnings before Interest, Taxes and Depreciation (EBITD)	\$21.00	21.00%	\$23.00	20.91%
Depreciation	\$3.00	3.00%	\$1.00	0.91%
Earnings before Interest & Taxes (EBIT) =Operating Income	\$18.00	18.00%	\$22.00	20.00%
Interest Expense	\$2.00	2.00%	\$2.00	1.82%
Earnings before Taxes (EBT)	\$16.00	16.00%	\$20.00	18.18%
Income Taxes (40%)	\$6.40	6.40%	\$8.00	7.27%
Net Income	<u>\$9.60</u>	9.60%	<u>\$12.00</u>	<u>10.91%</u>

FIGURE 3-6

The Delta Company
Statement of Cash Flows
(In Thousands of Dollars)
For the Year Ended December 31, 20x5 and 20x6

	20x6		20x5	
Cash flows from operating activities:				
Net income		\$9.6		\$12.0
Add (deduct) to reconcile net income to net cash flow				
Depreciation	3.0		1.0	
Increase in current liabilities	5.4		(2.0)	
Increase in accounts receivable	(5.0)		(5.0)	
Increase in inventory	<u>(5.0)</u>	<u>(1.6)</u>	<u>5.0</u>	<u>(1.0)</u>
Net cash flow from operating activities		8.0		11.0
Cash flows from investing activities:				
Cash paid to purchase marketable securities		(13.0)		(6.0)
Cash paid to purchase fixed assets		<u>(5.0)</u>		<u>(10.0)</u>
Net cash flow used for investing activities		(18.0)		(16.0)
Cash flows from financing activities:				
Issuance of long-term debt		<u>5.0</u>		<u>5.0</u>
Net cash flow used in financing activities		<u>5.0</u>		<u>5.0</u>
Net decrease in cash and cash equivalents		<u>(5.0)</u>		<u>0.0</u>
Cash and cash equivalents at the beginning of the year		<u>35.0</u>		<u>35.0</u>
Cash and cash equivalents at the end of the year		<u><u>\$30.0</u></u>		<u><u>\$35.0</u></u>

Net working capital is equal to current assets less current liabilities. Current assets are those assets that are expected to be converted into cash or used up within 1 year. Current liabilities are those liabilities that must be paid within 1 year; they are paid out of current assets. Net working capital is a safety cushion to creditors. A large balance is required when the entity has difficulty borrowing on short notice.

$$\begin{aligned}\text{Net working capital} &= \text{current assets} - \text{current liabilities} \\ &= \$120,000 - \$55,400 \\ &= \$64,600\end{aligned}$$

In 20x5, net working capital was \$60,000. The increase in net working capital is a favorable sign.

The *current ratio* is equal to current assets divided by current liabilities. This ratio, which is subject to seasonal fluctuations, is used to measure the ability of an enterprise to meet its current liabilities out of current assets. A high ratio is needed when the firm has difficulty borrowing on short notice. A limitation of this ratio is that it may rise just prior to financial distress because of a company's desire to improve its cash position by, for example, selling fixed assets. Such dispositions have a detrimental effect upon productive capacity. Another limitation of the current ratio is that it will be excessively high when inventory is carried on the last-in, first-out (LIFO) basis.

$$\text{Current ratio} = \left(\frac{\text{Current assets}}{\text{Current liabilities}} \right)$$

For 20x6, the current ratio is:

$$\left(\frac{\$120,000}{\$55,400} \right) = 2.17$$

In 20x5, the current ratio was 2.2. The ratio showed a slight decline over the year.

Table 3-1 shows current ratios of certain companies compared with industry averages.

TABLE 3-1
CURRENT RATIOS

Company	Industry	January 12 2008	Industry Average
Boeing (BA)	Aerospace	0.9	1.2
Google (GOOG)	Internet search	8.8	7.1
General Motors (GM)	Cars & Trucks	NA	1.1
Nordstrom (JWN)	Apparel stores	1.9	2.1
Intel (INTC)	Semiconductor	2.8	3.2
Wal-mart (WMT)	Discount, variety	0.8	1.0

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>) and Google Finance (<http://finance.google.com/finance>)

The *quick ratio*, also known as the *acid-test ratio*, is a stringent test of liquidity. It is found by dividing the most liquid current assets (cash, marketable securities, and accounts receivable) by current liabilities. Inventory is not included because of the length of time needed to convert inventory into cash. Prepaid expenses are also not included because they are not convertible into cash and so are not capable of covering current liabilities.

$$\text{Quick ratio} = \frac{\text{cash} + \text{marketable securities} + \text{accounts receivable}}{\text{current liabilities}}$$

The quick ratio for 20x6 is:

$$\left(\frac{\$30,000 + \$20,000 + \$20,000}{\$55,400} \right) = 1.26$$

In 20x5, the ratio was 1.3. The ratio went down slightly over the year.

Other Liquidity Ratios. Two other popular liquidity ratios that a short-term creditor might be interested in are: the cash ratio and the cash burn rate. The *cash ratio* (or *doomsday ratio*) is:

$$\frac{\text{cash}}{\text{current liabilities}}$$

For the Ratio Company, the *cash ratio* is:

<u>20x6</u>	<u>20x5</u>	<u>Trend</u>
\$30,000/\$55,400= 0.54	\$35,000/\$50,000=0.70	Deteriorated

Note: This ratio is most relevant for companies in financial distress. The doomsday ratio name comes from the worst case assumption that the business ceases to exist and only the cash on hand is available to meet credit obligations.

Suppose that a company is facing a strike and cash inflows begin to dry up. How long could the company keep running? One answer is given by the *cash burn rate*:

$$\text{Cash burn rate} = \frac{\text{current assets}}{\text{average daily operating expenses}}$$

In 20x6, total operating expenses is \$70,000 (\$50,000 cost of goods sold + \$12,000 operating expenses). The daily average expense is \$72,000/365 = \$197.26 per day. The burn rate is thus = \$120,000/\$197.26 = 608 days. Based on this, the Ratio Company could hang on for about 20 months. It was 508 days in 20x5, which suggests that the burn rate is improving. *Note:* This ratio is most relevant for start-up companies that often have little in the way of revenues.

The overall liquidity trend shows a slight deterioration as reflected in the lower current, quick, and cash ratios, although it is better than the industry norms (see Figure 3-7 for industry averages). But a mitigating factor is the increase in net working capital and cash burn rate.

ACTIVITY (ASSET UTILIZATION, TURNOVER) RATIOS

Activity (asset utilization, turnover) ratios are used to determine how quickly various accounts are converted into sales or cash. Overall liquidity ratios generally do not give an adequate picture of a company's real liquidity, due to differences in the kinds of current assets and liabilities the company holds. Thus, it is necessary to evaluate the activity or liquidity of specific current accounts. Various ratios exist to measure the activity of receivables, inventory, and total assets.

Accounts receivable ratios comprise the accounts receivable turnover and the average collection period.

The *accounts receivable turnover* gives the number of times accounts receivable is collected during the year. It is found by dividing net credit sales (if not available, then total sales) by the average accounts receivable. Average accounts receivable is typically found by adding the beginning and ending accounts receivable and dividing by 2. Although average accounts receivable may be computed annually, quarterly, or monthly, the ratio is most accurate when the shortest period available is used. In general, the higher the accounts receivable turnover, the better since the company is collecting quickly from customers and these funds can then be invested. However, an excessively high ratio may indicate that the company's credit policy is too stringent, with the company not tapping the potential for profit through sales to customers in higher risk classes. Note that here, too, before changing its credit policy, a company has to weigh the profit potential against the risk inherent in selling to more marginal customers.

$$\text{Accounts receivable turnover} = \frac{\text{net credit sales}}{\text{average accounts receivable}}$$

For 20x6, the average accounts receivable is:

$$\frac{\$15,000 + \$20,000}{2} = \$17,500$$

The accounts receivable turnover for 20x6 is:

$$\frac{\$80,000}{\$17,500} = 4.57 \text{ times}$$

Table 3-2 shows receivable turnover ratios of certain companies compared with industry averages.

TABLE 3-2
ACCOUNTS RECEIVABLE TURNOVER

Company	Industry	2007 February 25	Industry Average
Boeing (BA)	Aerospace	12.2	26.9
Google (GOOG)	Internet search	10.3	11.1
General Motors (GM)	Cars & Trucks	21.1	9.8
Nordstrom (JWN)	Apparel stores	8.0	66.5
Intel (INTC)	Semiconductor	11.9	9.9
Wal-mart (WMT)	Discount, variety	132.1	110.0

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>) and Google Finance (<http://finance.google.com/finance>)

In 20x5, the turnover was 8.16. The drop in this ratio in ~3 is significant and indicates a serious problem in collecting from customers. The company needs to reevaluate its credit policy, which may be too lax, or its billing and collection practices, or both.

The *average collection period* is the number of days it takes to collect on receivables.

$$\text{Average collection period} = \frac{365 \text{ days}}{\text{accounts receivable turnover}}$$

In 20x6, the collection period is:

$$\frac{365}{4.57} = 79.9 \text{ days}$$

This means that it takes almost 80 days for a sale to be converted into cash. In 20x5, the average collection period was 44.7 days. With the substantial increase in collection days in 20x6, there exists a danger that customer balances may become uncollectible. One possible cause for the

increase may be that the company is now selling to highly marginal customers. The analyst should compare the company's credit terms with the extent to which customer balances are delinquent. An aging schedule, which list the accounts receivable according to the length of time they are outstanding, would be helpful for this comparison

Inventory Ratios. If a company is holding excess inventory, it means that funds which could be invested elsewhere are being tied up in inventory. In addition, there will be high carrying cost for storing the goods, as well as the risk of obsolescence. On the other hand, if inventory is too low, the company may lose customers because it has run out of merchandise. Two major ratios for evaluating inventory are *inventory turnover* and *average age of inventory*.

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

Average inventory is determined by adding the beginning and ending inventories and dividing by 2.

The inventory turnover for 20x6 is:

$$\frac{\$50,000}{\$47,500} = 1.05 \text{ times}$$

For 20x5, the turnover was 1.26 times.

The decline in the inventory turnover indicates the stocking of goods. An attempt should be made to determine whether specific inventory categories are not selling well and if this is so, the reasons therefore. Perhaps there are obsolete goods on hand not actually worth their stated value. However, a decline in the turnover rate would not cause concern if it were primarily due to the introduction of a new product line for which the advertising effects have not been felt yet.

$$\text{Average age of inventory} = \frac{365}{\text{inventory turnover}}$$

In 20x6, the average age is:

$$\frac{365}{1.05} = 347.6 \text{ days}$$

In the previous year, the average age was 298.7 days. The lengthening of the holding period shows a potentially greater risk of obsolescence.

The *operating cycle* of a business is the number of days it takes to convert inventory and receivables to cash. Hence, a short operating cycle is desirable.

$$\text{Operating cycle} = \text{average collection period} + \text{average age of inventory}$$

In 20x6, the operating cycle is:

$$79.9 \text{ days} + 347.6 \text{ days} = 427.5 \text{ days}$$

In the previous year, the operating cycle was 334.4 days. This is an unfavorable trend since an increased amount of money is being tied up in noncash assets.

Cash Conversion Cycle. Noncash working capital consists of current assets and liabilities, other than cash. One way to view noncash working capital efficiency is to view operations as a cycle—from initial purchase of inventory to the final collection upon sale. The cycle begins with a purchase of inventory on account followed by the account payment, after which the item is sold and the account collected. These three balances can be translated into days of sales and used to measure how well a company efficiently manages noncash working capital. This measure is termed the *cash conversion cycle* or *cash cycle*. This is the number of days that pass before we collect the cash from a sale, measured from when we actually pay for the inventory. The cash conversion cycle is:

Cash conversion cycle = operating cycle – accounts payable period,

where accounts payables turnover* = $\frac{\text{cost of goods sold}}{\text{average accounts payable}}$ and

$$\text{accounts payable period} = \frac{365}{\text{accounts payable turnover}}$$

$$\text{In 20x6, accounts payables turnover} = \frac{\$50,000}{(\$55,400 + \$50,000)/2} = .95 \text{ times}$$

$$\text{accounts payable period} = \frac{365}{0.95} = 384.2 \text{ days}$$

*Current liabilities for the company are all accounts payable.

In 20x6 for the company, the cash conversion cycle = 427.5 days – 384.2 days = 43.3 days.

Thus, on average, there is a 43-day delay between the time the company pays for merchandise and the time it collects on the sale. In 20x5 the ratio was 25.1 days. This is an unfavorable sign since an increased cycle implies that more money is being tied up in inventories and receivables.

Total Asset Turnover. The total asset turnover ratio is helpful in evaluating a company's ability to use its asset base efficiently to generate revenue. A low ratio may be due to many factors, and it is important to identify the underlying reasons. For example, is investment in assets excessive when compared to the value of the output being produced? If so, the company might want to consolidate its present operation, perhaps by selling some of its assets and investing the proceeds for a higher return or using them to expand into a more profitable area.

$$\text{Total asset turnover} = \frac{\text{net sales}}{\text{average total assets}}$$

In 20x6, the ratio is:

$$\frac{\$80,000}{(\$220,000 + \$200,000)/2} = \frac{\$80,000}{\$210,000} = 0.381$$

In 20x5, the ratio was 0.53 (\$102,000/\$192,500). The company's use of assets declined significantly, and the reasons need to be pinpointed. For example, are adequate repairs being made? Or are the assets getting old and do they need replacing?

Delta, Inc. has suffered a sharp deterioration in activity ratios, pointing to a need for improved credit and inventory management, although the 20x5 ratios are not far out of line with the industry

averages (See Figure 3-7). It appears that problems are inefficient collection and obsolescence of inventory.

Interrelationship of Liquidity and Activity to Earnings. A trade-off exists between liquidity risk and return. Liquidity risk is minimized by holding greater current assets than noncurrent assets. However, the rate of return will decline because the return on current assets (i.e., marketable securities) is typically less than the rate earned on productive fixed assets. Also, excessively high liquidity may mean that management has not aggressively searched for desirable capital investment opportunities. Maintaining a proper balance between liquidity and return is important to the overall financial health of a business.

It must be pointed out that high profitability does not necessarily infer a strong cash flow position. Income may be high but cash problems may exist because of maturing debt and the need to replace assets, among other reasons. For example, it is possible that a growth company may experience a decline in liquidity since the net working capital needed to support the expanding sales is tied up in assets that cannot be realized in time to meet the current obligations. The impact of earning activities on liquidity is highlighted by comparing cash flow from operations to net income. If accounts receivable and inventory turn over quickly, the cash flow received from customers can be invested for a return, thus increasing net income.

SOLVENCY (LEVERAGE, DEBT SERVICE, LONG-TERM DEBT) RATIOS

Solvency is a company's ability to meet its long-term obligations as they become due. An analysis of solvency concentrates on the long-term financial and operating structure of the business. The degree of long-term debt in the capital structure is also considered. Further, solvency is dependent upon profitability since in the long run a firm will not be able to meet its debts unless it is profitable. When debt is excessive, additional financing should be obtained primarily from equity sources. Management might also consider lengthening the maturity of the debt and staggering the debt repayment dates.

Some leverage ratios follow.

Debt Ratio. The debt ratio compares total liabilities (total debt) to total assets. It shows the percentage of total funds obtained from creditors. Creditors would rather see a low debt ratio because there is a greater cushion for creditor losses if the firm goes bankrupt. *Note:* How much debt is too much? The rule of thumb is: The debt portion should be less than 50%. All of bankruptcies arise from a company's inability to meet its debt obligations, according to **BankruptcyData.com**).

The debt ratio is:

$$\text{Debt ratio} = \frac{\text{Total liabilities}}{\text{Total assets}}$$

In 20x6, the ratio is:

$$\frac{\$135,400}{\$220,000} = 0.62$$

In 20x5, the ratio was 0.63. There was a slight improvement in the ratio over the year as indicated by the lower degree of debt to total assets.

Table 3-1 shows the debt ratios for selected companies.

Debt/Equity Ratio. The debt/equity ratio is a significant measure of solvency since a high degree of debt in the capital structure may make it difficult for the company to meet interest charges and principal payments at maturity. Further, with a high debt position comes the risk of running out of cash under conditions of adversity. Also, excessive debt will result in less financial flexibility since the company will have greater difficulty obtaining funds during a tight money market.

$$\text{Debt-equity ratio} = \frac{\text{Total liabilities}}{\text{Stockholders' equity}}$$

In 20x6, the ratio is:

$$\frac{\$135,400}{\$84,600} = 1.60$$

In the previous year, the ratio was 1.67. The ratio remained fairly constant. A desirable debt/equity ratio depends on many variables, including the rates of other companies in the industry, the access for further debt financing, and the stability of earnings.

Times Interest Earned (Interest Coverage) Ratio. The times interest earned ratio reflects the number of times before-tax earnings cover interest expense. It is a safety margin indicator in the sense that it shows how much of a decline in earnings a company can absorb.

$$\text{Times interest earned} = \frac{\text{Income before interest and taxes (EBIT)}}{\text{interest expense}}$$

For 20x6, the ratio is:

$$\frac{\$18,000}{\$2,000} = 9 \text{ times}$$

In 20x5, interest was covered 11 times. The decline in the coverage is a negative indicator since less earnings are available to meet interest charges.

Table 3-3 shows interest coverage ratios of certain companies compared with industry averages.

TABLE 3-3
INTEREST COVERAGE RATIOS

Company	Industry	January 12 2008	Industry Average
Boeing (BA)	Aerospace	212.6	126.5
Google (GOOG)	Internet search	NA	1.1
General Motors (GM)	Cars & Trucks	0.6	0.7
Nordstrom (JWN)	Apparel stores	18.9	14.2
Intel (INTC)	Semiconductor	NA	1.5
Wal-mart (WMT)	Discount, variety	13.5	15.3

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>) and Google Finance (<http://finance.google.com/finance>)

You must also note liabilities that have not yet been reported in the balance sheet by closely examining footnote disclosure. For example, you should find out about lawsuits, noncapitalized leases, and future guarantees.

Cash Coverage Ratio. A problem with the times interested earned ratio is that is based on EBIT, which it is not really a measure of cash available to pay interest. A more accurate way is to use earnings before interest, taxes, and depreciation (EBITD). *Note:* depreciation, a noncash expense, should not be taken out. The cash coverage ratio (or EBITD coverage ratio) is:

$$\frac{\text{EBITD}}{\text{interest}}$$

For the company, the *cash coverage ratio* is:

<u>20x6</u>	<u>20x5</u>	<u>Trend</u>
\$21,000/\$2,000 = 10.5 times	\$23,000/\$2,000 = 11.5 times	Deteriorated

Managers want to generate cash from operations using a minimum of noncash working capital resources. The efficiency and cash generating ability of a firm can be measured by the cash conversion cycle and free cash flow.

Free Cash Flow. This is a valuable tool for evaluating the cash position of a business. Free cash flow (FCF) is a measure of operating cash flows available for corporate purposes after providing sufficient fixed asset additions to maintain current productive capacity and dividends. It is calculated as follows:

Cash flow from operations
Less: Cash used to purchase fixed assets
Less: Cash dividends

Free cash flow

For the company, FCF is:

<u>20x6</u>	<u>20x5</u>	<u>Trend</u>
\$8,000 - 13,000 - 0 = (\$5,000)	\$11,000 - 6,000 - 0 = \$5,000	Deteriorated

The company's negative free cash flow for the year 20x6 would be a concern to management and investors.

A company that has FCF is able to fund internal growth, retire debt, and enjoy financial flexibility. Lack of FCF can be an early sign of liquidity problems. In fact, all three of the major credit rating agencies use a form of FCF in evaluating credit-worthiness of businesses.

As shown in Figure 3-7, the company's overall solvency is poor, relative to the industry averages although it has remained fairly constant. There has been no significant change in its ability to satisfy long-term debt. Note that significantly less profit is available to cover interest payments.

PROFITABILITY RATIOS

An indication of good financial health and how effectively the firm is being managed is the company's ability to earn a satisfactory profit and return on investment. Investors will be reluctant to associate themselves with an entity that has poor earning potential since the market price of stock and dividend potential will be adversely affected. Creditors will shy away from companies with deficient profitability since the amounts owed to them may not be paid. Absolute dollar profit by itself has little significance unless it is related to its source.

Some major ratios that measure operating results are summarized below.

Gross Profit Margin. The gross profit margin reveals the percentage of each dollar left over after the business has paid for its goods. The higher the gross profit earned, the better. Gross profit equals net sales less cost of goods sold.

$$\text{Gross profit margin} = \frac{\text{gross profit}}{\text{net sales}}$$

In 20x6, the ratio is:

$$\frac{\$30,000}{\$80,000} = 0.375$$

The ratio was 0.41 in 20x5. The decline in this ratio indicates the business is earning less gross profit on each sales dollar. The reasons for the decline may be many, including a higher relative production cost of merchandise sold.

Table 3-4 shows gross margin ratios of certain companies compared with industry averages.

TABLE 3-4
GROSS MARGIN RATIOS

Company	Industry	January 12 2008	Industry Average
Boeing (BA)	Aerospace	19.4	18.0
Google (GOOG)	Internet search	60.1	61.3
General Motors (GM)	Cars & Trucks	13.6	19.6
Nordstrom (JWN)	Apparel stores	37.6	37.6
Intel (INTC)	Semiconductor	49.5	48.0
Wal-mart (WMT)	Discount, variety	23.4	243.8

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>) and Google Finance (<http://finance.google.com/finance>)

Profit Margin. The ratio of net income to net sales is called the profit margin. It indicates the profitability generated from revenue and hence is an important measure of operating performance. It also provides clues to a company's pricing, cost structure, and production efficiency.

$$\text{Profit margin} = \frac{\text{net income}}{\text{net sales}}$$

The ratio in 20x6 is:

$$\frac{\$9,600}{\$80,000} = 0.12$$

For the previous year, profit margin was .012. The constant profit margin indicates that the earning power of the business remained static. (Note that these percentages are available in the common size income statement as given in Figure 3-3).

Return on Investment. Return on investment (ROI) is a key, but rough, measure of performance. Although ROI shows the extent to which earnings are achieved on the investment made in the business, the actual value is generally somewhat distorted.

There are basically two ratios that evaluate the return on investment. One is the return on total assets, and the other is the return on owners' equity.

The *return on total assets* (ROA) indicates the efficiency with which management has used its available resources to generate income.

$$\text{Return on total assets} = \frac{\text{net income}}{\text{average total assets}}$$

In 20x6, the return is:

$$\frac{\$9,600}{(\$220,000 + \$200,000) / 2} = 0.0457$$

In 20x5, the return was .0623. The productivity of assets in deriving income deteriorated in 20x6.

Du Pont Formula I. The Du Pont Formula I shows an important tie-in between the profit margin and the return on total assets. The relationship is:

$$\text{Return on total assets} = \text{profit margin} \times \text{total asset turnover}$$

Therefore,

$$\frac{\text{Net income}}{\text{Average total assets}} = \frac{\text{net income}}{\text{net sales}} \times \frac{\text{net sales}}{\text{average total assets}}$$

As can be seen from this formula, the ROA can be raised by increasing either the profit margin or the asset turnover. The latter is to some extent industry dependent, with retailers and the like having a greater potential for raising the asset turnover ratio than do service and utility companies. However, the profit margin may vary greatly within an industry since it is subject to sales, cost controls, and pricing. The interrelationship shown in the Du Pont formula can therefore be useful to a company trying to raise its ROA since the area most sensitive to change can be targeted.

For 20x6, the figures for the company are:

$$\text{Return on total assets} = \text{profit margin} \times \text{total asset turnover}$$

$$0.0457 = 0.120 \times 0.381$$

We know from our previous analysis that the profit margin has remained stable while asset turnover has deteriorated, bringing down the ROI. Since asset turnover can be considerably higher, Ratio Company might first focus on improving this ratio while at the same time reevaluating its pricing policy, cost controls, and sales practices.

The *return on common equity* (ROE) measures the rate of return earned on the common stockholders' investment.

$$\text{Return on common equity} = \frac{\text{net income available to common stockholders}}{\text{average stockholders equity}}$$

$$\text{The return in 20x6 is: } \frac{\$9,600}{(\$84,600 + \$75,000) / 2} = 0.1203$$

In 20x5, the return was 0.17. There has been a significant drop in return to the owners.

The overall profitability of the company has decreased considerably, causing a decline in both the return on assets and return on equity. Perhaps lower earnings were due in part to higher costs of short-term financing arising from the decline in liquidity and activity ratios. Moreover, as turnover rates in assets go down, profit will similarly decline because of a lack of sales and higher costs of carrying higher current asset balances. As indicated in Figure 3-7, industry comparisons reveal that the company is faring very poorly in the industry.

Du Pont Formula II. Du Pont formula II reveals how ROE and ROA are related through what is known as the equity multiplier (leverage, or debt ratio) as follows:

$$\text{ROE} = \text{ROA} \times \text{equity multiplier}$$

$$= \text{ROA} \times \frac{\text{total assets}}{\text{common equity}}$$

or

$$= \frac{\text{ROA}}{1 - \text{debt ratio}}$$

In 20x6, the debt ratio is 0.62. Thus,

$$\text{ROE} = \frac{0.0457}{1 - 0.62} = 0.1203$$

Note that ROA = 0.0457 and ROE = 0.1203. This means that through the favorable use of leverage (debt), the company was able to increase the stockholders' return significantly.

Note: If the return on the resources provided by creditors exceeds the cost (interest or fixed dividends), leverage is used effectively, and the return to common equity will be higher than the other measures. The reason is that common equity provides a smaller proportion of the investment than in an unleveraged company. The purpose of financial leverage is to use other people's money (OPM) to earn income for shareholders.

Table 3-5 shows return on equity of certain companies compared with industry averages.

TABLE 3-5
RETURN ON EQUITY

Company	Industry	January 12 2008	Industry Average
Boeing (BA)	Aerospace	46.0	34.1
Google (GOOG)	Internet search	22.7	20.3
General Motors (GM)	Cars & Trucks	-42.9	10.2
Nordstrom (JWN)	Apparel stores	45.0	38.7
Intel (INTC)	Semiconductor	16.4	14.6
Wal-mart (WMT)	Discount, variety	20.9	19.5

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>) and Google Finance (<http://finance.google.com/finance>)

MARKET VALUE RATIOS

A final group of ratios relates the firm's stock price to its earnings (or book value) per share. It also includes dividend-related ratios.

Earnings per Share. Earnings per share indicates the amount of earnings for each common share held. When preferred stock is included in the capital structure, net income must be reduced by the preferred dividends to determine the amount applicable to common stock. When preferred stock does not exist, as is the case with the Ratio Company, earnings per share is equal to net income divided by common shares outstanding. Earnings per share is a useful indicator of the operating performance of the company as well as of the dividends that may be expected.

$$\text{EPS} = \frac{\text{net income} - \text{preferred dividend}}{\text{common shares outstanding}}$$

EPS in 20x6 is:

$$\frac{\$9,600}{4,600 \text{ shares}} = \$2.13$$

For 20x5, EPS was \$2.67. The decline in earnings per share should be of concern to investors.

The *price/earnings (P/E) ratio*, also called *earnings multiple*, reflects the company's relationship to its stockholders. The P/E ratio represents the amount investors are willing to pay for each dollar of the firm's earnings. A high multiple (cost per dollar of earnings) is favored since it shows that investors view the firm positively. On the other hand, investors looking for value would prefer a relatively lower multiple (cost per dollar of earnings) as compared with companies of similar risk and return.

$$\text{Price/earnings ratio} = \frac{\text{market price per share}}{\text{earnings per share}}$$

Assume a market price per share of \$20 on December 31, 20x6, and \$22 on December 31, 20x5. The P/E ratios are:

$$20x6: \frac{\$20}{\$2.13} = 9.39$$

$$20x5: \frac{\$22}{\$2.67} = 8.24$$

From the higher P/E multiple, you can infer that the stock market now has a favorable opinion of the business.

Table 3-6 shows price-earnings ratios of certain companies compared with industry averages.

TABLE 3-6
P/E RATIOS

Company	Industry	January 12 2008	Industry Average
Boeing (BA)	Aerospace	15.5	17.3
Google (GOOG)	Internet search	49.9	52.8
General Motors (GM)	Cars & Trucks	NA	11.3
Nordstrom (JWN)	Apparel stores	11.0	14.1
Intel (INTC)	Semiconductor	20.9	17.2
Wal-mart (WMT)	Discount, variety	15.4	16.7

Source: MSN Money Central Investor (<http://moneycentral.msn.com/investor/home.asp>) and Google Finance (<http://finance.google.com/finance>)

Book value per share equals the net assets available to common stockholders divided by shares outstanding. By comparing it to market price per share you can get another view of how investors feel about the business.

The book value per share in 20x6 is:

$$\begin{aligned}\text{Book value per share} &= \frac{\text{Total stockholders' equity} - \text{preferred stock}}{\text{common shares outstanding}} \\ &= \frac{\$84,600 - 0}{4,500} = \$18.80\end{aligned}$$

In 20x5, book value per share was \$16.67

The increased book value per share is a favorable sign, because it indicates that each share now has a higher book value. If we assume the stock market has a market price of \$20 per share, the company's stock is favorably regarded by investors since its market price exceeds its book value.

The *price/book value ratio* shows the market value of the company in comparison to its historical accounting value. A company with old assets may have a high ratio whereas one with new assets may have a low ratio. Hence, you should note the changes in the ratio in an effort to appraise the corporate assets.

The ratio equals:

$$\text{Price/book value} = \frac{\text{Market price per share}}{\text{Book value per share}}$$

In 20x5, the ratio is:

$$\frac{\$20}{\$18.80} = 1.064$$

In 20x5, the ratio was 1.32. The significant drop in the ratio may indicate a lower opinion of the company in the eyes of investors. Market price of stock may have dropped because of a deterioration in liquidity, activity, and profitability ratios. The major indicators of a company's performance are intertwined (i.e., one affects the other) so that problems in one area may spill over into another. This appears to have happened to the company in our example.

Market Value Added. The major goal of a firm is to maximize wealth maximization. This goal is maximized by maximizing the difference between the market value of the firm's stock and the amount of equity capital supplied by shareholders. The difference is called the *market value added (MVA)*. $MVA = \text{market value of the firm's stock} - \text{equity capital supplied by shareholders} = (\text{stock price} \times \text{shares outstanding}) - \text{total common equity}$

In 20x5, the company's MVA is $(\$20 \times 4,500 \text{ shares}) - \$84,500 = \$5,500$. It was \$24,000, which indicates a substantial reduction. The higher its MVA, the better the job management is doing for the company's shareholders.

Dividend ratios help you determine the current income from an investment. Two relevant ratios are:

$$\text{Dividend yield} = \frac{\text{dividends per share}}{\text{market price per share}}$$

$$\text{Dividend payout} = \frac{\text{dividends per share}}{\text{earnings per share}}$$

There is no such thing as a "right" payout ratio. Stockholders look unfavorably upon reduced dividends because it is a sign of possible deteriorating financial health. However, companies with ample opportunities for growth at high rates of return on assets tend to have low payout ratios.

AN OVERALL EVALUATION -- SUMMARY OF FINANCIAL RATIOS

As indicated in the chapter, a single ratio or a single group of ratios is not adequate for assessing all aspects of the firm's financial condition. Figure 3-4 summarizes the 20x5 and 20x5 ratios calculated in the previous sections, along with the industry average ratios for 20x5. The figure also shows the formula used to calculate each ratio. The last three columns of the figure contain subjective assessments of Delta's financial condition, based on trend analysis and 20x5 comparisons to the industry norms. (5-year ratios are generally needed for trend analysis to be more meaningful, however.)

By appraising the trend in the company's ratios from 20x5 to 20x6, we see from the drop in the current and quick ratios that there has been a slight detraction in short-term liquidity, although they have been above the industry averages. But working capital has improved. A material deterioration in the activity ratios has occurred, indicating that improved credit and inventory policies are required. They are not terribly alarming, however, because these ratios are not way out of line with industry averages. Also, total utilization of assets, as indicated by the total asset turnover, shows a deteriorating trend.

Leverage (amount of debt) has been constant. However, there is less profit available to satisfy interest charges. Delta's profitability has deteriorated over the year. In 20x5, it is consistently below the industry average in every measure of profitability. In consequence, the return on the owner's investment and the return on total assets have gone down. The earnings decrease may be partly due to the firm's high cost of short-term financing and partly due to operating inefficiency. The higher costs may be due to receivable and inventory difficulties that forced a decline in the liquidity and activity ratios. Furthermore, as receivables and inventory turn over less, profit will fall off from a lack of sales and the costs of carrying more in current asset balances.

The firm's market value, as measured by the price/earnings (P/E) ratio, is respectable as compared with the industry. But it shows a declining trend.

In summary, it appears that the company is doing satisfactorily in the industry in many categories. The 20x5-20x6 period, however, seems to indicate that the company is heading for financial trouble in terms of earnings, activity, and short-term liquidity. The business needs to concentrate on increasing operating efficiency and asset utilization.

IS RATIO ANALYSIS A PANACEA?

While ratio analysis is an effective tool for assessing a business's financial condition, you must also recognize the following limitations:

1. Accounting policies vary among companies and can inhibit useful comparisons. For example, the use of different depreciation methods (straight-line vs. double declining balance) will affect profitability and return ratios.
2. Management may "fool around" with ("window-dress") the figures. For example, it can reduce needed research expense just to bolster net income. This practice, however, will almost always hurt the company in the long run.
3. A ratio is static and does not reveal future flows. For example, it will not answer questions such as "How much cash do you have in your pocket now?" or "Is that sufficient, considering your expenses and income over the next month?"
4. A ratio does not indicate the quality of its components. For example, a high quick ratio may contain receivables that may not be collected.
5. Reported liabilities may be undervalued. An example is a lawsuit on which the company is contingently liable.
6. The company may have multiple lines of business, making it difficult to identify the industry group the company is a part.
7. Industry averages cited by financial advisory services are only approximations. Hence, you may have to compare a company's ratios to those of competing companies in the industry.

CONCLUSION

The analysis of financial statements means different things to different people. It is of interest to creditors, present and prospective investors, and the firm's own management. This chapter has presented the various financial statement analysis tools useful in evaluating the firm's present and future financial condition. These techniques include horizontal, vertical, and ratio analysis, which provide relative measures of the performance and financial health of the company. Two methods were demonstrated for analyzing financial ratios. The first involved trend analysis for the company over time; the second involved making comparisons with industry norms. While ratio analysis is an effective tool for assessing a company's financial condition, the limitation of ratios must be recognized.

FIGURE 3-7

The Delta Company
Summary of Financial Ratios - Trend and Industry Comparisons

Ratios	Definitions	20x5	20x6	(a) Industry	(b) Evaluation		
					Ind.	Trend	Overall
LIQUIDITY							
Net working capital	Current assets - current liabilities	\$60,000	\$64,600	\$56,000	good	improving	good
Current Ratio	Current assets/current liabilities	2.2	2.17	2.05	OK	deteriorated	OK
Quick (Acid-test) Ratio	(Cash + marketable securities + accounts receivable)/current liabilities	1.3	1.26	1.11	OK	deteriorated	OK
Cash Ratio	Cash/current liabilities	0.7	0.4	N/A	N/A	deteriorated	poor
Cash burn rate	Current assets/average daily operating expenses	508 days	608 days	N/A	N/A	deteriorated	poor
ASSET UTILIZATION							
Accounts receivable Turnover	Net credit sales/average accounts receivable	8.16	4.57	5.5	OK	deteriorated	poor
Average collection Period	365 days/accounts receivable turnover	44.7 days	79.9 days	66.4 days	OK	deteriorated	poor
Inventory turnover	Cost of goods sold/average inventory	1.26	1.05	1.2	OK	deteriorated	poor

Average age of inventory	365 days/inventory turnover	289.7 days	347.6 days	N/A	N/A	deteriorated	poor
Operating cycle	Average collection period + average age of inventory	334.4 days	427.5 days	N/A	N/A	deteriorated	poor
Cash conversion cycle	Operating cycle - average payable period	25.1 days	43.3 days	N/A	N/A	deteriorated	poor
Total asset turnover	Net sales/average total assets	0.53	0.381	0.44	OK	deteriorated	poor
SOLVENCY							
Debt ratio	Total liabilities/total assets	0.63	0.62	N/A	N/A	OK	OK
Debt-equity ratio	Total liabilities/stockholders' equity	1.67	1.6	1.3	poor	deteriorated	poor
Times interest Earned	Income before interest and taxes/ interest expense	11 times	9 times	10 times	OK	deteriorated	poor
Cash coverage Ratio	EBITD/interest	11.5 times	10.5 times	N/A	N/A	deteriorated	poor
Free cash flow (FCF)	Cash flow from operations - cash used to purchase fixed assets - cash dividends	\$5,000	(\$5,000)	N/A	N/A	N/A	poor
PROFITABILITY							
Gross profit margin	Gross profit/net sales	0.41	0.38	0.48	poor	deteriorated	poor
Profit margin	Net income/net sales	0.12	0.12	0.15	poor	OK	poor

Return on total assets (ROA)	Net income/average total assets	0.0623	0.0457	0.1	poor	deteriorated	poor
Return on equity (ROE)	Earnings available to common stockholders/ average stockholders' equity	0.17	0.1203	0.27	poor	deteriorated	poor
MARKET VALUE							
Earnings per share (EPS)	(Net income -preferred dividend)/ common shares outstanding	\$2.67	\$2.13	4.51	poor	deteriorated	poor
Price/earnings (P/E) Ratio	Market price per share/EPS	8.24	9.39	7.12	OK	deteriorated	poor
Book value per share	(Total stockholders' equity - preferred stock)/ common shares outstanding	\$16.67	\$18.8	N/A	N/A	improving	improving
Price/book value Ratio	Market price per share/book value per share	1.32	1.06	N/A	N/A	improving	good
Market value added (MVA)	market value of the firm's stock - equity capital supplied by shareholders	\$24,000	\$5,500	N/A	N/A	deteriorated	poor
Dividend yield	Dividends per share/market price per share						
Dividend payout	Dividends per share/EPS						

(a) Obtained from sources not included in this chapter

(b) Represent subjective evaluation

CHAPTER 4

IMPROVING FINANCIAL PERFORMANCE

LEARNING OBJECTIVES

After studying the material in this chapter, you should be able to:

- Define ROI.
 - Identify the basic components of the *Du Pont* formula and to explain how it can be used for profit improvement.
 - Analyze how financial leverage affects the stockholder's return.
-

You will have an understanding of the relationship between ROI and ROE. The ability to measure managerial performance is essential in controlling operations toward the achievement of organizational goals. As companies grow or their activities become more complex, they attempt to decentralize decision making as much as possible. They do this by restructuring the firm into several divisions and treating each as an independent business. The managers of these subunits or segments are then evaluated on the basis of the effectiveness with which they use the assets entrusted to them.

Perhaps the most widely used single measure of success of an organization and its subunits is the rate of return on investment (ROI). Related is the return to stockholders, known as the return on equity (ROE).

WHAT IS RETURN ON INVESTMENT (ROI)?

ROI relates net income to invested capital (total assets). ROI provides a standard for evaluating how efficiently management employs the average dollar invested in a firm's assets, whether that dollar came from owners or creditors. Furthermore, a better ROI can also translate directly into a higher return on the stockholders' equity.

ROI is calculated as:

$$\text{ROI} = \frac{\text{Net profit after taxes}}{\text{Total assets}}$$

EXAMPLE 4-1

Consider the following financial data:

Total assets = \$100,000
Net profit after taxes = 18,000

$$\text{Then, ROI} = \frac{\text{Net profit after taxes}}{\text{Total assets}} = \frac{\$18,000}{\$100,000} = 18\%$$

The problem with this formula is that it only tells you about how a company did and how well it fared in the industry. It has very little value from the standpoint of profit planning.

WHAT DOES ROI CONSIST OF?--DU PONT FORMULA

ROI can be broken down into two factors--profit margin and asset turnover. In the past, managers have tended to focus only on the profit margin earned and have ignored the turnover of assets. It is important to realize that excessive funds tied up in assets can be just as much of a drag on profitability as excessive expenses. The Du Pont Corporation was the first major company to recognize the importance of looking at both net profit margin and total asset turnover in assessing the performance of an organization. The ROI breakdown, known as the *Du Pont formula*, is expressed as a product of these two factors, as shown below.

$$\begin{aligned} \text{ROI} &= \frac{\text{Net profit after taxes}}{\text{Total assets}} = \frac{\text{Net profit after taxes}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}} \\ &= \text{Net profit margin} \quad \times \quad \text{Total asset turnover} \end{aligned}$$

The Du Pont formula combines the income statement and balance sheet into this otherwise static measure of performance. Net profit margin is a measure of profitability or operating efficiency. It is the percentage of profit earned on sales. This percentage shows how many cents attach to each dollar of sales. On the other hand, total asset turnover measures how well a company manages its assets. It is the number of times by which the investment in assets turn over each year to generate sales.

The breakdown of ROI is based on the thesis that the profitability of a firm is directly related to management's ability to manage assets efficiently and to control expenses effectively.

EXAMPLE 4-2

Assume the same data as in Example 4-1. Also assume sales of \$200,000.

$$\text{Then, ROI} = \frac{\text{Net profit after taxes}}{\text{Total assets}} = \frac{\$18,000}{\$100,000} = 18\%$$

Alternatively,

$$\text{Net profit margin} = \frac{\text{Net profit after taxes}}{\text{Sales}} = \frac{\$18,000}{\$200,000} = 9\%$$

$$\text{Total asset turnover} = \frac{\text{Sales}}{\text{Total assets}} = \frac{\$200,000}{\$100,000} = 2 \text{ times}$$

Therefore,

$$\text{ROI} = \text{Net profit margin} \times \text{Total asset turnover} = 9\% \times 2 \text{ times} = 18\%$$

The breakdown provides a lot of insights to financial managers on how to improve profitability of the company and investment strategy. (Note that net profit margin and total asset turnover are called hereafter margin and turnover, respectively, for short). Specifically, it has several advantages over the original formula (i.e., net profit after taxes/total assets) for profit planning. They are:

(1) The importance of turnover as a key to overall return on investment is emphasized in the breakdown. In fact, turnover is just as important as profit margin in enhancing overall return.

(2) The importance of sales is explicitly recognized, which is not in the original formula.

(3) The breakdown stresses the possibility of trading one off for the other in an attempt to improve the overall performance of a company. The margin and turnover complement each other. In other words, a low turnover can be made up by a high margin; and vice versa.

EXAMPLE 4-3

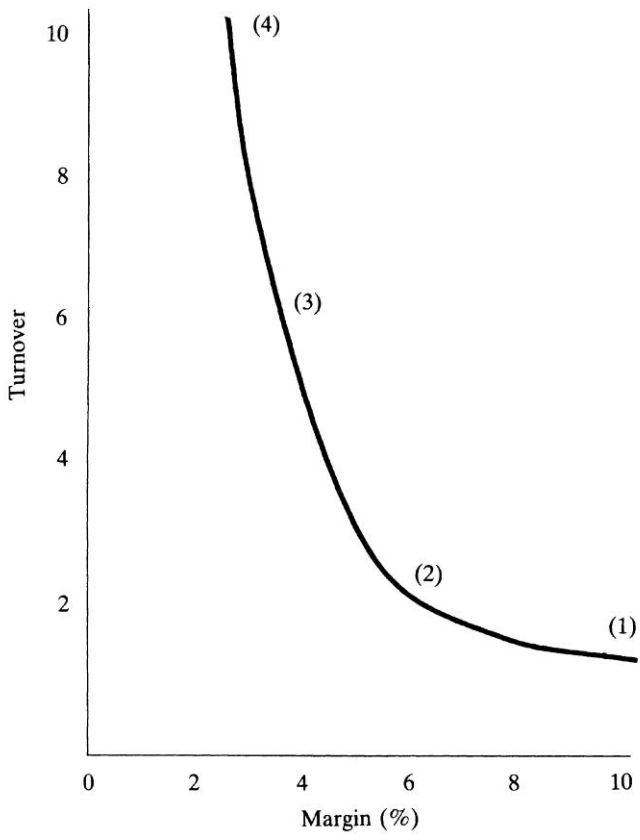
The breakdown of ROI into its two components shows that a number of combinations of margin and turnover can yield the same rate of return, as shown below:

	<u>Margin</u>	<u>x</u>	<u>Turnover</u>	<u>= ROI</u>
(1)	9%	x	2 times	= 18%
(2)	6	x	3	= 18
(3)	3	x	6	= 18
(4)	2	x	9	= 18

	<u>Margin</u>	<u>x</u>	<u>Turnover</u>	<u>=</u>	<u>ROI</u>
(1)	9%	x	2 times	=	18%
(2)					
(3)					
(4)					

The turnover-margin relationship and its resulting ROI is depicted in Figure 4-1.

FIGURE 4-1
TURNOVER-MARGIN RELATIONSHIP



IS THERE AN OPTIMAL COMBINATION?

Figure 4-1 can also be looked at as showing four companies that performed equally well (in terms of ROI), but with varying income statements and balance sheets. There is no ROI that is satisfactory for all companies. Sound and successful operation must point toward the optimum combination of profits, sales, and capital employed. The combination will necessarily vary depending upon the nature of the business and the characteristics of the product. An industry with products tailor-made to customers' specifications will have different margins and turnover ratios, compared with industries that mass produce highly competitive consumer goods. For example, the combination (4) may describe a supermarket operation which inherently works with low margin and high turnover, while the combination (1) may be a jewelry store which typically has a low turnover and high margin.

HOW TO USE DU PONT FORMULA FOR PROFIT IMPROVEMENT

The breakdown of ROI into margin and turnover gives management insight into planning for profit improvement by revealing where weaknesses exist: margin or turnover, or both. Various actions can be taken to enhance ROI. Generally, management can:

1. Improve margin
2. Improve turnover
3. Improve both

Alternative 1 demonstrates a popular way of improving performance. Margins may be increased by reducing expenses, raising selling prices, or increasing sales faster than expenses. Some of the ways to reduce expenses are:

- (a) Use less costly inputs of materials, although this can be dangerous in today's quality-oriented environment.
- (b) Automate processes as much as possible to increase labor productivity. But this will probably increase assets, thereby reducing turnover.
- (c) Bring the discretionary fixed costs under scrutiny, with various programs either curtailed or eliminated. Discretionary fixed costs arise from annual budgeting decisions by management. Examples include advertising, research and development, and management development programs. The cost-benefit analysis is called for in order to justify the budgeted amount of each discretionary program.

A company with pricing power can raise selling prices and retain profitability without losing business. Pricing power is the ability to raise prices even in poor economic times when unit sales volume may be flat and capacity may not be fully utilized. It is also the ability to pass on cost increases to consumers without attracting domestic and import competition, political opposition, regulation, new entrants, or threats of product substitution. The company with pricing power must have a unique economic position. Companies that offer unique, high-quality goods and services (where the service is more important than the cost) have this economic position.

Alternative 2 may be achieved by increasing sales while holding the investment in assets relatively constant, or by reducing assets. Some of the strategies to reduce assets are:

(a) Dispose of obsolete and redundant inventory. The computer has been extremely helpful in this regard, making continuous monitoring of inventory more feasible for better control.

(b) Devise various methods of speeding up the collection of receivables and also evaluate credit terms and policies.

(c) See if there are unused fixed assets.

(d) Use the converted assets (primarily cash) obtained from the use of the previous methods to repay outstanding debts or repurchase outstanding issues of stock. You may use those funds elsewhere to get more profit, which will improve margin as well as turnover.

Alternative 3 may be achieved by increasing sales or by any combinations of alternatives 1 and 2.

Figure 4-2 shows complete details of the relationship of ROI to the underlying ratios -margin and turnover--and their components. This will help identify more detailed strategies to improve margin, turnover, or both.

EXAMPLE 4-4

Assume that management sets a 20% ROI as a profit target. It is currently making an 18 percent return on its investment.

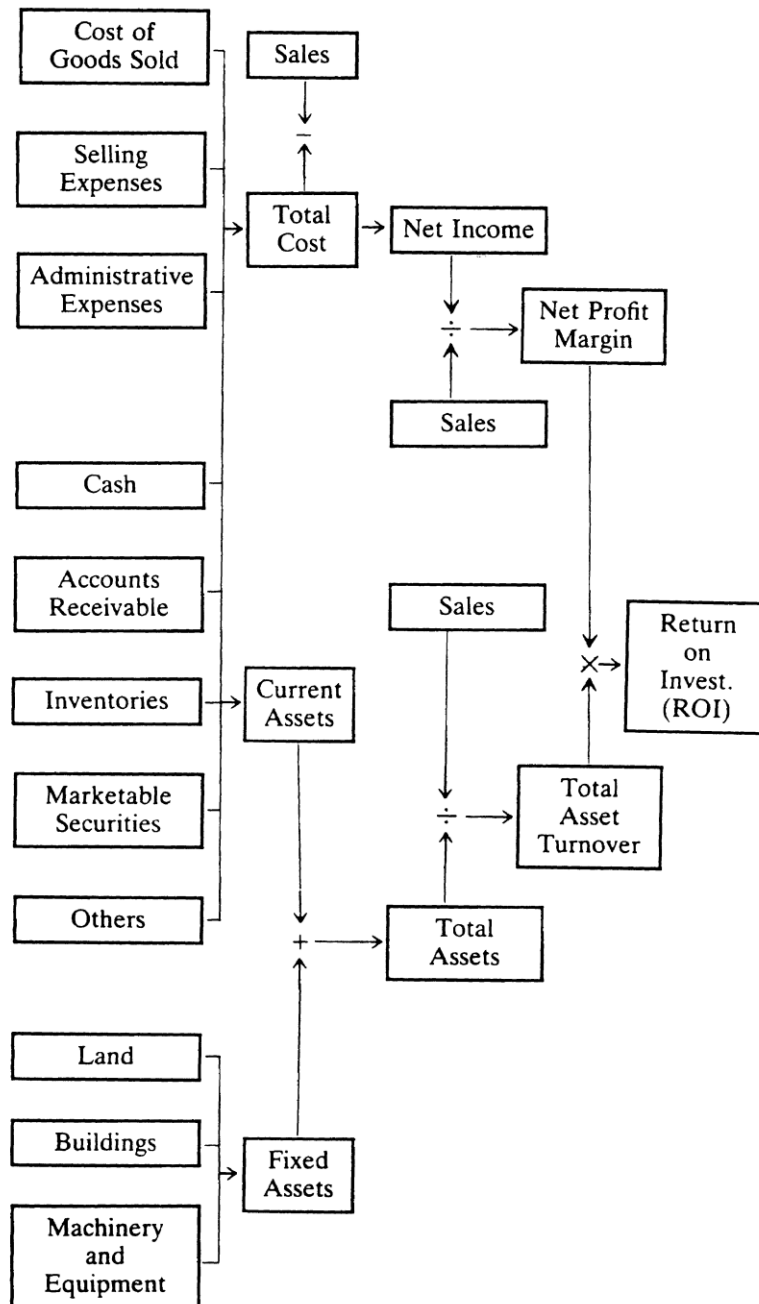
$$\text{ROI} = \frac{\text{Net profit after taxes}}{\text{Total assets}} = \frac{\text{Net profit after taxes}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}}$$

Present situation:

$$18\% = \frac{18,000}{200,000} \times \frac{200,000}{100,000}$$

FIGURE 4-2

RELATIONSHIPS OF FACTORS INFLUENCING ROI



The following are illustrative of the strategies which might be used (each strategy is independent of the other).

Alternative 1: Increase the margin while holding turnover constant. Pursuing this strategy would involve leaving selling prices as they are and making every effort to increase efficiency so as to reduce expenses. By doing so, expenses might be reduced by \$2,000 without affecting sales and investment to yield a 20% target ROI, as follows:

$$20\% = \frac{20,000}{200,000} \times \frac{200,000}{100,000}$$

Alternative 2: Increase turnover by reducing investment in assets while holding net profit and sales constant. Working capital might be reduced or some land might be sold, reducing investment in assets by \$10,000 without affecting sales and net income to yield the 20% target ROI as follows:

$$20\% = \frac{18,000}{200,000} \times \frac{200,000}{90,000}$$

Alternative 3: Increase both margin and turnover by disposing of obsolete and redundant inventories or through an active advertising campaign. For example, trimming down \$5,000 worth of investment in inventories would also reduce the inventory holding charge by \$1,000. This strategy would increase ROI to 20%.

$$20\% = \frac{19,000}{200,000} \times \frac{200,000}{95,000}$$

Excessive investment in assets is just as much of a drag on profitability as excessive expenses. In this case, cutting unnecessary inventories also helps cut down expenses of carrying those inventories, so that both margin and turnover are improved at the same time. In practice, alternative 3 is much more common than alternative 1 or 2.

HOW TO IMPROVE RETURN TO STOCKHOLDERS THROUGH FINANCIAL LEVERAGE

Generally, a better management performance (i.e., a high or above-average ROI) produces a higher return to equity holders. However, even a poorly managed company that suffers from a below-average performance can generate an above-average return on the stockholders' equity, simply called the return on equity (ROE). This is because borrowed funds can magnify the returns a company's profits represent to its stockholders.

Another version of the Du Pont formula, called the modified Du Pont formula reflects this effect. The formula ties together the ROI and the degree of financial leverage (use of borrowed funds). The financial leverage is measured by the equity multiplier, which is the ratio of a company's total asset base to its equity investment, or, stated another way, the ratio of how many dollars of assets held per dollar of stockholders' equity. It is calculated by dividing total assets by stockholders' equity. This measurement gives an indication of how much of a company's assets are financed by stockholders' equity and how much with borrowed funds.

The return on equity (ROE) is calculated as:

$$\begin{aligned}\text{ROE} &= \frac{\text{Net profit after taxes}}{\text{Stockholders' equity}} = \frac{\text{Net profit after taxes}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Stockholders' equity}} \\ &= \text{ROI} \qquad \qquad \qquad \times \text{Equity multiplier}\end{aligned}$$

ROE measures the returns earned on the owners' (both preferred and common stockholders') investment. The use of the equity multiplier to convert the ROI to the ROE reflects the impact of the leverage (use of debt) on the stockholders' return.

$$\begin{aligned}\text{The equity multiplier} &= \frac{\text{Total assets}}{\text{Stockholders' equity}} \\ &= \frac{\text{Total assets}}{\text{Total assets} - \text{Total liabilities}} \\ &= \frac{1}{1 - \frac{\text{Total liabilities}}{\text{Total assets}}} \\ &= \frac{1}{(1 - \text{debt ratio})}\end{aligned}$$

Figure 4-3 shows the relationship among ROI, ROE, and financial leverage.

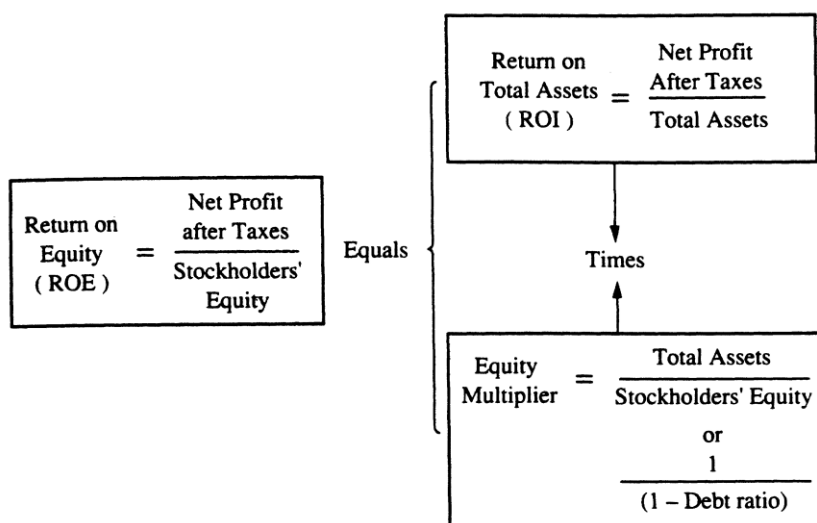
EXAMPLE 4-5

In Example 4-1, assume stockholders' equity of \$45,000.

$$\begin{aligned}\text{Then, equity multiplier} &= \frac{\text{Total assets}}{\text{Stockholders' equity}} = \frac{\$100,000}{\$45,000} = 2.22 \\ &= \frac{1}{(1 - \text{debt ratio})} = \frac{1}{(1 - 0.55)} = \frac{1}{0.45} = 2.22 \\ \text{ROE} &= \frac{\text{Net profit after taxes}}{\text{Stockholders' equity}} = \frac{\$18,000}{\$45,000} = 40\%\end{aligned}$$

FIGURE 4-3

ROI, ROE, AND FINANCIAL LEVERAGE



$$\text{ROE} = \text{ROI} \times \text{equity multiplier} = 18\% \times 2.22 = 40\%$$

If the company used only equity, the 18% ROI would equal ROE. However, 55% of the firm's capital is supplied by creditors (\$45,000/\$100,000 = 45% is the equity-to-asset ratio; \$55,000/\$100,000 = 55% is the debt ratio). Since the 18% ROI all goes to stockholders, who put up only 45% of the capital, the ROE is higher than 18%. This example indicates the company was using leverage (debt) favorably.

EXAMPLE 4-6

To further demonstrate the interrelationship between a firm's financial structure and the return it generates on the stockholders' investments, let us compare two firms that generate \$300,000 in operating income. Both firms employ \$800,000 in total assets, but they have different capital structures. One firm employs no debt, whereas the other uses \$400,000 in borrowed funds. The comparative capital structures are shown as:

	A	B
Total assets	\$800,000	\$800,000
Total liabilities	--	400,000
Stockholders' equity(a)	800,000	400,000
Total liabilities and stockholders' equity	\$800,000	\$800,000

Firm B pays 10% interest for borrowed funds. The comparative income statements and ROEs for firms A and B would look as follows:

Operating income	\$300,000	\$300,000
Interest expense	<u>-</u>	<u>(40,000)</u>
Profit before taxes	\$300,000	\$260,000
Taxes (30% assumed)	<u>(90,000)</u>	<u>(78,000)</u>
Net Profit after taxes (b)	\$210,000	\$182,000
ROE [(b)/(a)]	26.25%	45.5%

The absence of debt allows firm A to register higher profits after taxes. Yet the owners in firm B enjoy a significantly higher return on their investments. This provides an important view of the positive contribution debt can make to a business, but within a certain limit. Too much debt can increase the firm's financial risk and thus the cost of financing.

If the assets in which the funds are invested are able to earn a return greater than the fixed rate of return required by the creditors, the leverage is positive and the common stockholders benefit. The advantage of this formula is that it enables the company to break its ROE into a profit margin portion (net profit margin), an efficiency-of-asset-utilization portion (total asset turnover), and a use-of-leverage portion (equity multiplier). It shows that the company can raise shareholder return by employing leverage--taking on larger amounts of debt to help finance growth.

Since financial leverage affects net profit margin through the added interest costs, management must look at the various pieces of this ROE equation, within the context of the whole, to earn the highest return for stockholders. Financial managers have the task of determining just what combination of asset return and leverage will work best in its competitive environment. Most companies try to keep at least a level equal to what is considered to be "normal" within the industry.

A WORD OF CAUTION

Unfortunately, leverage is a two-edged sword. If assets are unable to earn a high enough rate to cover fixed finance charges, then stockholder suffers. The reason is that part of the profits from the assets which the stockholder has provided to the firm will have to go to make up the shortfall to the long-term creditors, and he/she will be left with a smaller return than otherwise have been earned.

CONCLUSION

This chapter covered in detail various strategies to increase the return on investment (ROI). The breakdown of ROI into margin and turnover, popularly known as the Du Pont formula, provides lots of insight into: (a) the strengths and weaknesses of a business and its segments, and (b) what needs to be done in order to improve performance. Another version of the Du Pont formula --the modified Du Pont formula-- relates ROI to ROE (stockholders' return) through financial leverage. It shows how leverage can work favorably for the shareholders of the company.

CHAPTER 5

BUDGETING, PLANNING, AND FINANCIAL FORECASTING

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Apply the *percent-of-sales method* to determine the amount of external financing needed.
 - Diagram the firm's budgetary system, including the cash budget and the forecasted (*pro forma*) income statement and balance sheet.
 - Calculate a firm's sustainable rate of growth.
 - Formulate the master budget, step by step.
 - Discuss why budgeting is used for profit planning and "what-if" analysis.
-

Financial forecasting, an essential element of planning, is the basis for *budgeting* activities. It is also needed when estimating future financing requirements. The company may look either internally or externally for financing. Internal financing refers to cash flow generated by the company's normal operating activities. External financing refers to capital provided by parties external to the company. You need to analyze how to estimate *external* financing requirements. Basically, forecasts of future sales and related expenses provide the firm with the information to project future external financing needs.

HOW DOES THE PERCENT-OF-SALES METHOD WORK?

The basic steps in projecting financing needs are:

1. Project the firm's sales. The sales forecast is the initial most important step. Most other forecasts (budgets) follow the sales forecast.
2. Project additional variables such as expenses.
3. Estimate the level of investment in current and fixed assets required to support the projected sales.
4. Calculate the firm's financing needs.

The most widely used method for projecting the company's financing needs is the *percent-of-sales method*. This method involves estimating the various expenses, assets, and liabilities for a future period as a percent of the sales forecast and then using these percentages, together with the projected sales, to construct forecasted balance sheets. The following example illustrates how to develop a pro forma balance sheet and determine the amount of external financing needed.

EXAMPLE 5-1

Assume that sales for 20X0 = \$20, projected sales for 20X1 = \$24, net income = 5% of sales, and the dividend payout ratio = 40%. Figure 5-1 illustrates the method, step by step. All dollar amounts are in millions.

The steps for the computations are outlined as follows:

Step 1. Express those balance sheet items that vary directly with sales as a percentage of sales. Any item such as long-term debt that does not vary directly with sales is designated "n.a.," or "not applicable."

Step 2. Multiply these percentages by the 20X1 projected sales = \$24 to obtain the projected amounts as shown in the last column.

Step 3. Simply insert figures for long-term debt, common stock and paid-in-capital from the 19x1 balance sheet.

Step 4. Compute 20X1 retained earnings as shown in (b).

Step 5. Sum the asset accounts, obtaining a total projected assets of \$7.2, and also add the projected liabilities and equity to obtain \$7.12, the total financing provided. Since liabilities and equity must total \$7.2, but only \$7.12 is projected, we have a shortfall of \$0.08 "external financing needed."

Although the forecast of additional funds required can be made by setting up pro forma balance sheets as described above, it is often easier to use the following formula:

$$\begin{array}{rcccl} \text{External} & & \text{Required} & & \text{Spontaneous} & & \text{Increase in} \\ \text{funds needed} & = & \text{increase} & - & \text{increase in} & - & \text{retained} \\ \text{(EFN)} & & \text{in assets} & & \text{liabilities} & & \text{earnings} \\ \\ \text{EFN} & = & (A/S)\Delta S & - & (L/S)\Delta S & - & (PM)(PS)(1-d) \end{array}$$

where A/S = Assets that increase spontaneously with sales as a percentage of sales.

L/S = Liabilities that increase spontaneously with sales as a percentage of sales.

ΔS = Change in sales.

PM = Profit margin on sales.

PS = Projected sales

d = Dividend payout ratio.

EXAMPLE 5-2

In Example 5-1,

$$A/S = \$6/\$20 = 30\%$$

$$L/S = \$2/\$20 = 10\%$$

$$\Delta S = (\$24 - \$20) = \$4$$

$$PM = 5\% \text{ on sales}$$

$$PS = \$24$$

$$d = 40\%$$

Plugging these figures into the formula yields:

$$\begin{aligned} \text{EFN} &= 0.3(\$4) - 0.1(\$4) - (0.05)(\$24)(1 - 0.4) \\ &= \$1.2 - \$0.4 - \$0.72 = \$0.08 \end{aligned}$$

Thus, the amount of external financing needed is \$800,000, which can be raised by issuing notes payable, bonds, stocks, or any combination of these financing sources.

The major advantage of the percent-of-sales method of financial forecasting is that it is simple and inexpensive to use. One important assumption behind the use of the method is that the firm is operating at full capacity. This means that the company has no sufficient productive capacity to absorb a projected increase in sales and thus requires additional investment in assets.

Therefore, the method must be used with extreme caution if excess capacity exists in certain asset accounts.

To obtain a more precise projection of the firm's future financing needs, however, the preparation of a cash budget (to be presented later) is required.

FIGURE 5-1

PRO FORMA BALANCE SHEET IN MILLIONS OF DOLLARS

	Present (20X0)	% of Sales (20X0 Sales=\$20)	Projected (20X1 Sales=\$24)	
Assets				
Current assets	2	10	2.4	
Fixed assets	<u>4</u>	20	<u>4.8</u>	
Total assets	<u>6</u>		<u>7.2</u>	
Liabilities and Stockholders'				
Equity				
Current liabilities	2	10	2.4	
Long-term debt	<u>2.5</u>	n.a.	<u>2.5</u>	
Total liabilities	<u>4.5</u>		<u>4.9</u>	
Common stock	0.1	n.a.	0.1	
Paid-in-capital	0.2	n.a.	0.2	
Retained earnings	<u>1.2</u>		<u>1.92</u>	
Total equity	<u>1.5</u>		<u>2.22</u>	
Total liabilities and stockholders' eqty	<u>6</u>		<u>7.12</u>	Total financing provided
			<u>0.08</u>	External financing needed
			<u>7.2</u>	Total

$$\begin{aligned}
 20X1 \text{ retained earnings} &= 20X0 \text{ retained earnings} + \text{projected net income} - \text{cash dividends paid} \\
 &= \$1.2 + 5\%(\$24) - 40\%[5\%(\$24)]
 \end{aligned}$$

$$= \$1.2 + \$1.2 - \$0.48 = \$2.4 - \$0.48 = \$1.92$$

External financing needed projected total assets - (projected total liabilities + projected equity)

$$= \$7.2 - (\$4.9 + \$2.22) = \$7.2 - \$7.12 = \$0.08$$

THE SUSTAINABLE RATE OF GROWTH

The sustainable rate of growth (g^*) represents the rate at which a firm's sales can grow if it wants to maintain its present financial ratios and does not want to resort to the sale of new equity shares. A simple formula can be derived for g^* where we assume that a firm's assets and liabilities all grow at the same rate as its sales, that is,

$$\text{Sustainable rate of growth } (g^*) = \text{ROE} (1 - b)$$

Recall that ROE is the firm's return on equity:

$$\text{ROE} = \frac{\text{Net profit after taxes}}{\text{Stockholders' equity}} = \frac{\text{Net profit after taxes}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Stockholders' equity}}$$

$$= \text{ROI} \times \text{Equity multiplier}$$

and b is the firm's dividend payout ratio, that is, $\frac{\text{dividends per share}}{\text{earnings per share}}$

The term $(1 - b)$ is sometimes referred to as the *plowback ratio* since it indicates the fraction of earnings that are reinvested or plowed back into the firm. Consequently, a firm's sustainable rate of growth is determined by its ROE (i.e., its anticipated net profit margin, asset turnover, and capital structure), as well as its dividend policy.

Calculating the Sustainable Rate of Growth

Consider the three firms:

<i>Firm</i>	<i>ROI</i>	<i>Equity Multiplier</i>	<i>Plowback Ratio</i>	<i>g^*</i>
A	10%	3.33	50%	16.65%
B	10%	3.33	100%	33.30%
C	10%	2.00	100%	20.00%

Comparing Firms A and B we see that the only difference is that Firm A pays out half its earnings in common dividends (i.e., plows back half its earnings) whereas Firm B retains or plows back all of its earnings. The net result is that Firm B with its added source of internal equity financing can grow at twice the rate of Firm A (33.30 percent compared to 16.65 percent). Likewise, comparing Firms B and C we note that they differ only in that Firm B finances only 30 percent ($1/3.33$) of its assets with equity whereas Firm C finances 50 percent ($1/2.00$) of its assets with equity. The result is that Firm C's sustainable rate of growth is 20 percent compared to 33.30 percent for Firm B. This example indicates Firm B was using leverage (debt) favorably.

For this equation to accurately depict a firm's sustainable rate of growth, the following assumptions must hold: First, the firm's assets must vary as a constant percent of sales (i.e., even fixed assets expand and contract directly with the level of firm sales). Second, the firm's liabilities must all vary directly with firm sales. This means that the firm's management will expand its borrowing (both spontaneous and discretionary) in direct proportion with sales to maintain its present ratio of debt to assets. Finally, the firm pays out a constant proportion of its earnings in common stock dividends regardless of the level of firm sales. Since all three of these assumptions are only rough approximations to the way that firms actually behave, the equation provides crude approximation of the firm's actual sustainable rate of growth. However, an estimate of g^* using the equation can be a very useful first step in the firm's financial planning process.

HOW TO PREPARE A BUDGET

A company's annual financial plan is called a *budget*. A comprehensive (master) budget is a formal statement of management's expectation regarding sales, expenses, volume, and other financial transactions of an organization for the coming period. Simply put, a budget is a set of *pro forma* (projected or planned) financial statements. It consists basically of a pro forma income statement, pro forma balance sheet and cash budget.

A budget is a tool for both planning and control. At the beginning of the period, the budget is a plan or standard; at the end of the period it serves as a control device to help management measure its performance against the plan so that future performance may be improved.

It is important to realize that with the aid of computer technology, budgeting can be used as an effective device for evaluation of "what-if" scenarios. This way management should be able to move toward finding the best course of action among various alternatives through simulation. If management does not like what they see on the budgeted financial statements in terms of various financial ratios such as liquidity, activity (turnover), leverage, profit margin, and market value ratios, they can always alter their contemplated decision and planning set.

The master budget is classified broadly into two categories:

1. Operating budget, reflecting the results of operating decisions.
2. Financial budget, reflecting the financial decisions of the firm.

The *operating budget* consists of:

- Sales budget
- Production budget
- Direct materials budget
- Direct labor budget
- Factory overhead budget
- Selling and administrative expense budget
- Pro forma income statement

The financial budget consists of:

- Cash budget
- Pro forma balance sheet

The major steps in preparing the budget are:

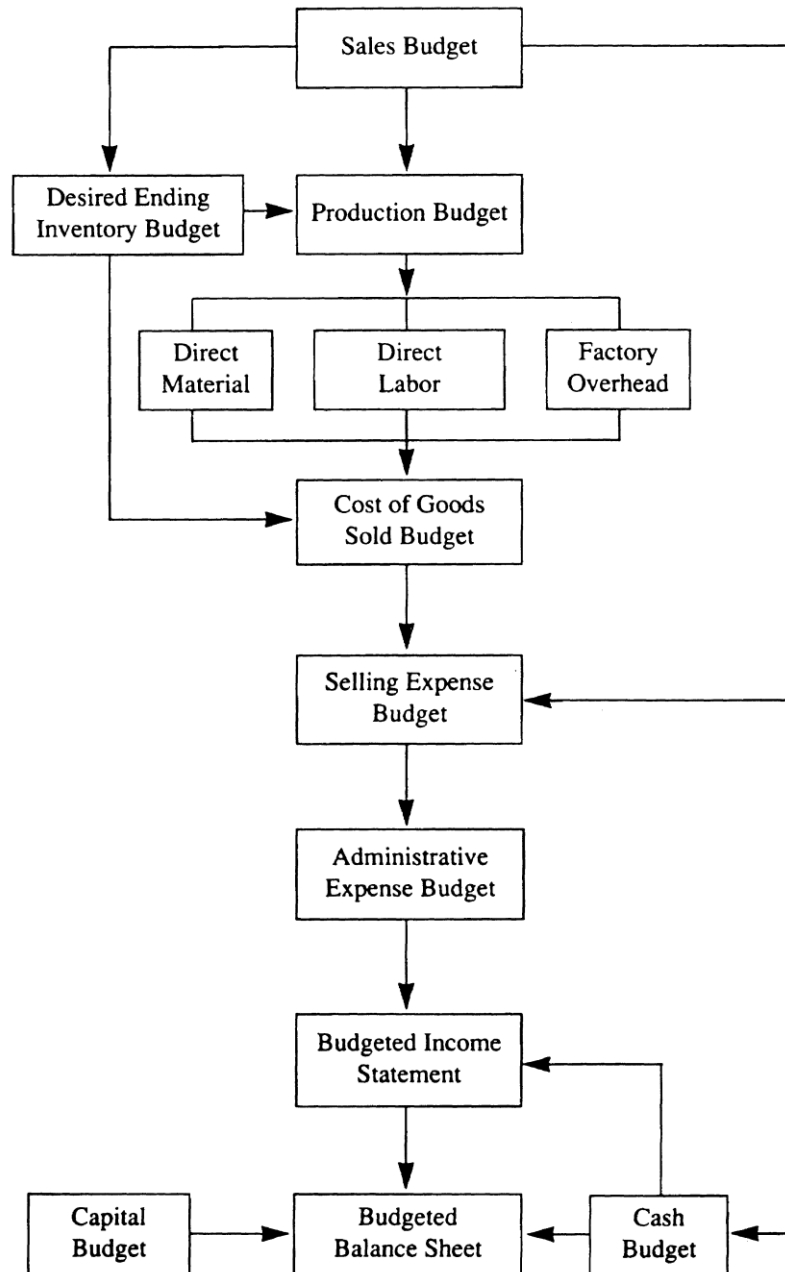
1. Prepare a sales forecast.

2. Determine expected production volume.
3. Estimate manufacturing costs and operating expenses.
4. Determine cash flow and other financial effects.
5. Formulate projected financial statements.

Figure 5-2 shows a simplified diagram of the various parts of the comprehensive (master) budget, the master plan of the company.

FIGURE 5-2

A MASTER (COMPREHENSIVE) BUDGET



Note: The capital expenditure budget may be prepared more than a year in advance, unlike the other elements of the master budget. Because of the long-term commitments that must be made for some types of capital investments, planning must be done far in advance and is based on needs in future years as opposed to the current year's needs.

COMPREHENSIVE ILLUSTRATION

To illustrate how all these budgets are put together, we will focus on a manufacturing company called the Johnson Company, which produces and markets a single product. We will assume that the company develops the master budget on a quarterly basis. We will use the variable cost-fixed cost breakdown throughout the illustration. Note that variable costs are those costs that vary in proportion to sales or production volume while fixed costs do not and remain constant regardless of volume.

THE SALES BUDGET

The sales budget is the starting point in preparing the master budget, since estimated sales volume influences nearly all other items appearing throughout the master budget. The sales budget ordinarily indicates the quantity of each product expected to be sold. After sales volume has been estimated, the sales budget is constructed by multiplying the expected sales in units by the expected unit selling price. Generally, the sales budget includes a computation of expected cash collections from credit sales, which will be used later for cash budgeting.

EXAMPLE 5-3

THE JOHNSON COMPANY Sales Budget For the Year Ending December 31, 20B

	Quarter				
	1	2	3	4	Total
Expected sales in units	800	700	900	800	3,200
Unit sales price	x\$80	x\$80	x\$80	x\$80	x\$80
Total sales	\$64,000	\$56,000	\$72,000	\$64,000	\$256,000
	=====	=====	=====	=====	=====

SCHEDULE OF EXPECTED CASH COLLECTIONS

Accounts receivable, 12/31/20A	9,500*				\$9,500
1st quarter sales (\$64,000)	44,800+	\$17,920++			62,720
2d quarter sales (\$56,000)		39,200	\$15,680		54,880
3d quarter sales (\$72,000)			50,400	\$20,160	70,560
4th quarter sales (\$64,000)				44,800	44,800
Total cash collections	\$54,300	\$57,120	\$66,080	\$64,960	\$242,460
	=====	=====	=====	=====	=====

*All of the \$9,500 accounts receivable balance is assumed to be collectible in the first quarter.

+ 70 percent of a quarter's sales are collected in the quarter of sale.

++ 28 percent of a quarter's sales are collected in the quarter following, and the remaining 2 percent are uncollectible.

THE PRODUCTION BUDGET

After sales are budgeted, the production budget is determined. The number of units expected to be manufactured to meet budgeted sales and inventory requirements is set forth in the production budget. The expected volume of production is determined by subtracting the

estimated inventory at the beginning of the period from the sum of the units expected to be sold and the desired inventory at the end of the period. The production budget is illustrated as follows:

EXAMPLE 5-4

THE JOHNSON COMPANY Production Budget For the Year Ending December 31, 20B					
	Quarter				
	1	2	3	4	Total
Planned sales (Example 5-3)	800	700	900	800	3,200
Desired ending inventory*	<u>70</u>	<u>90</u>	<u>80</u>	<u>100+</u>	<u>100</u>
Total Needs	870	790	980	900	3,300
Less: Beginning inventory++	<u>80</u>	<u>70</u>	<u>90</u>	<u>80</u>	<u>80</u>
Units to be produced	790	720	890	820	3,220
	=====	=====	=====	=====	=====

* 10 percent of the next quarter's sales.

+ Estimated.

++The same as the previous quarter's ending inventory.

THE DIRECT MATERIAL BUDGET

When the level of production has been computed, a direct material budget should be constructed to show how much material will be required and how much material must be purchased to meet this production requirement. The purchase will depend on both expected usage of materials and inventory levels. The formula for computation of the purchase is:

$$\text{Purchase in units} = \text{Usage} + \text{Desired ending material inventory units} \\ - \text{Beginning inventory units}$$

The direct material budget is usually accompanied by a computation of expected cash payments for materials.

EXAMPLE 5-5

THE JOHNSON COMPANY Direct Material Budget For the Year Ending December 31, 20B					
	Quarter				
	1	2	3	4	Total
Units to be produced (Ex.5-4)	790	720	890	820	3,220
Material needs per unit(lbs)	<u>x 3</u>	<u>x 3</u>	<u>x 3</u>	<u>x 3</u>	<u>x 3</u>
Material needs for production	2,370	2,160	2,670	2,460	9,660
Desired ending inventory of materials*	<u>216</u>	<u>267</u>	<u>246</u>	<u>250+</u>	<u>250</u>

Total needs	2,586	2,427	2,916	2,710	9,910
Less: Beginning inventory					
of materials++	<u>237</u>	<u>216</u>	<u>267</u>	<u>246</u>	<u>237</u>
Materials to be purchased	2,349	2,211	2,649	2,464	9,673
Unit price	<u>x \$2</u>	<u>x \$2</u>	<u>x \$2</u>	<u>x \$2</u>	<u>x \$2</u>
Purchase cost	\$4,698	\$4,422	\$5,298	\$4,928	\$19,346
	=====	=====	=====	=====	=====

SCHEDULE OF EXPECTED CASH DISBURSEMENTS

Accounts payable, 12/31/20A	\$2,200				\$2,200
1st quarter purchases(\$4,698)	2,349	2,349**			4,698
2d quarter purchases(\$4,422)		2,211	2,211		4,422
3d quarter purchases(\$5,298)			2,649	2,649	5,298
4th quarter purchases (\$4,928)				<u>2,464</u>	<u>2,464</u>
Total disbursements	\$4,549	\$4,560	\$4,860	\$5,113	\$19,082
	=====	=====	=====	=====	=====

* 10 percent of the next quarter's units needed for production.

+ Estimated.

++ The same as the prior quarter's ending inventory.

** 50 percent of a quarter's purchases are paid for in the quarter of purchase; the remainder are paid for in the following quarter.

THE DIRECT LABOR BUDGET

The production requirements in the production budget also provide the starting point for the preparation of the direct labor budget. To compute direct labor requirements, expected production volume for each period is multiplied by the number of direct labor hours required to produce a single unit. The direct labor hours to meet production requirements is then multiplied by the direct labor cost per hour to obtain budgeted total direct labor costs.

EXAMPLE 5-6

THE JOHNSON COMPANY Direct Labor Budget For the Year Ending December 31, 20B

	Quarter				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>Total</u>
Units to be produced (Example 5-4)	790	720	890	820	3,220
Direct labor hours per unit	<u>x 5</u>	<u>x 5</u>	<u>x 5</u>	<u>x 5</u>	<u>x 5</u>
Total hours	3,950	3,600	4,450	4,100	16,100
Direct labor cost per hour	<u>x \$5</u>	<u>x \$5</u>	<u>x \$5</u>	<u>x \$5</u>	<u>x \$5</u>
Total direct labor cost	\$19,750	\$18,000	22,250	\$20,500	\$80,500
	=====	=====	=====	=====	=====

THE FACTORY OVERHEAD BUDGET

The factory overhead budget provides a schedule of all manufacturing costs other than direct materials and direct labor, such as depreciation, property taxes and factory rent. In developing the cash budget, we must remember that depreciation does not entail a cash outlay and therefore must be deducted from the total factory overhead in computing cash disbursement for factory overhead.

EXAMPLE 5-7

To illustrate the factory overhead budget, we assume that

- Total factory overhead budgeted = \$6,000 fixed (per quarter), plus \$2 per hour of direct labor.
- Depreciation expenses are \$3,250 each quarter.
- All overhead costs involving cash outlays are paid for in the quarter incurred.

THE JOHNSON COMPANY Factory Overhead Budget For the Year Ending December 31, 20B

	Quarter				Total
	1	2	3	4	
Budgeted direct labor hours (Example 5-6)	3,950	3,600	4,450	4,100	16,100
Variable overhead rate	x \$2	x \$2	x \$2	x \$2	x \$2
Variable overhead budgeted	7,900	7,200	8,900	8,200	32,200
Fixed overhead budgeted	6,000	6,000	6,000	6,000	24,000
Total budgeted overhead	13,900	13,200	14,900	14,200	56,200
Less: Depreciation	3,250	3,250	3,250	3,250	13,000
Cash disbursement for overhead	10,650	9,950	11,650	10,950	43,200

THE ENDING INVENTORY BUDGET

The desired ending inventory budget provides the information required for the construction of budgeted financial statements. Specifically, it will help compute the cost of goods sold

on the budgeted income statement. Secondly, it will give the dollar value of the ending materials and finished goods inventory to appear on the budgeted balance sheet.

EXAMPLE 5-8

THE JOHNSON COMPANY Ending Inventory Budget For the Year Ending December 31, 20B Ending Inventory

	Units	Unit Cost	Total
Direct materials	250 pounds (Example 5-5)	\$2	\$500
Finished goods	100 units (Example 5-4)	\$41*	\$4,100

*The unit variable cost of \$41 is computed as follows:

	<u>Unit Cost</u>	<u>Units</u>	<u>Total</u>
Direct materials (Ex. 5-5)	\$2	3 pounds	\$ 6
Direct labor (Ex. 5-6)	5	5 hours	25
Variable overhead (Ex. 5-7)	2	5 hours	<u>10</u>
Total variable manufacturing cost			<u>\$41</u>

THE SELLING AND ADMINISTRATIVE EXPENSE BUDGET

The selling and administrative expense budget lists the operating expenses in selling the products and in managing the business. To complete the budgeted income statement in contribution format, variable selling and administrative expense per unit must be computed.

EXAMPLE 5-9

THE JOHNSON COMPANY Selling and Administrative Expense Budget For the Year Ending December 31, 20B

	<u>Quarter</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>Total</u>
Expected sales in units	800	700	900	800	3,200
Variable selling and administrative expense per unit*	<u>x \$4</u>	<u>x \$4</u>	<u>x \$4</u>	<u>x \$4</u>	<u>x \$4</u>
Budgeted variable expense	\$3,200	\$2,800	\$3,600	\$3,200	\$12,800
Fixed selling and administrative expenses:					
Advertising	1,100	1,100	1,100	1,100	4,400
Insurance	2,800				2,800
Office salaries	8,500	8,500	8,500	8,500	34,000
Rent	350	350	350	350	1,400
Taxes			<u>1,200</u>		<u>1,200</u>
Total budgeted selling and administrative expenses+	\$15,950	\$12,750	\$14,750	\$13,150	\$56,600
	=====	=====	=====	=====	=====

* Assumed. It includes sales agents' commissions, shipping, and supplies.

+ Paid for in the quarter incurred.

THE CASH BUDGET

The cash budget is prepared for the purpose of cash planning and control. It presents the expected cash inflow and outflow for a designated time period. The cash budget helps management keep cash balances in reasonable relationship to its needs. It aids in avoiding

unnecessary idle cash and possible cash shortages. The cash budget consists typically of four major sections:

1. The *receipts* section, which is the beginning cash balance, cash collections from customers, and other receipts such as proceeds of loans .
2. The *disbursements* section, which comprises all cash payments that are planned during the budget period.
3. The *cash surplus or deficit* section, which simply shows the difference between the cash receipts section and the cash disbursements section.
4. The *financing* section, which provides a detailed account of the borrowings and repayments expected during the budgeting period.

EXAMPLE 5-10

To illustrate, we will make the following assumptions:

- The company desires to maintain a \$5,000 minimum cash balance at the end of each quarter.
- All borrowing and repayment must be in multiples of \$500 at an interest rate of 10 percent per annum. Interest is computed and paid as the principal is repaid. Borrowing takes place at the beginning of each quarter and repayment is at the end of each quarter.

THE JOHNSON COMPANY Cash Budget For the Year Ending December 31, 20B

	From Example	<u>1</u>	<u>Quarter 2</u>	<u>3</u>	<u>4</u>	<u>Total</u>
Cash balance, beginning		10,000*	9,401	5,461	9,106	10,000
Add: Receipts:						
Collections from customers	5-3	<u>54,300</u>	<u>57,120</u>	<u>66,080</u>	<u>64,960</u>	<u>242,460</u>
Total cash available		<u>64,300</u>	<u>66,521</u>	<u>71,541</u>	<u>74,066</u>	<u>252,460</u>
Less: Disbursements:						
Direct materials	5-5	4,549	4,560	4,860	5,113	19,082
Direct labor	5-6	19,750	18,000	22,250	20,500	80,500
Factory overhead	5-7	10,650	9,950	11,650	10,950	43,200
Selling and Admin.	5-9	15,950	12,750	14,750	13,150	56,600
Machinery purchase	Given	--	24,300	--	--	24,300
Income tax	Given	<u>4,000</u>	<u>--</u>	<u>--</u>	<u>--</u>	<u>4,000</u>
Total disbursements		<u>54,899</u>	<u>69,560</u>	<u>53,510</u>	<u>49,713</u>	<u>227,682</u>
Cash surplus (deficit)		<u>9,401</u>	<u>(3,039)</u>	<u>18,031</u>	<u>24,353</u>	<u>24,778</u>
Financing:						
Borrowing	--	--	8,500	--	--	8,500
Repayment	--	--	--	(8,500)	--	(8,500)
Interest	--	--	--	(425)	--	(425)
Total financing		<u>--</u>	<u>8,500</u>	<u>(8,925)</u>	<u>--</u>	<u>(425)</u>
Cash balance, ending		<u>9,401</u>	<u>5,461</u>	<u>9,106</u>	<u>24,353</u>	<u>24,353</u>
		=====	=====	=====	=====	=====

*From balance sheet 20A.

THE BUDGETED INCOME STATEMENT

The budgeted income statement summarizes the various component projections of revenue and expenses for the budgeting period. However, for control purposes the budget can be divided into quarters or even months depending on the need.

EXAMPLE 5-11

THE JOHNSON COMPANY
Budgeted Income Statement
For the Year Ending December 31, 20B

From Example

Sales (3,200 units @ \$80)	5-3		\$256,000
Less: Variable expenses			
Variable cost of goods sold			
(3,200 units @ \$41)	5-4	\$131,200	
Variable selling & administrative	5-9	<u>12,800</u>	<u>144,000</u>
Contribution margin			112,000
Less: Fixed expenses			
Factory overhead	5-7	24,000	
Selling and administrative	5-9	<u>43,800</u>	<u>67,800</u>
Net operating income			44,200
Less: Interest expense	5-10		<u>425</u>
Income before taxes			43,775
Less: Income taxes	20%		<u>8,755</u>
Net income			<u>35,020</u>

THE BUDGETED BALANCE SHEET

The budgeted balance sheet is developed by beginning with the balance sheet for the year just ended and adjusting it, using all the activities that are expected to take place during the budgeting period. Some of the reasons why the budgeted balance sheet must be prepared are:

- (a) It could disclose some unfavorable financial conditions that management might want to avoid.
- (b) It serves as a final check on the mathematical accuracy of all the other schedules.
- (c) It helps management perform a variety of ratio calculations.
- (d) It highlights future resources and obligations.

EXAMPLE 5-12

To illustrate, we will use the following balance sheet for the year 20A.

THE JOHNSON COMPANY
Balance Sheet
As of December 31, 20A

<u>ASSETS</u>		<u>LIABILITIES AND STOCKHOLDERS' EQUITY</u>	
Current Assets:		Current Liabilities:	
Cash	10,000	Accounts Payable	2,200
Accounts Receivable	9,500	Income Tax Payable	<u>4,000</u>
Material Inventory	474	Total Current Liabilities	6,200
Finished Goods Inventory	<u>3,280</u>		
Total Current Assets	23,254		
Fixed Assets:		Stockholders' Equity:	
Land	50,000	Common Stock, No-Par	70,000
Building and Equipment	100,000	Retained Earnings	37,054
Accumulated Depreciation	<u>(60,000)</u>		
	<u>90,000</u>		
Total Assets	<u>113,254</u>	Total Liabilities and Stockholders' equity	<u>113,254</u>

THE JOHNSON COMPANY
Budgeted Balance Sheet
As of December 31, 20B

<u>ASSETS</u>		<u>LIABILITIES AND STOCKHOLDERS' EQUITY</u>	
Current Assets:		Current Liabilities:	
Cash	24,353(a)	Accounts Payable	2,464(h)
Accounts Receivable	23,040(b)	Income Tax Payable	<u>8,755(i)</u>
Material Inventory	<u>500(c)</u>	Total Current Liabilities	11,219
Finished Goods Inventory	4,100(d)		
Total Current Assets	<u>\$51,993</u>		
Fixed Assets:		Stockholders' Equity:	
Land	50,000(e)	Common Stock, No-Par	70,000(j)
Building and Equipment	124,300(f)	Retained Earnings	72,074(k)
Accumulated Depreciation	<u>(73,000)(g)</u>		
	<u>01,300</u>		
Total Assets	<u>153,293</u>	Total Liabilities and Stockholders' Equity	<u>153,293</u>

Computations:

(a) From Example 5-10 (cash budget).

(b) \$9,500 (from balance sheet 20A) + \$256,000 sales (from Example 5-3) - \$242,460 receipts (from Example 5-3) = \$23,040.

- (c) and (d) From Example 5-8 (ending inventory budget).
 (e) No change.
 (f) \$100,000 (from balance sheet 20A) + \$24,300 (from Example 5-10) = \$124,300.
 (g) \$60,000 (from balance sheet 20A) + \$13,000 (from Example 5-7) = \$73,000.
 (h) \$2,200 (from balance sheet 20A) + \$19,346 (from Example 5-5) - \$19,082 (from Example 5-5) = \$2,464 (all accounts payable relate to material purchases), or 50% of 4th quarter purchase = 50% (\$4,928) = 2,464.
 (i) From Example 5-11 (budgeted income statement).
 (j) No change.
 (k) \$37,054 (from balance sheet 20A) + \$35,020 net income (from Example 5-11) = \$72,074.

SOME FINANCIAL RATIO CALCULATIONS

To see what kind of financial condition the Johnson Company is expected to be in for the budgeting year, a sample of financial ratio calculations are in order: (Assume 20A after-tax net income was \$15,000)

	20A	20B
Current ratio		
(Current assets/ current liabilities)	$= \$23,254/\$6,200$ $= 3.75$	$= \$51,993/\$11,219$ $= 4.63$
Return on total assets		
(Net income after taxes/ total assets)	$= \$15,000/\$113,254$ $= 13.24\%$	$= \$35,020/\$153,293$ $= 22.85\%$

Sample calculations indicate that the Johnson Company is expected to have better liquidity as measured by the current ratio. Overall performance will be improved as measured by return on total assets. This could be an indication that the contemplated plan may work out well.

USING AN ELECTRONIC SPREADSHEET TO DEVELOP A BUDGET PLAN

Example 5-3 to 5-12 showed a detailed procedure for formulating a master budget. However, in practice a short-cut approach to budgeting is quite common using computer technology. Using a spreadsheet program such as Excel, financial managers will be able to evaluate various "what-if" scenarios.

CONCLUSION

Financial forecasting, an essential element of planning, is a vital function of financial managers. It is needed where the future financing needs are being estimated. Basically, forecasts of future sales and their related expenses provide the firm with the information needed to project its financing requirements. The chapter discussed two major methods: (1) a short-cut technique of financial forecasting, referred to as the percent-of-sales method and (2) the budgetary system, including the cash budget. Financial forecasting and budgeting can be done with ease with the aid of electronic spreadsheet software such as Excel.

CHAPTER 6

THE TIME VALUE OF MONEY

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Outline the concept of future value, with both annual and intrayear compounding.
- Distinguish between future value and present value concepts.
- Calculate the future value of a single payment and an annuity.
- Calculate the present value of a single payment and an annuity.
- Compare and contrast future value and present value tables.
- Determine some important financial variables such as a sinking fund amount, the monthly payment of an amortized loan, and annual percentage rate (APR).

A dollar now is worth more than a dollar to be received later. This statement sums up an important principle: money has a time value. The truth of this principle is not that inflation might make the dollar received at a later time worth less in buying power. The reason is that you could invest the dollar now and have more than a dollar at the specified later date.

Time value of money is a critical consideration in financial and investment decisions. For example, compound interest calculations are needed to determine future sums of money resulting from an investment. Discounting, or the calculation of present value, which is inversely related to compounding, is used to evaluate the future cash flow associated with capital budgeting projects. There are plenty of applications of time value of money in finance.

HOW DO YOU CALCULATE FUTURE VALUES - HOW MONEY GROWS?

A dollar in hand today is worth more than a dollar to be received tomorrow because of the interest it could earn from putting it in a savings account or placing it in an investment account. Compounding interest means that interest earns interest. For the discussion of the concepts of compounding and time value, let us define:

F_n = future value = the amount of money at the end of year n

P = principal

i = annual interest rate

n = number of years

Then,

F_1 = the amount of money at the end of year 1
= principal and interest = $P + iP = P(1+i)$

F_2 = the amount of money at the end of year 2
= $F_1(1+i) = P(1+i)(1+i) = P(1+i)^2$

The future value of an investment compounded annually at rate i for n years is

$$F_n = P(1+i)^n = P \cdot T_1(i,n)$$

where $T_1(i,n)$ is the compound amount of \$1 and can be found in Table 6-1 in the Appendix.

EXAMPLE 6-1

You place \$1,000 in a savings account earning 8 percent interest compounded annually. How much money will you have in the account at the end of 4 years?

$$F_n = P(1+i)^n$$

$$F_4 = \$1,000 (1 + 0.08)^4 = \$1,000 T_1(8\%, 4 \text{ years})$$

From Table 6-1, the T_1 for 4 years at 8 percent is 1.361. Therefore,

$$F_4 = \$1,000 (1.361) = \$1,361.$$

EXAMPLE 6-2

You invested a large sum of money in the stock of TLC Corporation. The company paid a \$3 dividend per share. The dividend is expected to increase by 20 percent per year for the next 3 years. You wish to project the dividends for years 1 through 3.

$$F_n = P(1+i)^n$$

$$F_1 = \$3(1+0.2)^1 = \$3 T_1(20\%, 1) = \$3 (1.200) = \$3.60$$

$$F_2 = \$3(1+0.2)^2 = \$3 T_1(20\%, 2) = \$3 (1.440) = \$4.32$$

$$F_3 = \$3(1+0.2)^3 = \$3 T_1(20\%, 3) = \$3 (1.728) = \$5.18$$

INTRAYEAR COMPOUNDING

Interest is often compounded more frequently than once a year. Banks, for example, compound interest quarterly, daily and even continuously. If interest is compounded m times a year, then the general formula for solving the future value becomes

$$F_n = P\left(1 + \frac{i}{m}\right)^{n \bullet m} = P \bullet T_1(i/m, n \bullet m)$$

The formula reflects more frequent compounding ($n \bullet m$) at a smaller interest rate per period (i/m). For example, in the case of semiannual compounding ($m = 2$), the above formula becomes

$$F_n = P(1+i/2)^{n \bullet 2} = P \bullet T_1(i/2, n \bullet 2)$$

EXAMPLE 6-3

You deposit \$10,000 in an account offering an annual interest rate of 20 percent. You will keep the money on deposit for five years. The interest rate is compounded quarterly. The accumulated amount at the end of the fifth year is calculated as follows:

$$F_n = P\left(1 + \frac{i}{m}\right)^{n \bullet m} = P \bullet T_1(i/m, n \bullet m)$$

where $P = \$10,000$
 $i/m = 20\%/4 = 5\%$
 $n \bullet m = 5 \times 4 = 20$

Therefore,

$$F_5 = \$10,000(1 + .05)^{20} = \$10,000 T_1(5\%, 20) = \$10,000 (2.653) = \$26,530$$

EXAMPLE 6-4

Assume that $P = \$1,000$, $i = 8\%$ and $n = 2$ years. Then for

Annual compounding ($m=1$):

$$F_2 = \$1,000(1+0.08)^2 = \$1,000 T_1(8\%, 2) = \$1,000(1.166) = \$1,166.00$$

Semiannual compounding (m=2):

$$\begin{aligned} F_2 &= \$1,000 \left(1 + \frac{0.08}{2}\right)^{2 \cdot 2} \\ &= \$1,000(1+.04)^4 = \$1,000 T_1(4\%,4) \\ &= \$1,000(1.170) \\ &= \$1,170.00 \end{aligned}$$

Quarterly compounding (m=4):

$$\begin{aligned} F_2 &= \$1,000 \left(1 + \frac{0.08}{4}\right)^{2 \cdot 4} \\ &= \$1,000(1+.02)^8 = \$1,000 T_1(2\%,8) \\ &= \$1,000(1.172) \\ &= \$1,172.00 \end{aligned}$$

As the example shows, the more frequently interest is compounded, the greater the amount accumulated. This is true for any interest for any period of time.

FUTURE VALUE OF AN ANNUITY

An annuity is defined as a series of payments (or receipts) of a fixed amount for a specified number of periods. Each payment is assumed to occur at the end of the period. The future value of an annuity is a compound annuity which involves depositing or investing an equal sum of money at the end of each year for a certain number of years and allowing it to grow.

Let S_n = the future value on an n-year annuity

A = the amount of an annuity

Then we can write

$$\begin{aligned} S_n &= A(1+i)^{n-1} + A(1+i)^{n-2} + \dots + A(1+i)^0 \\ &= A[(1+i)^{n-1} + (1+i)^{n-2} + \dots + (1+i)^0] \\ &= A \cdot \sum_{t=0}^{n-1} (1+i)^t = A \left[\frac{(1+i)^n - 1}{i} \right] = A \cdot T_2(i, n) \end{aligned}$$

where $T_2(i, n)$ represents the future value of an annuity of \$1 for n years compounded at i percent and can be found in Table 6-2 in the Appendix.

EXAMPLE 6-5

You wish to determine the sum of money you will have in a savings account at the end of 6 years by depositing \$1,000 at the end of each year for the next 6 years. The annual interest rate is 8 percent. The $T_2(8\%, 6 \text{ years})$ is given in Table 6-2 as 7.336. Therefore,

$$S_6 = \$1,000 T_2(8\%, 6) = \$1,000 (7.336) = \$7,336$$

EXAMPLE 6-6

You deposit \$30,000 semiannually into a fund for ten years. The annual interest rate is 8 percent. The amount accumulated at the end of the tenth year is calculated as follows:

$$S_n = A \cdot T_2(i, n)$$

where $A = \$30,000$

$$i = 8\%/2 = 4\%$$

$$n = 10 \times 2 = 20$$

Therefore,

$$\begin{aligned} S_n &= \$30,000 T_2(4\%, 20) \\ &= \$30,000 (29.778) = \$893,340 \end{aligned}$$

WHAT IS PRESENT VALUE - HOW MUCH MONEY IS WORTH NOW?

Present value is the present worth of future sums of money. The process of calculating present values, or discounting, is actually the opposite of finding the compounded future value. In connection with present value calculations, the interest rate i is called the *discount rate*. The discount rate we use is more commonly called the *cost of capital*, which is the minimum rate of return required by the investor. How to determine the cost of capital is covered in detail in Chapter 9 (The Cost of Capital).

Recall that $F_n = P (1+i)^n$

Therefore,

$$P = \frac{F_n}{(1+i)^n} = F_n \left[\frac{1}{(1+i)^n} \right] = F_n \cdot T_3(i,n)$$

Where $T_3(i,n)$ represents the present value of \$1 and is given in Table 6-3 in the Appendix.

EXAMPLE 6-7

You have been given an opportunity to receive \$20,000 6 years from now. If you can earn 10 percent on your investments, what is the most you should pay for this opportunity? To answer this question, you must compute the present value of \$20,000 to be received 6 years from now at a 10 percent rate of discount. F_6 is \$20,000, i is 10 percent, and n is 6 years. $T_3(10\%,6)$ from Table 3 is 0.565.

$$P = \$20,000 \left[\frac{1}{(1+0.1)^6} \right] = \$20,000 T_3(10\%,6) = \$20,000(0.565) = \$11,300$$

This means that you can earn 10 percent on your investment, and you would be indifferent to receiving \$11,300 now or \$20,000 6 years from today since the amounts are time equivalent. In other words, you could invest \$11,300 today at 10 percent and have \$20,000 in 6 years.

PRESENT VALUE OF MIXED STREAMS OF CASH FLOWS

The present value of a series of mixed payments (or receipts) is the sum of the present value of each individual payment. We know that the present value of each individual payment is the payment times the appropriate T_3 value.

EXAMPLE 6-8

You are thinking of starting a new product line that initially costs \$32,000. Your annual projected cash inflows are:

Year 1	\$10,000
Year 2	\$20,000
Year 3	\$5,000

If you must earn a minimum of 10 percent on your investment, should you undertake this new product line?

The present value of this series of mixed streams of cash inflows is calculated as follows:

<i>Year</i>	<i>Cash inflows</i>	<i>x T3(10%, n)</i>	<i>Present Value</i>
1	\$10,000	0.909	\$9,090
2	\$20,000	0.826	\$16,520
3	\$5,000	0.751	<u>\$3,755</u>
			<u>\$29,365</u>

Since the present value of your projected cash inflows is less than the initial investment, you should not undertake this project.

PRESENT VALUE OF AN ANNUITY

Interest received from bonds, pension funds, and insurance obligations all involve annuities. To compare these financial instruments, we need to know the present value of each. The present value of an annuity (P_n) can be found by using the following equation:

$$\begin{aligned}
 P_n &= A \cdot \left[\frac{1}{(1+i)^1} \right] + A \cdot \left[\frac{1}{(1+i)^2} \right] + \dots + A \cdot \left[\frac{1}{(1+i)^n} \right] \\
 &= A \cdot \left[\frac{1}{(1+i)^1} + \frac{1}{(1+i)^2} + \dots + \frac{1}{(1+i)^n} \right] \\
 &= A \cdot \sum_{t=1}^n \frac{1}{(1+i)^t} = A \cdot \frac{1}{i} \left[1 - \frac{1}{(1+i)^n} \right] \\
 &= A \cdot T_4(i, n)
 \end{aligned}$$

where $T_4(i, n)$ represents the present value of an annuity of \$1 discounted at i percent for n years and is found in Table 6-4.

EXAMPLE 6-9

Assume that the cash inflows in Example 6-8 form an annuity of \$10,000 for 3 years. Then the present value is

$$P_n = A \cdot T_4(i, n)$$

$$P_3 = \$10,000 T_4(10\%, 3 \text{ years}) = \$10,000 (2.487) = \$24,870$$

PERPETUITIES

Some annuities go on forever, called perpetuities. An example of a perpetuity is preferred stock which yields a constant dollar dividend indefinitely. The present value of a perpetuity is found as follows:

$$\text{Present value of a perpetuity} = \frac{\text{receipt}}{\text{discount rate}} = \frac{A}{i}$$

EXAMPLE 6-10

Assume that a perpetual bond has an \$80-per-year interest payment and that the discount rate is 10 percent. The present value of this perpetuity is:

$$P = \frac{A}{i} = \frac{\$80}{0.10} = \$800$$

WHAT ARE THE APPLICATIONS OF FUTURE VALUES AND PRESENT VALUES?

Future and present values have numerous applications in financial and investment decisions. Six of these applications are presented below.

DEPOSITS TO ACCUMULATE A FUTURE SUM (OR SINKING FUND)

A financial manager might wish to find the annual deposit (or payment) that is necessary to accumulate a future sum. To find this future amount (or sinking fund) we can use the formula for finding the future value of an annuity.

$$S_n = A \bullet T_2(i, n)$$

Solving for A, we obtain:

$$\text{Annual deposit amount} = A = \frac{S_n}{T_2(i, n)}$$

EXAMPLE 6-11

You wish to determine the equal annual end-of-year deposits required to accumulate \$5,000 at the end of 5 years in a fund. The interest rate is 10 percent. The annual deposit is:

$$S_5 = \$5,000$$

$$T_2(10\%, 5 \text{ years}) = 6.105 \text{ (from Table 6-2)}$$

$$A = \frac{\$5,000}{6.105} = \$819$$

In other words, if you deposit \$819 at the end of each year for 5 years at 10 percent interest, you will have accumulated \$5,000 at the end of the fifth year.

EXAMPLE 6-12

You need a sinking fund for the retirement of a bond 30 years from now. The interest rate is 10 percent. The annual year-end contribution needed to accumulate \$1,000,000 is

$$S_{30} = \$1,000,000$$

$$T_2(10\%, 30 \text{ years}) = 164.49$$

$$A = \frac{\$1,000,000}{164.49} = 6,079.40$$

AMORTIZED LOANS

If a loan is to be repaid in equal periodic amounts, it is said to be an amortized loan. Examples include auto loans, mortgage loans, and most commercial loans. The periodic payment can easily be computed as follows:

$$P_n = A \bullet T_4(i, n)$$

Solving for A, we obtain:

$$\text{Amount of loan} = A = \frac{P_n}{T_4(i, n)}$$

EXAMPLE 6-13

You borrow \$200,000 for five years at an interest rate of 14 percent. The annual year-end payment on the loan is calculated as follows:

$$P_5 = \$200,000$$

$$T_4(14\%, 5 \text{ years}) = 3.433 \text{ (from Table 6-4)}$$

$$\begin{aligned} \text{Amount of loan} = A &= \frac{P_5}{T_4(14\%, 5 \text{ years})} = \frac{\$200,000}{3.433} \\ &= \$58,258.08 \end{aligned}$$

EXAMPLE 6-14

You take out a 40-month bank loan of \$5,000 at a 12 percent annual interest rate. You want to find out the monthly loan payment.

$$i = 12\% / 12 \text{ months} = 1\%$$

$$P_{40} = \$5,000$$

$$T_4(1\%, 40 \text{ months}) = 32.835 \text{ (from Table 6-4)}$$

$$\text{Therefore, } A = \frac{\$5,000}{32.835} = \$152.28$$

So, to repay the principal and interest on a \$5,000, 12 percent, 40-month loan, you have to pay \$152.28 a month for the next 40 months.

EXAMPLE 6-15

Assume that a firm borrows \$2,000 to be repaid in three equal installments at the end of each of the next 3 years. The bank charges 12 percent interest. The amount of each payment is

$$P_3 = \$2,000$$

$$T_4(12\%, 3 \text{ years}) = 2.402$$

$$\text{Therefore, } A = \frac{\$2,000}{2.402} = \$832.64$$

HOW TO DEVELOP LOAN AMORTIZATION SCHEDULE

Each loan payment consists partly of interest and partly of principal. The breakdown is often displayed in a loan amortization schedule. The interest component of the payment is largest in the first period (because the principal balance is the highest) and subsequently declines, whereas the principal portion is smallest in the first period (because of the high interest) and increases thereafter, as shown in the following example.

EXAMPLE 6-16

Using the same data as in Example 15, we set up the following amortization schedule:

<u>Year</u>	<u>Payment</u>	<u>Interest</u>	<u>Repayment of Principal</u>	<u>Remaining Balance</u>
0				\$2,000.00
1	\$832.64	\$240.00(a)	\$592.64(b)	\$1,407.36

2	\$832.64	\$168.88	\$663.76	\$743.60
3	\$832.64	\$89.23	\$743.41(c)	

(a) Interest is computed by multiplying the loan balance at the beginning of the year by the interest rate. Therefore, interest in year 1 is $\$2,000(0.12) = \240 ; in year 2 interest is $\$1,407.36(0.12) = \168.88 ; and in year 3 interest is $\$743.60(0.12) = \89.23 . All figures are rounded.

(b) The reduction in principal equals the payment less the interest portion ($\$832.64 - \$240.00 = \$592.64$)

(c) Not exact because of accumulated rounding errors.

ANNUAL PERCENTAGE RATE (APR)

Different types of investments use different compounding periods. For example, most bonds pay interest semiannually; banks generally pay interest quarterly. If a financial manager wishes to compare investments with different compounding periods, he or she needs to put them on a common basis. The annual percentage rate (APR), or effective annual rate, is used for this purpose and is computed as follows:

$$APR = \left(1 + \frac{i}{m}\right)^m - 1.0$$

where i = the stated, nominal or quoted rate and m = the number of compounding periods per year.

EXAMPLE 6-17

If the nominal rate is 6 percent, compounded quarterly, the APR is

$$APR = \left(1 + \frac{i}{m}\right)^m - 1.0 = \left(1 + \frac{0.06}{4}\right)^4 - 1.0 = (1.015)^4 - 1.0 = 1.0614 - 1.0 = 0.0614 = 6.14\%$$

This means that if one bank offered 6 percent with quarterly compounding, while another offered 6.14 percent with annual compounding, they would both be paying the same effective rate of interest.

Annual percentage rate (APR) also is a measure of the cost of credit, expressed as a yearly rate. It includes interest as well as other financial charges such as loan origination and certain closing fees. The lender is required to tell you the APR. It provides you with a good basis for comparing the cost of loans, including mortgage plans.

RATES OF GROWTH

In finance, it is necessary to calculate the compound annual rate of growth, associated with a stream of earnings. The compound annual growth rate in earnings per share is computed as follows:

$$F_n = P \cdot T_1(i, n)$$

Solving this for T_1 , we obtain

$$T_1(i, n) = \frac{F_n}{P}$$

EXAMPLE 6-18

Assume that your company has earnings per share of \$2.50 in 19x1, and 10 years later the earnings per share has increased to \$3.70. The compound annual rate of growth in earnings per share is computed as follows:

$$F_{10} = \$3.70 \text{ and } P = \$2.50$$

Therefore,

$$T_1(i, 10) = \frac{\$3.70}{\$2.50} = 1.48$$

From Table 6-1 an T_1 of 1.48 at 10 years is at $i = 4\%$. The compound annual rate of growth is therefore 4 percent.

BOND VALUES

Bonds call for the payment of a specific amount of interest for a stated number of years and the repayment of the face value at the maturity date. Thus, a bond represents an annuity plus a lump sum. Its value is found as the present value of the payment stream. The interest is usually paid semiannually.

$$V = \sum_{t=1}^n \frac{I}{(1+i)^t} + \frac{M}{(1+i)^n}$$

$$= I \cdot T_4(i, n) + M \cdot T_3(i, n)$$

where I = interest payment per period

M = par value, or maturity value, usually \$1,000

i = investor's required rate of return

n = number of periods

This topic is covered in more detail in Chapter 8 (Valuation of Stocks and Bonds).

EXAMPLE 6-19

Assume there is a 10-year bond with a 10 percent coupon, paying interest semiannually and having a face value of \$1,000. Since interest is paid semiannually, the number of periods involved is 20 and the semiannual cash inflow is $\$100/2 = \50 .

Assume that you have a required rate of return of 12 percent for this type of bond. Then, the present value (V) of this bond is:

$$V = \$50 \cdot T_4(6\%, 20) + \$1,000 \cdot T_3(6\%, 20)$$

$$= \$50(11.470) + \$1,000(0.312) = \$573.50 + \$312.00 = \$885.50$$

Note that the required rate of return (12 percent) is higher than the coupon rate of interest (10 percent), and so the bond value (or the price investors are willing to pay for this particular bond) is less than its \$1,000 face value.

CAN A COMPUTER HELP?

Besides manual calculations using future and present value tables discussed so far, these calculations also can be done using:

- (a) Financial calculators
- (b) Spreadsheet software such as *Excel*.

Note: Depending on the method you use, rounding errors in answers are unavoidable. Computer software can be extremely helpful in making these calculations. For example, $PV(\text{rate}, \text{nper}, \text{pmt}, \text{fv}, \text{type})$ of *Excel* determines the present value of an investment, based on a

series of equal payments, discounted at a periodic interest rate over the number of periods. To calculate the present value of an annuity due, use the following formula:
 $PV(rate, nper, pmt, fv, type) * (1 + rate)$.

CONCLUSION

The basic idea of the time value of money is that money received in the future is not as valuable as money received today. The time value of money is a critical factor in many financial and investment applications such as finding the amount of deposits to accumulate a future sum and the periodic payment of an amortized loan. The development of the time value of money concept permits comparison of sums of money that are available at different points in time. This chapter developed two basic concepts: future value and present value. It showed how these values are calculated and can be applied to various financial and investment situations.

TABLE 6-1
THE FUTURE VALUE OF \$1
(COMPOUND AMOUNT OF \$1.00) = $(1 + i)^n = T_1(i, n)$

Periods	4%	6%	8%	10%	12%	14%	20%
1	1.040	1.060	1.080	1.100	1.120	1.140	1.200
2	1.082	1.124	1.166	1.210	1.254	1.300	1.440
3	1.125	1.191	1.260	1.331	1.405	1.482	1.728
4	1.170	1.263	1.361	1.464	1.574	1.689	2.074
5	1.217	1.338	1.469	1.611	1.762	1.925	2.488
6	1.265	1.419	1.587	1.772	1.974	2.195	2.986
7	1.316	1.504	1.714	1.949	2.211	2.502	3.583
8	1.369	1.594	1.851	2.144	2.476	2.853	4.300
9	1.423	1.690	1.999	2.359	2.773	3.252	5.160
10	1.480	1.791	2.159	2.594	3.106	3.707	6.192
11	1.540	1.898	2.332	2.853	3.479	4.226	7.430
12	1.601	2.012	2.518	3.139	3.896	4.818	8.916
13	1.665	2.133	2.720	3.452	4.364	5.492	10.699
14	1.732	2.261	2.937	3.798	4.887	6.261	12.839
15	1.801	2.397	3.172	4.177	5.474	7.138	15.407
16	1.873	2.540	3.426	4.595	6.130	8.137	18.488
17	1.948	2.693	3.700	5.055	6.866	9.277	22.186
18	2.026	2.854	3.996	5.560	7.690	10.575	26.623
19	2.107	3.026	4.316	6.116	8.613	12.056	31.948
20	2.191	3.207	4.661	5.728	9.646	13.743	38.338
30	3.243	5.744	10.063	17.450	29.960	50.950	237.380
40	4.801	10.286	21.725	45.260	93.051	188.880	1469.800

TABLE 6-2
THE FUTURE VALUE OF AN ANNUITY OF \$1
(COMPOUND AMOUNT OF AN ANNUITY OF \$1) = $T_2(i,n)$

Periods	4%	6%	8%	10%	12%	14%	20%
1	1.000	1.000	1.000	1.000	1.000	1.000	1.000
2	2.040	2.060	2.080	2.100	2.120	2.140	2.200
3	3.122	3.184	3.246	3.310	3.374	3.440	3.640
4	4.247	4.375	4.506	4.641	4.779	4.921	5.368
5	5.416	5.637	5.867	6.105	6.353	6.610	7.442
6	6.633	6.975	7.336	7.716	8.115	8.536	9.930
7	7.898	8.394	8.923	9.487	10.089	10.730	12.916
8	9.214	9.898	10.637	11.436	12.300	13.233	16.499
9	10.583	11.491	12.488	13.580	14.776	16.085	20.799
10	12.006	13.181	14.487	15.938	17.549	19.337	25.959
11	13.486	14.972	16.646	18.531	20.655	23.045	32.150
12	15.026	16.870	18.977	21.385	24.133	37.271	39.580
13	16.627	18.882	21.495	24.523	28.029	32.089	48.497
14	18.292	21.015	24.215	27.976	32.393	37.581	59.196
15	20.024	23.276	27.152	31.773	37.280	43.842	72.035
16	21.825	25.673	30.324	35.950	42.753	50.980	87.442
17	23.698	28.213	33.750	40.546	48.884	59.118	105.930
18	25.645	30.906	37.450	45.600	55.750	68.394	128.120
19	27.671	33.760	41.446	51.160	63.440	78.969	154.740
20	29.778	36.778	45.762	57.276	75.052	91.025	186.690
30	56.085	79.058	113.283	164.496	241.330	356.790	1181.900
40	95.026	154.762	259.057	442.597	767.090	1342.000	7343.900

*Payments (or receipts) at the *end* of each period.

TABLE 6-3

THE PRESENT VALUE OF \$1 = $T_3(i,n)$

Periods	4%	6%	8%	10%	12%	14%	16%	18%	20%	22%	24%	26%	28%	30%	40%
1	.962	.943	.926	.909	.893	.877	.862	.847	.833	.820	.806	.794	.781	.769	.714
2	.925	.890	.857	.826	.797	.769	.743	.718	.694	.672	.650	.630	.610	.592	.510
3	.889	.840	.794	.751	.712	.675	.641	.609	.579	.551	.524	.500	.477	.455	.364
4	.855	.792	.735	.683	.636	.592	.552	.516	.482	.451	.423	.397	.373	.350	.260
5	.822	.747	.681	.621	.567	.519	.476	.437	.402	.370	.341	.315	.291	.269	.186
6	.790	.705	.630	.564	.507	.456	.410	.370	.335	.303	.275	.250	.227	.207	.133
7	.760	.665	.583	.513	.452	.400	.354	.314	.279	.249	.222	.198	.178	.159	.095
8	.731	.627	.540	.467	.404	.351	.305	.266	.233	.204	.179	.157	.139	.123	.068
9	.703	.592	.500	.424	.361	.308	.263	.225	.194	.167	.144	.125	.108	.094	.048
10	.676	.558	.463	.386	.322	.270	.227	.191	.162	.137	.116	.099	.085	.073	.035
11	.650	.527	.429	.350	.287	.237	.195	.162	.135	.112	.094	.079	.066	.056	.025
12	.625	.497	.397	.319	.257	.208	.168	.137	.112	.092	.076	.062	.052	.043	.018
13	.601	.469	.368	.290	.229	.182	.145	.116	.093	.075	.061	.050	.040	.033	.013
14	.577	.442	.340	.263	.205	.160	.125	.099	.078	.062	.049	.039	.032	.025	.009
15	.555	.417	.315	.239	.183	.140	.108	.084	.065	.051	.040	.031	.025	.020	.006
16	.534	.394	.292	.218	.163	.123	.093	.071	.054	.042	.032	.025	.019	.015	.005
17	.513	.371	.270	.198	.146	.108	.080	.060	.045	.034	.026	.020	.015	.012	.003
18	.494	.350	.250	.180	.130	.095	.069	.051	.038	.028	.021	.016	.012	.009	.002
19	.475	.331	.232	.164	.116	.083	.060	.043	.031	.023	.017	.012	.009	.007	.002
20	.456	.312	.215	.149	.104	.073	.051	.037	.026	.019	.014	.010	.007	.005	.001
21	.439	.294	.199	.135	.093	.064	.044	.031	.022	.015	.011	.008	.006	.004	.001
22	.422	.278	.184	.123	.083	.056	.038	.026	.018	.013	.009	.006	.004	.003	.001
23	.406	.262	.170	.112	.074	.049	.033	.022	.015	.010	.007	.005	.003	.002	
24	.390	.247	.158	.102	.066	.043	.028	.019	.013	.008	.006	.004	.003	.002	
25	.375	.233	.146	.092	.059	.038	.024	.016	.010	.007	.005	.003	.002	.001	
26	.361	.220	.135	.084	.053	.033	.021	.014	.009	.006	.004	.002	.002	.001	
27	.347	.207	.125	.076	.047	.029	.018	.011	.007	.005	.003	.002	.001	.001	
28	.333	.196	.116	.069	.042	.026	.016	.010	.006	.004	.002	.002	.001	.001	
29	.321	.185	.107	.063	.037	.022	.014	.008	.005	.003	.002	.001	.001	.001	
30	.308	.174	.099	.057	.033	.020	.012	.007	.004	.003	.002	.001	.001		
40	.208	.097	.046	.022	.011	.005	.003	.001	.001						

TABLE 6-4

THE PRESENT VALUE OF AN ANNUITY OF \$1 = $T_4(i,n)$

Periods	3%	4%	5%	6%	7%	8%	10%	12%	14%	15%	18%	20%	22%	24%
1	.9709	.9615	.9524	.9434	.9346	.9259	.9091	.8929	.8772	.8621	.8475	.8333	.8197	.8065
2	1.9135	1.8861	1.8594	1.8334	1.8080	1.7833	1.7355	1.6901	1.6467	1.6052	1.5656	1.5278	1.4915	1.4568
3	2.8286	2.7751	2.7232	2.6730	2.6243	2.5771	2.4869	2.4018	2.3216	2.2459	2.1743	2.1065	2.0422	1.9813
4	3.7171	3.6299	3.5460	3.4651	3.3872	3.3121	3.1699	3.0373	2.9137	2.7982	2.6901	2.5887	2.4936	2.4043
5	4.5797	4.4518	4.3295	4.2124	4.1002	3.9927	3.7908	3.6048	3.4331	3.2743	3.1272	2.9906	2.8636	2.7454
6	5.4172	5.2421	5.0757	4.9173	4.7665	4.6229	4.3553	4.1114	3.8887	3.6847	3.4976	3.3255	3.1669	3.0205
7	6.2303	6.0021	5.7864	5.5824	5.3893	5.2064	4.8684	4.5638	4.2883	4.0386	3.8115	3.6046	3.4155	3.2423
8	7.0197	6.7327	6.4632	6.2098	5.9713	5.7466	5.3349	4.9676	4.6389	4.3436	4.0776	3.8372	3.6193	3.4212
9	7.7861	7.4353	7.1078	6.8017	6.5152	6.2469	5.7590	5.3282	4.9464	4.6065	4.3030	4.0310	3.7863	3.5655
10	8.5302	8.1109	7.7217	7.3601	7.0236	6.7101	6.1446	5.6502	5.2161	4.8332	4.4941	4.1925	3.9232	3.6819
11	9.2526	8.7605	8.3064	7.8869	7.4987	7.1390	6.4951	5.9377	5.4527	5.0286	4.6560	4.3271	4.0354	3.7757
12	9.9540	9.3851	8.8633	8.3838	7.9427	7.5361	6.8137	6.1944	5.6603	5.1971	4.7932	4.4392	4.1274	3.8514
13	10.6350	9.9856	9.3936	8.8527	8.3577	7.9038	7.1034	6.4235	5.8424	5.3423	4.9095	4.5327	4.2028	3.9124
14	11.2961	10.5631	9.8986	9.2950	8.7455	8.2442	7.3667	6.6282	6.0021	5.4675	5.0081	4.6106	4.2646	3.9616
15	11.9379	11.1184	10.3797	9.7122	9.1079	8.5595	7.6061	6.8109	6.1422	5.5755	5.0916	4.6755	4.3152	4.0013
16	12.5611	11.6523	10.8378	10.1059	9.4466	8.8514	7.8237	6.9740	6.2651	5.6685	5.1624	4.7296	4.3567	4.0333
17	13.1661	12.1657	11.2741	10.4773	9.7632	9.1216	8.0216	7.1196	6.3729	5.7487	5.2223	4.7746	4.3908	4.0591
18	13.7535	12.6593	11.6896	10.8276	10.0591	9.3719	8.2014	7.2497	6.4674	5.8178	5.2732	4.8122	4.4187	4.0799
19	14.3238	13.1339	12.0853	11.1581	10.3356	9.6036	8.3649	7.3658	6.5504	5.8775	5.3162	4.8435	4.4415	4.0967
20	14.8775	13.5903	12.4622	11.4699	10.5940	9.8181	8.5136	7.4694	6.6231	5.9288	5.3527	4.8696	4.4603	4.1103
21	15.4150	14.0292	12.8212	11.7641	10.8355	10.0168	8.6487	7.5620	6.6870	5.9731	5.3837	4.8913	4.4756	4.1212
22	15.9369	14.4511	13.1630	12.0416	11.0612	10.2007	8.7715	7.6446	6.7429	6.0113	5.4099	4.9094	4.4882	4.1300
23	16.4436	14.8568	13.4886	12.3034	11.2722	10.3711	8.8832	7.7184	6.7921	6.0442	5.4321	4.9245	4.4985	4.1371
24	16.9355	15.2470	13.7986	12.5504	11.4693	10.5288	8.9847	7.7843	6.8351	6.0726	5.4509	4.9371	4.5070	4.1428
25	17.4131	15.6221	14.0939	12.7834	11.6536	10.6748	9.0770	7.8431	6.8729	6.0971	5.4669	4.9476	4.5139	4.1474
26	17.8768	15.9828	14.3752	13.0032	11.8258	10.8100	9.1609	7.8957	6.9061	6.1182	5.4804	4.9563	4.5196	4.1511
27	18.3270	16.3296	14.6430	13.2105	11.9867	10.9352	9.2372	7.9426	6.9352	6.1364	5.4919	4.9636	4.5243	4.1542
28	18.7641	16.6631	14.8981	13.4062	12.1371	11.0511	9.3066	7.9844	6.9607	6.1520	5.5016	4.9697	4.5281	4.1566
29	19.1885	16.9837	15.1411	13.5907	12.2777	11.1584	9.3696	8.0218	6.9830	6.1656	5.5098	4.9747	4.5312	4.1585
30	19.6004	17.2920	15.3725	13.7648	12.4090	11.2578	9.4269	8.0552	7.0027	6.1772	5.5168	4.9789	4.5338	4.1601
40	23.1148	19.7928	17.1591	15.0463	13.3317	11.9246	9.7791	8.2438	7.1050	6.2335	5.5482	4.9966	4.5439	4.1659

CHAPTER 7

THE MEANING AND MEASUREMENT OF RISK AND RATES OF RETURN

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Define *return* and describe how it is measured.
 - Distinguish between arithmetic return and geometric return.
 - Calculate and state risk statistics: the variance, standard deviation, and coefficient of variation.
 - Identify the types of *risk*.
 - Explain the nature of diversification and how it reduces risk.
 - Calculate portfolio return and portfolio risk.
 - Compare the Capital Asset Pricing Model (CAPM) and the Arbitrage Pricing Model (APM).
 - Calculate a *beta* value and describe its use in designing a portfolio.
-

The outcome of any financial or investment decision is not known with certainty. In fact, the decisions of the financial manager are never made under conditions of certainty. Each decision presents certain risks and return characteristics.

Hence, all major decisions must be viewed in terms of expected return, expected risk, and their combined impact on the market value of your company. Also, an understanding of the trade-off between the return you are expecting from the decision and the degree of risk you must assume to earn it is perhaps the most important key to successful financial and investment decisions.

WHAT IS RETURN?

Return is a key consideration in financial and investment decisions. Return is the reward for investing. You must compare the expected return for a given investment with the risk involved.

The return on an investment consists of the following sources of income:

- (a) Periodic cash payments, called *current income*.
- (b) Appreciation (or depreciation) in market value, called *capital gains (or losses)*.

Current income, which is received on a periodic basis, may take the form of interest, dividends, rent, and the like. Capital gains or losses represent changes in market value. A capital gain is the amount by which the proceeds from the sale of an investment exceeds its original purchase price. If the investment is sold for less than its purchase price, then the difference is a capital loss.

HOW IS RETURN MEASURED?

The way to measure the return on a given investment depends primarily on how you define the relevant period over which you hold the investment, called the *holding period*. We use the term

holding period return (HPR) to refer to the total return earned from holding an investment for that period of time. It is computed as follows:

$$\text{HPR} = \frac{\text{Current income} + \text{Capital gain (or loss)}}{\text{Purchase price}}$$

EXAMPLE 7-1

Consider the investment in stocks A and B over a one period of ownership:

	<u>Stock</u>	
	<u>A</u>	<u>B</u>
Purchase price (beginning of year)	\$100	\$100
Cash dividend received (during the year)	\$13	\$18
Sales price (end of year)	\$107	\$97

The current income from the investment in stocks A and B over the one-year period are \$13 and \$18, respectively. For stock A, a capital gain of \$7 (\$107 sales price - \$100 purchase price) is realized over the period. In the case of stock B, a \$3 capital loss (\$97 sales price - \$100 purchase price) results.

Combining the capital gain return (or loss) with the current income, the total return on each investment is summarized below:

	<u>Stock</u>	
Return	A	B
Cash dividend	\$13	\$18
Capital gain (loss)	<u>7</u>	<u>(3)</u>
Total return	\$20	\$15

Thus, the return on investments A and B are:

$$\begin{aligned}\text{HPR (stock A)} &= \frac{\$13 + (\$107 - \$100)}{\$100} = \frac{\$13 + \$7}{\$100} = \frac{\$20}{\$100} = 20\% \\ \text{HPR (stock B)} &= \frac{\$18 + (\$97 - \$100)}{\$100} = \frac{\$18 - \$3}{\$100} = \frac{\$15}{\$100} = 15\%\end{aligned}$$

ARITHMETIC AVERAGE RETURN VS. GEOMETRIC AVERAGE RETURN

It is one thing to measure the return over a single holding period and quite another to describe a series of returns over time. When a financial manager holds an investment for more than one period, it is important to understand how to compute the average of the successive rates of return. There are two types of multi-period average (mean) returns. They are the *arithmetic average return* and *geometric average return*.

The arithmetic return is simply the arithmetic average of successive one-period rates of return. It is defined as:

$$\text{Arithmetic return} = 1/n \sum r_t$$

where n = the number of time periods and r = the single holding period return in time t . The arithmetic average return, however, can be quite misleading in multi-period return calculations.

A more accurate measure of the actual return generated by an investment over multiple periods is the *geometric average return*, commonly called the *compounded annual rate of return*. The geometric return over n periods is computed as follows:

$$\text{Geometric return} = \sqrt[n]{(1 + r_1)(1 + r_2) \dots (1 + r_n)} - 1$$

The following example illustrates why the geometric return is an accurate measure in the multiple-period situation.

EXAMPLE 7-2

Consider the following data where the price of a stock doubles in one period and depreciates back to the original price. Dividend income (current income) is zero.

	<u>Time periods</u>		
	t=0	t=1	t=2
Price (end of period)	\$80	\$160	\$80
HPR	--	100%	-50%

The arithmetic average return is the average of 100% and -50%, which is 25%, as shown below:

$$\frac{100\% + (-50\%)}{2} = 25\%$$

Note, however, that the stock purchased for \$80 and sold for the same price two periods later did not earn 25%; it clearly earned zero return. This can be shown by computing the geometric average return. Note that $n = 2$, $r_1 = 100\% = 1$, and $r_2 = -50\% = -0.5$

Then,

$$\begin{aligned} \text{Geometric return} &= \sqrt{(1 + 1)(1 - 0.5)} - 1 \\ &= \sqrt{(2)(0.5)} - 1 \\ &= \sqrt{1} - 1 = 1 - 1 = 0 \end{aligned}$$

Table 7-1 shows the geometric return in ranking order by type of U. S. investment for the period 1945-2004.

TABLE 7-1
GEOMETRIC RATES OF RETURN IN RANKING ORDER

<u>Rank</u>	<u>U.S. Investment</u>
1	Real Estate
2	Metals
3	Portfolios

4	Stocks
5	T-bills
6	Bonds

Source: Ibbotson, R., and Rex A. Sinquefeld, *Stocks, Bonds, Bills and Inflation: 2005 Yearbook*, (Chicago: Dow Jones-Irwin, 2005).

WHAT IS EXPECTED RATE OF RETURN?

A financial manager is primarily concerned with predicting future returns from an investment in a security. No one can state precisely what these future returns will be. At best he/she can state the most likely expected outcome. This outcome is the expected rate of return. Of course, historical (actual) rates of return could provide a useful basis for formulating these future expectations.

Probabilities may be used to evaluate the expected return. The expected rate of return ($\bar{r}$), is the weighted average of possible returns from a given investment, weights being probabilities.

Mathematically,

$$\bar{r} = \sum r_i p_i$$

where r_i is the i^{th} possible return and p_i is the probability of the i^{th} return.

EXAMPLE 7-3

Consider the possible rates of return, depending upon the states of the economy, recession, normal, and prosperity, that you might earn next year on a \$50,000 investment in stock A or on a \$50,000 investment in stock B:

Stock A

<u>State of economy</u>	<u>Return (r)</u>	<u>Probability (p)</u>
Recession	-5%	.2
Normal	20	.6
Prosperity	40	.2

Stock B

<u>State of economy</u>	<u>Return (r)</u>	<u>Probability (p)</u>
Recession	10%	.2
Normal	15	.6
Prosperity	20	.2

The expected rates of return can be calculated as follows:

For stock A,

$$\bar{r} = (-5\%)(.2) + (20\%)(.6) + (40\%)(.2) = 19\%$$

For stock B,

$$\bar{r} = (10\%)(.2) + (15\%)(.6) + (20\%)(.2) = 15\%$$

WHAT IS THE RISK AND THE RISK-RETURN TRADE-OFF?

Integral to the subject of finance is the concept of a risk-return trade-off. All financial decisions involve some sort of risk-return trade-off. The greater the risk associated with any financial

decision, the greater the return expected from it. Proper assessment and balance of the various risk-return trade-offs available is part of creating a sound financial and investment plan. Figure 7-1 depicts the risk-return trade-off, where the risk-free rate is the rate of return commonly required on a risk-free security such as a U.S. Treasury bill.

EXAMPLE 7-4

In the case of investment in stock, you, as an investor, would demand higher return from a speculative stock to compensate for the higher level of risk. In the case of working capital management, the less inventory you keep, the higher the expected return (since less of your current assets is tied up), but also the greater the risk of running out of stock and thus losing potential revenue.

HOW IS RISK MEASURED?

Risk refers to the variation in earnings. It includes the chance of losing money on an investment. As a measure of risk, we use the standard deviation, which is a statistical measure of dispersion of the probability distribution of possible returns of an investment. The smaller the deviation, the tighter the distribution, and thus, the lower the riskiness of the investment. Mathematically,

$$\sigma = \sqrt{\sum (r_i - \bar{r})^2 p_i}$$

To calculate σ , we proceed as follows:

Step 1. First compute the expected rate of return ($\bar{r}$)

Step 2. Subtract each possible return from $\bar{r}$ to obtain a set of deviations ($r_i - \bar{r}$)

Step 3. Square each deviation, multiply the squared deviation by the probability of occurrence for its respective return, and sum these products to obtain the variance (σ^2):

$$\sigma^2 = \sum (r_i - \bar{r})^2 p_i$$

Step 4. Finally, take the square root of the variance to obtain the standard deviation (σ).

EXAMPLE 7-5

To follow this step-by-step approach, it is convenient to set up a table, as follows:

Stock A

Return (r_i)	Probability(p_i)	(step 1) $r_i p_i$	(step 2) $(r_i - \bar{r})$	(step 3) $(r_i - \bar{r})^2$	$(r_i - \bar{r})^2 p_i$
-5%	.2	-1%	-24%	576	115.2
20	.6	12	1	1	.6
40	.2	<u>8</u>	21	441	<u>88.2</u>
		$\bar{r} = 19\%$			$\sigma^2 = 204$
				(step 4)	$\sigma = \sqrt{204}$ = 14.18%

Stock B

Return (r_i)	Probability(p_i)	(step 1) $r_i p_i$	(step 2) $(r_i - \bar{r})$	(step 3) $(r_i - \bar{r})^2$	$(r_i - \bar{r})^2 p_i$
10%	.2	2%	-5%	25	5
15	.6	9	0	0	0
20	.2	<u>4</u>	5	25	<u>5</u>
		$\bar{r} = 15\%$			$\sigma^2 = 10$
				(step 4)	$\sigma = \sqrt{10}$
				$\sigma = 3.16\%$	

Table 7-2 shows average return rates and standard deviations for selected types of investments.

TABLE 7-2
RISK AND RETURN 1926-2004

<i>Securities</i>	<i>Geometric average</i>	<i>Arithmetic average</i>	<i>Standard deviation</i>
Common stocks	9.3%	12.5%	20.4%
Long-term corporate bonds	2.8	6.0	8.7
Long-term government bonds	2.3	5.5	9.2
U.S. Treasury bills	0.6	3.8	3.3

Source: Ibbotson, R., and Rex A. Sinquefeld, *Stocks, Bonds, Bills and Inflation: 2005 Yearbook*, (Chicago: Dow Jones-Irwin, 2005)

WORD OF CAUTION

The financial manager must be careful in using the standard deviation to compare risk since it is only an absolute measure of dispersion (risk). In other words, it does not consider the risk in relationship to an expected return. In comparisons of securities with differing expected returns, we commonly use the *coefficient of variation*. The coefficient of variation is computed simply by dividing the standard deviation for a security by its expected value, i.e.,

$$\sigma / \bar{r}$$

The higher the coefficient, the more risky the security.

EXAMPLE 7-6

Based on the following data, we can compute the coefficient of variation for each stock as follows:

	<u>Stock A</u>	<u>Stock B</u>
$\bar{r}$	19%	15%
σ	14.28%	3.16%

The coefficient of variation is computed as follows:

For stock A,

$$\sigma / \bar{r} = 14.18/19 = .75$$

For stock B,

$$\sigma / \bar{r} = 3.16/15 = .21$$

Although, stock A produces a considerably higher return than stock B, stock A is overall more risky than stock B, based on the computed coefficient of variation. Note, however, that if investments have the same expected returns there is no need for the calculation of the coefficient of variation.

TYPES OF RISK

It is important to recognize that there are different types of risk. These risks affect various investment alternatives, such as stocks, bonds, or real estate, differently. All investments are subject to risk.

1. *Business risk.* Business risk is the relative dispersion or variability in the firm's expected earnings. The nature of the firm's operations causes its business risk. This type of risk is affected by the firm's cost structure, product demand characteristics, and intra industry competitive position.
2. *Liquidity risk.* It represents the possibility that an asset may not be sold on short notice for its market value. If an investment must be sold at a high discount, then it is said to have a substantial amount of liquidity risk.
3. *Default risk.* It is the risk that the issuing company is unable to make interest payments or principal repayments on debt. For example, there is a great amount of default risk inherent in the bonds of a company experiencing financial difficulty.
4. *Market risk.* Prices of all stocks are correlated to some degree with broad swings in the stock market. Market risk refers to changes in the price of a stock that result from changes in the stock market as a whole, regardless of the fundamental change in a firm's earning power. For example, the prices of many stocks are affected by trends such as bull or bear markets.
5. *Interest rate risk.* It refers to the fluctuations in the value of an asset as the interest rates and conditions of the money and capital markets change. Interest rate risk relates to fixed income securities such as bonds and real estate. For example, if interest rates rise (fall), bond prices fall (rise).
6. *Purchasing power risk.* This risk relates to the possibility that you will receive a lesser amount of purchasing power than was originally invested. Bonds are most affected by this risk since the issuer will be paying back in cheaper dollars during an inflationary period.

HOW TO REDUCE RISK: DIVERSIFY

Diversification is usually an answer to reduction in risk. "Diversify" means "Don't Put All Your Eggs in One Basket." With a diversified portfolio (e.g., stocks, bonds, real estate, and savings accounts), the value of all these investments do not increase or decrease at the same time or in the same magnitude. Thus, you can protect yourself against fluctuations. Your company may diversify into different lines of businesses that are not subject to the same economic and political influences. Thus, it can protect itself against fluctuations in earnings.

PORTFOLIO THEORY

The central theme of portfolio theory is that rational investors behave in a way that reflects their aversion to taking increased risk without being compensated by an adequate increase in expected return. Also, for any given expected return, most investors will prefer a lower risk, and for any given level of risk, they will prefer a higher return to a lower return. Harry Markowitz showed how to calculate a set of "efficient" portfolios. An investor then will choose among a set of efficient portfolios the best that is consistent with the risk profile of the investor.

Most financial assets are not held in isolation but rather are held as part of a portfolio. Therefore, the risk-return analysis should not be confined to single assets only. It is important to look at portfolios and the gains from diversification. What is important is the return on the portfolio, not just the return on one asset, and the portfolio's risk.

Portfolio Return

The expected return on a portfolio (r_p) is simply the weighted average return of the individual sets in the portfolio, the weights being the fraction of the total funds invested in each asset:

$$r_p = w_1r_1 + w_2r_2 + \dots + w_nr_n = \sum_{j=1}^n w_j r_j$$

where r_j = expected return on each individual asset

w_j = fraction for each respective asset investment

n = number of assets in the portfolio

$$\sum_{j=1}^n w_j = 1.0$$

EXAMPLE 7-7

A portfolio consists of assets A and B. Asset A makes up one-third of the portfolio and has an expected return of 18 percent. Asset B makes up the other two-thirds of the portfolio and is expected to earn 9 percent. The expected return on the portfolio is:

Asset	Return (r_j)	Fraction (w_j)	$w_j r_j$
A	18%	1/3	1/3 X 18% = 6%
B	9%	2/3	2/3 X 9% = 6%
			$r_p = 12\%$

Portfolio Risk

Unlike returns, the risk of a portfolio (σ_p) is not simply the weighted average of the standard deviations of the individual assets in the contribution, for a portfolio's risk is also dependent on the correlation coefficients of its assets. The correlation coefficient (ρ) is a measure of the degree to which two variables "move" together. It has a numerical value that ranges from -1.0 to 1.0. In a two-asset (A and B) portfolio, the portfolio risk is defined as:

$$\sigma_p = \sqrt{w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2\rho_{AB} w_A w_B \sigma_A \sigma_B}$$

where σ_A and σ_B = standard deviations of assets A and B, respectively

w_A and w_B = weights, or fractions, of total funds invested in assets A and B

ρ_{AB} = the correlation coefficient between assets A and B.

Incidentally, the correlation coefficient is the measurement of joint movement between two securities.

Diversification

As can be seen in the above formula, the portfolio risk, measured in terms of σ is not the weighted average of the individual asset risks in the portfolio. Note that in the formula, we have the third term, (ρ) which make a significant contribution to the overall portfolio risk. What the formula basically shows is that portfolio risk can be minimized or completely eliminated by diversification. The degree of reduction in portfolio risk depends upon the correlation between the assets being combined. Generally speaking, by combining two perfectly negatively correlated assets ($\rho = -1.0$), we are able to eliminate the risk completely. In the real world, however, most securities are negatively, but not perfectly correlated. In fact, most assets are positively correlated. We could still reduce the portfolio risk by combining even positively correlated assets. An example of the latter might be ownership of two automobile stocks or two housing stocks.

EXAMPLE 7-8

Assume the following:

Asset	σ	w
A	20%	1/3
B	10%	2/3

The portfolio risk then is:

$$\begin{aligned}\sigma_p &= \sqrt{w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2\rho_{AB} w_A w_B \sigma_A \sigma_B} \\ &= [(1/3)^2 (0.2)^2 + (2/3)^2 (0.1)^2 + 2\rho_{AB} (1/3)(2/3)(0.2)(0.1)]^{1/2} \\ &= 0.0089 + 0.0089\rho_{AB}\end{aligned}$$

(a) Now assume that the correlation coefficient between A and B is +1 (a perfectly positive correlation). This means that when the value of asset A increases in response to market conditions, so does the value of asset B, and it does so at exactly the same rate as A. The portfolio risk when $\rho_{AB} = +1$ then becomes:

$$\sigma_p = 0.0089 + 0.0089\rho_{AB} = 0.0089 + 0.0089(+1) = 0.1334 = 13.34\%$$

(b) If $\rho_{AB} = 0$, the assets lack correlation and the portfolio risk is simply the risk of the expected returns on the assets, i.e., the weighted average of the standard deviations of the individual assets in the portfolio. Therefore, when $\rho_{AB} = 0$, the portfolio risk for this example is:

$$\sigma_p = 0.0089 + 0.0089\rho_{AB} = 0.0089 + 0.0089(0) = 0.0089 = 8.9\%$$

(c) If $\rho_{AB} = -1$ (a perfectly negative correlation coefficient), then as the price of A rises, the price of B declines at the very same rate. In such a case, risk would be completely eliminated. Therefore, when $\rho_{AB} = -1$, the portfolio risk is

$$\sigma_p = 0.0089 + 0.0089\rho_{AB} = 0.0089 + 0.0089(-1) = 0.0089 - 0.0089 = 0 = 0$$

When we compare the results of (a), (b), and (c), we see that a positive correlation between assets increases a portfolio's risk above the level found at zero correlation, while a perfectly negative correlation eliminates that risk.

EXAMPLE 7-9

To illustrate the point of diversification, assume data on the following three securities are as follows:

Year	Security X (%)	Security Y (%)	Security Z (%)
20X1	10	50	10
20X2	20	40	20

20X3	30	30	30
20X4	40	20	40
20X5	50	10	50
r_j	30	30	30
σ_p	14.14	14.14	14.14

Note here that securities X and Y have a perfectly negative correlation, and securities X and Z have a perfectly positive correlation. Notice what happens to the portfolio risk when X and Y, and X and Z are combined. Assume that funds are split equally between the two securities in each portfolio.

<i>Year</i>	<i>Portfolio XY (50% - 50%)</i>	<i>Portfolio XZ (50% - 50%)</i>
20X1	30	10
20X2	30	20
20X3	30	30
20X4	30	40
20X5	30	50
r_p	30	30
σ_p	0	14.14

Again, see that the two perfectly negative correlated securities (XY) result in a zero overall risk.

WHAT IS BETA?

Many investors hold more than one financial asset. A portion of a security's risk (called *unsystematic risk*) can be controlled through diversification. This type of risk is unique to a given security. Business, liquidity, and default risks, which were discussed earlier, fall in this category. Non-diversifiable risk, more commonly referred to as *systematic risk*, results from forces outside of the firm's control and are therefore not unique to the given security. Purchasing power, interest rate, and market risks fall into this category. This type of risk is measured by *beta*.

Beta (b) measures a security's volatility relative to an average security. A particular stock's beta is useful in predicting how much the security will go up or down, provided that you know which way the market will go. It does help you to figure out risk and expected return.

Most of the unsystematic risk affecting a security can be diversified away in an efficiently constructed portfolio. Therefore, this type of risk does not need to be compensated with a higher level of return. The only relevant risk is systematic risk or beta risk for which the investor can expect to receive compensation. You, as an investor, are compensated for taking this type of risk which cannot be controlled.

Under the *capital asset pricing model* (CAPM), in general, there is a relationship between a stock's expected (or required return) and its beta. The following formula is very helpful in determining a stock's expected return.

$$r_j = r_f + b(r_m - r_f)$$

In words,

$$\text{Expected return} = \text{risk-free rate} + \text{beta} \times (\text{market risk premium})$$

where r_j = the expected (or required) return on security j ; r_f = the risk-free rate on a security such as a T-bill; r_m = the expected return on the market portfolio (such as Standard and Poor's 500 Stock Composite Index or Dow Jones 30 Industrials); and b = beta, an index of systematic (nondiversifiable, noncontrollable) risk.

The market risk premium ($r_m - r_f$) equals the expected market return (r_m) minus the risk-free rate (r_f). The market risk premium is the additional return above that which you could earn on, say a T-bill, to compensate for assuming a given level of risk (as measured by beta).

Thus, the formula shows that the required (expected) return on a given security is equal to the return required for securities that have no risk plus a risk premium required by the investor for assuming a given level of risk. The key idea behind the formula is that the relevant measure of risk is the risk of the individual security, or its beta. The higher the beta for a security, the greater the return expected (or demanded) by the investor.

EXAMPLE 7-10

Assume that $r_f=6\%$, and $r_m=10\%$. If a stock has a beta of 2.0, its risk premium should be 14%:

$$r_j = r_f + b(r_m - r_f)$$

$$6\% + 2.0(10\% - 6\%) = 6\% + 8\% = 14\%$$

This means that you would expect (or demand) an extra 8% (risk premium) on this stock on top of the risk-free return of 6%. Therefore, the total expected (required) return on the stock should be 14%:

$$6\% + 8\% = 14\%$$

HOW TO READ BETA?

Beta (b) measures a security's volatility relative to an average security. Putting it another way, it is a measure of a security's return over time to that of the overall market. For example, if your company's beta is 2.0, it means that if the stock market goes up 10%, your company's common stock goes up 20%; if the market goes down 10%, your company's stock price goes down 20%. Here is how to read betas:

<u>Beta</u>	<u>What It Means</u>
0	The security's return is independent of the market. An example is a risk-free security such as a T-bill.
0.5	The security is only half as responsive as the market.
1.0	The security has the same responsive or risk as the market (i.e., average risk). This is the beta value of the market portfolio such as Standard & Poor's 500.
2.0	The security is twice as responsive, or risky, as the market

Table 7-3 shows examples of betas for selected stocks.

TABLE 7-3

BETAS FOR SOME SELECTED CORPORATIONS

Company	January 12 2008
Boeing (BA)	1.25
Google (GOOG)	1.36
General Motors (GM)	1.62
Nordstrom (JWN)	1.84
Intel (INTC)	1.78
Wal-mart (WMT)	0.18

THE ARBITRAGE PRICING MODEL (APM)

The CAPM assumes that required rates of return depend only on one risk factor, the stock's *beta*. The Arbitrage Pricing Model (APM) disputes this and includes any number of risk factors:

$$r = r_f + b_1 RP_1 + b_2 RP_2 + \dots + b_n RP_n$$

where r = the expected return for a given stock or portfolio

r_f = the risk-free rate

b_i = the sensitivity (or reaction) of the returns of the stock to unexpected changes in economic forces i ($i = 1, \dots, n$)

RP_i = the market risk premium associated with an unexpected change in the i th economic force

n = the number of relevant economic forces

Roll and Ross suggest the following five economic forces:

1. Changes in expected inflation
2. Unanticipated changes in inflation
3. Unanticipated changes in industrial production
4. Unanticipated changes in the yield differential between low- and high-grade bonds (the default-risk premium)
5. Unanticipated changes in the yield differential between long-term and short-term bonds (the term structure of interest rates)

EXAMPLE 7-11

Suppose returns required in the market by investors are a function of two economic factors according to the following equation, where the risk-free rate is 7 percent:

$$r = 0.07 + b_1(0.04) + b_2(0.01)$$

ABC stock has the reaction coefficients to the factors, such that $b_1 = 1.3$ and $b_2 = 0.90$. Then the required rate of return for the ABC stock is

$$r = 0.07 + (1.3)(0.04) + (0.90)(0.01) = 0.113 = 11.3\%$$

CONCLUSION

Risk and return are two major factors you should consider in making financial and investment decisions. You must compare the expected risks and returns of each investment. Always remember that the higher the return, the higher the risk. Beta can help you estimate the expected return and risk of a security. In order to reduce the risk, you might want to diversify your investment holdings by constructing a portfolio of different investments.

The chapter covered a wide range of tools and measures associated with return and risk. The need for an understanding of the different types of risk was emphasized.

CHAPTER 8

VALUATION OF STOCKS AND BONDS

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Outline the key inputs and concepts underlying the security valuation process.
 - Determine the value of bonds
 - Identify and calculate various yields on a bond.
 - Distinguish between preferred stock and common stock.
 - Describe the various methods of common stock valuation.
 - Determine the investor's expected rate of return on preferred stock and common stock.
-

Valuation is the process of determining the worth (or value) of an asset. Just like a company's investors, the company's financial managers must have a good understanding of how to value its stocks, bonds, and other securities to judge whether or not they are a "good buy." The failure to understand the concepts and computational procedures in valuing a security may preclude sound financial decisions. This fact is evident in the company's objective of maximizing the value of its common stock. We will use the concept of the time value of money to analyze the values of bonds and stocks. Basic bond valuation and stock valuation models under varying assumptions are discussed. In all cases, bond and stock values are found to be the present value of the future cash flows expected from the security.

HOW TO VALUE A SECURITY

The process of determining security valuation involves finding the present value of an asset's expected future cash flows using the investor's required rate of return. Thus, the basic security valuation model can be defined mathematically as follows:

$$V = \sum_{t=1}^n \frac{C_t}{(1+r)^t}$$

where V = intrinsic value or present value of a security
 C_t = expected future cash flows in period $t = 1, \dots, n$
 r = the investor's required rate of return

WHAT IS A BOND?

A bond is a contract showing loaned funds to a company in return for fixed future interest and repayment of principal.

There are certain terms and features of bonds you should be familiar with, including:

1. *Par value.* The par value of a bond is the face value (maturity value), usually \$1,000.
2. *Coupon rate.* The coupon rate is the nominal interest rate that determines the actual interest to be received on a bond. It is an annual interest based on par value. For example, if you own a \$1,000 bond having a coupon rate of 6%, the annual interest payment you will receive is \$60.

3. *Maturity date*. It is the final date on which repayment of the bond principal is due.

4. *Yield*. The yield is different than the coupon interest rate. It is the effective interest rate you are earning on the bond investment. If a bond is bought below its face value (i.e., purchased at a discount), the yield is higher than the coupon rate. If a bond is acquired above face value (i.e., bought at a premium), the yield is below the coupon rate.

HOW TO VALUE BONDS

The valuation process for a bond requires a knowledge of three basic elements: (1) the amount of the cash flows to be received by the investor, which is equal to the periodic interest to be received and the par value to be paid at maturity; (2) the maturity date of the loan; and (3) the investor's required rate of return.

Incidentally, the periodic interest can be received annually or semiannually. The value of a bond is simply the present value of these cash flows. Two versions of the bond valuation model are presented below:

If the interest payments are made annually, then

$$V = \sum_{t=1}^n \frac{I}{(1+r)^t} + \frac{M}{(1+r)^n} = I \cdot T_4(r,n) + M \cdot T_3(r,n)$$

where

I = interest payment each year = coupon interest rate x par value

M = par value, or maturity value, typically \$1,000

r = the investor's required rate of return

n = number of years to maturity

T_4 = present value interest factor of an annuity of \$1 (which can be found in Table 4 in the Appendix).

T_3 = present value interest factor of \$1 (which can be found in Table 3 in the Appendix).

Both T_4 and T_3 were discussed in detail in Chapter 6 (The Time Value of Money).

EXAMPLE 8-1

Consider a bond, maturing in 10 years and having a coupon rate of 8 percent. The par value is \$1,000. Investors consider 10 percent to be an appropriate required rate of return in view of the risk level associated with this bond. The annual interest payment is \$80(8% x \$1,000). The present value of this bond is:

$$\begin{aligned} V &= \sum_{t=1}^n \frac{I}{(1+r)^t} + \frac{M}{(1+r)^n} \\ &= I \cdot T_4(r,n) + M \cdot T_3(r,n) \\ &= \sum_{t=1}^{10} \frac{\$80}{(1+0.1)^t} + \frac{\$1,000}{(1+0.1)^{10}} \\ &= \$80 \cdot T_4(10\%,10) + \$1,000 \cdot T_3(10\%,10) \\ &= \$80(6.145) + \$1,000(0.386) \\ &= \$491.60 + 386.00 \\ &= \$877.60 \end{aligned}$$

If the interest is paid semiannually, then

$$V = \sum_{t=1}^{2n} \frac{I/2}{(1+r/2)^t} + \frac{M}{(1+r/2)^{2n}} = \frac{I}{2} \bullet T_4(r/2, 2n) + M \bullet T_3(r/2, 2n)$$

EXAMPLE 8-2

Assume the same data as in Example 8-1, except the interest is paid semiannually.

$$\begin{aligned} V &= \sum_{t=1}^{2n} \frac{I/2}{(1+r/2)^t} + \frac{M}{(1+r/2)^{2n}} = \frac{I}{2} \bullet T_4(r/2, 2n) + M \bullet T_3(r/2, 2n) \\ &= \sum_{t=1}^{20} \frac{\$40}{(1+0.05)^t} + \frac{\$1,000}{(1+0.05)^{20}} \\ &= \$40 \bullet T_4(5\%, 20) + \$1,000 \bullet T_3(5\%, 20) \\ &= \$40(12.462) + \$1,000(0.377) \\ &= \$498.48 + \$377.00 \\ &= \$875.48 \end{aligned}$$

HOW DO YOU CALCULATE YIELD (EFFECTIVE RATE OF RETURN) ON A BOND?

Bonds are evaluated on many different types of returns including current yield and yield to maturity.

1. *Current yield.* The current yield is the annual interest payment divided by the current price of the bond. This is reported in the Wall Street Journal, among others.

EXAMPLE 8-3

Assume a 12 percent coupon rate \$1,000 par value bond selling for \$960. The current yield is:
 $\$120/\$960 = 12.5\%$

The problem with this measure of return is that it does not take into account the maturity date of the bond. A bond with 1 year to run and another with 15 years to run would have the same current yield quote if interest payments were \$120 and the price were \$960. Clearly, the one year bond would be preferable under this circumstance because you would not only get \$120 in interest, but also a gain of \$40 (\$1000- \$960) with a one-year time period, and this amount could be reinvested.

2. *Yield to maturity.* The expected rate of return on a bond, better known as the bond's yield to maturity, is computed by solving the following equation (the bond valuation model) for r:

$$V = \sum_{t=1}^{2n} \frac{I}{(1+r)^t} + \frac{M}{(1+r)^n} = I \bullet T_4(r, n) + M \bullet T_3(r, n)$$

The yield to maturity takes into account the maturity date of the bond. It is the real return you would receive from interest income plus capital gain assuming the bond is held to maturity.

Finding the bond's yield r, involves trial and error. It is best explained by an example.

EXAMPLE 8-4

Suppose you are offered a 10-year, 8 percent coupon, \$1,000 par value bond at a price of \$877.60. What rate of return could you earn if you bought the bond and held it to maturity? Recall that in Example 1 the value of the bond, \$877.60, was obtained using the required rate of return of 10 percent. Compute this bond's yield to see if it is 10 percent.

First, set up the bond valuation model:

$$V = \$877.60 \sum_{t=1}^{10} \frac{\$80}{(1+r)^t} + \frac{\$1,000}{(1+r)^{10}} =$$

$$= \$80 \bullet T_4(r,10) + \$1,000 \bullet T_3(r,10)$$

Since the bond is selling at a discount under the par value (\$877.60 versus \$1,000), the bond's yield is above the going coupon rate of 8 percent. Therefore, try a rate of 9 percent. Substituting factors for 9 percent in the equation, we obtain:

$$V = \$80(6.418) + \$1,000(0.422) = \$513.44 + \$422.0 = \$935.44$$

The calculated bond value, \$935.44, is above the actual market price of \$877.60, so the yield is not 9 percent. To lower the calculated value, the rate must be raised. Trying 10 percent, we obtain:

$$V = \$80(6.145) + \$1,000(0.386) = \$491.60 + \$386.0 = \$877.60$$

This calculated value is exactly equal to the market price of the bond; thus, 10 percent is the bond's yield to maturity.

The formula that can be used to find the approximate yield to maturity on a bond is:

$$\text{Yield} = \frac{I + (M - V) / n}{(M + V) / 2}$$

where

I = dollars of interest paid per year

M = the par value, typically \$1,000 per bond

V = a bond's current value (price)

n = number of years to maturity

This formula can also be used to obtain a starting point for the trial-and-error method discussed in Example 8-4.

EXAMPLE 8-5

Using the same data as in Example 4 and the short-cut method, the rate of return on the bond is:

$$\text{Yield} = \frac{\$80 + (\$1,000 - \$877.60) / 10}{(\$1,000 + \$877.60) / 2}$$

$$= \frac{\$80 + \$12.24}{\$938.80} = \frac{\$92.24}{\$938.80} = 9.8\%$$

As can be seen, since the bond was bought at a discount, the yield (9.8%) came out greater than the coupon rate of 8%.

WHAT IS PREFERRED STOCK?

Preferred stock carries a fixed dividend that is paid quarterly. The dividend is stated in dollar terms per share, or as a percentage of par (stated) value of the stock. Preferred stock is considered a hybrid security because it possesses features of both common stock and a corporate bond. It is like common stock in that:

- It represents equity ownership and is issued without stated maturity dates;
- It pays dividends. Preferred stock is also like a corporate bond in that:
- It provides for prior claims on earnings and assets;
- Its dividend is fixed for the life of the issue;

-- It can carry call and convertible features and sinking fund provisions.

Since preferred stocks are traded on the basis of the yield offered to investors, they are in effect viewed as fixed income securities and, as a result, are in competition with bonds in the marketplace. Convertibles, however, trade more like common stock, depending on conversion prices.

HOW TO VALUE PREFERRED STOCK

The value of preferred stock is the present worth of a series of equal cash flow streams (dividends), continuing indefinitely. Since the dividends in each period are equal for preferred stock, the valuation model can be reduced to the following relationship:

$$V = D/r$$

where V = present value of a preferred stock

D = annual dividend

r = the investor's required rate of return

EXAMPLE 8-6

ABC preferred stock pays an annual dividend of \$4.00. You, as an investor, require a 16% return on your investment. Then the value of the ABC preferred stock can be determined as follows:

$$V = D/r = \$4.00/.16 = \$25$$

HOW TO CALCULATE EXPECTED RETURN FROM PREFERRED STOCK

In computing the preferred stockholder's expected rate of return, we use the valuation equation for preferred stock presented in the above. Simply solving it for r ,

$$r = D/V$$

which indicates that the expected rate of return of a preferred stock equals the dividend yield (annual dividend/market price).

EXAMPLE 8-7

A preferred stock paying \$5.00 a year in dividends and having a market price of \$25 would have a current yield of 20%, computed as follows:

$$r = D/V = \$5/\$25 = 20\%$$

WHAT IS COMMON STOCK?

Common stock is an equity investment that represents the ownership of a corporation. It corresponds to the capital account for a sole proprietorship or capital contributed by each partner for a partnership.

The corporation's stockholders have certain rights and privileges including:

1. *Control of the firm.* The stockholders elect the firm's directors who in turn select officers to manage the business.

2. *Preemptive rights.* This is the right to purchase new stock. A preemptive right entitles a common stockholder to maintain his or her proportional ownership through the opportunity to purchase, on a pro rata basis, any new stock being offered or any securities convertible into common stock.

HOW TO VALUE COMMON STOCK

The value of a common stock is the present value of all future cash inflows expected to be received by the investor. The cash inflows expected to be received are dividends and the future price at the time of the sale of the stock.

SINGLE HOLDING PERIOD

For an investor holding a common stock for only 1 year, the value of the stock would be the present value of both the expected cash dividend to be received in 1 year (D_1) and the expected market price per share of the stock at year-end (P_1). If r represents an investor's required rate of return, the value of common stock (P_0) would be:

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{P_1}{(1+r)^1}$$

EXAMPLE 8-8

Assume an investor is considering the purchase of stock A at the beginning of the year. The dividend at year-end is expected to be \$1.50, and the market price by the end of the year is expected to be \$40. If the investor's required rate of return is 15%, the value of the stock would be:

$$\begin{aligned} P_0 &= \frac{D_1}{(1+r)^1} + \frac{P_1}{(1+r)^1} = \frac{\$1.50}{(1+0.15)} + \frac{\$40}{(1+0.15)} \\ &= \$1.50 T_3(15\%,1) + \$40 T_3(15\%,1) \\ &= \$1.50(0.870) + \$40(0.870) \\ &= \$1.31 + \$34.80 = \$36.11 \end{aligned}$$

MULTIPLE HOLDING PERIOD

Since common stock has no maturity date and is held for many years, a more general, multiperiod model is needed. The general common stock valuation model is defined as follows:

$$P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}$$

where D_t = cash dividend in period t .

Two cases of growth in dividends are explained below. They are:

(a) Zero growth and (b) constant growth.

(a) Zero Growth Case

In the case of zero growth (i.e., $D_0 = D_1 = \dots = D$), then the valuation model reduces to the formula:

$$P_0 = \frac{D}{r}$$

This is the case with a perpetuity. This model is most applicable to the valuation of preferred stocks, as was discussed earlier, or the common stocks of very mature companies such as large utilities.

EXAMPLE 8-9

Assuming dividends (D) equals \$2.50 and r equals 10 percent, then the value of the stock is:

$$P_0 = \frac{\$2.50}{0.1} = \$25$$

(b) Constant Growth Case

In the case of constant growth, if we assume that dividends grow at a constant rate of g every year [i.e., $D_t = D_0(1 + g)^t$], then the general model is simplified to:

$$P_0 = \frac{D_1}{r - g}$$

In words,

$$\text{Common stock value} = \frac{\text{dividend in year 1}}{(\text{required rate of return}) - (\text{growth rate})}$$

This formula is known as the Gordon's valuation model. This model is most applicable to the valuation of the common stocks of very large or broadly diversified firms.

EXAMPLE 8-10

Consider a common stock that paid a \$3 dividend per share at the end of the last year and is expected to pay a cash dividend every year at a growth rate of 10 percent. Assume the investor's required rate of return is 12 percent. The value of the stock would be:

$$D_1 = D_0(1 + g) = \$3(1 + 0.10) = \$3.30$$

$$P_0 = \frac{D_1}{(r - g)} = \frac{\$3.30}{0.12 - 0.10} = \$165$$

WHAT IS THE EXPECTED RETURN ON COMMON STOCK?

The formula for computing the expected rate of return on common stock can be derived easily from the valuation models.

The single-holding-period return formula is derived from:

$$P_0 = \frac{D_1}{(1+r)} + \frac{P_1}{(1+r)}$$

Solving for r gives:

$$r = \frac{D_1 + (P_1 - P_0)}{P_0}$$

In words,

$$\begin{aligned} \text{Rate of return} &= \frac{\text{annual dividend} + \text{capital gain}}{\text{beginning price}} \\ &= \frac{\text{annual dividend}}{\text{beginning price}} + \frac{\text{capital gain}}{\text{beginning price}} \\ &= \text{dividend yield} + \text{capital gain yield} \end{aligned}$$

This formula is the same as the holding period rate of return (HPR), which was introduced in Chapter 7.

EXAMPLE 8-11

Consider a stock that sells for \$50. The company is expected to pay a \$3 cash dividend at the end of the year, and the stock market price at the end of the year is expected to be \$55 a share. Thus the expected return would be:

$$r = \frac{D_1 + (P_1 - P_0)}{P_0} = \frac{\$3.00 + (\$55 - \$50)}{\$50} = \frac{\$3.00 + \$5.00}{\$50} = 16\%$$

or:

$$\text{Dividend yield} = \frac{\$3.00}{\$50} = 6\%$$

$$\text{Capital gain yield} = \frac{\$5.00}{\$50} = 10\%$$

$$r = \text{dividend yield} + \text{capital gain yield} \\ = 6\% + 10\% = 16\%$$

Assuming a constant growth in dividends, the formula for the expected rate of return on an investment in stock can be derived as follows:

$$P_0 = \frac{D_1}{r - g}$$

Solving for r gives:

$$r = \frac{D_1}{P_0} + g \\ = \text{dividend yield} + \text{annual growth rate}$$

EXAMPLE 8-12

Suppose that your company's dividend per share was \$4.50, and was expected to grow at a constant rate of 6 percent. The current market price of the stock is \$30. Then the expected rate of return is:

$$r = \frac{D_1}{P_0} + g \\ = \frac{\$4.50}{\$30} + 6\% = 15\% + 6\% = 21\%$$

CONCLUSION

In this chapter we have discussed the valuation of bonds, preferred stock and common stock. Valuation is essentially a present value concept that involves estimating future cash flows and discounting them at a required rate of return. The value of a bond is essentially the present value of all future interest and principal payments. Stock price may be expressed as a function of the expected future dividends and a rate of return required by investors. The Gordon's market valuation model reflects this process. The chapter also discussed how to calculate the expected return from a stock investment and the yield on a bond.

CHAPTER 9 THE COST OF CAPITAL

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Compute individual costs of financing including long-term debt, bonds, preferred stock, common stock, and retained earnings.
- Determine the overall cost of capital.
- Discuss the various weighting schemes.
- Explain how the weighted marginal cost of capital can be used with the investment opportunity schedule to find the optimal capital budget

The cost of capital is defined as the rate of return that is necessary to maintain the market value of the firm (or price of the firm's stock). Financial managers must know the cost of capital (the minimum required rate of return) in (1) making capital budgeting decisions, (2) helping to establish the optimal capital structure, and (3) making decisions such as leasing, bond refunding, and working capital management. The cost of capital is used either as a discount rate under the NPV method or as a hurdle rate under the IRR method in Chapter 10. The cost of capital is computed as a weighted average of the various capital components, which are items on the right-hand side of the balance sheet such as debt, preferred stock, common stock, and retained earnings.

COMPUTING INDIVIDUAL COSTS OF CAPITAL

Each element of capital has a component cost that is identified by the following:

k_i = before-tax cost of debt

$k_d = k_i (1-t)$ = after-tax cost of debt, where t =tax rate

k_p = cost of preferred stock

k_s = cost of retained earnings (or internal equity)

k_e = cost of external equity, or cost of issuing new common stock

k_o = firm's overall cost of capital, or a weighted average cost of capital

COST OF DEBT

The before-tax cost of debt can be found by determining the internal rate of return (or yield to maturity) on the bond cash flows.

However, the following short-cut formula may be used for approximating the yield to maturity on a bond:

$$k_i = \frac{I + (M - V) / n}{(M + V) / 2}$$

where I = annual interest payments in dollars

M = par or face value, usually \$1,000 per bond

V = market value or net proceeds from the sale of a bond

n = term of the bond in years

Since the interest payments are tax-deductible, the cost of debt must be stated on an after-tax basis. The after-tax cost of debt is:

$$k_d = k_i (1 - t)$$

where t is the tax rate.

EXAMPLE 9-1

Assume that the Carter Company issues a \$1,000, 8%, 20-year bond whose net proceeds are \$940. The tax rate is 40%. Then, the before-tax cost of debt, k_i , is:

$$k_i = \frac{I + (M - V) / n}{(M + V) / 2}$$
$$= \frac{\$80 + (\$1,000 - \$940) / 20}{(\$1,000 + \$940) / 2} = \frac{\$83}{\$970} = 8.56\%$$

Therefore, the after-tax cost of debt is:

$$k_d = k_i (1 - t)$$
$$= 8.56\% (1 - 0.4) = 5.14\%$$

COST OF PREFERRED STOCK

The cost of preferred stock, k_p , is found by dividing the annual preferred stock dividend, d_p , by the net proceeds from the sale of the preferred stock, p , as follows:

$$k_p = \frac{d_p}{p}$$

Since preferred stock dividends are not a tax-deductible expense, these dividends are paid out after taxes. Consequently, no tax adjustment is required.

EXAMPLE 9-2

Suppose that the Carter company has preferred stock that pays a \$13 dividend per share and sells for \$100 per share in the market. The flotation (or underwriting) cost is 3 percent, or \$3 per share. Then the cost of preferred stock is:

$$k_p = \frac{d_p}{p}$$
$$= \frac{\$13}{\$97} = 13.4\%$$

COST OF EQUITY CAPITAL

The cost of common stock, k_e , is generally viewed as the rate of return investors require on a firm's common stock. Two techniques for measuring the cost of common stock equity capital are widely used:

- (1) the Gordon's growth model and
- (2) the *capital asset pricing model* (CAPM) approach.

The Gordon's Growth Model. The Gordon's model is:

$$P_0 = \frac{D_1}{r - g}$$

where P_0 = value (or market price) of common stock

D_1 = dividend to be received in 1 year

r = investor's required rate of return

g = rate of growth (assumed to be constant over time)

Solving the model for r results in the formula for the cost of common stock:

$$r = \frac{D_1}{P_0} + g \quad \text{or} \quad k_e = \frac{D_1}{P_0} + g$$

Note that the symbol r is changed to k_e to show that it is used for the computation of cost of capital.

EXAMPLE 9-3

Assume that the market price of the Carter Company's stock is \$40. The dividend to be paid at the end of the coming year is \$4 per share and is expected to grow at a constant annual rate of 6 percent. Then the cost of this common stock is:

$$k_e = \frac{D_1}{P_0} + g = \frac{\$4}{\$40} + 6\% = 16\%$$

The cost of new common stock, or external equity capital, is higher than the cost of existing common stock because of the *flotation costs* involved in selling the new common stock. Flotation costs, sometimes called *issuance costs*, are the total costs of issuing and selling a security that include printing and engraving, legal fees, and accounting fees.

If f is the flotation cost shown as a percentage of market price, the formula for the cost of new common stock is:

$$k_e = \frac{D_1}{P_0(1-f)} + g$$

EXAMPLE 9-4

Assume the same data as in Example 9-3, except the firm is trying to sell new issues of stock A and its flotation cost is 10 percent.

Then:

$$\begin{aligned} k_e &= \frac{D_1}{P_0(1-f)} + g \\ &= \frac{\$4}{\$40(1-0.1)} + 6\% = \frac{\$4}{\$36} + 6\% = 11.11\% + 6\% = 17.11\% \end{aligned}$$

The Capital Asset Pricing Model (CAPM) Approach. An alternative approach to measuring the cost of common stock is to use the CAPM, which involves the following steps:

1. Estimate the risk-free rate, r_f , generally taken to be the United States Treasury bill rate.

2. Estimate the stock's beta coefficient, b , which is an index of systematic (or nondiversifiable market) risk.

3. Estimate the rate of return on the market portfolio, r_m , such as the Standard & Poor's 500 Stock Composite Index or Dow Jones 30 Industrials.

4. Estimate the required rate of return on the firm's stock, using the CAPM equation:

$$k_e = r_f + b(r_m - r_f)$$

Again, note that the symbol r_j is changed to k_e

EXAMPLE 9-5

Assuming that r_f is 7 percent, b is 1.5, and r_m is 13 percent, then:

$k_e = r_f + b(r_m - r_f) = 7\% + 1.5(13\% - 7\%) = 16\%$. This 16 percent cost of common stock can be viewed as consisting of a 7 percent risk-free rate plus a 9 percent risk premium, which reflects that the firm's stock price is 1.5 times more volatile than the market portfolio to the factors affecting nondiversifiable, or systematic, risk.

COST OF RETAINED EARNINGS

The cost of retained earnings, k_s , is closely related to the cost of existing common stock, since the cost of equity obtained by retained earnings is the same as the rate of return investors require on the firm's common stock. Therefore,

$$k_e = k_s$$

MEASURING THE OVERALL COST OF CAPITAL

The firm's overall cost of capital is the weighted average of the individual capital costs, with the weights being the proportions of each type of capital used. Let k_o be the overall cost of capital.

$k_o = \Sigma(\text{percentage of the total capital structure supplied by each source of capital} \times \text{cost of capital for each source})$

$$= w_d k_d + w_p k_p + w_e k_e + w_s k_s$$

where w_d = % of total capital supplied by debts

w_p = % of total capital supplied by preferred stock

w_e = % of total capital supplied by external equity

w_s = % of total capital supplied by retained earnings (or internal equity)

The weights can be *historical*, *target*, or *marginal*.

HISTORICAL WEIGHTS

Historical weights are based on a firm's existing capital structure. The use of these weights is based on the assumption that the firm's existing capital structure is optimal and therefore should be maintained in the future. Two types of historical weights can be used - book value weights and market value weights.

Book Value Weights. The use of book value weights in calculating the firm's weighted cost of capital assumes that new financing will be raised using the same method the firm used for its present capital structure. The weights are determined by dividing the book value of each capital component by the sum of the book values of all the long-term capital sources. The computation of overall cost of capital is illustrated in the following example.

EXAMPLE 9-6

Assume the following capital structure and cost of each source of financing for the Carter Company:

		<u>Cost</u>
Mortgage bonds (\$1,000 par)	\$20,000,000	5.14% (from Example 9-1)
Preferred stock (\$100 par)	5,000,000	13.40% (from Example 9-2)
Common stock (\$40 par)	20,000,000	17.11% (from Example 9-4)
Retained earnings	5,000,000	16.00% (from Example 9-3)
Total	<u>\$50,000,000</u>	

The book value weights and the overall cost of capital are computed as follows:

<u>Source</u>	<u>Book Value</u>	<u>Weights</u>	<u>Cost</u>	<u>Weighted Cost</u>
Debt	\$20,000,000	40%(a)	5.14%	2.06%(b)
Preferred stock	5,000,000	10	13.40%	1.34
Common stock	20,000,000	40	17.11%	6.84
Retained earnings	5,000,000	10	16.00%	1.60
	<u>\$50,000,000</u>	<u>100%</u>		<u>11.84%</u>

Overall cost of capital = $k_o = 11.84\%$

(a) $\$20,000,000 / \$50,000,000 = .40 = 40\%$

(b) $5.14\% \times 40\% = 2.06\%$

Market Value Weights. Market value weights are determined by dividing the market value of each source by the sum of the market values of all sources. The use of market value weights for computing a firm's weighted average cost of capital is theoretically more appealing than the use of book value weights because the market values of the securities closely approximate the actual dollars to be received from their sale.

EXAMPLE 9-7

In addition to the data from Example 9-6, assume that the security market prices are as follows:

Mortgage bonds = \$1,100 per bond

Preferred stock = \$90 per share

Common stock = \$80 per share

The firm's number of securities in each category is:

$$\text{Mortgage bonds} = \frac{\$20,000,000}{\$1,000} = 20,000$$

$$\text{Preferred stock} = \frac{\$5,000,000}{\$100} = 50,000$$

$$\text{Common stock} = \frac{\$20,000,000}{\$40} = 500,000$$

Therefore, the market value weights are:

<u>Source</u>	<u>Number of Securities</u>	<u>Price</u>	<u>Market Value</u>
Debt	20,000	\$1,100	\$22,000,000
Preferred stock	50,000	\$90	4,500,000
Common stock	500,000	\$80	<u>40,000,000</u>

\$66,500,000

The \$40 million common stock value must be split in the ratio of 4 to 1 (the \$20 million common stock versus the \$5 million retained earnings in the original capital structure), since the market value of the retained earnings has been impounded into the common stock.

The firm's cost of capital is as follows:

<u>Source</u>	<u>Market Value</u>	<u>Weights</u>	<u>Cost</u>	<u>Weighted Average</u>
Debt	\$22,000,000	33.08%	5.14%	1.70%
Preferred stock	4,500,000	6.77	13.40%	0.91
Common stock	32,000,000	48.12	17.11%	8.23
Retained earnings	<u>8,000,000</u>	<u>12.03</u>	16.00%	<u>1.92</u>
	<u>\$66,500,000</u>	<u>100.00%</u>		<u>12.76%</u>

Overall cost of capital = k_o = 12.76%

TARGET WEIGHTS

If the firm has a target capital structure (desired debt-equity mix), which is maintained over the long term, then the use of that capital structure and associated weights can be used in calculating the firm's weighted cost of capital.

MARGINAL WEIGHTS

Marginal weights involves the use of *actual* financial mix used in financing the proposed investments. In using target weights, the firm is concerned with what it believes to be the optimal capital structure or target percentage. In using marginal weights, the firm is concerned with the actual dollar amounts of each type of financing to be needed for a given investment project. This approach, while attractive, presents a problem. The cost of capital for the individual sources depend on the firm's financial risk, which is affected by the firm's financial mix. If the company alters its present capital structure, the individual costs will change, which makes it more difficult to compute the weighted cost of capital. The important assumption needed is that the firm's financial mix is relatively stable and that these weights will closely approximate future financing practice.

EXAMPLE 9-8

The Carter Company is considering raising \$8 million for plant expansion. Management estimates using the following mix for financing this project:

Debt	\$4,000,000	50%
Common stock	2,000,000	25%
Retained earnings	<u>2,000,000</u>	<u>25%</u>
	<u>\$8,000,000</u>	<u>100%</u>

The company's cost of capital is computed as follows:

<u>Source</u>	<u>Marginal Weights</u>	<u>Cost</u>	<u>Weighted Cost</u>
Debt	50%	5.14%	2.57%
Common stock	25	17.11%	4.28
Retained Earnings	<u>25</u>	16.00%	<u>4.00</u>
	<u>100%</u>		<u>10.85%</u>

Overall cost of capital = k_o = 10.85%

LEVEL OF FINANCING AND THE MARGINAL COST OF CAPITAL (MCC)

In the previous illustration, the weighted cost of capital was determined under the assumption that no new common stock was issued. If new common stock is issued, the firm's weighted cost of capital will increase for each dollar of new financing, because external equity capital has a higher cost than retained earnings due to flotation costs. Therefore, the lower-cost capital sources are used first. In fact, the firm's cost of capital is a function of the size of its total investment outlay.

A schedule or graph relating the firm's cost of capital to the level of new financing is called the *weighted marginal cost of capital* (MCC). Such a schedule is used to determine the discount rate to be used in the firm's capital budgeting process. The steps to be followed in calculating the firm's marginal cost of capital are summarized below.

1. Determine the cost and the percentage of financing to be used for each source of capital (debt, preferred stock, common stock equity).

2. Compute the break points on the MCC curve where the weighted cost will increase. The formula for computing the break points is:

$$\text{Break point} = \frac{\text{maximum amount of the lower - cost source of capital}}{\text{percentage financing provided by the source}}$$

3. Calculate the weighted cost of capital over the range of total financing between break points.

4. Construct a MCC schedule or graph that shows the weighted cost of capital for each level of total new financing. This schedule will be used in conjunction with the firm's available *investment opportunities schedule* (IOS) in order to select the investments. As long as a project's IRR is greater than the marginal cost of new financing, the project should be accepted. Also, the point at which the IRR intersects the MCC gives the optimal capital budget.

EXAMPLE 9-9

A firm is contemplating three investment projects, A, B, and C, whose initial cash outlays and expected internal rate of return (IRR) are shown below. IOS for these projects is:

<u>Project</u>	<u>Cash Outlay</u>	<u>IRR</u>
A	\$2,000,000	13%
B	\$2,000,000	15%
C	\$1,000,000	10%

If these projects are accepted, the financing will consist of 50 percent debt and 50 percent common stock. The firm should have \$1.8 million in earnings available for reinvestment (internal common). The firm will consider only the effects of increases in the cost of common stock on its marginal cost of capital.

1. The costs of capital for each source of financing have been computed and are given below:

<u>Source</u>	<u>Cost</u>
Debt	5%
Common stock (\$1.8 million)	15%
New common stock	9%

If the firm uses only internally generated common stock, the weighted cost of capital is:
 $k_o = E$ percentage of the total capital structure supplied by each source of capital x cost of capital for each source.

In this case, the capital structure is composed of 50 percent debt and 50 percent internally generated common stock. Thus,

$$k_o = (0.5)5\% + (0.5)15\% = 10\%$$

If the firm uses only new common stock, the weighted cost of capital is:

$$k_o = (0.5)5\% + (0.5)19\% = 12\%$$

Range of Total New Financing (In Millions of Dollars)		Type of Capital	Proportion	Cost	Weighted Cost
\$0 - \$3.6		Debt	0.5	5%	2.5%
		Internal common	0.5	15%	<u>7.5</u>
					<u>10.0%</u>
\$3.6 and up		Debt	0.5	5%	2.5%
		New common	0.5	19%	<u>9.5</u>
					<u>12.0%</u>

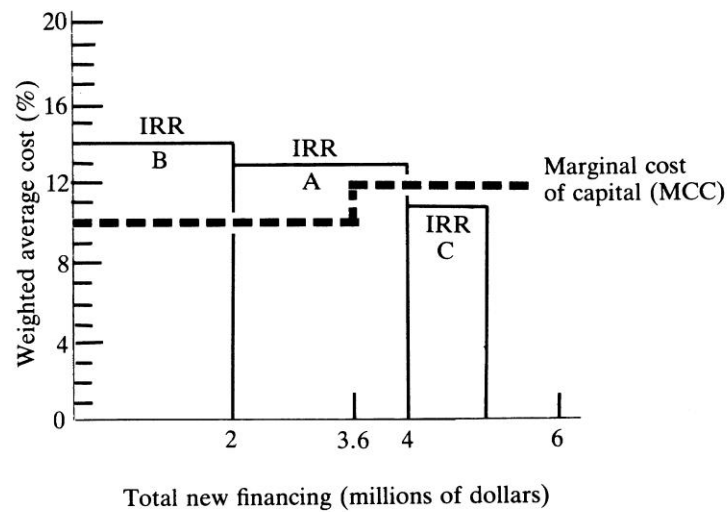
2. Next compute the break point, which is the level of financing at which the weighted cost of capital increases.

$$\begin{aligned} \text{Break point} &= \frac{\text{maximum amount of source of the lower cost source of capital}}{\text{percentage financing provided by the source}} \\ &= \frac{\$1,800,000}{0.5} = \$3,600,000 \end{aligned}$$

3. That is, the firm may be able to finance \$3.6 million in new investments with internal common stock and debt without having to change the current mix of 50 percent debt and 50 percent common stock. Therefore, if the total financing is \$3.6 million or less, the firm's cost of capital is 10 percent.
4. Construct the MCC schedule on the IOS graph to determine the discount rate to be used in order to decide in which project to invest and to show the firm's optimal capital budget. See Figure 9-1.

The firm should continue to invest up to the point where the IRR equals the MCC. From the graph in Figure 1, note that the firm should invest in projects B and A, since each IRR exceeds the marginal cost of capital. The firm should reject project C since its cost of capital is greater than the IRR. The optimal capital budget is \$4 million, since this is the sum of the cash outlay required for projects A and B.

FIGURE 9-1
MCC AND ISO GRAPH



CONCLUSION

Cost of capital is an important concept within financial management. It is the rate of return that must be achieved in order for the price of the stock to remain unchanged. Therefore, the cost of capital is the minimum acceptable rate of return for the company's new investments. The chapter discussed how to calculate the individual costs of financing sources, various ways to calculate the overall cost of capital, and how the optimal budget for capital spending can be constructed. Financial officers should be thoroughly familiar with the ways to compute the costs of various sources of financing for financial, capital budgeting, and capital structure decisions.

CHAPTER 10

CAPITAL BUDGETING: TECHNIQUES AND PRACTICE

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Describe the types and special features of capital budgeting decisions.
 - Calculate, interpret, and evaluate five capital budgeting techniques.
 - Select the best mix of projects with a limited capital spending budget.
 - Discuss how income tax factors affect investment decisions.
 - Explain the types of depreciation methods.
 - Discuss the effect of Modified Accelerated Cost Recovery System (MACRS) on capital budgeting decisions.
-

Capital budgeting is the process of making long-term investment decisions. These decisions should be made in light of the goals of the company. The stockholders have entrusted the company with their money and they expect the firm to invest their money wisely. Investments in fixed assets should be consistent with the goal of maximizing the market value of the firm.

There are many investment decisions that the company may have to make in order to grow. Examples of capital budgeting applications are product line selection, keep or sell a business segment decisions, lease or buy, and which asset to invest in. To make long-term investment decisions in accordance with a goal, three tasks must be performed in evaluating capital budgeting projects: (1) estimate cash flows, (2) estimate the cost of capital (or required rate of return), and (3) apply a decision rule to determine if a project is "good" or "bad."

WHAT ARE THE TYPES OF INVESTMENT PROJECTS?

There are typically two types of long-term investment decisions made by a company:

1. *Expansion decisions* in terms of obtaining new facilities or expanding existing facilities:

Examples include:

- (a) Investments in property, plant, and equipment as well as other types of assets.
- (b) Resource commitments in the form of new product development, market research, introduction of information technology (IT), refunding of long-term debt, etc.
- (c) Mergers and acquisitions in the form of buying another company to add a new product line.

2. *Replacement decisions* in terms of replacing existing facilities with new facilities. Examples include replacing an old machine with a high-tech machine.

WHAT ARE THE FEATURES OF INVESTMENT PROJECTS?

Long-term investments have three important features:

1. They typically involve a large amount of initial cash outlay which tend to have a long-term impact on the firm's future profitability. Therefore, this initial cash outlay needs to be justified on a cost-benefit basis.

2. There are expected recurring cash inflows (for example, increased revenues, savings in cash operating expenses, etc.) over the life of the investment project. This frequently requires considering the *time value of money*. Depreciation expense is a consideration only to the extent that it affects the cash flows for taxes. Otherwise, depreciation is excluded from the analysis because it is a noncash expense.

3. Income taxes could make a difference in the accept or reject decision. Therefore, income tax factors must be taken into account in every capital budgeting decision.

HOW DO YOU MEASURE INVESTMENT WORTH?

Several methods of evaluating investment projects are as follows:

1. Payback period
2. Accounting rate of return (ARR)
3. Internal rate of return (IRR)
4. Net present value (NPV)
5. Profitability index (or cost/benefit ratio)

The NPV method and the IRR method are called discounted cash flow (DCF) methods. Each of these methods is discussed below.

PAYBACK PERIOD

The payback period measures the length of time required to recover the amount of initial investment. It is computed by dividing the initial investment by the cash inflows through increased revenues or cost savings.

EXAMPLE 10-1

Assume:

Cost of investment	\$18,000
Annual after-tax cash savings	\$3,000

Then, the payback period is:

$$\text{Payback period} = \frac{\text{initial investment}}{\text{cost savings}} = \frac{\$18,000}{\$3,000} = 6 \text{ years}$$

Decision rule: Choose the project with the shorter payback period. The rationale behind this choice is: The shorter the payback period, the less risky the project, and the greater the liquidity.

EXAMPLE 10-2

Consider the two projects whose after-tax cash inflows are not even. Assume each project costs \$1,000.

	<u>Cash</u>	<u>Inflow</u>
Year	A(\$)	B(\$)
1	100	500
2	200	400
3	300	300
4	400	100

5	500
6	600

When cash inflows are not even, the payback period has to be found by trial and error. The payback period of project A is (\$1,000 = \$100 + \$200 + \$300 + \$400) 4 years. The payback period of project B is \$1,000 = \$500 + \$400 + \$100):

$$2 \text{ years} + \frac{\$100}{\$300} = 2 \frac{1}{3} \text{ years}$$

Project B is the project of choice in this case, since it has the shorter payback period.

The advantages of using the payback period method of evaluating an investment project are that (1) it is simple to compute and easy to understand, and (2) it handles investment risk effectively. The shortcomings of this method are that (1) it does not recognize the time value of money, and (2) it ignores the impact of cash inflow received after the payback period; essentially, cash flows after the payback period determine profitability of an investment.

ACCOUNTING RATE OF RETURN

Accounting rate of return (ARR) measures profitability from the conventional accounting standpoint by relating the required investment--or sometimes the average investment--to the future annual net income.

Decision rule: Under the ARR method, choose the project with the higher rate of return.

EXAMPLE 10-3

Consider the following investment:

Initial investment	\$6,500
Estimated life	20 years
Cash inflows per year	\$1,000
Depreciation per year (using straight line method)	\$325

The accounting rate of return for this project is:

$$\text{APR} = \frac{\text{net income}}{\text{investment}} = \frac{\$1000 - \$325}{\$6,500} = 10.4\%$$

If average investment (usually assumed to be one-half of the original investment) is used, then:

$$\text{APR} = \frac{\$1,000 - \$325}{\$3,250} = 20.8\%$$

The advantages of this method are that it is easily understandable, simple to compute, and recognizes the profitability factor.

The shortcomings of this method are that it fails to recognize the time value of money, and it uses accounting data instead of cash flow data.

INTERNAL RATE OF RETURN

Internal rate of return (IRR) is defined as the rate of interest that equates I with the PV of future cash inflows. In other words, at IRR,

$$I = PV$$

or

$$NPV = 0$$

Decision rule: Accept the project if the IRR exceeds the cost of capital. Otherwise, reject it.

EXAMPLE 10-4

Consider the following investment:

Initial investment	\$37,910
Estimated life	5 years
Annual cash inflows after taxes	\$10,000
Cost of capital (minimum required rate of return)	8%

We set the following equality ($I = PV$):

$$\$37,910 = \$10,000 \cdot T_4(i, 5 \text{ years})$$

$$T_4(i, 5 \text{ years}) = \frac{\$37,910}{\$10,000} = 3.791$$

which is right on 10% in the 5-year line of Table 6-4.

Since the IRR of the investment is greater than the cost of capital (8 percent), accept the project.

The advantage of using the IRR method is that it considers the time value of money and, therefore, is more exact and realistic than the ARR method. The shortcomings of this method are that (1) it is time-consuming to compute, especially when the cash inflows are not even, although most business calculators have a program to calculate IRR, and (2) it fails to recognize the varying sizes of investment in competing projects.

When cash inflows are not even, IRR is computed by the trial and error method, which is not discussed here. Financial calculators such as Texas Instruments and Sharp have a key for IRR calculations.

NET PRESENT VALUE

Net present value (NPV) is the excess of the present value (PV) of cash inflows generated by the project over the amount of the initial investment (I):

$$NPV = PV - I$$

The present value of future cash flows is computed using the so-called cost of capital (or minimum required rate of return) as the discount rate. In the case of an annuity, the present value would be

$$PV = A \cdot T_4(i, n)$$

where A is the amount of the annuity. The value of T_4 is found in Table 6-4 of Chapter 6.

Decision rule: If NPV is positive, accept the project. Otherwise reject it.

EXAMPLE 10-5

Assume the same data given in Example 10-4 and the net present value of the cash inflows is:

Present value of the cash inflows is:

$$\begin{aligned} PV &= A \cdot T_4(i, n) \\ &= \$10,000 \cdot T_4(8\%, 5 \text{ years}) \\ &= \$10,000 (3.993) \end{aligned} \quad \$39,930$$

Initial investment (I)	<u>37,910</u>
Net present value (NPV = PV - I)	<u>\$ 2,020</u>

Since the NPV of the investment is positive, the investment should be accepted.

The advantages of the NPV method are that it obviously recognizes the time value of money and it is easy to compute whether the cash flows are in the form of an annuity or vary from period to period.

Can a Computer Help?

Spreadsheet programs can be used in making IRR calculations. For example, *Excel* has a function `IRR(values, guess)`. *Excel* considers negative numbers as cash outflows such as the initial investment, and positive numbers as cash inflows. Many financial calculators have similar features. As in Example 3, suppose you want to calculate the IRR of a \$37,910 investment (the value --37910 entered in year 0 that is followed by 5 monthly cash inflows of \$10,000). Using a guess of 8% (the value of 0.08), which is in effect the cost of capital, your formula would be `@IRR(values, 0.08)` and *Excel* would return 10%, as shown below.

<i>Year 0</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
-37910	10000	10000	10000	10000	10000
IRR= 10%					
NPV= \$2,017.10					

Note: The *Excel* formula for NPV is `NPV (discount rate, cash inflow values) + I`, where I is given as a negative number.

PROFITABILITY INDEX

The profitability index is the ratio of the total PV of future cash inflows to the initial investment, that is, PV/I . This index is used as a means of ranking projects in descending order of attractiveness.

Decision rule: If the profitability index is greater than 1, then accept the project.

EXAMPLE 10-6

Using the data in Example 10-4, the profitability index is

$$\frac{PV}{I} = \frac{\$39,930}{\$37,910} = 1.05$$

Since this project generates \$1.05 for each dollar invested (i.e., its profitability index is greater than 1), accept the project.

The profitability index has the advantage of putting all projects on the same relative basis regardless of size.

HOW TO SELECT THE BEST MIX OF PROJECTS WITH A LIMITED BUDGET

Many firms specify a limit on the overall budget for capital spending. Capital rationing is concerned with the problem of selecting the mix of acceptable projects that provides the highest overall NPV. The profitability index is used widely in ranking projects competing for limited funds.

EXAMPLE 10-7

A company with a fixed budget of \$250,000 needs to select a mix of acceptable projects from the following:

<i>Projects</i>	<i>I(\$)</i>	<i>PV(\$)</i>	<i>NPV(\$)</i>	<i>Profitability Index</i>	<i>Ranking</i>
A	70,000	112,000	42,000	1.60	1
B	100,000	145,000	45,000	1.45	2
C	110,000	126,500	16,500	1.15	5
D	60,000	79,000	19,000	1.32	3
E	40,000	38,000	-2,000	0.95	6
F	80,000	95,000	15,000	1.19	4

The ranking resulting from the profitability index shows that the company should select projects A, B, and D.

	<i>I</i>	<i>PV</i>
A	\$70,000	\$112,000
B	100,000	145,000
D	<u>60,000</u>	<u>79,000</u>
	<u>\$230,000</u>	<u>\$336,000</u>

Therefore,

$$\text{NPV} = \$336,000 - \$230,000 = \$106,000$$

A more general approach to solving capital rationing problems is the use of *zero-one programming*, which is a special case of *linear programming*. Here the objective is to select the mix of projects that maximizes the net present value (NPV) subject to a budget constraint. Using the data given in Example 10-7, we can set up the problem as a zero-one programming problem such that

$$X_j = \begin{cases} 1 & \text{if project } j \text{ is selected} \\ 0 & \text{if project } j \text{ is not selected} \end{cases}$$

($j = 1, 2, 3, 4, 5, 6$)

The problem then can be formulated as follows:

Maximize

$$\text{NPV} = \$42,000x_1 + \$45,000x_2 + \$16,500x_3 + \$19,000x_4 - \$2,000x_5 + \$15,000x_6$$

subject to

$$\begin{aligned} \$70,000x_1 + \$100,000x_2 + \$110,000x_3 + \$60,000x_4 + \$40,000x_5 + \$80,000x_6 &\leq \$250,000 \\ &= x_j \quad (j = 1, 2, \dots, 6) \end{aligned}$$

Using the zero-one programming solution routine, the solution to the problem is:

$x_1 = A = 1, x_2 = B = 1, x_4 = D = 1$
and the NPV is \$106,000. Thus, projects A, B and D should be selected.

The strength of the use of zero-one programming is its ability to handle mutually exclusive and interdependent projects, which is reserved for an advanced finance textbook.

HOW TO HANDLE MUTUALLY EXCLUSIVE INVESTMENTS

A project is said to be mutually exclusive if the acceptance of one project automatically excludes the acceptance of one or more other projects (for example, two alternative uses of a single plot of land). In the case where one must choose between mutually exclusive investments, the NPV and IRR methods may result in contradictory indications. The conditions under which contradictory rankings can occur are:

1. Projects that have different life expectancies.
2. Projects that have different sizes of investment.
3. Projects whose cash flows differ over time. For example, the cash flows of one project increase over time, while those of another decrease.

The contradictions result from different assumptions with respect to the reinvestment rate on cash flows from the projects.

1. The NPV method discounts all cash flows at the cost of capital, thus implicitly assuming that these cash flows can be reinvested at this rate.
2. The IRR method assumes that cash flows are reinvested at the often unrealistic rate specified by the project's internal rate of return. Thus, the implied reinvestment rate will differ from project to project.

Thus, the relative desirability of mutually exclusive projects depends on what rate of return the subsequent cash flows can earn. The NPV method generally gives correct ranking, since the cost of capital is a more realistic reinvestment rate. The cost of capital tends to give a close approximation for the market rate of return.

EXAMPLE 10-8

Assume the following:

	Cash Flows					
	0	1	2	3	4	5
A	(100)	120				
B	(100)				201.14	

Computing IRR and NPV at 10 percent gives the following different rankings:

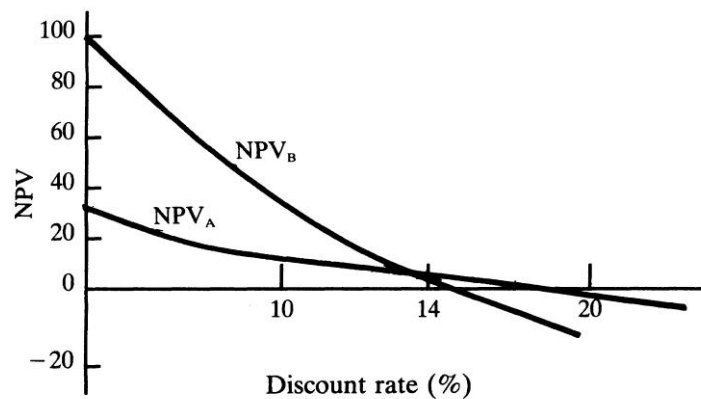
	<u>IRR</u>	<u>NPV at 10%</u>
A	20%	9.01
B	15%	24.90

The difference in ranking between the two methods is caused by the methods' reinvestment rate assumptions. The IRR method assumes Project A's cash inflow of \$120 is reinvested at 20% for the subsequent 4 years and the NPV method assumes \$120 is reinvested at 10%. The correct decision is to select the project with the higher NPV (that is, Project B), since the NPV method assumes a more realistic reinvestment rate, that is, the cost of capital (10% in this example).

The net present values plotted against various discount rates (costs of capital) results in the NPV profiles for projects A and B (Figure 1). An analysis of Figure 10-1 indicates that at a discount rate

larger than 14 percent, A has a higher NPV than B. Therefore, A should be selected. At a discount rate less than 14 percent, B has the higher NPV than A, and thus should be selected.

**FIGURE 10-1
THE NPV GRAPH**



HOW DOES INCOME TAXES AFFECT INVESTMENT DECISIONS?

Income taxes make a difference in many capital budgeting decisions. In other words, the project which is attractive on a before-tax basis may have to be rejected on an after-tax basis. Income taxes typically affect both the amount and the timing of cash flows. Since net income, not cash inflows, is subject to tax, after-tax cash inflows are not usually the same as after-tax net income.

Let us define:

S = Sales

E = Cash operating expenses

d = Depreciation

t = Tax rate

Then, before-tax cash inflows (or before-tax *cash savings*) = $S - E$ and net income = $S - E - d$.

By definition,

$$\begin{aligned} \text{After-tax cash inflows} &= \text{Before-tax cash inflows} - \text{Taxes} \\ &= (S - E) - (S - E - d)(t) \end{aligned}$$

Rearranging gives the short-cut formula:

$$\text{After-tax cash inflows} = (S - E)(1 - t) + (d)(t)$$

As can be seen, the deductibility of depreciation from sales in arriving at net income subject to taxes reduces income tax payments and thus serves as a tax shield.

$$\text{Tax shield} = \text{Tax savings on depreciation} = (d)(t)$$

EXAMPLE 10-9

Assume:

$$S = \$12,000$$

$$E = \$10,000$$

$d = \$500$ per year using the straight line method

$$t = 30\%$$

Then,

$$\begin{aligned}\text{After-tax cash inflow} &= (\$12,000 - \$10,000) (1 - 0.3) + (\$500)(0.3) \\ &= (\$2,000)(.7) + (\$500)(0.3) \\ &= \$1,400 + \$150 = \$1,550\end{aligned}$$

$$\begin{aligned}\text{Note that a tax shield} &= \text{tax savings on depreciation} = (d)(t) \\ &= (\$500)(.3) = \$150\end{aligned}$$

Since the tax shield is dt , the higher the depreciation deduction, the higher the tax savings on depreciation. Therefore, an accelerated depreciation method (such as double-declining balance) produces higher tax savings than the straight-line method. Accelerated methods produce higher present values for the tax savings which may make a given investment more attractive.

EXAMPLE 10-10

The Shalimar Company estimates that it can save \$2,500 a year in cash operating costs for the next ten years if it buys a special-purpose machine at a cost of \$10,000. No salvage value is expected. Assume that the income tax rate is 30%, and the after-tax cost of capital (minimum required rate of return) is 10%. After-tax cash savings can be calculated as follows:

Note that depreciation by straight-line is $\$10,000/10 = \$1,000$ per year. Here before-tax cash savings $= (S - E) = \$2,500$. Thus,

$$\begin{aligned}\text{After-tax cash savings} &= (S - E) (1 - t) + (d)(t) \\ &= \$2,500(1 - 0.3) + \$1,000(0.3) \\ &= \$1,750 + \$300 = \$2,050\end{aligned}$$

To see if this machine should be purchased, the net present value can be calculated.

$$PV = \$2,050 T_4(10\%, 10 \text{ years}) = \$2,050 (6.145) = \$12,597.25$$

$$\text{Thus, NPV} = PV - I = \$12,597.25 - \$10,000 = \$2,597.25$$

Since NPV is positive, the machine should be bought.

TYPES OF DEPRECIATION METHODS

We saw that depreciation provided the tax shield in the form of $(d)(t)$. Among the commonly used depreciation methods are straight-line and accelerated methods. The two major accelerated methods are sum-of-the years'-digits (SYD) and double-declining-balance (DDB).

STRAIGHT-LINE METHOD

This is the easiest and most popular method of calculating depreciation. It results in equal periodic depreciation charges. The method is most appropriate when an asset's usage is uniform from period to period, as is the case with furniture. The annual depreciation expense is calculated by using the following formula:

$$\text{Depreciation expense} = \frac{\text{cost} - \text{salvage value}}{\text{number of years of useful life}}$$

EXAMPLE 10-11

An auto is purchased for \$20,000 and has an expected salvage value of \$2,000. The auto's estimated life is 8 years. Its annual depreciation is calculated as follows:

$$\begin{aligned}\text{Depreciation expense} &= \frac{\text{cost} - \text{salvage value}}{\text{number of years of useful life}} \\ &= \frac{\$20,000 - \$2,000}{8 \text{ years}} = \$2,250 / \text{year}\end{aligned}$$

An alternative means of computation is to multiply the *depreciable* cost (\$18,000) by the annual depreciation rate, which is 12.5 percent in this example. The annual rate is calculated by dividing the number of years of useful life into one ($1/8 = 12.5\%$). The result is the same: $\$18,000 \times 12.5\% = \$2,250$.

SUM-OF-THE YEARS'-DIGITS (SYD) METHOD

In this method, the number of years of life expectancy is enumerated in reverse order in the numerator, and the denominator is the sum of the digits. For example, if the life expectancy of a machine is 8 years, write the numbers in reverse order: 8, 7, 6, 5, 4, 3, 2, 1. The sum of these digits is 36, or $(8 + 7 + 6 + 5 + 4 + 3 + 2 + 1)$. Thus, the fraction for the first year is $8/36$, while the fraction for the last year is $1/36$. The sum of the eight fractions equals $36/36$, or 1. Therefore, at the end of 8 years, the machine is completely written down to its salvage value.

The following formula may be used to quickly find the sum-of-the-years' digits (S):

$$S = \frac{(N)(N + 1)}{2}$$

where N represents the number of years of expected life.

EXAMPLE 10-12

In Example 13, the *depreciable* cost is \$18,000 (\$20,000 - \$2,000). Using the SYD method, the computation for each year's depreciation expense is

$$S = \frac{(N)(N + 1)}{2} = \frac{8(9)}{2} = \frac{72}{2} = 36$$

Year	Fraction x	Depreciation Amount (\$) =	Depreciation Expense
1	8/36	\$18,000	\$ 4,000
2	7/36	18,000	3,500
3	6/36	18,000	3,000
4	5/36	18,000	2,500
5	4/36	18,000	2,000
6	3/36	18,000	1,500
7	2/36	18,000	1,000
8	1/36	18,000	500
Total			\$18,000

DOUBLE-DECLINING-BALANCE (DDB) METHOD

Under this method, depreciation expense is highest in the earlier years and lower in the later years. First, a depreciation rate is determined by doubling the straight-line rate. For example, if an asset has a life of 10 years, the straight-line rate is $1/10$ or 10 percent, and the double-declining rate is 20 percent. Second, depreciation expense is computed by multiplying the rate by the book value of the asset at the beginning of each year. Since book value declines over time, the depreciation expense decreases each successive period.

This method *ignores* salvage value in the computation. However, the book value of the fixed asset at the end of its useful life cannot be below its salvage value.

EXAMPLE 10-13

Assume the data in Example 13. Since the straight-line rate is 12.5 percent (1/8), the double-declining-balance rate is 25 percent (2 x 12.5%). The depreciation expense is computed as follows:

Year	Book Value at beginning of year	x	Rate (%) =	Depreciation Expense	Year-end Book Value
1	\$20,000		25%	\$5,000	\$15,000
2	15,000		25	3,750	11,250
3	11,250		25	2,813	8,437
4	8,437		25	2,109	6,328
5	6,328		25	1,582	4,746
6	4,746		25	1,187	3,559
7	3,559		25	890	2,669
8	2,669		25	667	2,002

Note: If the original estimated salvage value had been \$2,100, the depreciation expense for the eighth year would have been \$569 (\$2,669 - \$2,100) rather than \$667, since the asset cannot be depreciated below its salvage value.

HOW DOES MACRS AFFECT INVESTMENT DECISIONS?

Although the traditional depreciation methods still can be used for computing depreciation for book purposes, 1981 saw a new way of computing depreciation deductions for tax purposes. The new rule is called the *Modified Accelerated Cost Recovery System* (MACRS) rule, as enacted by Congress in 1981 and then modified somewhat in 1986 under the Tax Reform Act of 1986. This rule is characterized as follows:

1. It abandons the concept of useful life and accelerates depreciation deductions by placing all depreciable assets into one of eight age property classes. It calculates deductions, based on an allowable percentage of the asset's original cost (See Tables 10-1 and 10-2). With a shorter life than useful life, the company would be able to deduct depreciation more quickly and save more in income taxes in the earlier years, thereby making an investment more attractive. The rationale behind the system is that this way the government encourages the company to invest in facilities and increase its productive capacity and efficiency. (Remember that the higher d , the larger the tax shield $(d)(t)$).
2. Since the allowable percentages in Table 10-2 add up to 100%, there is no need to consider the salvage value of an asset in computing depreciation.
3. The company may elect the straight line method. The straight-line convention must follow what is called the *half-year convention*. This means that the company can deduct only half of the regular straight-line depreciation amount in the first year. The reason for electing to use the MACRS optional straight-line method is that some firms may prefer to stretch out depreciation deductions using the straight-line method rather than to accelerate them. Those firms are the ones

that just start out or has little or no income and wish to show more income on their income statements.

EXAMPLE 10-14

Assume that a machine falls under a 3-year property class and costs \$3,000 initially. The straight line option under MACRS differs from the traditional straight line method in that under this method the company would deduct only \$500 depreciation in the first year and the fourth year ($\$3,000/3$ years = \$1,000; $\$1,000/2 = \500). The table below compares the straight line with half-year convention with the MMACRS.

<u>Year</u>	<u>Straight Line (half-year) depreciation</u>	<u>Cost</u>		<u>MACRS %</u>	<u>MACRS deduction</u>
1	\$500	\$3,000	x	33.3%	\$999
2	1,000	3,000	x	44.5	1,335
3	1,000	3,000	x	14.8	444
4	500	3,000	x	7.4	222
	<u>\$3,000</u>				<u>\$3,000</u>

EXAMPLE 10-15

A machine costs \$1,000. Annual cash inflows are expected to be \$500. The machine will be depreciated using the MACRS rule and will fall under the 3-year property class. The cost of capital after taxes is 10%. The estimated life of the machine is 4 years. The tax rate is 30%. The formula for computation of after-tax cash inflows $(S - E)(1 - t) + (d)(t)$ needs to be computed separately. The NPV analysis can be performed as follows:

<u>(S - E)(1 - t):</u>					Present value factor @ Present 10% value		
\$500(1 - 0.3) = \$350 for 4 years					3.170 ^(a)	\$1,109.5	
<u>(d)(t):</u> year	Cost		MACRS%	d	(d)(t)		
1	\$1,000	x	33.3%	\$333	\$99.9	.909(b)	90.81
2	\$1,000	x	44.5	445	133.5	.826(b)	110.27
3	\$1,000	x	14.8	148	44.4	.751(b)	33.34
4	\$1,000	x	7.4	74	22.2	.683(b)	15.16
							<u>\$1,359.08</u>

(a) $T_4(10\%, 4 \text{ years}) = 3.170$ (from Table 6-4).

(b) T_3 values obtained from Table 6-3.

Therefore, $NPV = PV - I = \$1,359.08 - \$1,000 = \$359.08$, which is positive, so that the machine should be bought.

TABLE 10-1
MODIFIED ACCELERATED COST RECOVERY SYSTEM
CLASSIFICATION OF ASSETS

Property class

<i>Year</i>	<i>3-year</i>	<i>5-year</i>	<i>7-year</i>	<i>10-year</i>	<i>15-year</i>	<i>20-year</i>
1	33.3%	20.0%	14.3%	10.0%	5.0%	3.8%
2	44.5	32.0	24.5	18.0	9.5	7.2
3	14.8a	19.2	17.5	14.4	8.6	6.7
4	7.4	11.5a	12.5	11.5	7.7	6.2
5		11.5	8.9a	9.2	6.9	5.7
6		5.8	8.9	7.4	6.2	5.3
7			8.9	6.6a	5.9a	4.9
8			4.5	6.6	5.9	4.5a
9				6.5	5.9	4.5
10				6.5	5.9	4.5
11				3.3	5.9	4.5
12					5.9	4.5
13					5.9	4.5
14					5.9	4.5
15					5.9	4.5
16					3.0	4.4
17						4.4
18						4.4
19						4.4
20						4.4
21						<u>2.2</u>
Total	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

a. Denotes the year of changeover to straight-line depreciation.

TABLE 10-2

MACRS TABLES BY PROPERTY CLASS

<i>Property Class & Depreciation Method</i>	<i>Useful Life (ADR Midpoint Life) "a"</i>	<i>Examples of Assets</i>
3-year property 200% declining balance	4 years or less	Most small tools are included; the law specifically excludes autos and light trucks from this property class.
5-year property 200% computers, declining balance	More than 4 years to Less than 10 years	Autos and light trucks, typewriters, copiers, duplicating equipment, heavy general- purpose trucks, and research and experimentation equipment are included.
7-year property 200% and declining balance	10 years or more to less than 16 years	Office furniture and fixtures most items of machinery and equipment used in production are included
10-year property 200% declining balance	16 years or more to less than 20 years	Various machinery and equipment, such as that used in petroleum distilling and refining and in the milling of grain, are included.
15-year property 150% declining balance	20 years or more to less than 25 years	Sewage treatment plants telephone and electrical distribution facilities, and land improvements are included.
20-year property 150% declining balance	25 years or more	Service stations and other real property with an ADR midpoint life of less than 27.5 years are included.
27.5-year property Straight-line	Not applicable	All residential rental property is included
31.5-year property Straight-line	Not applicable	All nonresidential property is included.

“a” The term ADR midpoint life means the “useful life” of an asset in a business sense; the appropriate ADR midpoint lives for assets are designated in the tax Regulations.

CONCLUSION

We have examined the process of evaluating investment projects. We have also discussed five commonly used criteria for evaluating capital budgeting projects, including the net present value (NPV) and internal rate of return (IRR) methods. The problems that arise with mutually exclusive investments and capital rationing were addressed. Since income taxes could make a difference in the accept or reject decision, tax factors must be taken into account in every decision.

Although the traditional depreciation methods still can be used for computing depreciation for book purposes, 1981 saw a new way of computing depreciation deductions for tax purposes. The new rule is called the modified accelerated cost recovery system (MACRS). It was enacted by Congress in 1981 and then modified somewhat in 1986 under the Tax Reform Act of 1986. We illustrated the use of MACRS, and presented an overview of the traditional depreciation methods.

CHAPTER 11

DETERMINING THE FINANCING MIX

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Discuss the basics of break-even analysis and operating leverage and how they relate to each other.
 - Measure operating leverage and financial leverage and distinguish between them.
 - Apply the EBIT-EPS approach to evaluate alternative financing plans.
 - Explain how to determine the best capital structure.
-

In the previous chapters we developed an understanding of how securities are valued in the marketplace. Drawing on the tenets of valuation theory, we then presented various approaches to measuring the cost of funds to the company. The concepts to be covered in this chapter relate closely to those discussions of the valuation process and the cost of capital, and also extend to the crucial problem of determining the firm's optimal capital structure. First, we present the concept of leverage and discuss how it impacts the firm's profits. We will then proceed to discuss how to build an appropriate financing mix.

Leverage is that portion of the fixed costs which represents a risk to the firm. Operating leverage, a measure of operating risk, refers to the fixed operating costs found in the firm's income statement. Financial leverage, a measure of financial risk, refers to long term financing of the firm's assets, bearing fixed financing charges. The higher the financial leverage, the higher the financial risk, and the higher the cost of capital. Cost of capital rises because it costs more to raise funds for a risky business. The optimal capital structure, if any, will depend to a great extent upon the amount of leverage (risk) the company can tolerate and the resultant cost of capital.

BREAK-EVEN ANALYSIS, OPERATING LEVERAGE, AND FINANCIAL LEVERAGE

Break-even analysis, which is closely related to operating leverage, determines the break-even sales. Break-even point--the financial crossover point when revenues exactly match costs--does not show up in corporate earnings reports, but financial officers find it an extremely useful measurement in a variety of ways. Let us define:

S = Sales (\$)

x = Sales volume in units

p = Selling price per unit

v = Unit variable cost

VC = Variable operating costs

FC = Fixed operating costs

In connection with break-even analysis, we note the following important concepts.

(1) *Contribution margin (CM)*. The contribution margin is the excess of sales (S) over the variable costs (VC) of the product. It is the amount of money available to cover fixed costs (FC) and to generate profits. Symbolically, $CM = S - VC$.

(2) *Unit CM*. The unit CM is the excess of the unit selling price (p) over the unit variable cost (v). Symbolically, $unit\ CM = p - v$.

EXAMPLE 11-1

To illustrate these concepts, consider the following data for company Z:

	<u>Total</u>	<u>Per Unit</u>	<u>Percentage</u>
Sales (1,500 units)	\$37,500	\$25	100%
Less: Variable costs	<u>15,000</u>	<u>10</u>	<u>40</u>
Contribution margin	\$22,500	\$15	60%
Less: Fixed costs	<u>15,000</u>		
Net income	<u>\$7,500</u>		

From the data listed above, CM, and unit CM are computed as:

$$CM = S - VC = \$37,500 - \$15,000 = \$22,500$$

$$Unit\ CM = p - v = \$25 - \$10 = \$15$$

BREAK-EVEN POINT

The break-even point represents the level of sales revenue that equals the total of the variable and fixed costs for a given volume of output at a particular capacity use rate. For example, you might want to ask the break-even occupancy rate (or vacancy rate) for a hotel or the break-even load rate for an airliner. Generally, the lower the break-even point, the higher the profits and the less the operating risk, other things being equal. The break-even point can be found easily by setting sales just equal to the total of the variable costs plus the fixed costs:

$$\begin{aligned} S &= VC + FC \\ px &= vx + FC \\ (p-v)x &= FC \\ x &= \frac{FC}{(p - v)} \end{aligned}$$

That is,

$$\text{Break-even points in units} = \frac{\text{Fixed costs}}{\text{Unit CM}}$$

EXAMPLE 11-2

Using the same data in Example 11-1, in which $unit\ CM = \$25 - \$10 = \$15$, we get:

$$\text{Break-even point in units} = \$15,000 / \$15 = 1,000 \text{ units}$$

$$\text{Break-even point in dollars} = 1,000 \text{ units} \times \$25 = \$25,000$$

CASH BREAK-EVEN POINT

If a company has a minimum of available cash or the opportunity cost of holding excess cash is too high, management may want to know the volume of sales that will cover all cash expenses during a period. This is known as the cash break-even point. Not all fixed operating costs involve cash

payments. For example, depreciation expenses are noncash fixed charges. To find the cash break-even point, the noncash charges must be subtracted from fixed costs. Therefore, the cash break-even point is lower than the usual break-even point. The formula is:

$$\text{Cash break-even point} = \frac{\text{Fixed costs} - \text{depreciation}}{\text{Unit CM}}$$

EXAMPLE 11-3

Assume from Example 11-1 that the total fixed costs of \$15,000 include depreciation of \$1,500. Then the cash break-even point is:

$$\frac{\$15,000 - \$1,500}{\$25 - \$10} = \frac{\$13,500}{\$15} = 900$$

Company Z has to sell 900 units to cover only the fixed costs involving cash payments of \$13,500 and to break even.

OPERATING LEVERAGE

Operating leverage is a measure of operating risk and arises from the firm's use of fixed operating costs. A simple indication of operating leverage is the effect that a change in sales has on earnings before interest and taxes (EBIT). The formula is:

$$\begin{aligned} \text{Operating leverage at a} &= \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}} \\ \text{given level of sales (x)} &= \frac{(p - v)x}{(p - v)x - FC} \end{aligned}$$

where EBIT = earnings before interest and taxes
 $= (p - v)x - FC$

EXAMPLE 11-4

The Wayne Company manufactures and sells doors to home builders. The doors are sold for \$25 each. Variable costs are \$15 per door, and fixed operating costs total \$50,000. Assume further that the Wayne Company is currently selling 6,000 doors per year.

Its operating leverage is:

$$\begin{aligned} \frac{(p - v)x}{(p - v)x - FC} &= \frac{(\$25 - \$15)(\$6,000)}{(\$25 - \$15)(6,000) - \$50,000} \\ &= \frac{\$60,000}{\$10,000} = 6 \end{aligned}$$

which means if sales increase by 10 percent, the company can expect its net income to increase by six times that amount, or 60 percent.

All types of leverage are two-edge swords. When sales decrease by some percentage, the negative impact upon EBIT will be even larger.

FINANCIAL LEVERAGE

Financial leverage is a measure of financial risk and arises from the presence of debt and/or preferred stock in the firm's capital structure bearing fixed financial costs. One way to measure financial leverage is to determine how earnings per share (EPS) is affected by a change in EBIT.

When financial leverage is used, changes in EBIT translate into larger changes in EPS. EBIT can rise or fall. If it falls, the use of financial leverage will make the firm's stockholders endure negative changes in EPS that are larger than the relative decline in EBIT. Again, leverage is a two-edged sword,

$$\begin{aligned} \text{Financial leverage at a} &= \frac{\text{Percentage in change in EPS}}{\text{Percentage in change in EBIT}} \\ \text{given level of sales (x)} &= \frac{(p - v)x - FC}{(p - v)x - FC - I} \end{aligned}$$

where EPS is earnings per share, and I is fixed finance charges, i.e., interest expense or preferred stock dividends. [Preferred stock dividend must be adjusted for taxes i.e., preferred stock dividend divided by (1-t).]

EXAMPLE 11-5

Using the data in Example 4, the Wayne Company has total financial charges of \$2,000, half in interest expense and half in preferred stock dividends. The corporate tax rate is 40 percent. First, the fixed financial charges are:

$$I = \$1,000 + \frac{\$1,000}{(1 - 0.4)} = \$1,000 + \$1,667 = \$2,667$$

Therefore, Wayne's financial leverage is computed as follows:

$$\frac{(p - v)x - FC}{(p - v)x - FC - I} = \frac{(\$25 - \$15)(6,000) - \$50,000}{(\$25 - \$15)(6,000) - \$50,000 - \$2,667} = \frac{\$10,000}{\$7,333} = 1.36$$

which means that if EBIT increases by 10 percent, Wayne can expect its EPS to increase by 1.36 times, or by 13.6 percent.

TOTAL LEVERAGE

Total leverage is a measure of total risk. The way to measure total leverage is to determine how EPS is affected by a change in sales.

$$\begin{aligned} \text{Total leverage at a} &= \frac{\text{Percentage in change in EPS}}{\text{Percentage in change in sales}} \\ \text{given level of sales (x)} &= \text{operating leverage} \times \text{financial leverage} \\ &= \frac{(p - v)x}{(p - v)x - FC} \cdot \frac{(p - v)x - FC}{(p - v)x - FC - I} \\ &= \frac{(p - v)x}{(p - v)x - FC - I} \end{aligned}$$

EXAMPLE 11-6

From Examples 11-4 and 11-5, the total leverage for Wayne company is:

$$\text{Operating leverage} \times \text{financial leverage} = 6 \times 1.36 = 8.16$$

or

$$\frac{(p - v)x}{(p - v)x - FC - I} = \frac{(\$25 - \$15)(6000)}{(\$25 - \$15)(6000) - \$50,000 - \$2,667}$$

$$= \frac{\$60,000}{\$7,333} = 8.16 \text{ (due to rounding error)}$$

TOOLS OF CAPITAL STRUCTURE MANAGEMENT

Capital structure management is closely related to the firm's cost of capital. Capital structure is the mix of the long-term sources of funds used by the firm. The primary objective of capital structure decisions is to maximize the market value of the firm through an appropriate mix of long-term sources of funds. This mix, called the *optimal capital structure*, will minimize the firm's overall cost of capital. However, there are arguments about whether an optimal capital structure actually exists. The arguments center on whether a firm can, in reality, affect its valuation and its cost of capital by varying the mixture of the funds used.

The decision to use debt and/or preferred stock in the firm's capitalization causes two types of financial leverage effects. The first effect is the increased risk in earnings per share (EPS) due to the use of fixed financial obligations. As was discussed earlier, this was measured by the *degree of financial leverage* (DFL). The second effect relates to the level of EPS at a given EBIT under a specific capital structure. We rely upon *EBIT-EPS analysis* to measure this second effect.

EBIT-EPS APPROACH TO CAPITAL STRUCTURE DECISIONS

This analysis is a practical tool that enables the financial manager to evaluate alternative financing plans by investigating their effect on EPS over a range of EBIT levels. Its primary objective is to determine the EBIT break-even, or indifference, points between the various alternative financing plans. The indifference point identifies the EBIT level at which the EPS will be the same regardless of the financing plan chosen by the financial manager.

This indifference point has major implications for capital structure decisions. At EBIT amounts in excess of the EBIT indifference level, the more heavily levered financing plan will generate a higher EPS. At EBIT amounts below the EBIT indifference level, the financing plan involving less leverage will generate a higher EPS. Therefore, it is of critical importance for the financial manager to know the EBIT indifference level. The indifference points between any two methods of financing can be determined by solving for EBIT in the following equation:

$$\frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{S_1} = \frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{S_2}$$

where t = tax rate

PD = preferred stock dividends

S_1 and S_2 = number of shares of common stock outstanding after financing for plan 1 and plan 2, respectively.

EXAMPLE 11-7

Assume that ABC Company, with long-term capitalization consisting entirely of \$5 million in stock, wants to raise \$2 million for the acquisition of special equipment by (1) selling 40,000 shares of common stock at \$50 each, (2) selling bonds at 10 percent interest, or (3) issuing preferred stock with an 8 percent dividend. The present EBIT is \$800,000, the income tax rate is 50 percent, and 100,000 shares of common stock are now outstanding. To compute the indifference points, we begin by calculating EPS at a projected EBIT level of \$1 million.

	<u>All Common</u>	<u>All Debt</u>	<u>All Preferred</u>
EBIT	\$1,000,000	\$1,000,000	\$1,000,000
Interest		<u>200,000</u>	
Earnings before taxes (EBT)	\$1,000,000	\$800,000	\$1,000,000
Taxes	<u>500,000</u>	<u>400,000</u>	<u>500,000</u>
Earnings after taxes (EAT)	\$500,000	\$400,000	\$500,000
Preferred stock dividend			<u>160,000</u>
Earnings available to common stockholders	\$500,000	\$400,000	\$340,000
Number of shares	<u>140,000</u>	<u>\$4.00</u>	<u>\$3.40</u>

Now connect the EPSs at the level of EBIT of \$1 million with the EBITs for each financing alternative on the horizontal axis to obtain the EPS-EBIT graphs. We plot the EBIT necessary to cover all fixed financial costs for each financing alternative on the horizontal axis. For the common stock plan, there are no fixed costs, so the intercept on the horizontal axis is zero. For the debt plan, there must be an EBIT of \$200,000 to cover interest charges. For the preferred stock plan, there must be an EBIT of \$320,000 [$\$160,000 / (1 - 0.5)$] to cover \$160,000 in preferred stock dividends at a 50 percent income tax rate; so \$320,000 becomes the horizontal axis intercept. See Figure 11-1.

In this example, the indifference point between all common and all debt is:

$$\frac{\frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{S_1}}{\frac{(\text{EBIT} - 0)(1 - 0.5) - 0}{140,000}} = \frac{\frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{S_2}}{\frac{(\text{EBIT} - 200,000)(1 - 0.5) - 0}{100,000}}$$

Rearranging yields:

$$\begin{aligned} 0.5(\text{EBIT})(100,000) &= 0.5(\text{EBIT})(140,000) - 0.5(200,000)(140,000) \\ 20,000 \text{ EBIT} &= 14,000,000,000 \\ \text{EBIT} &= \$700,000 \end{aligned}$$

Similarly, the indifference point between all common and all preferred would be:

$$\frac{\frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{S_1}}{\frac{(\text{EBIT} - 0)(1 - 0.5) - 0}{140,000}} = \frac{\frac{(\text{EBIT} - I)(1 - t) - \text{PD}}{S_2}}{\frac{(\text{EBIT} - 0)(1 - 0.5) - 160,000}{100,000}}$$

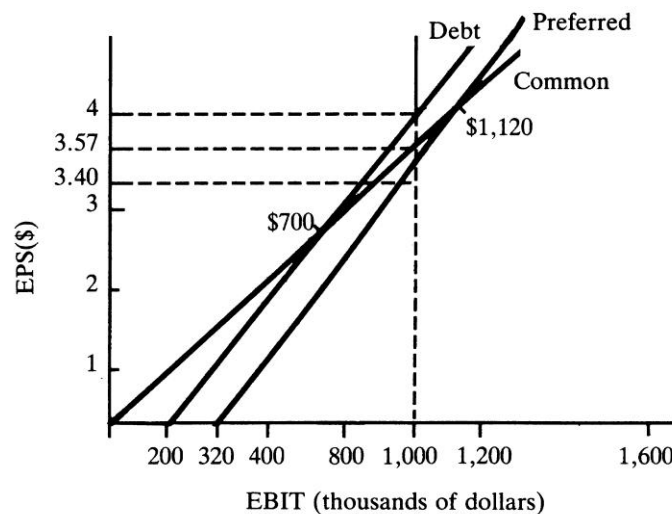
Rearranging yields:

$$\begin{aligned} 0.5(\text{EBIT})(100,000) &= 0.5(\text{EBIT})(140,000) - 160,000(140,000) \\ 20,000 \text{ EBIT} &= 22,400,000,000 \\ \text{EBIT} &= \$1,120,000 \end{aligned}$$

Based on the above computations and observing Figure 11-4, we can draw the following conclusions:

1. At any level of EBIT, debt is better than preferred stock, since it gives a higher EPS.
2. At a level of EBIT above \$700,000, debt is better than common stock. If EBIT is below \$700,000, the reverse is true.
3. At a level of EBIT above \$1,120,000, preferred stock is better than common. At or below that point, the reverse is true.

FIGURE 11-4
THE EPS-EBIT GRAPH



A WORD OF CAUTION

It is important to realize that financial leverage is a two-edge sword. It can magnify profits but it can also increase losses. The EBIT-EPS approach helps financial managers examine the impact of financial leverage as a financing method. Investment performance is crucial to the successful application of any leveraging strategy.

ANALYSIS OF CORPORATE CASH FLOWS

A second tool of capital structure management involves the *analysis of cash flows*. When considering the appropriate capital structure, among other things, it is important to analyze the cash-flow ability of the firm to service fixed charges. The greater the dollar amount of debt and/or preferred stock the firm issues and the shorter their maturity, the greater the fixed charges of the firm. These charges include principal and interest payments on debt, lease payments, and preferred stock dividends. Before assuming additional fixed charges, the firm should analyze its expected future cash flows, for fixed charges must be met with cash. The inability to meet these charges, with the exception of preferred stock dividends, may result in insolvency. The greater and more stable the expected future cash flows of the firm, the greater the debt capacity of the company.

COVERAGE RATIOS

A third tool is the calculation of *comparative coverage ratios*. Among the ways we can gain insight into the debt capacity of a firm is through the use of coverage ratios, which were introduced in

Chapter 3 (Evaluating a Firm's Financial Performance). In the computation of these ratios, a corporate financial officer typically uses EBIT as a rough measure of the cash flow available to cover debt-servicing obligations. Perhaps the most widely used coverage ratio is *times interest earned*, which is simply:

$$\text{Times interest earned} = \frac{\text{EBIT}}{\text{Interest on debt}}$$

Assume that the most recent annual EBIT for a company was \$4 million, and that interest payments on all debt obligations were \$1 million. Therefore, times interest earned would be four times. This tells us that EBIT can drop by as much as 75 percent and the firm still will be able to cover its interest payments out of earnings.

However, a coverage ratio of only 1.0 indicates that earnings are just sufficient to satisfy the interest burden. While it is difficult to generalize as to what is an appropriate interest coverage ratio, a financial officer usually is concerned when the ratio gets much below 3:1. However, it all depends. In a highly stable industry, a relatively low times-interest-earned ratio may be appropriate, whereas it is not appropriate in a highly cyclical one.

Unfortunately, the times-interest-earned ratio tells us nothing about the ability of the firm to meet principal payments on its debt. The inability to meet a principal payment constitutes the same legal default as failure to meet an interest payment. Therefore, it is useful to compute the coverage ratio for the full debt-service burden. This ratio is

$$\text{Debt-service coverage} = \frac{\text{EBIT}}{\text{Interest} + \frac{\text{Principal payments}}{1 - \text{Tax rate}}}$$

Here principal payments are adjusted upward for the tax effect. The reason is that EBIT represents earnings before taxes. Because principal payments are not tax deductible, they must be paid out of after-tax earnings. Therefore, we must adjust principal payments so that they are consistent with EBIT. If principal payments in our previous example were \$1.5 million per annum and the tax rate were 34 percent, the debt-service coverage ratio would be

$$\text{Debt-service coverage} = \frac{\$4 \text{ million}}{\$1 \text{ million} + \frac{\$1.5 \text{ million}}{1 - 0.34}} = 1.22$$

A coverage ratio of 1.22 means that EBIT can fall by only 22 percent before earnings coverage is insufficient to service the debt. Obviously, the closer the ratio is to 1.0, the worse things are, all other things being equal. However, even with a coverage ratio of less than 1.0, a company may still meet its obligations if it can renew some of its debt when it comes due.

The financial risk associated with leverage should be analyzed on the basis of the firm's ability to service total fixed charges. While lease financing is not debt per se, its impact on cash flows is exactly the same as the payment of interest and principal on a debt obligation. Therefore, annual lease payments should be added to the denominator of the formula in order to properly reflect the total cash-flow burden associated with financing.

Two types of comparison should be undertaken with a coverage ratio. First, it should be compared with past and expected future ratios of the same company. The idea behind *trend analysis* is to determine if there has been an improvement or a deterioration in coverage over time. Another method of analyzing the appropriate capital structure for a company is to evaluate the capital structure of other companies having similar business risk. Companies used in this

comparison may be those in the same industry. If the firm is contemplating a capital structure significantly out of line with that of similar companies, it is conspicuous to the marketplace. This is not to say, however, that the firm is wrong; other companies in the industry may be too conservative with respect to the use of debt. The optimal capital structure for all companies in the industry might call for a higher proportion of debt to equity than the industry average. As a result, the firm may well be able to justify more debt than the industry average. Because investment analysts and creditors tend to evaluate companies by industry, however, the firm should be able to justify its position if its capital structure is noticeably out of line in either direction.

Ultimately, a financial officer wants to make generalizations about the appropriate amount of debt (and leases) for a firm to have in its capital structure. It is clear that over the long run the source to service debt for a going concern is earnings. Therefore, coverage ratios are an important analytical tool. However, coverage ratios are but only one tool by which a financial manager is able to reach conclusions with respect to the company's best capital structure. Coverage ratios are subject to certain limitations and, consequently, cannot be used as a sole means for determining the capital structure. For one thing, the fact that EBIT falls below the debt-service burden does not spell immediate doom for the company. Often alternative sources of funds, including renewal of a loan, are available, and these sources must be considered.

CAPITAL STRUCTURE DECISIONS IN PRACTICE

How do companies decide in practice which route to go in raising capital? It is a complex decision, related to a company's balance sheet, market conditions, outstanding obligations and a host of other factors.

Many financial managers believe that the following factors influence capital structure:

1. Growth rate and stability of future sales
2. Competitive structure in the industry
3. Asset makeup of the individual firm
4. The business risk to which the firm is exposed.
5. Control status of owners and management
6. Lenders' attitudes toward the industry and the company

Surveys indicate that the majority of financial managers on large firms believe in the concept of an optimal capital structure. The optimal capital structure is approximated by the identification of target debt ratios. The most frequently mentioned factor that affects the level of the target debt ratio was the company's ability to service fixed financing costs. Other factors identified as affecting the target were (1) maintaining a desired bond rating, (2) providing an adequate borrowing reserve, and (3) exploiting the advantages of financial leverage.

CONCLUSION

The chapter discussed the process of arriving at an appropriate capital structure for the firm. Tools that can assist financial officers in this task were examined. We were first concerned with assessing the variability in the firm's earnings per share (EPS) induced by operating leverage and financial leverage. This assessment built upon the principles of breakeven analysis.

In deciding upon an appropriate capital structure, the financial manager should take into account a number of factors. One important method of gaining insight into the question of the optimal capital structure involves analyzing the relationship between earnings before interest and taxes (EBIT) and earnings per share (EPS) for alternative methods of financing. In addition, the financial

manager can learn much from a comparison of capital structure ratios and coverage ratios (such as times interest earned and debt-service coverage) for similar companies and over time.

CHAPTER 12

MANAGING LIQUID ASSETS

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Accelerate cash receipts.
- Delay cash payments.
- Determine an optimal cash balance.
- Identify the types of marketable securities.
- Explain how to manage accounts receivable.
- Describe what credit and discount policies may be advisable.
- Outline some ways to manage inventory.
- Compute the carrying cost and ordering cost of inventory.
- Determine how much inventory to order each time and when to order it.

Effective management of working capital (current assets less current liabilities) improves returns and minimizes the risk that the company will run short of cash. By optimally managing cash, receivables and inventory, a company can maximize its rate of return and minimize its liquidity and business risk. The amount invested in each current asset may change daily and should be monitored carefully to ensure that funds are used in the most productive way possible. Large account balances may also indicate risk; for example, inventory may not be salable and/or accounts receivable may not be collectible. On the other hand, maintaining inadequate current asset levels may be costly; business may be lost if inventory is too low.

Cash refers to currency and demand deposits; excess funds may be invested in marketable securities. Cash management involves accelerating cash inflow and delaying cash outflow. Accounts receivable management involves selecting customers with good credit standing and speeding up customer collections. Inventory management involves having the optimal order size at the right time.

EVALUATING WORKING CAPITAL

Working capital equals current assets less current liabilities. If current assets are \$6,500,000 and current liabilities are \$4,000,000, working capital equals \$2,500,000. Managing working capital--regulating the various types of current assets and current liabilities--requires making decisions on how assets should be financed (e.g., by short-term debt, long-term debt, or equity); net working capital increases when current assets are financed through noncurrent sources.

Managing working capital is also evaluating the trade-off between return and risk. If funds are transferred from fixed assets to current assets, liquidity risk is reduced, greater ability to obtain short-term financing is enhanced, and the company has greater flexibility in adjusting current assets to meet changes in sales volume. However, it also receives reduced return, because the yield on fixed assets exceeds that of current assets. Financing with noncurrent debt carries less liquidity risk than financing with current debt because the former is payable over a longer time

period. However, long-term debt often has a higher cost than short-term debt because of its greater uncertainty.

Liquidity risk may be reduced by using the *hedging* approach to financing, in which assets are financed by liabilities with similar maturity. When a company needs funds to purchase seasonal or cyclical inventory, it uses short-term financing, which gives it flexibility to meet its seasonal needs within its ability to repay the loan. On the other hand, the company's permanent assets should be financed with long-term debt. Because the assets last longer, the financing can be spread over a longer time, helping to ensure the availability of adequate funds with which to meet debt payments.

The less time it takes between purchase and delivery of goods, the less working capital needed. For example, if the company can receive a raw material in two weeks, it can maintain a lower level of inventory than if two months' lead time is required. You should purchase material early if by doing so you can pay significantly lower prices and if the material's cost savings exceed inventory carrying costs.

CASH MANAGEMENT

The goal of cash management is to invest excess cash for a return and at the same time have adequate liquidity. A proper cash balance, neither excessive nor deficient, should exist; for example, companies with many bank accounts may be accumulating excessive balances. Proper cash forecasting is particularly crucial in a recession and is required to determine (1) the optimal time to incur and pay back debt and (2) the amount to transfer daily between accounts. A daily computerized listing of cash balances and transaction reporting can let you know the up-to-date cash balance so you can decide how best to use the funds. You should also assess the costs you are paying for banking services, looking at each account's cost.

When cash receipts and cash payments are highly synchronized and predictable, your company may keep a smaller cash balance; if quick liquidity is needed, it can invest in marketable securities. Any additional cash should be invested in income producing securities with maturities structured to provide the necessary liquidity.

Financially strong companies that are able to borrow at favorable rates, even in difficult financial markets, can afford to keep a lower level of cash than companies that are highly leveraged or considered poor credit risks.

At a minimum, a company should hold in cash the greater, of (1) compensating balances (deposits held by a bank to compensate it for providing services) or (2) precautionary balances (money held for emergency purposes) plus transaction balances (money to cover checks outstanding). It must also hold enough cash to meet its daily requirements.

A number of factors go into the decision on how much cash to hold, including the company's liquid assets, business risk, debt levels and maturity dates, ability to borrow on short notice and on favorable terms, rate of return, economic conditions, and the possibility of unexpected problems, such as customer defaults.

Acceleration of Cash Inflow

To improve cash inflow, you should evaluate the causes of and take corrective action for delays in having cash receipts deposited. Ascertain the origin of cash receipts, how they are delivered, and how cash is transferred from outlying accounts to the main corporate account. Also

investigate banking policy regarding availability of funds and the length of the time lag between when a check is received and when it is deposited.

The types of delays in processing checks are: (1) "mail float," the time required for a check to move from debtor to creditor; (2) "processing float," the time needed for the creditor to render the payment; and (3) "deposit collection float," the time it takes for a check to clear. *Note:* Electronic data exchange (EDI) or financial EDI (FEDI) significantly reduces or eliminates a float. EDI refers to the growing practice of direct, electronic information exchange between all types of businesses, thereby shortening the length of time required to initiate and complete a business transaction.

You should try out all possible ways to accelerate cash receipts including the use of lockboxes, pre-authorized debits (PADs), wire transfers, and depository transfer checks.

-- *Lockbox.* A lockbox represents a way to place the optimum collection point near customers. Customer payments are mailed to strategic post office boxes geographically situated to reduce mailing and depositing time. Banks make collections from these boxes several times a day and deposit the funds to the corporate account. They then prepare a computer listing of payments received by account and a daily total, which is forwarded to the corporation.

To determine the effectiveness of using a lockbox, you should determine the average face value of checks received, the cost of operations eliminated, reducible processing overhead, and the reduction in "mail float" days. Because per-item processing costs for lockboxes is typically significant, it makes the most sense to use one for low-volume, high-dollar collections. However, businesses with high-volume, low-dollar receipts are using them more and more as technological advances lower their per-item cost.

Wholesale lockboxes are used for checks received from other *companies*. As a rule, the average dollar cash receipts are large, and the number of cash receipts is small. Many wholesale lock boxes result in mail time reductions of no more than one business day and check-clearing time reductions of only a few tenths of one day. They are therefore most useful for companies that have gross revenues of at least several million dollars and that receive large checks from distant customers.

A *retail lockbox* is the best choice if the company deals with the *public* (retail customers as distinguished from companies). Retail lockboxes typically receive many transactions of nominal amounts. The lockbox reduces float and transfers workload from the company to the bank, resulting in improved cash flow and reduced expenses.

-- *Return Envelopes.* Providing return envelopes can accelerate customer remissions. On the return envelope, you can use bar codes, nine-digit code numbers, or post office box numbers. Another option is Accelerated Reply Mail (ARM), in which a unique "truncating" ZIP code is assigned to payments such as lockbox receivables. The coded remittances are removed from postal system and processed by banks or third parties.

-- *Pre-Authorized Debits.* Cash from customers may be collected faster if you obtain permission from customers to have pre-authorized debits (PADs) automatically charged to the customers' bank accounts for repetitive charges. This is a common practice among insurance companies, which collect monthly premium payments via PADs. These debits may take the form of pre-authorized checks (PACs) or paperless automatic clearing house entries. PADs are cost-effective because they avoid the process of billing the customer, receiving and processing

the payment, and depositing the check. Using PADs for variable payments is less efficient because the amount of the PAD must be changed each period and the customer generally must be advised by mail of the amount of the debit. PADs are most effective when used for constant, relatively nominal periodic payments.

-- *Wire Transfers*. To accelerate cash flow, you may transfer funds between banks by wire transfers through computer terminal and telephone. Such transfers should be used only for significant dollar amounts because wire transfer fees are assessed by both the originating and receiving banks. Wire transfers are best for intraorganization transfers, such as transfers to and from investments, deposits to an account made the day checks are expected to clear, and deposits made to any other account that requires immediate availability of funds. They may also be used to fund other types of checking accounts, such as payroll accounts. In order to avoid unnecessarily large balances in the account, you may fund it on a staggered basis. However, to prevent an overdraft, you should make sure balances are maintained in another account at the bank.

There are two types of wire transfers--preformatted (recurring) and free-form (nonrepetitive). Recurring transfers do *not* involve extensive authorization and are suitable for ordinary transfers in which the company designates issuing and receiving banks and provides its account number. Nonrecurring transfers require greater control, including written confirmations instead of telephone or computer terminal confirmations.

-- *Depository Transfer Checks (DTCs)*. Paper or paperless depository checks may be used to transfer funds between the company's bank accounts. They do not require a signature, since the check is payable to the bank for credit to the company's account. DTCs typically clear in one day. *Manual* DTCs are preprinted checks that include all information except the amount and date; *automated* DTCs are printed as needed. It is usually best to use the bank's printer since it is not cost-effective for the company to purchase a printer. Automatic check preparation is advisable only for companies that must prepare a large number of transfer checks daily.

There are other ways to accelerate cash inflow. You can send bills to customers sooner than in your practice, perhaps immediately after the order is shipped. You can also require deposits on large or custom orders or submit progress billings as the work on the order progresses. You can charge interest on accounts receivable that are past due and offer cash discounts for early payment; you can also use cash-on-delivery terms. In any event, you should deposit checks immediately.

EXAMPLE 12-1

C Corporation obtains average cash receipts of \$200,000 per day. It usually takes five days from the time a check is mailed until the funds are available for use. The amount tied up by the delay is:

$$5 \text{ days} \times \$200,000 = \$1,000,000$$

You can also calculate the return earned on the average cash balance.

EXAMPLE 12-2

A company's weekly average cash balances are as follows:

<u>Week</u>	<u>Average Cash Balance</u>
1	\$12,000

2	17,000
3	10,000
4	<u>15,000</u>
Total	<u>\$54,000</u>

The weekly average cash balance is:

$$\frac{\$54,000}{4} = \$13,500$$

If the annual interest rate is approximately 12 percent, the monthly return earned on the average cash balance is:

$$\$13,500 \times \frac{0.12}{12} = \underline{\$135}$$

If you are thinking of establishing a lockbox to accelerate cash inflow, you will need to determine the maximum monthly charge you will incur for the service.

EXAMPLE 12-3

It takes Travis Corporation about seven days to receive and deposit payments from customers. Therefore, it is considering establishing a lockbox system. It expects the system to reduce the float time to five days. Average daily collections are \$500,000. The rate of return is 12 percent.

The reduction in outstanding cash balances arising from implementing the lockbox system is:

$$2 \text{ days} \times \$500,000 = \$1,000,000$$

The return that could be earned on these funds in a year is:

$$\$1,000,000 \times 0.12 = \$120,000$$

The maximum monthly charge the company should pay for this lockbox arrangement is therefore:

$$\frac{\$120,000}{12} = \$10,000$$

You should compare the return earned on freed cash to the cost of the lockbox arrangement to determine if using the lockbox is financially advantageous.

EXAMPLE 12-4

A company's financial officer is determining whether to initiate a lockbox arrangement that will cost \$150,000 annually. The daily average collections are \$700,000. Using a lockbox will reduce mailing and processing time by two days. The rate of return is 14%.

Annual return on freed cash (14% x 2 x \$700,000) \$196,000

Annual cost \$150,000

Net advantage of lockbox system \$46,000

Sometimes you need to determine whether to switch banks in order to lower the overall costs associated with a lockbox arrangement.

EXAMPLE 12-5

You now have a lockbox arrangement in which Bank A handles \$5 million a day in return for an \$800,000 compensating balance. You are thinking of canceling this arrangement and further dividing your western region by entering into contracts with two other banks. Bank B will handle

\$3 million a day in collections with a compensating balance of \$700,000, and Bank C will handle \$2 million a day with a compensating balance of \$600,000. Collections will be half a day quicker than they are now. Your return rate is 12%.

Accelerated cash receipts

((\$5 million per day x 0.5 day))	\$2,500,000
Increased compensating balance	<u>500,000</u>
Improved cash flow	\$2,000,000
Rate of return	<u>x 0.12</u>
Net annual savings	<u>\$240,000</u>

Delay of Cash Outlay

Delaying cash payments can help your company earn a greater return and have more cash available. You should evaluate the payees and determine to what extent you can reasonably stretch time limits without incurring finance charges or impairing your credit rating.

There are many ways to delay cash payments, including centralizing payables, having zero balance accounts, and paying by draft.

-- *Centralize Payables.* You should centralize your company's payable operation--that is, make one center responsible for making all payments--so that debt may be paid at the most profitable time and so that the amount of disbursement float in the system may be ascertained.

-- *Zero Balance Account (ZBA).* Cash payments may be delayed by maintaining zero balance accounts in one bank in which you maintain zero balances for all of the company's disbursing units with funds being transferred in from a master account as needed. The advantages of ZBAs are that they allow better control over cash payments and reduced excess cash balances in regional banks. Using ZBAs is an aggressive strategy that requires the company to put funds into its payroll and payables checking accounts only when it expects checks to clear. However, watch out for overdrafts and service charges.

-- *Drafts.* Payment drafts are another strategy for delaying disbursements. With a draft, payment is made when the draft is presented for collection to the bank, which in turn goes to the issuer for acceptance. When the draft is approved, the company deposits the funds to the payee's account. Because of this delay, you can maintain a lower checking balance. Banks usually impose a charge for drafts, and you must endure the inconveniences of formally approving them before payment. Drafts can provide a measure of protection against fraud and theft because they must be presented for inspection before payment.

-- *Delay in Mail.* You can delay cash payment by drawing checks on remote banks (e.g., a New York company might use a Texas bank), thus ensuring that checks take longer to clear. You may also mail checks from post offices that offer limited service or at which mail must go through numerous handling points. If you utilize the mail float properly, you can maintain higher actual bank balances than book balances. For instance, if you write checks averaging \$200,000 per day and they take three days to clear, you will have \$600,000 (\$200,000 x 3) in your checking account for those three days, even though the money has been deducted in your records. When you use this method, you should keep your money in some kind of interest bearing account.

-- *Check Clearing.* You can use probability analysis to determine the expected date for checks to clear. Probability is defined as the degree of likelihood that something will happen and is expressed as a percentage from 0 to 100. For example, it's likely that not all payroll checks are

cashed on the payroll date, so you can deposit some funds later and earn a return until the last minute.

-- *Delay Payment to Employees.* You can reduce the frequency of payments to employees (e.g., expense account reimbursements, payrolls); for example, you can institute a monthly payroll rather than a weekly one. In this way, you have the use of the cash for a greater time period. You can also disburse commissions on sales when the receivables are collected rather than when sales are made. Finally, you can utilize noncash compensation and remuneration methods (e.g., distribute stock instead of bonuses).

Other ways exist to delay cash payments. Instead of making full payment on an invoice, you can make partial payments. You can also delay payment by requesting additional information about an invoice from the vendor before paying it. Another strategy is to use a charge account to lengthen the time between when you buy goods and when you pay for them. In any event, never pay a bill before its due date.

EXAMPLE 12-6

Every two weeks the company disburses checks that average \$500,000 and take three days to clear. You want to find out how much money can be saved annually if the transfer of funds is delayed from an interest-bearing account that pays 0.0384 percent per day (annual rate of 14 percent) for those three days.

$$\$500,000 \times (0.000384 \times 3) = \underline{\$576}$$

$$\text{The savings per year is } \$576 \times 26 \text{ (yearly payrolls)} = \underline{\$14,976}$$

A cash management system is shown in Table 12-1.

CASH MODELS

A number of mathematical models have been developed to assist the financial manager in distributing a company's funds so that they provide a maximum return to the company. A model developed by William Baumol can determine the optimum amount of cash for a company to hold under conditions of certainty. The objective is to minimize the sum of the fixed costs of transactions and the opportunity cost (return forgone) of holding cash balances that do not yield a return. These costs are expressed as

$$F * \frac{(T)}{C} + i \frac{(C)}{2}$$

where F = the fixed cost of a transaction

T = the total cash needed for the time period involved

i = the interest rate on marketable securities

C = cash balance

C* = optimal level of cash

The optimal level of cash is determined using the following formula:

$$C^* = \sqrt{\frac{2FT}{i}}$$

TABLE 12-1
CASH MANAGEMENT SYSTEM

Acceleration of Cash Receipts

Lock box System
Concentration Banking
Preauthorized Checks
Preaddressed Stamped Envelopes
Obtain Deposits on Large Orders
Charge Interest on Overdue Receivables

Delay of Cash Payments

Pay by Draft
Requisition More Frequently
Disbursing Float
Make Partial Payments
Use Charge Accounts
Delay Frequency of Paying Employees

EXAMPLE 12-7

You estimate a cash need for \$4,000,000 over a 1-month period during which the cash account is expected to be disbursed at a constant rate. The opportunity interest rate is 6 percent per annum, or 0.5 percent for a one-month period. The transaction cost each time you borrow or withdraw is \$100.

The optimal transaction size (the optimal borrowing or withdrawal lot size) and the number of transactions you should make during the month follow:

$$C^* = \sqrt{\frac{2FT}{i}} = \sqrt{\frac{2(100)(4,000,000)}{0.0005}} = \$400,000$$

The optimal transaction size is \$400,000.

The average cash balance is

$$\frac{C^*}{2} = \frac{\$400,000}{2} = \$200,000$$

The number of transactions required is

$$\frac{4,000,000}{\$400,000} = 10 \text{ transactions during the month.}$$

There is also a model for cash management when cash payments are uncertain. The Miller-Orr model places upper and lower limits on cash balances. When the upper limit is reached, a transfer of cash to marketable securities is made; when the lower limit is reached, a transfer from securities to cash occurs. No transaction occurs as long as the cash balance stays within the limits.

Factors taken into account in the Miller-Orr model are the fixed costs of a securities transaction (F), assumed to be the same for buying as well as selling; the daily interest rate on marketable securities (i); and the variance of daily net cash flows (σ^2)--(σ is sigma). The objective is to meet cash requirements at the lowest possible cost. A major assumption of this

model is the randomness of cash flows. The control limits in the MillerOrr model are "d" dollars as an upper limit and zero dollars at the lower limit. When the cash balance reaches the upper level, d less z dollars (optimal cash balance) of securities are bought, and the new balance becomes z dollars. When the cash balance equals zero, z dollars of securities are sold and the new balance again reaches z. Of course, in practice the minimum cash balance is established at an amount greater than zero because of delays in transfer; the higher minimum in effect acts as a safety buffer.

The optimal cash balance z is computed as follows:

$$Z = \sqrt[3]{\frac{3F\sigma^2}{4i}}$$

The optimal value for d is computed as 3z.

The average cash balance approximates $\frac{(z + d)}{3}$.

EXAMPLE 12-8

You wish to use the Miller-Orr model. The following information is supplied:

Fixed cost of a securities transaction	\$10
Variance of daily net cash flows	\$50
Daily interest rate on securities (10%/360)	0.000277

The optimal cash balance, the upper limit of cash needed, and the average cash balance follow:

$$z = \sqrt[3]{\frac{3(10)(50)}{4(0.000277)}} = \sqrt[3]{\frac{3(10)(50)}{0.001108}} = \sqrt[3]{\frac{1,500}{0.001108}} = \sqrt[3]{1,353,790} \\ = \$108$$

The optimal cash balance is \$108; the upper limit is \$324 (3 x \$108); and the average cash balance is \$144 $\frac{(\$108 + \$324)}{3}$.

When the upper limit of \$324 is reached, \$216 of securities (\$324 - \$108) will be purchased to bring the account to the optimal cash balance of \$108. When the lower limit of zero dollars is reached, \$108 of securities will be sold to again bring it to the optimal cash balance of \$108.

BANKING RELATIONSHIPS

Before establishing a relationship with a bank, you should appraise its financial soundness by checking the ratings compiled by financial advisory services such as Moody's and Standard & Poor's. Your company may want to limit its total deposits at any one bank to no more than the amount insured by the Federal Deposit Insurance Corporation, especially if the bank is having difficulties.

You may also decide to use different banks for different services. In selecting a bank, consider location (which affects lockboxes and disbursement points), type and cost of services, and availability of funds.

You may undertake a bank account analysis by comparing the value of the company balance maintained at the bank to the service charges imposed. Banks will provide such analysis for you, if you wish, but you should scrutinize the bank's analysis closely to be sure it is accurate.

Most checks clear in one business day; clearing time of three or more business days is rare. Try to arrange for the financial institution to give same-day credit on deposits received prior to a specified cutoff time. If the deposit is made over the counter, the funds may not be immediately available; if the deposit is made early enough, especially through a lockbox, they may be.

INVESTING IN MARKETABLE SECURITIES

Cash management requires knowing the amount of funds the company has available for investment and the length of time for which they can be invested. Such investments earn a return for the company. Marketable securities include:

- Time deposits -- savings accounts that earn daily interest, long-term savings accounts, and certificates of deposit.
- Money market funds -- managed portfolios of short-term? high-grade debt instruments such as Treasury bills and commercial paper.
- Interest-paying demand deposits. -- U.S. Treasury securities.

Automatic short-term money market investments immediately deposit excess cash in money market securities in order to earn a return on the funds. Holding marketable securities serves as protection against cash shortages; companies with seasonal operations may purchase marketable securities when they have excess funds and then sell the securities when cash deficits occur. Companies may also invest in marketable securities when they are holding funds temporarily in expectation of short term capital expansion. In selecting an investment portfolio, you should consider return, default risk, marketability, and maturity date.

You should monitor coupon and security collection to ensure that the company receives any interest it is entitled to and that securities that mature or are sold are properly collected and deposited.

MANAGEMENT OF ACCOUNTS RECEIVABLE

Accounts receivable management directly impacts the profitability of the firm. It includes determining discount policy and credit policy for marginal customers, investigating ways of speeding up collections and reducing bad debts, and setting terms of sale to assure ultimate collection.

As part of accounts receivable management, you should appraise order entry, billing, and accounts receivable activities to be sure that proper procedures are being followed from the time an order is received until ultimate collection. Among the points to consider is how the average time lag between completing the sales transaction and invoicing the customer can be reduced. You should also consider the opportunity cost of holding receivables, that is, the return lost by having funds tied up in accounts receivable instead of invested elsewhere.

Accounts receivable management involves two types of float--invoicing and mail. *Invoicing float* is the number of days between the time goods are shipped to the customer and the time the

invoice is sent out. Obviously, the company should mail invoices on a timely basis. *Mail float* is the time between the preparation of an invoice and the time it is received by the customer. Mail float may be reduced by decentralizing invoicing and mailing, coordinating outgoing mail with post office schedules, using express mail services for large invoices, enforcing due dates, and offering discounts for early payment.

Credit Policies

A key concern in accounts receivable management is determining credit terms to be given to customers, which affects sales volume and collections. For example, offering longer credit terms will probably increase sales. Credit terms have a direct bearing on the costs and revenue generated from receivables. If credit terms are tight, the company will have a lower investment in accounts receivable and incur fewer bad-debt losses, but it may also experience lower sales, reduced profits, and adverse customer reaction. On the other hand, if credit terms are lax, the company may enjoy higher sales and gross profit, but it risks increased bad debts and a higher opportunity cost of carrying the investment in accounts receivable because marginal customers take longer to pay. Receivable terms should be liberalized when you want to get rid of excessive inventory or obsolete items or if you operate in an industry in which products are sold in advance of retail seasons (e.g., swimsuits). If your products are perishable, you should impose short receivable terms and possibly require payment on delivery.

In evaluating a potential customer's ability to pay, consider the customer's integrity, financial soundness, and collateral. A customer's credit soundness may be appraised through quantitative techniques such as regression analysis, which examines the change in a dependent variable that occurs as an independent (explanatory) variable changes. Such techniques are particularly useful when you need to evaluate a large number of small customers. You should be able to estimate bad debt losses reliably if your company sells to many customers and has not changed its credit policies for a long time.

Keep in mind that extending credit involves additional expenses--the administrative costs of operating the credit department; computer services; and fees paid to rating agencies.

You may find it useful to obtain references from retail credit bureaus and professional credit reference services as part of your customer credit evaluation. Dun and Bradstreet (D&B) reports contain information about a company's nature of business, product line, management, financial statements, number of employees, previous payment history as reported by suppliers, current debts, including any past due, terms of sale, audit opinion, lawsuits, insurance coverage, leases, criminal proceedings, banking relationships and account information (e.g., current bank loans), location, and seasonal fluctuations, if applicable.

Monitoring Receivables

There are many ways to maximize profitability from accounts receivable and keep losses to a minimum. These include proper billing, factoring, and evaluating the customers' financial health. -- *Billing*. Cycle billing, in which customers are billed at different time periods, can smooth out the billing process. In such a system, customers with last names starting with A may be billed on the first of the month, those with last names beginning with B on the second day, and so on. Customer statements should be mailed within twenty-four hours of the close of the billing period.

To speed up collections, you can send invoices to customers when their order is processed at the warehouse instead of when the merchandise is shipped. You can also bill for services at intervals when work is performed over a period of time or charge a retainer, rather than receiving payment when the work is completed. In any event, you should bill large sales immediately.

When business is slow, seasonal datings, in which you offer delayed payment terms to stimulate demand from customers who are unable to pay until later in the season, can be used.

- *Customer Evaluation Process.* Before giving credit, carefully analyze customer financial statements and obtain ratings from financial advisory services. Try to avoid high-risk receivables, such as customers who are in a financially troubled industry or region. Be careful of customers who have been in business less than one year since about 50 percent of businesses fail within the first two years. As a rule, consumer receivables carry a greater risk of default than do corporate receivables. You should modify credit limits and accelerate collections based on changes in a customer's financial health; you may want to withhold products or services until payments are made and ask for collateral in support of questionable accounts (the collateral value should equal or exceed the account balance). If necessary, you can use outside collection agencies to try to collect from recalcitrant customers.

You should age accounts receivable (that is, rank them by the time elapsed since they were billed) to spot delinquent customers and charge interest on late payments. After you compare current aged receivables to those of prior years, industry norms, and the competition's, you can prepare a Bad Debt Loss Report showing cumulative bad debt losses by customer, terms of sale, and size of account and then summarized by department, product line, and type of customer (e.g., industry). Bad debt losses are typically higher for smaller companies than for larger ones.

- *Insurance Protection.* You may want to have credit insurance to guard against unusual bad debt losses. In deciding whether to acquire this protection, consider expected average bad debt losses, the company's financial ability to withstand the losses, and the cost of insurance.

- *Factoring.* Factor (sell) accounts receivable if that results in a net savings. However, you should realize that confidential information may be disclosed in a factoring transaction. (Factoring is discussed in Chapter 13.)

Credit Policy

In granting trade credit, you should consider your competition and current economic conditions. In a recession, you may want to relax your credit policy in order to stimulate additional business. For example, the company may not rebill customers who take a cash discount even after the discount period has elapsed. On the other hand, you may decide to tighten credit policy in times of short supply, because at such times your company as the seller has the upper hand.

DETERMINING THE INVESTMENT IN ACCOUNTS RECEIVABLE

To determine the dollar investment tied up in accounts receivable, use a computation that takes into account the annual credit sales and the length of time receivables are outstanding.

EXAMPLE 12-9

A company sells on terms of net/30, meaning payment is required within 30 days. The accounts are on average 20 days past due. Annual credit sales are \$600,000. The investment in accounts receivable is:

$$\frac{50}{360} \times \$600,000 = \underline{\$83,333.28}$$

The *investment* in accounts receivable represents the cost tied up in those receivables, including both the cost of the product and the cost of capital.

EXAMPLE 12-10

The cost of a product is 30 percent of selling price, and the cost of capital is 10 percent of selling price. On average, accounts are paid four months after sale. Average sales are \$70,000 per month.

The investment in accounts receivable from this product is

Accounts receivable (4 months x \$70,000)	\$280,000
Investment in accounts receivable [\$280,000 x (0.30 + 0.10)]	112,000

EXAMPLE 12-11

Accounts receivable are \$700,000. The average manufacturing cost is 40% of the selling price. The before-tax profit margin is 10%. The carrying cost of inventory is 3% of selling price. The sales commission is 8% of sales. The investment in accounts receivable is:

$$\$700,000 (0.40 + 0.03 + 0.08) = \$700,000 (0.51) = \$357,000$$

The average investment in accounts receivable may be computed by multiplying the average accounts receivable by the cost/selling price ratio.

EXAMPLE 12-12

If a company's credit sales are \$120,000, the collection period is 60 days, and the cost is 80% of sales price, what is (a) the average accounts receivable balance and (b) the average investment in accounts receivable?

$$\text{Accounts receivable turnover} = \frac{360}{60} = 6$$

$$\text{Average accounts receivable} = \frac{\text{Credit sales}}{\text{Turnover}} = \frac{\$120,000}{6} = \$20,000$$

$$\text{Average invest in account receivable} \quad \$20,000 \times 0.8 = \$16,000$$

DISCOUNT POLICY

In order to determine if customers should be offered a discount the early payment of account balances, the financial manager has to compare the return on freed cash resulting from customer's paying sooner to the cost of the discount.

EXAMPLE 12-13

The following data are provided:

Current annual credit sales	\$14,000,000
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Collection period	3 months
Terms	net/30
Minimum rate of return	15%

The company is considering offering a 3/10, net/30 discount (that is, if the customer pays within 10 days of the date of sale, the customer will receive a 3% discount. If payment is made after 10 days, no discount is offered. Total payment must be made within 30 days.) The company expects 25 percent of the customers to take advantage of the discount. The collection period will decline to two months.

The discount should be offered, as indicated in the following calculations:

Advantage of discount

Increased profitability:

Average account receivable balance before a change in policy

$$\frac{\text{Credit sales}}{\text{Accounts receivable turnover}} = \frac{\$14,000,000}{12 \div 3 = 4} = \$3,500,000$$

Average accounts receivable balance after change in policy

$$\frac{\text{Credit sales}}{\text{Average receivable turnover}} = \frac{\$14,000,000}{12 \div 2 = 6} = \underline{\$2,333,333}$$

Reduction in average accounts receivable balance	\$1,166,667
Rate of return	x .15
Return	<u>\$ 175,000</u>

Disadvantage of discount

Cost of the discount $0.30 \times 0.25 \times \$14,000,000$	<u>\$ 105,000</u>
Net advantage of discount	<u>\$ 70,000</u>

Changing Credit Policy

To decide whether the company should give credit to marginal customers, you need to compare the earnings on the additional sales obtained to the added cost of the receivables. If the company has idle capacity, the additional earnings is the contribution margin on the new sales, since fixed costs are constant. The additional cost of the receivables results from the likely increase in bad debts and the opportunity cost of tying up funds in receivables for a longer time period.

EXAMPLE 12-14

Sales price per unit	\$120
Variable cost per unit	80
Fixed cost per unit	15
Annual credit sales	\$600,000
Collection period	1 month
Minimum return	16%

If you liberalize the credit policy, you project that
 -- Sales will increase by 40%.

- The collection period on total accounts will increase to two months.
- Bad debts on the increased sales will be 5%.

Preliminary calculations:

Current units (\$600,000/\$120)	5,000
Additional units (5,000 x 0.4)	2,000

Advantage of the change in policy

Additional profitability:

Incremental sales volume	2,000 units
x Contribution margin per unit	
(Selling price - variable cost) \$120 - \$80	<u>x\$40</u>
Incremental profitability	<u>\$80,000</u> units

Disadvantage of the change in policy

Incremental bad debts:

Incremental units x Selling price (2,000 x \$120)	\$240,000
Bad debt percentage	<u>x 0.05</u>
Additional bad debts	<u>\$ 12,000</u>

The first step in determining the opportunity cost of the investment tied up in accounts receivable is to compute the new average unit cost as follows:

	<u>Units</u>	x	<u>Unit Cost</u>	=	<u>Total Cost</u>
Current units	5,000	x	\$95	=	\$475,000
Additional units	<u>2,000</u>	x	\$80	=	<u>160,000</u>
Total	<u>7,000</u>				<u>\$635,000</u>

$$\text{New average unit cost} = \frac{\text{Total cost}}{\text{Units}} = \frac{\$635,000}{7,000} = \$90.71$$

Note that at idle capacity, fixed cost remains constant; therefore, the incremental cost is only the variable cost of \$80 per unit. Therefore, the average unit cost will drop.

We now compute the opportunity cost of funds placed in accounts receivable:

Average investment in accounts receivable after change in policy:

$$\frac{\text{Credit sales}}{\text{Accounts receivable turnover}} \times \frac{\text{Unit cost}}{\text{Selling price}} = \$105,828$$

$$\frac{\$840,000 @}{6} \times \frac{\$90.71}{\$120} = \$105,828$$

$$@7,000 \text{ units} \times \$120 = \$840,000$$

Current average investment in accounts receivable:

$$\frac{\$600,000}{12} \times \frac{\$95}{\$120} = 39,583$$

Additional investment in accounts receivable	\$66,245
Minimum return	<u>x 0.16</u>

Opportunity cost of funds tied up	<u>\$10,599</u>
-----------------------------------	-----------------

Net advantage of relaxation in credit standards:	
Additional earnings	\$80,000
Less:	
Additional bad debt losses	\$12,000
Opportunity cost	<u>10,599</u>
Net savings	<u>\$57,401</u>

The company may have to decide whether to extend full credit to presently limited credit customers or no-credit customers. Full credit should be given only if net profitability occurs.

EXAMPLE 12-15

<i>Category</i>	<i>Bad Debt Percentage</i>	<i>Collection Period</i>	<i>Credit Policy</i>	<i>Increase in Annual Sales if Credit Restrictions are Relaxed</i>
X	2%	30 days	Unlimited	\$80,000
Y	5%	40 days	Restricted	600,000
Z	30%	80 days	No credit	850,000

Gross profit is 25 percent of sales. The minimum return on investment is 12%.

As you decide whether credit standards should be loosened, consider the gross profit on increased sales versus the opportunity cost associated with higher receivable balances and collection expenses.

EXAMPLE 12-16

You are considering liberalizing the credit policy to encourage more customers to purchase on credit. Currently, 80 percent of sales are on credit, and there is a gross margin of 30 percent. The return rate on funds is 10 percent. Other relevant data are:

	<u>Currently</u>	<u>Proposal</u>
Sales	\$300,000	\$450,000
Credit sales	240,000	360,000
Collection expenses	4% of credit sales	5% of credit sales
Accounts receivable turnover	4.5	3

An analysis of the proposal yields of the following results:

Gross profit:	
Expected increase in credit sales	\$360,000 - \$240,000
Gross profit rate	<u>x .30</u>
Increase in gross profit	<u>\$36,000</u>
Opportunity cost:	
Average accounts receivable balance	
(credit sales/accounts receivable turnover)	

Expected average accounts receivable \$360,000/3	\$120,000
Current average accounts receivable \$240,000/4.5	<u>53,333</u>
Increase in average accounts receivable	\$66,667
x Return rate	<u>x 10%</u>
Opportunity cost of funds tied up in accounts receivable	<u>\$6,667</u>
Collection expenses:	
Expected collection expenses 0.05 x \$360,000	\$18,000
Current collection expenses 0.04 x \$240,000	<u>9,600</u>
Increase in collection expenses	<u>\$8,400</u>

You would profit from a more liberal credit policy as follows:

Increase in gross profit	\$36,000
Opportunity cost in accounts receivable	(6,667)
Increase in collection expenses	<u>(8,400)</u>
Net advantage	<u>\$20,933</u>

To determine whether it is advantageous to engage in a sales campaign, you should consider the gross margin earned, the sales discount, and the opportunity cost of higher receivable balances.

EXAMPLE 12-17

The company is planning a sales campaign in which it will offer credit terms of 3/10, net/45. It expects the collection period to increase from sixty days to eighty days. Relevant data for the contemplated campaign follow

	<u>Percent of Sales Before Campaign</u>	<u>Percent of Sales During Campaign</u>
Cash sales	40%	30%
Payment from (in days)		
1-10	25	55
11-100	35	15

The proposed sales strategy will probably increase sales from \$8 million to \$10 million. There is a gross margin rate of 30%. The rate of return is 14%. Sales discounts are given on cash sales.

	<u>Without Sales Campaign</u>	<u>With Sales Campaign</u>
Gross margin (0.3 x \$8,000,000)	\$2,400,000	(0.3 x \$10,000,000) \$3,000,000
Sales subject to discount (0.65 x \$8,000,000 (0.85 x \$10,000,000	\$5,200,000	\$8,500,000
Sales discount <u>x 0.03</u>	-156,000	<u>x 0.03</u> -255,000
Investment in average accounts receivable (60/360 x \$8,000,000 x 0.7)	\$933,333 <u>x 0.14</u>	

	(80/360 x \$10,000,000 x 0.7)	\$1,555,555	
		<u>x 0.14</u>	
Return rate	<u>-130,667</u>		<u>-217,778</u>
Net profit	<u>\$2,113,333</u>		<u>\$2,527,222</u>

The company should undertake the sales campaign, because earnings will increase by \$413,889 (\$2,527,222 - \$2,113,333).

INVENTORY MANAGEMENT

The purpose of inventory management is to develop policies that will achieve an optimal inventory investment. This level varies among industries and among companies in a given industry. Successful inventory management minimizes inventory, lowers cost, and improves profitability.

As part of this process, you should appraise the adequacy of inventory levels, which depend on many factors, including sales, liquidity, available inventory financing, production, supplier reliability, delay in receiving new orders, and seasonality. In the event you have slow-moving products, you may wish to consider discarding them at lower prices to reduce inventory carrying costs and improve cash flow.

You should try to minimize the lead time in your company's acquisition, manufacturing, and distribution functions--that is, how long it takes to receive the merchandise from suppliers after an order is placed. Depending upon lead times, you may need to increase inventory or alter the purchasing pattern. Calculate the ratio of the value of outstanding orders to average daily purchases to indicate the lead time for receiving orders from suppliers; this ratio indicates whether you should increase the inventory balance or change your buying pattern.

You must also consider the obsolescence and spoilage risk of inventory. For example, technological, perishable, fashionable, flammable, and specialized goods usually have high salability risk, which should be taken into account in computing desired inventory levels.

Inventory management involves a trade-off between the costs of keeping inventory and the benefits of holding it. Different inventory items vary in profitability and the amount of space they take up, and higher inventory levels result in increased costs for storage, casualty and theft insurance, spoilage, property taxes for larger facilities, increased staffing, and interest on funds borrowed to finance inventory acquisition. On the other hand, an increase in inventory lowers the possibility of lost sales from stockouts and the production slowdowns caused by inadequate inventory. Additionally, large volume purchases result in greater purchase discounts.

Inventory levels are also affected by short-term interest rates. As short-term interest rates increase, the optimum level of holding inventory is reduced.

You may have to decide whether it is more profitable to sell inventory as is or to sell it after further processing. For example, assume inventory can be sold as is for \$40,000 or for \$80,000 if it is put into further processing costing \$20,000. The latter should be selected because the additional processing yields a \$60,000 profit, compared to \$40,000 for the current sale.

Quantity Discount

You may be entitled to a quantity discount when purchasing large orders. The discount reduces the cost of materials.

EXAMPLE 12-18

A company purchases 1,000 units of an item having a list price of \$10 each. The quantity discount is 5 percent. The net cost of the item is:

Acquisition cost (1,000 x \$10)	\$10,000
Less: Discount (0.05 x \$10,000)	<u>500</u>
Net cost	<u>\$ 9,500</u>

Investment in Inventory

You should consider the average investment in inventory, which equals the average inventory balance times the per unit cost.

EXAMPLE 12-19

Savon Company places an order for 5,000 units at the beginning of the year. Each unit costs \$10. The average investment is:

Average inventory (a)	2,500 units
Unit cost,\$	<u>x \$10</u>
Average investment	<u>\$25,000</u>

$$(a) \frac{\text{Quantity}(Q)}{2} = \frac{5,000}{2}$$

To get an average, add the beginning balance and the ending balance and then divide by 2. This gives the mid-value.

The more frequently a company places an order, the lower the average investment.

Determining Carrying and Ordering Costs

You want to determine the costs for planning, financing, record keeping, and control associated with inventory. Once inventory costs are known, you can compute the amount of timeliness of financing.

Inventory carrying costs include warehousing, handling, insurance, property taxes, and the opportunity cost of holding inventory. A provisional cost for spoilage and obsolescence should also be included in the analysis. The more the inventory held, the greater the carrying cost.

Carrying cost equals:

$$\text{Carrying Cost} = \frac{Q}{2} \times C$$

where $\frac{Q}{2}$ represents average quantity and C is the carrying cost per unit.

A knowledge of inventory carrying costs will help you determine which items are worth storing.

Inventory ordering costs are the costs of placing an order and receiving the merchandise. They include freight and the clerical costs incurred in placing the order. To minimize ordering you should enter the fewest number of orders possible. In the case of produced items, ordering cost also includes scheduling cost. Ordering cost equals:

$$\text{Ordering Cost} = \frac{S}{Q} \times P$$

where S = total usage, Q = quantity per order, and P = cost of placing an order.

The total inventory cost is therefore:

$$\frac{QC}{2} + \frac{SP}{C}$$

A knowledge of ordering costs helps you decide how many orders you should place during the period to suit your needs.

A tradeoff exists between ordering and carrying costs. A large order quantity increases carrying costs but lowers ordering cost.

The economic order quantity (EOQ) is the optimum amount of goods to order each time to minimize total inventory costs. EOQ analysis should be applied to every product that represents a significant proportion of sales.

$$EOQ = \sqrt{\frac{2SP}{C}}$$

The EOQ model assumes:

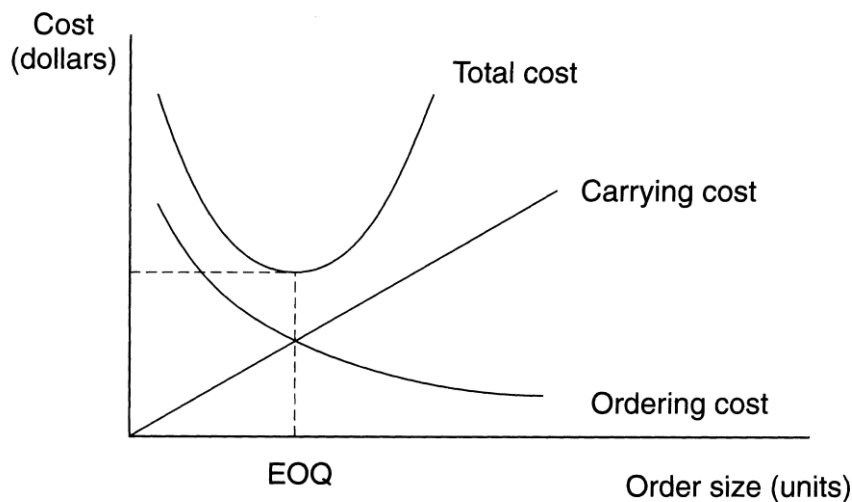
- Demand is constant and known with certainty.
- Depletion of stock is linear and constant.
- No discount is allowed for quantity purchases.
- Lead time, the time interval between placing an order and receiving delivery, is a constant (that is, stockout is not possible).

The number of orders for a period is the usage (S) divided by the EOQ.

Figure 12-2 graphically shows the EOQ point.

FIGURE 12-2

EOQ POINT



In the next two examples, we compute for a product the EOQ, the number of orders, and the number of days that should elapse before the next order is placed.

EXAMPLE 12-20

You want to know how frequently to place orders to lower your costs. The following information is provided:

$S = 500$ units per month

$P = \$40$ per order

$C = \$4$ per unit

$$EOQ = \sqrt{\frac{2SP}{C}} = \sqrt{\frac{2(500)(40)}{4}} = \sqrt{10,000} = 100 \text{ units}$$

The number of orders each month is:

$$\frac{S}{EOQ} = \frac{500}{100} = 5$$

Therefore, an order should be placed about every six days ($31/5$).

EXAMPLE 12-21

A company is determining its frequency of orders for product X. Each product X costs \$15. The annual carrying cost is \$200. The ordering cost is \$10. The company anticipates selling 50 product Xs each month. Its desired average inventory level is 40.

$S = 50 \times 12 = 600$

$P = \$10$

$$C = \frac{\text{Purchase price} \times \text{carrying cost}}{\text{Average investment}} = \frac{\$15 \times \$200}{40 \times \$15} = \$5$$

$$EOQ = \sqrt{\frac{2SP}{C}} = \sqrt{\frac{2(600)(10)}{5}} = \sqrt{\frac{12,000}{5}} = \sqrt{2,400} = 49 \text{ (rounded)}$$

The number of orders per year is:

$$\frac{S}{EOQ} = \frac{600}{49} = 12 \text{ orders (rounded)}$$

The company should place an order about every thirty days ($365/12$).

The Reorder Point

The reorder point (ROP) is a signal that tells you when to place an order. Calculating the reorder point requires a knowledge of the lead time between order and receipt of merchandise. It may be influenced by the months of supply or total dollar ceilings on inventory to be held or inventory to be ordered.

Reorder point is computed as follows:

$ROP = \text{lead time} \times \text{average usage per unit of time}$

This reveals the inventory level at which a new order should be placed. If a safety stock is needed, add to the ROP.

You have to know at what inventory level you should place an order to reduce inventory costs and have an adequate stock of goods with which to satisfy customer orders.

EXAMPLE 12-22

A company needs 6,400 units evenly throughout the year. There is a lead time of one week. There are 50 working weeks in the year. The reorder point is:

$$1 \text{ week} \times \frac{6,400}{50 \text{ weeks}} = 1 \times 128 = 128 \text{ units}$$

When the inventory level drops to 128 units, a new order should be placed.

An optimal inventory level can be based on consideration of the incremental profitability resulting from having more merchandise compared to the opportunity cost of carrying the higher inventory balances.

EXAMPLE 12-23

The current inventory turnover is 12 times. Variable costs are 60 percent of sales. An increase in inventory balances is expected to prevent stockouts, thus increasing sales. Minimum rate of return is 18 percent. Relevant data include:

Sales	Turnover
\$800,000	12
890,000	10
940,000	8
980,000	7

(1) Sales	(2) Turnover	(3) [(1)(2)] Average Inventory Balance	(4) Opportunity Cost of Carrying Incremental Inventory (a)	(5) Increased Profitability (b)	(6) [(5)-(4)] Net Savings
\$800,000	12	\$66,667	----	----	----
890,000	10	89,000	\$4,020	20,000	14,870
940,000	8	117,500	5,130	20,000	14,870
980,000	7	140,000	4,050	16,000	11,950

(a) Increased inventory from column 3 x 0.18

(b) Increased sales from column 1 x 0.40

The optimal inventory level is \$89,000, because it results in the highest net savings.

Using the ABC Inventory Control Method

ABC analysis focuses on the most critical items--gross profitability, sensitive price or demand patterns, and supply excesses or shortages. The ABC method requires the classification of inventory into one of four groups--A, B, C, or D--according to the potential savings associated with a proper level of inventory control.

Perpetual inventory records should be maintained for Group A items, which require accuracy and frequent, often daily, attention. A items usually consist of about 70 percent of the dollar value of inventory. Group B items are less expensive than Group A items but are still important and require intermediate level control. Group C items include most of the inventory items. Since

they are usually less expensive and less used, they receive less attention. There is usually a high safety stock level for Group C items. Blanket purchase orders should exist for A items and only "spot buys" for Bs and Cs. Group D items are the losers, items that have not been used for an extended time period (e.g., six months). D items should not be reordered unless special authorization is given. Items may be reclassified as need be. For instance, a "fragile" item or one that is frequently stolen can be reclassified from C to A.

To institute the ABC method:

1. Segregate merchandise into components based on dollar value.
2. Compute annual dollar usage by inventory type (anticipated annual usage times unit cost).
3. Rank inventory in terms of dollar usage, ranging from high to low (e.g., As in top 30 percent, Bs in next 50 percent, and Cs in last 20 percent).

Tag inventory with the appropriate classification and record the classifications in the inventory records.

Figure 12-3 depicts an ABC inventory control system, while Table 12-2 illustrates an ABC distribution.

FIGURE 12-3

ABC INVENTORY CONTROL SYSTEM

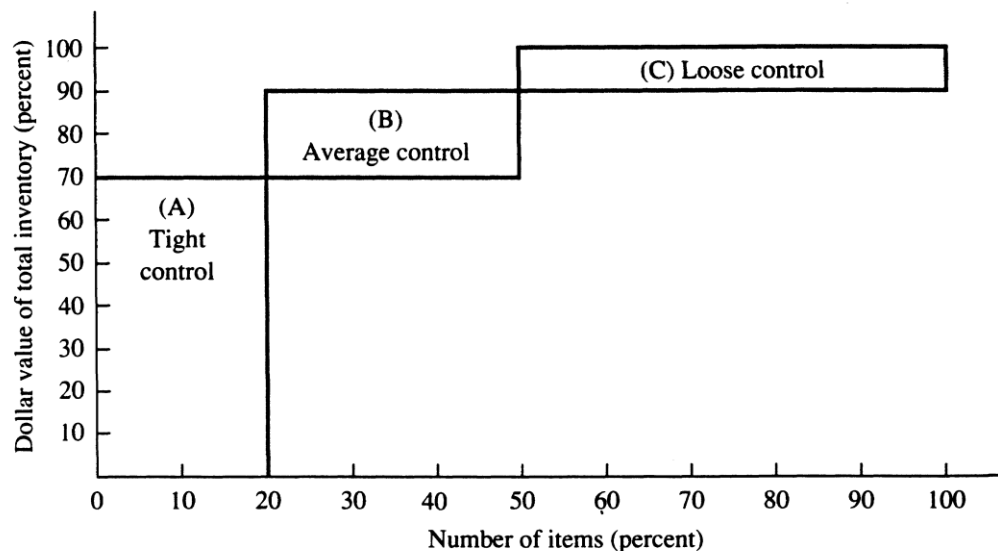


TABLE 12-2

ABC INVENTORY DISTRIBUTION

Inventory Classification	Population (Percent)	Dollar Usage (Percent)
A	20	80
B	30	15
C	50	5

CONCLUSION

To maximize cash flow, cash collections should be accelerated and cash payments delayed. Accounts receivable management requires decisions on whether to give credit and to whom, the amount to give, and the terms. The proper amount of investment in inventory may change daily and requires close evaluation. Improper inventory management occurs when funds tied up in inventory can be used more productively elsewhere. A buildup of inventory may carry risk, such as obsolescence. On the other hand, an excessively low inventory may result in reduced profit through lost sales.

CHAPTER 13

SHORT-TERM FINANCING

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Explain the different short-term financing instruments and when each one is most appropriate.
 - List the advantages of trade credit.
 - Identify the types of bank loans and how they work.
 - Compute interest.
 - Outline the attributes of commercial paper financing.
 - Finance using receivables and inventory as collateral.
 - Distinguish between short-term and long-term financing.
 - List the advantages and disadvantages of leasing.
-

In this chapter we provide a broad picture of short-term financing (financing that will be repaid in one year or less). Examples of short-term financing are trade credit, short-term bank loans commercial paper, and financing for receivables and inventory.

We also discuss intermediate-term financing, instruments with a maturity in excess of one year, such as some bank loans and leases. In deciding on a particular source of financing, managers should consider cost, risk, liquidity, and flexibility.

SHORT-TERM FINANCING

Short-term financing may be used to meet seasonal and temporary fluctuations in funds position as well as to meet long-term needs. For example, short-term financing may be used to provide additional working capital, finance current assets (such as receivables and inventory), or provide interim financing for a long-term project (such as the acquisition of plant and equipment) until long-term financing is arranged. (Long-term financing may not always be appropriate because of perceived long-term credit risk or excessively high cost.)

When compared to long-term financing (see Chapters 14 and 15), short-term financing has several advantages. It is usually easier to arrange and less expensive and has more flexibility. The drawbacks of short-term financing are that it is subject to greater fluctuations in interest rates, refinancing is frequently required, there is greater risk of default because the loan comes due sooner, and any delinquency may damage the company's credit rating.

The sources of short-term financing include trade credit, bank loans, banker's acceptances, finance company loans, commercial paper, receivable financing, and inventory financing. One particular source may be more appropriate than another in a given circumstance; some are more desirable than others because of interest rates or collateral requirements. *Note:* Banker's acceptances is a time draft payable on a specified date and guaranteed by the bank.

You should consider the merits of the different sources of short-term financing, focusing on:

- Cost.
- Effect on financial ratios.
- Effect on credit rating (some sources of short-term financing may negatively impact the company's credit rating, such as factoring accounts receivable).
- Risk (reliability of the source of funds for future borrowing). If your company is materially affected by outside forces, it will need more stable and reliable financing.
- Restrictions, such as requiring a minimum level of working capital.
- Flexibility.
- Expected money market conditions (e.g., future interest rates) and availability of future financing.
- Inflation rate.
- Company profitability and liquidity positions, both of which must be favorable if the company is to be able to pay its near term obligations.
- Stability and maturity of operations.
- Tax rate.

If the company can predict that it will be short of cash during certain times, the financial manager should arrange for financing (such as a line of credit) in advance instead of waiting for an emergency.

Using Trade Credit

Trade credit (accounts payable) are balances owed by your company to suppliers. It is a spontaneous (recurring) financing source for creditworthy companies since it comes from normal operations. Trade credit is the least expensive form of financing inventory. Its benefits are that it is readily available, since suppliers want business; it requires no collateral; there is no interest charge or else a minimal one; it is convenient; and it is likely to be extended if the company gets into financial trouble. If the company has liquidity difficulties, it may be able to stretch (extend) accounts payable; however, the company will be required to give up any cash discount offered and accept a lower credit rating. The company should prepare a report analyzing accounts payable in terms of lost discounts, aged debit balances, aged unpaid invoices, and days to pay.

EXAMPLE 13-1

The company purchases \$500 worth of merchandise per day from suppliers. The terms of purchase are net/60, and the company pays on time. The accounts payable balance is:

\$500 per day x 60 days = \$30,000

The company should typically take advantage of a cash discount offered for early payment because failing to do so results in a high opportunity cost. The cost of not taking a discount equals:

$$\left(\frac{\text{Discount Lost}}{\text{Dollar Proceeds You Have}} \right) \times \left(\frac{360}{\text{Number of Days You have Use of}} \right)$$

Use of by Not Taking the the Money by Not Taking the
Discount Discount

EXAMPLE 13-2

The company buys \$1,000 in merchandise on terms of 2/10, net/30. The company fails to take the discount and pays the bill on the thirtieth day. The cost of the discount is:

$$\frac{\$20}{\$980} \times \frac{360}{20} = 36.7\%$$

The company would be better off taking the discount even if it needed to borrow the money from the bank, since the opportunity cost is 36.7 percent. The interest rate on a bank loan would be far less.

Bank Loans

Even though other institutions, such as savings and loan associations and credit unions, provide banking services, most banking activities are conducted by commercial banks. Commercial banks allow the company to operate with minimal cash and still be confident of planning activities even in uncertain conditions.

Commercial banks favor short-term loans since they like to get their money back within one year. If the company is large, a group of banks may form a consortium to furnish the desired level of capital.

The prime interest rate is a benchmark for the short-term loan interest rate banks charge small to medium corporate borrowers. Other rates such as LIBOR are more common benchmarks for largest customers. Good companies with strong financial strength can get terms below prime. Your company's interest rate may be higher depending upon the risk the bank believes it is taking.

Bank financing may take the following forms:

- Unsecured loans
- Secured loans
- Lines of credit
- Letters of credit
- Revolving credit
- Installment loans
- *Unsecured Loans.* Most short-term unsecured (uncollateralized) loans are self-liquidating. This kind of loan is recommended if the company has an excellent credit rating. It is usually used to finance projects having quick cash flows and is appropriate if the company has immediate cash and can either repay the loan in the near future or quickly obtain longer-term financing. Seasonal cash shortfalls and desired inventory buildups are among the reasons to use an unsecured loan. The disadvantages of this kind of loan are that it carries a higher interest rate than a secured loan since there is no collateral and that a lump sum payment is required.
- *Secured Loans.* If the company's credit rating is deficient, the bank may lend money only on a secured basis. Collateral can take many forms, including inventory, marketable securities, or fixed assets. Even if the company is able to obtain an unsecured loan, it may be better off taking a collateralized loan at a lower interest rate.
- *Revolving Lines of Credit (Revolver).* Under a revolving line of credit, the bank agrees to lend money up to a specified amount on a recurring basis. The bank typically charges a commitment fee on the amount of the unused credit line. Credit lines are typically established for a one-year

period and may be renewed annually. You can determine if the preferred line of credit is adequate for your company's present and immediate future needs by considering the current and expected cash requirements of the business.

The advantages of a line of credit are that it offers easy and immediate access to funds during tight money market conditions and it enables the company to borrow only as much as it needs and to repay immediately when cash is available. You should use a line of credit if the company is working on large individual projects for a long time period and will obtain minimal or no payments until the job is completed. The disadvantages of lines of credit relate to the collateral requirements and the additional financial information that must be presented to the bank. Banks also may place restrictions on the company, such as setting a ceiling on capital expenditures or requiring a minimum level of working capital.

When the company borrows under a line of credit, it may be required to maintain a compensating balance (a noninterest-bearing account) with the bank. The compensating balance is stated as a percentage of the loan and effectively increases the cost of the loan. A compensating balance may also be placed on the unused portion of a line of credit, in which case the interest rate is reduced.

EXAMPLE 13-3

The company borrows \$200,000 and is required to keep a 12% compensating balance. It also has an unused line of credit of \$100,000, for which a 10% compensating balance is required.

The minimum balance that must be maintained is:

$$(\$200,000 \times .12) + (\$100,000 \times .10) = \$24,000 + \$10,000 = \$34,000$$

A line of credit is typically decided upon prior to the actual borrowing. In the days between the arrangement for the loan and the actual borrowing, interest rates may change. Therefore, the agreement will stipulate the loan is at the prime interest rate prevailing when the loan is extended plus a risk premium. (The prime interest rate will not be known until you actually borrow the money since market interest rates may change from the time you contract for a loan and the time you receive the funds.)

The bank may test the company's financial capability by requiring it to "clean up," that is, repay the loan for a brief time during the year (e.g., for one month). The payment shows the bank that the loan is actually seasonal rather than permanent. If the company is unable to repay a short-term loan, it should probably finance with long-term funds.

-- *Letters of Credit.* A letter of credit is a document issued by a bank guaranteeing the payment of a customer's drafts up to a specified amount for a designated time period. In effect, the bank's credit is substituted for that of the buyer, minimizing the seller's risk. Payment may be made on submission of proof of shipment or other performance. Letters of credit are used primarily in international trade.

There are different types of letters of credit. A *commercial letter of credit* is typically drawn in favor of a third party. A *confirmed letter of credit* is provided by a correspondent bank and guaranteed by the issuing bank.

The advantages of letters of credit are that the company does not have to pay cash in advance of shipment, using funds that could be used elsewhere in the business.

-- *Revolving Credit*. A revolving credit is an agreement between the bank and the borrower in which the bank contracts to make loans up to a specified ceiling within a prescribed time period. With revolving credit, notes are short term (typically ninety days). When part of the loan is paid, an amount equal to the repayment may again be borrowed under the terms of the agreement. Advantages are the readily available credit and few restrictions compared to line-of-credit agreements. A major disadvantage may be restrictions imposed by the bank.

-- *Installment Loans*. An installment loan requires monthly payments of interest and principal. When the principal on the loan decreases sufficiently, you may be able to refinance at a lower interest rate. The advantage of this kind of loan is that it may be tailored to satisfy seasonal financing needs.

Interest

Interest on a loan may be paid either at maturity (ordinary interest) or in advance (discounting the loan). When interest is paid in advance, the loan proceeds are reduced and the effective (true) interest rate is increased.

EXAMPLE 13-4

The company borrows \$30,000 at 16 percent interest per annum and repays the loan one year later. The interest is $\$30,000 \times 0.16 = \$4,800$. The effective interest rate is 16 percent ($\$4,800/\$30,000$).

EXAMPLE 13-5

Assume the same facts as in the prior example, except the note is discounted. The effective interest rate increases as follows:

Proceeds = principal - interest = $\$30,000 - \$4,800 = \$25,200$

$$\text{Effective interest rate} = \frac{\text{Interest}}{\text{Proceeds}} = \frac{\$4,800}{\$25,000} = 19\%$$

A compensating balance will increase the effective interest rate.

EXAMPLE 13-6

The effective interest rate for a one-year, \$600,000 loan that has a nominal interest rate of 19 percent with interest due at maturity and requiring a 15 percent compensating balance is:

Effective interest rate (with compensating balance) equals:

$$\begin{aligned} \frac{\text{Interest rate} \times \text{principal}}{\text{Proceeds, \%} \times \text{principal}} &= \frac{0.19 \times \$600,00}{(1.00 - 0.15) \times \$600,00} \\ &= \frac{\$114,000}{\$510,000} \\ &= 22.4\% \end{aligned}$$

EXAMPLE 13-7

Assume the same facts as in the prior example, except that the loan is discounted. The effective interest rate is:

Effective interest rate (with discount) equals:

$$\frac{\text{Interest rate} \times \text{principal}}{(\text{Proceeds, \%} \times \text{principal}) - \text{interest}} = \frac{0.19 \times \$600,000}{(0.85 \times \$600,000) - \$114,000} = \frac{\$114,000}{\$396,000} = 28.8\%$$

EXAMPLE 13-8

The company has a credit line of \$400,000, but it must maintain a compensating balance of 13% on outstanding loans and a compensating balance of 10% on the unused credit. The interest rate on the loan is 18%. The company borrows \$275,000. The effective interest rate on the loan is calculated as follows.

The required compensating balance is:

$$\begin{array}{r} .13 \times \$275,000 \quad \$35,750 \\ .10 \times 125,000 \quad \underline{12,500} \\ \hline \$48,250 \end{array}$$

Effective interest rate (with line of credit) equals:

$$\frac{\text{Interest rate (on loan)} \times \text{principal}}{\text{Principal} - \text{compensating balance}} = \frac{0.18 \times \$275,000}{\$275,000 - \$48,250} = \frac{\$49,500}{\$226,750} = 21.8\%$$

On an installment loan, the effective interest rate computation is illustrated below. Assuming a one-year loan payable in equal monthly installments, the effective rate is based on the average amount outstanding for the year. The interest is computed on the face amount of the loan.

EXAMPLE 13-9

The company borrows \$40,000 at an interest rate of 10% to be paid in 12 monthly installments. The average loan balance is \$40,000/2 = \$20,000. Divide by 2 to obtain an average (the beginning balance is \$40,000 and the ending balance is 0, so the average is beginning plus ending divided by 2). The effective interest rate is

$$\frac{\text{Interest}}{\text{Average Loan Balance}} = \frac{\$40,000 \times 10\%}{\$20,000} = \frac{\$4,000}{\$20,000} = 20\%$$

EXAMPLE 13-10

Assume the same facts as in the prior example, except that the loan is discounted. The interest of \$4,000 is deducted in advance so the proceeds received are \$40,000 - \$4,000 = \$36,000. The average loan balance is \$36,000/2 = \$18,000. The effective interest rate is \$4,000/\$18,000 = 22.2%.

The effective interest cost computation may be more complicated when installment payments vary. The true interest cost of an installment loan is the internal rate of return of the applicable cash flows converted on an annual basis (if desired).

EXAMPLE 13-11

The company borrows \$100,000 and will repay it in three monthly installments of \$25,000, \$25,000, and \$50,000. The interest rate is 12%

Amount of borrowing equals:

Installment loan	\$100,000
Less: Interest on first installment (\$25,000 x .12)	3,000
Balance	<u>\$ 97,000</u>

We now compute the effective interest cost on the installment loan as follows:

$$0 = -\$97,000 + \$25,000/(1 + \text{Cost}) + \$25,000/(1 + \text{Cost})^2 + \$50,000/(1 + \text{Cost})^3$$

$$= 1.37\% \text{ on monthly basis}$$

$$= 1.37\% \times 12 = 16.44\% \text{ on annual basis}$$

This shows that the effective annual interest rate on the installment loan is 16.44%.

Dealing with the Banker

Banks are eager to lend money to meet self-liquidating, cyclical business needs. A short-term bank loan is an inexpensive way to obtain funds to satisfy working capital requirements during the business cycle. But the financial officer must be able to explain what the company's needs are in an intelligent manner.

Commercial Finance Loans

When credit is unavailable from a bank, the company may have to go to a commercial finance company, which typically charges a higher interest rate than the bank and requires collateral. Typically, the value of the collateral is greater than the balance of the loan and may consist of accounts receivable, inventories, and fixed assets. Commercial finance companies also finance the installment purchases of industrial equipment. A portion of their financing is sometimes obtained through commercial bank borrowing at wholesale rates.

Commercial Paper

Commercial paper is a short-term unsecured obligation with a maturity ranging from two to 270 days, issued by companies to investors with temporarily idle cash. Commercial paper can be issued only if the company possesses a very high credit rating; therefore, the interest rate is less than that of a bank loan typically one-half percent below the prime interest rate. Commercial paper is sold at a discount (below face value), with the interest immediately deducted from the face of the note by the creditor; however, the company pays the full face value. Commercial paper may be issued through a dealer or directly placed to an institutional investor (a dealer is a company that buys securities and then sells them out of its own inventory, while an institutional investor is an entity that buys large volumes of securities, such as banks and insurance companies).

The benefits of commercial paper are that no security is required, the interest rate is typically less than that required by banks or finance companies, and the commercial paper dealer often offers financial advice. The drawbacks are that commercial paper can be issued only by large, financially sound companies and that commercial paper dealings are impersonal. Commercial paper is usually backed by a bank letter of credit.

We now look at an example that determines whether the amount of commercial paper issued by a company is excessive.

EXAMPLE 13-12

A company's balance sheet appears below.

ASSETS	
Current assets	\$540,000
Fixed assets	<u>800,000</u>
Total assets	\$1,340,000
 LIABILITIES AND STOCKHOLDERS' EQUITY	
Current liabilities-	
Notes payable to banks	\$100,000
Commercial paper	<u>650,000</u>
Total current liabilities	\$750,000
Long-term liabilities	<u>260,000</u>
Total liabilities	\$1,010,000
Stockholders' equity	<u>330,000</u>
Total liabilities and stockholders' equity	<u>\$1,340,000</u>

The amount of commercial paper issued by the company is a high percentage of both its current liabilities, 86.7% (\$650,000/ \$750,000), and its total liabilities, 64.4% (\$650,000/\$1,010,000). Because bank loans are minimal, the company may want to do more bank borrowing and less commercial paper financing. In the event of a money market squeeze, the company may find it advantageous to have a working relationship with a bank.

EXAMPLE 13-13

The company issues \$500,000 of commercial paper every two months at a 13% rate. There is a \$1,000 placement cost each time. The percentage cost of the commercial paper is:

Interest (\$500,000 x .13)	\$65,000
Placement cost (\$1,000 x 6)	6,000
Cost	<u>\$71,000</u>

$$\text{Percentage cost of commercial paper} = \frac{\$71,000}{\$500,000} = 14.2\%$$

EXAMPLE 13-14

Ajax Corporation issues \$300,000 worth of 18 percent, 90-day commercial paper. However, the funds are needed for only 70 days. The excess funds can be invested in securities earning 17 percent. The brokerage fee associated with the commercial paper transaction is 1.5 percent. The dollar cost to the company in issuing the commercial paper is:

Interest expense $<0.18 \times \$300,000 \times (90/360) >$	\$13,500
Brokerage fee $(0.015 \times \$300,000)$	<u>4,500</u>
Total cost	\$18,000
Less: Return on marketable securities	

$<0.17 \times \$300,000 \times (20/360) >$	<u>2,833</u>
Net cost	<u>\$15,167</u>

EXAMPLE 13-15

The company needs \$300,000 for the month of November. Its options are:

1. Obtaining a one-year line of credit for \$300,000 with a bank. The commitment fee is 0.5%, and the interest charge on the used funds is 12%.

2. Issuing two-month commercial paper at 10% interest. Because the funds are needed only for one month, the excess funds (\$300,000) can be invested in 8% marketable securities for December. The total transaction fee for the marketable securities is 0.3%.

The line of credit costs:

Commitment fee for unused period	
(0.005) (300,000) (11/12)	\$1,375
Interest for one month (0.12) (300,000) (1/12)	<u>3,000</u>
Total cost	<u>\$4,375</u>

The commercial paper costs:

Interest charge (0.10) (300,000) (2/12)	\$5,000
Transaction fee (0.003) (300,000)	900
Less interest earned on marketable securities	
(0.08) (300,000) (1/12)	<u>(2,000)</u>
Total cost	<u>\$3,900</u>

Since \$3,900 is less than \$4,375, the commercial paper arrangement is the better option.

Using Receivables for Financing

In accounts receivable financing, the accounts receivable serve as security for the loan as well as the source of repayment.

Financing backed by accounts receivable generally takes place when:

- Receivables are at least \$25,000.
- Sales are at least \$250,000.
- Individual receivables are at least \$100.
- Receivables apply to selling merchandise rather than rendering services.
- Customers are financially strong.
- Sales returns are low.
- The buyer receives title to the goods at shipment.

Receivable financing has several advantages. It eliminates the need to issue bonds or stock to obtain a recurring cash flow. Its drawback is the high administrative costs of monitoring many small accounts.

Accounts receivable may be financed under either a factoring agreement or an assignment (pledging) arrangement. *Factoring* is the outright sale of accounts receivable to a bank or finance company without recourse; the purchaser takes all credit and collection risks. The proceeds received by the seller are equal to the face value of the receivables less the commission charge, which is usually 2 to 4 percent higher than the prime interest rate. The cost of the factoring arrangement is the factor's commission for credit investigation, interest on the unpaid balance of

advanced funds, and a discount from the face value of the receivables if there is high credit risk. Remissions by customers are made directly to the factor.

The advantages of factoring are that it offers immediate cash, it reduces overhead because the credit examination function is no longer needed, it provides financial advice, it allows for receipt of advances as required on a seasonal basis, and it strengthens the company's balance sheet position.

The disadvantages of factoring include both the high cost and the negative impression left with customers as a result of the change in ownership of the receivables. Factors may also antagonize customers by their demanding methods of collecting delinquent accounts.

In an *assignment* (pledging) arrangement, ownership of the accounts receivable is not transferred. Instead, receivables are given to a finance company with recourse. The finance company usually advances between 50 and 85 percent of the face value of the receivables in cash; your company is responsible for a service charge, interest on the advance, and any resulting bad debt losses, and continues to receive customer remissions.

The assignment of accounts receivable has the advantages of providing immediate cash, making cash advances available on a seasonal basis, and avoiding negative customer feelings. The disadvantages include the high cost, the continuing of administrative costs, and the bearing of all credit risk.

Financial managers must be aware of the impact of a change in accounts receivable policy on the cost of financing receivables. When accounts receivable are financed, the cost of financing may rise or fall. For example, when credit standards are relaxed, costs rise; when recourse for defaults is given to the finance company, costs decrease; and when the minimum invoice amount of a credit sale is increased, costs decline.

The financial officer should compute the costs of accounts receivable financing and select the least expensive alternative.

EXAMPLE 13-16

A factor will purchase the company's \$120,000 per month accounts receivable. The factor will advance up to 80% of the receivables for an annual charge of 14% and a 1.5% fee on receivables purchased. The cost of this factoring arrangement is:

Factor fee $[0.015 \times (\$120,000 \times 12)]$	\$21,600
Cost of borrowing $[0.14 \times (\$120,000 \times 0.8)]$	<u>13,440</u>
Total cost	<u>\$35,040</u>

EXAMPLE 13-17

A factor charges a 3% fee per month. The factor lends the company up to 75% of receivables purchased for an additional 1% per month. Credit sales are \$400,000 per month. As a result of the factoring arrangement, the company saves \$6,500 per month in credit costs and a bad debt expense of 3% of credit sales.

XYZ Bank has offered an arrangement to lend the company up to 75% of the receivables. The bank will charge 2% per month interest plus a 4% processing charge on receivable lending.

The collection period is 30 days. If the company borrows the maximum per month, should it stay with the factor or switch to XYZ Bank?

Cost of factor:

Purchased receivables $(0.03 \times \$400,000)$ \$12,000

Lending fee (0.01 x .75 x \$400,000)	<u>3,000</u>
Total cost	<u>\$15,000</u>
Cost of bank financing:	
Interest (0.02 x .75 x \$400,000)	\$6,000
Processing charge (0.04 x \$300,000)	12,000
Additional cost of not using the factor:	
Credit costs	6,500
Bad debts (0.02 x \$400,000)	<u>8,000</u>
Total Cost	<u>\$32,500</u>

Since \$15,000 is less than \$32,500, the company should stay with the factor.

EXAMPLE 13-18

A company needs \$250,000 and is weighing the alternatives of arranging a bank loan or going to a factor. The bank loan terms are 18% interest, discounted, with a compensating balance of 20%. The factor will charge a 4% commission on invoices purchased monthly; the interest rate on the purchased invoices is 12%, deducted in advance. By using a factor, the company will save \$1,000 monthly credit department costs, and avoid uncollectible accounts estimated at 3% of the factored accounts. Which is the better alternative for the company?

The bank loan which will net the company its desired \$250,000 is:

$$\frac{\text{Proceeds}}{(100\% - \text{proceeds deducted})} = \frac{\$250,000}{100\% - (18\% + 20\%)}$$

$$\frac{\$250,000}{1.0 - 0.38} = \frac{\$250,000}{0.62} = \$403,226$$

$$\text{Effective interest rate} = \frac{\text{interest rate}}{\text{proceeds, \%}} = \frac{0.18}{0.62} = 29.0\%$$

We must briefly switch, to the factor arrangement in order to determine the \$8,929 below as a bank cost.

The amount of accounts receivable that should be factored to net the firm \$250,000 is:

$$\frac{\$250,000}{1.0 - 0.12 - 0.04} = \frac{\$250,000}{0.84} = \$297,619$$

The total annual cost of the bank arrangement is:

Interest (\$250,000 x 0.29)	\$72,500
Additional cost of not using a factor:	
Credit costs (\$1,000 x 12)	12,000
Uncollectible accounts (\$297,619 x 0.03)	<u>8,929</u>
Total cost	<u>\$93,429</u>

The effective interest rate of factoring accounts receivable is:

$$\text{Effective interest rate} = \frac{\text{interest rate}}{\text{proceeds, \%}} = \frac{12\%}{100\% - (12\% + 4\%)}$$

$$= \frac{0.12}{0.84} = 14.3\%$$

The total annual cost of the factoring alternative is:

Interest (\$250,000 x 0.143)	\$35,750
Factoring (\$297,619 x 0.04)	<u>11,905</u>
Total cost	<u>\$47,655</u>

Factoring should be used since it will cost almost half as much as the bank loan.

Before looking at the next example on factoring, we should discuss several items that were mentioned in that example. Reserve on accounts receivable is the amount retained by the factor against problem receivables, which reduces the proceeds received by the company. Average accounts receivable is the average balance held for the period and is the basis for the factor's commission at the time the receivables are purchased by the factor.

EXAMPLE 13-19

A company is considering a factoring arrangement. The company's sales are \$2,700,000, accounts receivable turnover is 9 times, and a 17% reserve on accounts receivable is required. The factor's commission charge on average accounts receivable payable at the point of receivable purchase is 2.0% . The factor's interest charge is 16% of receivables after subtracting the commission charge and reserve. The interest charge reduces the advance. The annual effective cost under the factoring arrangement is computed below.

$$\begin{aligned} \text{Average accounts receivable} &= \frac{\text{credit sales}}{\text{turnover}} = \frac{\$2,700,000}{9} \\ &= \$300,000 \end{aligned}$$

The company will receive the following amount by factoring its accounts receivable:

Average accounts receivable	\$300,000
Less: Reserve (\$300,000 x 0.17)	-51,000
Commission (\$300,000 x 0.02)	<u>-6,000</u>
Net prior to interest	\$243,000
Less: Interest (\$243,000 x (16%/9))	<u>4,320</u>
Proceeds received	<u>\$238,680</u>

The annual cost of the factoring arrangement is:

Commission (\$300,000 x 0.02)	\$6,000
Interest (\$243,000 x (16%/9))	<u>4,320</u>
Cost each 40 days (360/9)	\$10,320
Turnover	<u>x 9</u>
Total annual cost	<u>\$92,880</u>

The annual effective cost under the factoring arrangement based on the amount received is:

$$\frac{\text{Annual cost}}{\text{Average amount received}} = \frac{\$92,880}{\$238,680} = 38.9\%$$

Using Inventories for Financing

Financing inventory, which typically takes place when the company has completely used its borrowing capacity on receivables, requires the existence of marketable, nonperishable, and standardized goods that have quick turnover and that are not subject to rapid obsolescence. Good collateral inventory can be easily sold. However, you should consider the price stability of the merchandise and the costs of selling it when deciding on a course of action.

The cash advance for financed inventory is high when there is marketable inventory. In general, the financing of raw materials and finished goods is about 75 percent of their value; the interest rate is approximately 3 to 5 points over the prime interest rate.

The drawbacks of inventory financing include the high interest rate and the restrictions it places on inventory.

Types of inventory financing include floating (blanket) liens, warehouse receipts, and trust receipts. With a *floating lien*, the creditor's security lies in the aggregate inventory rather than in its components. Even though the company sells and restocks, the lender's security interest continues. With a *warehouse receipt*, the lender receives an interest in the inventory stored at a public warehouse; the fixed costs of this arrangement are high. There may be a field warehouse arrangement in which the warehouse sets up a secured area directly at the company's location; the company has access to the goods but must continually account for them. With a *trust receipt* loan, the creditor has title to the goods but releases them to the company to sell on the creditor's behalf; as goods are sold, the company remits the funds to the lender. The drawback of the trust receipt arrangement is that a trust receipt must be given for specific items.

A collateral certificate guaranteeing the existence of pledged inventory may be issued by a third party to the lender. The advantage of a collateral certificate is its flexibility; merchandise need not be segregated or possessed by the lender.

EXAMPLE 13-20

The company wants to finance \$500,000 of inventory. Funds are required for three months. A warehouse receipt loan may be taken at 16% with a 90% advance against the inventory's value. The warehousing cost is \$4,000 for the three-month period. The cost of financing the inventory is:

Interest $[0.16 \times 0.90 \times \$500,000 \times (3/12)]$	\$18,000
Warehousing cost	<u>4,000</u>
Total cost	\$22,000

EXAMPLE 13-21

The company shows growth in operations but is experiencing liquidity difficulties. Six large financially sound companies are customers and account for 75% of sales. On the basis of the following financial information for 19X1, should the financial manager borrow on receivables or inventory?

Balance sheet data follow

BALANCE SHEET

ASSET

Current Assets

Cash	\$ 27,000
Receivables	380,000
Inventory (consisting of 55% of work -process)	<u>320,000</u>

Total Current Assets	\$727,000
Fixed Assets	<u>250,000</u>
Total Assets	<u>\$977,000</u>

LIABILITIES AND STOCKHOLDERS' EQUITY

Current Liabilities		
Accounts Payable	\$ 260,000	
Loans Payable	200,000	
Accrued Expenses	<u>35,000</u>	
Total Current Liabilities		\$ 495,000
Noncurrent Liabilities		
Bonds Payable		<u>110,000</u>
Total Liabilities		\$ 605,000
Stockholders' Equity		
Common Stock	\$ 250,000	
Retained Earnings	<u>122,000</u>	
Total Stockholders' Equity		<u>372,000</u>
Total Liabilities and Stockholders' Equity		<u>\$977,000</u>

Selected income statement information follows:

Sales	\$1,800,000
Net income	130,000

Receivable financing is the expected choice, since a high percentage of sales are made to only six large and financially strong companies. Receivables thus are highly collectible. It is also easier to control a few large customer accounts.

Inventory financing is not likely because of the high percentage of partially completed items. Lenders are reluctant to finance inventory when a large work-in-process balance exists, since it will be hard for them to process and sell the goods.

Financing with Other Assets

Assets other than inventory and receivables may be used as security for short-term bank loans. Possibilities include real estate, plant and equipment, cash surrender value of life insurance policies, and securities. Lenders are also usually willing to advance a high percentage of the market value of bonds or to make loans based on a third-party guaranty.

Table 13-1 presents a summary of the major features of short-term financing sources.

Short-term financing is easier to arrange, has lower cost, and is more flexible than long-term financing. However, short-term financing leaves the borrower more vulnerable to interest-rate swings, requires more frequent refinancing, and requires earlier payment. As a rule, you should use short-term financing to provide additional working capital, to finance short-lived assets, or to serve as interim financing on long-term projects. Long-term financing is more appropriate for the financing of long-term assets or construction projects.

INTERMEDIATE-TERM FINANCING: TERM LOANS AND LEASING

We now consider the use of intermediate-term loans, primarily through banks and leases, to meet corporate financing needs. Examples are bank loans, insurance company term loans, and equipment financing.

Table 16–1. Summary of Short-term Financing Sources

Types of Financing	Source	Cost or Terms	Features
Spontaneous Sources			
Accounts payable	Suppliers	No explicit cost but there is an opportunity cost if a cash discount for early payment is not taken. Companies should take advantage of the discount offered.	The main source of short-term financing typically on terms of 0 to 120 days.
Accrued expenses	Employees and tax agencies	None	Expenses incurred but not yet paid (e.g., accrued wages payable, accrued taxes payable).
Unsecured sources			
Bank loans			
1. Single payment note	Commercial banks	Prime interest rate plus risk premium. The interest rate may be fixed or variable. Unsecured loans are less costly than secured loans.	A single-payment loan to satisfy a funds shortage to last a short time period.
2. Lines of credit	Commercial banks	Prime interest rate plus risk premium. The interest rate may be fixed or variable. A compensating balance is typically required. The line of credit must be "cleaned up" periodically.	An agreed upon borrowing limit for funds to satisfy seasonal needs.
Commercial paper	Commercial banks, insurance companies, other financial institutions, and other companies	A little less than the prime interest rate.	Unsecured short-term note of financially strong companies.
Secured sources			
Accounts receivable as collateral			
1. Pledging	Commercial banks and finance companies	Typically 2% to 5% above prime plus fees (usually 2% to 3%). Low administrative costs. Advances typically ranging from 60% to 85%.	Qualified accounts receivable accounts serve as collateral upon collection of the account, the borrower remits to the lender. Customers are not notified of the arrangement. With recourse means that the risk of nonpayment continues to be borne by the company.
2. Factoring	Factors, commercial banks, and commercial finance companies	Typically a 2% to 3% discount from the face value of factored receivables. Interest on advances of almost 3% over prime. Interest on surplus balances held by factor of about $\frac{1}{2}\%$ per month. Costs with factoring are higher than with pledging.	Certain accounts receivable are sold on a discount basis without recourse. This means that the factor bears the risk of nonpayment. Customers are notified of the arrangement. The factor provides more services than is the case with pledging.
Inventory collateral			
1. Floating liens	Commercial banks and commercial finance companies	About 4% above prime. Advance is about 40% of collateral value.	Collateral is all the inventory. There should be a stable inventory with many inexpensive items.
2. Trust receipts (floor planning)	Commercial banks and commercial finance companies	About 3% above prime. Advances ranging from 80% to 100% of collateral value.	Collateral is specific inventory that is typically expensive. Borrower retains collateral. Borrower remits proceeds to lender upon sale of the inventory.
3. Warehouse receipts	Commercial banks and commercial finance companies	About 4% above prime plus about a 2% warehouse fee. Advance of about 80% of collateral value.	Collateralized inventory is controlled by lender. A warehousing company issues a warehouse receipt held by the lender. The warehousing company acts as the lender's agent.

Purposes of Intermediate-term Bank Loans

Intermediate-term loans are loans with a maturity of more than one year but less than five years. They are appropriate when short-term unsecured loans are not, such as when a business is acquired, new fixed assets are purchased, or long-term debt is retired. If a company wants to float long-term debt or issue common stock but market conditions are unfavorable, it may seek an intermediate loan to bridge the gap until conditions improve. A company may use extendable debt when it will have a continuing financing need, reducing the time and cost required for repeated debt issuance.

The interest rate on intermediate-term loans is typically higher than that for short-term loans because of the longer maturity period and varies with the amount of the loan and the company's financial strength. The interest rate may be either fixed or variable.

Ordinary intermediate-term loans are payable in periodic equal installments except for the last payment, which may be higher (a balloon payment). The schedule of loan payments should be based on the company's cash flow position to satisfy the debt. The periodic payment in a term loan equals:

$$\text{Periodic Payment} = \frac{\text{Amount of loan}}{\text{Present value factor}}$$

EXAMPLE 13-22

The company contracts to repay a term loan in five equal yearend installments. The amount of the loan is \$150,000 and the interest rate is 10%. The payment each year is:

$$\frac{\$150,000}{3.791^{(a)}} = \$39,567.40$$

(a) Present value of annuity for five years at 10% (see Table 6-4 in Chapter 6).

The total interest on the loan is:

Total payments (5 x \$39,567.40)	\$197,837
Principal	<u>150,000</u>
Interest	<u>\$ 47,847</u>

EXAMPLE 13-23

The company takes out a term loan in twenty year-end annual installments of \$2,000 each. The interest rate is 12%. The amount of the loan is:

$$\$2,000 = \frac{\text{Amount of loan}}{7.469^{(a)}}$$

$$\text{Amount of loan} = \$2,000 \times 7.469 = \$14,938$$

(a) Present value of annuity for twenty years at 12%. (see Table 6-4) .

The amortization schedule for the first two years is:

<u>Year</u>	<u>Payment</u>	<u>Interest^a</u>	<u>Principal</u>	<u>Balance</u>
0				\$14,938.00

1	\$2,000	\$1,792.56	\$207.44	14,730.56
2	2,000	1,767.67	232.33	14,498.23

(a) 12 percent times the balance of the loan at the beginning of the year.

Restrictions may be placed on the company by the lender in an intermediate-term loan agreement in order to protect the lender's interest. Typical restrictions include:

- Working capital requirements and cash dividend limitations, such as requiring a minimum amount of working capital or limiting dividend payment to no more than 20 percent of net income.
- Routine (uniform) provisions employed universally in most agreements, such as the payment of taxes and the maintenance of proper insurance to assure maximum lender protection.
- Specific provisions tailored to a particular situation, such as limiting future loans and requiring adequate life insurance for executives.

The advantages of intermediate-term loans are:

- Flexibility--terms may be altered as the company's financing requirements change.
- Confidentiality--no public issuance (offering to the investment public after registering with the Securities and Exchange Commission) is involved, so no information about the company's finances need be made public.
- Speed--the loan may be arranged quickly, compared to preparing a public offering.
- Security--avoids the possible nonrenewal of a short-term loan.
- Low cost--eliminates public flotation (issuance) costs.

The disadvantages of intermediate-term loans are these:

- Collateral and restrictive covenants are usually required.
- Budgets and financial statements may have to be submitted periodically to the lender.
- "Kickers" or "sweeteners," such as stock warrants or a share of the profits, are sometimes requested by the bank.

Insurance Company Term Loans

Insurance companies and other institutional lenders such as commercial finance companies may be sources of intermediate-term loans. Insurance companies typically accept loan maturity dates exceeding 10 years, but their rate of interest is often higher than that of bank loans. Insurance companies do not require compensating balances but usually impose a prepayment penalty which is typically not true with a bank loan. A company may opt for an insurance company loan when it desires a longer maturity range.

Equipment-backed Financing

Equipment may serve as collateral for a loan, with the advance based on the market value of the equipment. The more marketable the equipment and the lower the cost of selling it, the higher the advance will be. The repayment schedule is designed so that the market value of the equipment at any given time is in excess of the unpaid loan principal.

Equipment financing may be obtained from banks, finance companies, and manufacturers of equipment and is secured by a chattel mortgage or a conditional sales contract. A *chattel mortgage* serves as a lien on property, except for real estate. In a *conditional sales contract*, the

seller of the equipment keeps title to it until the buyer has satisfied the terms; otherwise the seller can repossess the equipment. Conditional sales contracts are generally used by small companies with low credit ratings.

Equipment trust certificates may be issued to finance the purchase of readily salable equipment, preferably equipment that is general purpose and easily movable. A trust is formed by the lessor to buy the equipment and lease it to the user; the trust issues the certificates to finance 75 to 85 percent of the purchase price and holds title to the equipment until *all* the certificates have been fully repaid, at which time the title passes to the lessee.

Advantages of Leasing

The parties in a lease are the *lessor*, who legally owns the property, and the *lessee*, who uses it in exchange for making rental payments. Of course, your company is the *lessee*.

There are several types of leases:

1. *Operating (service) lease*. This type of lease includes both financing and maintenance services. The company leases property that is owned by the lessor, who may be the manufacturer of the asset or a leasing company that buys assets from the manufacturer to lease to others. The lease payments under the contract are typically not adequate to recover the full cost of the property. Operating leases usually contain a cancellation clause that allows the lessee to return the property prior to the expiration date of the agreement. The life of the contract is less than the economic life of the property.

2. *Financial (capital) lease*. This type of lease usually does not provide for maintenance services. It is noncancellable, and the rental payments equal the full price of the leased property. The life of the contract approximates the life of the property.

3. *Sale and leaseback*. With this lease arrangement, the company sells an asset to another (usually a financial institution) and then leases it back. This allows the company to obtain cash from the sale and still have the use of the property.

4. *Leveraged lease*. In a leveraged lease, a third party serves as the lender. The lessor borrows a significant portion of the purchase price (usually up to 80 percent) to buy the asset and provides the balance of the purchase price as his equity investment. The property is then leased to the lessee. As security for the loan, the lessor grants the long-term lender a mortgage on the asset and assigns the lease contract to the lender. Leverage leasing is a cost-effective alternative to debt financing when the lessee cannot use the full tax benefits of asset ownership.

Leasing has a number of advantages:

- No immediate cash outlay is required.
- It is a satisfactory way to meet *temporary* equipment needs and provides flexibility in operations.
- Usually there is a purchase option that allows the company to obtain the property at a bargain price at the expiration of the lease. This allows the flexibility to make a purchase decision based on the value of the property at the termination date.
- The lessor's expert service is available.
- Leasing typically imposes fewer financing restrictions than are imposed by lenders.
- The company's obligation for future rental payment need not be reported on the balance sheet if the lease is considered an operating lease. However, capital leases must be stated in financial statements.

- Leasing allows the company, in effect, to depreciate land, which is not allowed if land is purchased.
- Lessors may claim a maximum of three years' lease payments in the event of bankruptcy or reorganization? whereas creditors have a claim for the total amount of the unpaid financing.
- Leasing eliminates equipment disposal.

Leasing may be more attractive than buying when a business cannot use all of the tax deductions and tax credits associate with purchasing the assets.

Drawbacks to leasing are these:

- It carries a higher cost in the long run than purchasing the asset; the lessee does not build equity.
- The interest cost of leasing is typically higher than the interest cost on debt.
- If the property reverts to the lessor at termination of the lease, the lessee must either sign a new lease or buy the property at higher current prices. Also, the salvage value of the property is realized by the lessor.
- The lessee may have to retain property it no longer needs or wants (i.e., obsolete equipment).
- The lessee cannot make improvements to the leased property without the permission of the lessor.

Examples 13-24 to 13-26 below require the use of the present value of annuity table (Table 6-4), discussed in Chapter 6.

EXAMPLE 13-24

The company enters into a lease for a \$100,000 machine. It is to make 10 equal annual payments at year-end. The interest rate on the lease is 14 percent. The periodic payment equals:

$$\frac{\$100,000}{5.216^{(a)}} = \$19,171.78$$

(a) The present value of an ordinary annuity factor for $n = 10$, $i = 14\%$ is 5.216 (see Table 6-4).

EXAMPLE 13-25

Assume the same facts as in Example 13-24, except that now the annual payments are to be made at the beginning of each year. The periodic payment equals:

<u>Year</u>	<u>Factor</u>
0	1.0
1-9	4.9464
	<u>5.9464</u>

$$\frac{\$100,000}{5.946} = \$16,818.03$$

The interest rate associated with a lease agreement can also be computed by dividing the value of the leased property by the annual payment to obtain the factor, which is then used to find the interest rate with the help of a present value of annuity table.

EXAMPLE 13-26

The company leased \$300,000 of property and is to make equal annual payments at year-end of \$40,000 for 11 years. The interest rate associated with the lease agreement is:

$$\frac{\$300,000}{\$40,000} = 7.5$$

Going to the present value of annuity table and looking across 11 years to a factor nearest to 7.5, we find 7.499 at a 7% interest rate. Thus, the interest rate in the lease agreement is 7%.

Lease-Purchase Decision

Often, you must decide whether to buy an asset or lease it. Discounted cash flow (DCF) analysis may be used to determine the cheapest alternative (see Chapter 10).

CONCLUSION

When seeking short-term financing, you should select the best financing vehicle available to meet the company's objectives. The choice of a particular financing instrument depends on the company's particular circumstances and such factors as cost, risk, restrictions, stability of operations, and tax rate. Sources of short-term financing include trade credit, bank loans, bankers' acceptances, finance company loans, commercial paper, receivable financing, and inventory financing.

Intermediate-term financing has a maturity between one and five years and includes multi-year bank or insurance company loans and leases. Fixed assets may serve as collateral. Some advantages of intermediate-term financing are its flexibility and its lower flotation costs.

CHAPTER 14

DEBT FINANCING

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Identify the types of bonds that can be issued.
- Outline the advantages of using bonds for long term financing.
- Discuss how bond interest is calculated and paid.
- Decide if a bond issue should be refunded before maturity.

Long-term financing generally refers to financing with a maturity of more than five years. This chapter discusses the what, why, and how to of long-term debt financing. Long-term debt financing consists primarily of bonds. Long-term financing is often used to finance long-lived assets, such as land or equipment, or construction projects. The more capital-intensive the business, the more it should rely on long-term debt and equity. *Note:* In general, it is more expensive for a company to finance with equity capital than with debt capital because investors are exposed to greater risk with equity capital.

A company's mix of long-term funds is referred to as its *capital structure*. The ideal capital structure maximizes the total value of the company and minimizes the overall cost of capital. Managers charged with formulating an appropriate capital structure should take into account the nature of the business and industry, the company's strategic business plan, its current and historical capital structure, and its planned growth rate.

TYPES OF LONG-TERM DEBT

Different types of debt instruments are appropriate in different circumstances. The amount of debt a company may have depends largely on its available collateral. Sources of long-term debt include mortgages and bonds.

Mortgages

Mortgages are notes payable that are secured by real assets and that require periodic payments. Mortgages can be issued to finance the purchase of assets, the construction of plant, or the modernization of facilities. Banks require that the value of the property exceed the mortgage on that property and usually lend up to between 70 percent and 90 percent of the value of the collateral. Mortgages may be obtained from a bank, life insurance company, or other financial institution. As a rule, it is easier to obtain mortgage loans for multiple-use real assets than for single-use real assets.

There are two types of mortgages: *senior* mortgages, which have first claim on assets and earnings, and *junior* mortgages, which have subordinate liens.

A mortgage may have a closed-end provision that prevents the company from issuing additional debt of the same priority against the specific property. If the mortgage is open-ended, the company can issue additional first-mortgage bonds against the property.

Mortgages have a number of advantages, including favorable interest rates, fewer financing restrictions than bonds, extended maturity dates for loan repayment, and easy availability.

Bonds

Long-term corporate debt usually takes the form of bonds payable and loans payable. A *bond* is a contract indicating that the company has borrowed money and agrees to repay it. A written agreement, called an *indenture*, describes the features of the bond issue (e.g., payment dates, call price should the issuer decide to reacquire the bonds, conversion privileges, and any restrictions).

The indenture is a contract between the company, the bondholder, and the trustee, who makes sure that the company meets the terms of the bond contract (in many instances, the trustee is the trust department of a commercial bank). Although the trustee is an agent for the bondholder, it is selected by the issuing company prior to the issuance of the bonds. If a provision of the indenture is violated, the bonds are in default. (Covenants in the indenture should be flexible enough to allow companies to respond quickly to changes in the financial world.) The indenture may also have a negative pledge clause, which precludes the issuance of new debt that takes priority over existing debt in the event of liquidation. The clause can apply to assets currently held as well as to assets that may be purchased in the future.

The price of a bond depends on several factors, including its maturity date, interest rate, and collateral. In selecting a maturity period for long-term debt, you should structure the debt repayment schedule so that not all of the debt comes due close together. It is best to spread out the payments to avoid possibility that the cash flow will be inadequate to meet the debt payment. Also, if you expect your company's credit rating to improve in the near term, you should issue short-term debt and then refinance later at a lower interest rate.

Bond prices and market interest rates are inversely related. As market interest rates increase, the price of existing bonds falls because investors can invest in new bonds paying higher interest rates. The price of a bond on the open market depends on several factors such as its maturity value, interest rate, and collateral

Interest. Bonds are issued in \$1,000 denominations; many have maturities of 10 to 30 years. The interest payment to the bondholder is called *nominal interest*, which is the interest on the face of the bond and which is equal to the coupon (nominal) interest rate times the face value of the bond. Although the interest rate is stated on an annual basis, interest on a bond is usually paid semiannually. Interest expense incurred by the issuer is tax deductible .

EXAMPLE 14-1

A company issues a 20%, 20-year bond. The tax rate is 46%. The annual after-tax cost of the debt is:

$$20\% \times 54\% = 10.8\%$$

EXAMPLE 14-2

A company issues a \$100,000, 12%, 10-year bond. The semi-annual interest payment is:

$$\$100,000 \times 12\% \times 6/12 = \$6,000$$

Assuming a tax rate of 30 percent, the after-tax semiannual interest is

$$\$6,000 \times 70\% = \$4,200$$

A bond sold at face value (\$1,000) is said to be sold at 100. If a bond is sold below its face value, it is being sold at less than 100 and is issued at a discount. If a bond is sold above face value, it is being sold at more than 100, that is, at a premium. A bond is likely to be sold at a discount when the interest rate on the bond is below the prevailing market interest rate for that type of security, when the issuing company is risky, or when it carries a long maturity period. A bond is sold at a premium when the opposite conditions exist.

Bond issue costs are also tax deductible.

EXAMPLE 14-3

Travis Corporation issues a \$100,000, 14%, 20-year bond at 94. The maturity value of the bond is \$100,000. The annual interest payment is:

$$14\% \times \$100,000 = \$14,000$$

The proceeds from the issuance of the bond is:

$$94\% \times \$100,000 = \$94,000$$

The amount of the discount is:

$$\$100,000 - \$94,000 = \$6,000$$

EXAMPLE 14-4

A bond having a face value of \$100,000 with a 25-year life was sold at 102. The tax rate is 40% . The bond was sold at a premium since it was issued above face value. The total premium is \$2,000 (\$100,000 x 0.02).

Types of Bonds. Companies may issue various types of bonds:

- *Debentures*. Because debentures are unsecured (have no collateral) debt, they can be issued only by large, financially strong companies with excellent credit ratings. Note, however, that most "junk bonds" are debentures of large companies that do *not* have good credit ratings.
- *Subordinated Debentures*. The claims of the holders of these bonds are subordinated to those of senior creditors. Debt that has a prior claim over the subordinated debentures is set forth in the bond indenture. Typically, in the event a company is liquidated, subordinated debentures are paid off after short-term debt.
- *Mortgage Bonds*. These are bonds secured by real assets. The first-mortgage claim must be met before a distribution is made to a second-mortgage claim. There may be several mortgages for the same property.
- *Collateral Trust Bonds*. The collateral for these bonds is the company's security investments in other companies (bonds or stocks), which are held by a trustee for safekeeping.
- *Convertible Bonds*. These bonds may be converted to stock at a later date based on a specified conversion ratio. Convertible bonds are typically issued in the form of subordinated debentures. Convertible bonds are more marketable and are typically issued at a lower interest rate than are regular bonds because they offer the right to *conversion* to common stock. Of course if bonds are converted to stock, the debt is not repaid. A convertible bond is a quasi-equity security because its market value is tied to its value if converted to stock rather than as a bond.
- *Income Bonds*. These bonds pay interest only if the company makes a profit. The interest may be cumulative, in which case it accumulates regardless of earnings and if bypassed must be paid in a later year when adequate earnings exist, or noncumulative. Income bonds are appropriate for

companies with large fixed capital investments and large fluctuations in earnings or for emerging companies that expect low earnings in the early years.

-- *Guaranteed Bonds*. These are debt issued by one party and guaranteed by another.

-- *Serial Bonds*. These bonds are issued with different maturities available. At the time serial bonds are issued a schedule is prepared to show the yields, interest rates, and prices for each maturity. The interest rate on the shorter maturities is lower than the interest rate on the longer maturities because there is less uncertainty about the near future.

-- *Deep Discount Bonds*. These bonds have very low interest rates and thus are issued at substantial discounts from face value. The return to the holder comes primarily from appreciation in price rather than from interest payments. The bonds are volatile in price.

-- *Inflation-linked bonds*. These bonds have coupons (and the principal amount as well) that are adjusted according to the rate of inflation. The U.S. Treasury Inflation Protection Securities (TIPS) is an example.

-- *Zero Coupon Bonds*. These bonds do not pay interest; the return to the holder is in the form of appreciation in price. Lower interest rates may be available for zero coupon bonds (and deep discount bonds) because they cannot be called.

-- *Floating (Variable)-Rate Bonds*. The interest rates on the bonds are adjusted periodically to reflect changes in money market conditions (e.g., prime interest rate). These bonds are popular when future interest rates and inflation are uncertain.

-- *Eurobonds*. Eurobonds are issued outside the country in whose currency the bonds are denominated. Dollar-denominated Eurobonds cannot be sold by U . S . issuers to U . S . investors. They may be sold only to foreign investors, because they are not registered with the SEC.

-- *Catastrophe (cat) bonds*. These bonds are issued mostly by insurance companies to cover extraordinary losses.

-- *Put bonds*. These bonds allow the holder to force the issuer to buy the bond back at a stated price.

-- *Junk bonds*. These bonds are high risk and therefore high-yield securities that are normally issued when the debt ratio is very high.

TABLE 14-1

SUMMARY OF CHARACTERISTICS AND PRIORITY CLAIMS OF BONDS

Bond Type	Characteristics	Priority of Lender's Claim
Debentures	Available only to financially strong companies. Convertible bonds are typically debentures.	General creditor
Subordinated debentures	Comes after senior debt holders	General Creditor

Mortgage bonds	Collateral is real property or buildings.	Paid from the proceeds from the sale of mortgaged assets. If any deficiency exist, general creditor status applies.
Collateral trust bonds	Secured by stock and(or) bonds owned by the issuer. Collateral value is usually 30% more than bond value.	Paid from the proceeds of stock and (or) bond that is collateralized. If there is a deficiency, general creditor, status applies.
Income bonds	Interest is only paid if there is net income. Often issued when a company is in reorganization because of financial problems.	General creditor.
Deep-discount (and zero coupon) bonds	Issued at very low or no (zero) coupon rates. Issued at prices significantly below face value. Usually callable at par value.	Unsecured or secured status may apply depending on the features of the issue.
Variable-rate-bonds	Coupon rate changes within limits based on changes in money or capital market rates. Appropriate when uncertainty exists regarding inflation and future interest rates. Because of the automatic adjustment to changing market conditions, the bonds sell near face value.	Unsecured or secured status may apply depending on the features of the issue.

Small companies with unproven track records may have to issue what is commonly referred to as "junk bonds" (high-yielding risky bonds rated by Standard & Poor's as B + or below or by Moody's Investors Service as B-1 or below). These are considered low-quality bonds. A summary of the characteristics and priority claims associated with bonds appears in Table 14-1.

Bond Ratings. Rating agencies, such as Standard & Poor's, Fitch's, and Moody's, rate publicly traded bonds according to their risk of default. An inverse relationship exists between the quality of a bond and its yield; low-quality bonds have a higher yield than high-quality bonds. Hence, a risk-return trade-off exists for the bondholder. Bond ratings are important because they influence marketability and the cost associated with the bond issue. Bond ratings are based on the probability of default and the protection for investors in case of default. *Note:* AAA and AA are

Standard & Poor's highest ratings. They signify the highest quality. Bonds rated A and BBB are investment grade. Bonds rated below BBB are speculative high-yield or low-grade bonds (junk bonds).

Advantages and Disadvantages to Debt Refinancing.

Among the advantages of long-term debt are these:

- Interest is tax-deductible, while dividends paid to stockholders are not.
- Bondholders do not participate in earnings growth of the company .
- Debt is repaid in cheaper dollars during inflationary periods.
- Company control remains undiluted.
- Financing flexibility can be achieved by including a call provision allowing the company to pay the debt before the expiration date of the bond in the bond indenture. However, the issuer pays a price for this advantage in the form of the higher interest rates that callable bonds require.
- It may safeguard the company's future financial stability if used in times of tight money markets when short-term loans are not available.

The disadvantages of issuing long-term debt are these:

- Interest charges must be met regardless of the company's earnings.
- Debt must be repaid at maturity.
- Higher debt implies greater financial risk, which may increase the cost of financing.
- Indenture provisions may place stringent restrictions on the company .
- Overcommitments may arise from errors in forecasting future cash flow

To investors, bonds have the following advantages:

- They pay a fixed interest payment each year.
- They are safer than equity securities.

However, investors should consider these disadvantages:

- Bonds carry interest rate risk, the chance that principal will be lost if interest rates rise and the bond drops in value.
- Bonds do not participate in corporate profitability.
- Bondholders have no voting rights and therefore no say in how the company is run.

The proper mixture of long-term debt and equity depends on company organization, credit availability, and the after-tax cost of financing. If the company already has a high level of debt, it should take steps to minimize other corporate risks.

Long-term debt financing is appropriate when:

- The interest rate on debt is less than the rate of return that can be earned on the money borrowed. For example, a company may borrow at 10 percent interest but earn a return of 18 percent by investing that money in the business. Through the use of other people's money (OPM), the company can increase its after-tax profit. (Stockholders will have made an extra profit with no extra investment!)
- The company's revenue and earnings are stable, so that the company will be able to meet interest and principal in both good and bad years. However, cyclical factors should not scare a

company away from having any debt. The important thing is to accumulate no more interest and principal repayment obligations than can reasonably be satisfied in bad times as well as good.

- There is a satisfactory profit margin so that earnings are sufficient to meet debt obligations.
- The liquidity and cash flow positions are good.
- The debt/equity ratio is low so the company can handle additional obligations.
- The risk level of the firm is low.
- Stock prices are currently depressed so that it does not pay to issue common stock at the present time.
- Control considerations are a primary factor (if common stock was issued, greater control might fall into the hands of a potential corporate raider).
- The firm is mature, meaning it has been in business for a long time.
- The inflation rate is expected to rise, so that debt can be paid back in cheaper dollars.
- There is a lack of competition (e.g., entry barriers exist in the industry, such as stringent governmental regulations).
- The markets for the company's products are expanding and the company is growing.
- The tax rate is high so that the company will benefit by deducting interest payments from its taxes.
- Bond indenture restrictions are not burdensome.
- Money market trends are favorable and any necessary financing is available.

Project financing is tied to particular projects and may be suitable for large, self-contained undertakings, perhaps involving joint ventures.

If your company is experiencing financial difficulties, it may wish to refinance short-term debt on a long-term basis, perhaps by extending the maturity dates of existing loans. This may alleviate current liquidity and cash flow problems. As the default risk of your company becomes higher, so will the interest rate lenders demand to compensate for the greater risk.

When a high degree of debt (financial leverage) exists, you should try to reduce other risks (e.g., product risk) so that total corporate risk is controlled. The threat of financial distress or even bankruptcy is the ultimate limitation on leverage. If the company's debt is beyond a reasonable limit, the tax savings on interest expense will be offset by the increased interest rate demanded by creditors to compensate for the increased risk. Excessive debt also lowers the market price of stock because of the greater risk associated with the company.

Small companies with thinly traded stocks (little market activity) often issue debt and equity securities together in the form of *units*. A company may elect to issue units instead of convertible debt if it desires to increase its common equity immediately .

Bond Refunding. Companies may refund bonds before maturity by either issuing a serial bond or exercising a call privilege on a straight bond. The issuance of serial bonds allows the company to refund the debt over the life of the issue; calling the bond enables the company to retire it before the expiration date.

When future interest rates are expected to drop, it is wise for the company to exercise the call provision. It can buy back the higher-interest bond and then issue one at lower interest. The timing for the refunding depends on expected future interest rates. The call price typically exceeds the face value of the bond; the resulting call *premium* equals the difference between the call price and the maturity value. The call premium is usually equal to one year's interest if the

bond is called in the first year; it declines at a constant rate each year thereafter. Also involved in selling a new issue are flotation costs (e.g., brokerage commissions, printing costs).

A bond with a call provision typically has a lower offering price and is issued at an interest rate higher than one without the call provision. Investors prefer not to have a situation in which the company can buy back the bond at its option prior to maturity; they would obviously prefer to hold onto a high-interest bond when prevailing interest rates are low. A callable bond can be recalled by the issuer prior to maturity. A call provision is detrimental to the investor because the issuer can recall the bond when market interest rates decline. It is usually exercised only when a company wishes to refinance high-interest debt.

EXAMPLE 14-5

A \$100,000 issue of 8%, 10-year bonds is priced at 94%. The call price is 103%. Three years after the issue, the bonds are called. The call premium is equal to:

Call price	\$103,000
Face value of bond	<u>100,000</u>
Call premium	<u>\$ 3,000</u>

EXAMPLE 14-6

A company issues \$40,000 of callable bonds. The call price is 104. The tax rate is 35%. The after-tax cost of calling the issue is:

$$\$40,000 \times 0.04 \times 0.65 = \$1,040$$

EXAMPLE 14-7

Your company has a \$20 million, 10% bond issue outstanding that has 10 years to maturity. The call premium is 7 percent of face value. New 10-year bonds in the amount of \$20 million can be issued at an 8% interest rate. Flotation costs of the new issue are \$600,000.

Refunding of the original bond issue should occur as shown below.

Old interest payments (\$20,000,000 × 0.10)	\$2,000,000
New interest payments (\$20,000,000 × 0.08)	<u>1,600,000</u>
Annual Savings	<u>\$400,000</u>
Call premium (\$20,000,000 × 0.07)	\$1,400,000
Flotation cost	<u>600,000</u>
Total cost	<u>\$2,000,000</u>

<u>Year</u>	<u>Calculation</u>	<u>Present Value</u>
0	-\$2,000,000 × 1	-\$2,000,000
1-10	\$400,00 × 6.71 ^(a)	<u>2,684,000</u>
	Net present value	<u>\$684,000</u>

(a) Present value of annuity factor for $i = 8\%$, $n = 10$

Sinking Fund. Bond issues may require a sinking fund, into which the company puts aside money with which to buy and retire part of a bond issue each year. Usually, a mandatory fixed amount must be retired, but occasionally the amount is tied to the company's sales or profit for the year. If a sinking fund payment is not made, the bond issue may be in default.

In many instances, the company can handle the sinking fund in one of the following two ways:

- It can call a given percentage of the bonds at a specified price each year, for instance, 10 percent of the original amount at a price of \$1,070.
- It can buy its own bonds on the open market.

The least costly of these alternatives should be selected. If interest rates have increased, the price of the bonds will have decreased and the open market option should be employed. If interest rates have decreased, bond prices will have increased; thus calling the bonds is less costly.

EXAMPLE 14-8

Your company has to reduce bonds payable by \$300,000. The call price is 104. The market price of the bonds is 103. The company will opt to buy back the bonds on the open market because it is less expensive, as indicated below:

Call price ($\$300,000 \times 104\%$)	\$312,000
Purchase on open market ($\$300,000 \times 103\%$)	<u>309,000</u>
Advantage of purchasing bonds on the open market	<u>\$3,000</u>

CONCLUSION

This chapter has discussed the kinds of bonds a company uses in long-term financing. We have explained when to use bond financing and have discussed the advantages and disadvantages of using bonds. We have shown how bond interest is calculated and paid and we have showed you how to decide if bonds should be refunded before maturity. The next chapter covers stockholders' equity, the other source of long-term capital.

CHAPTER 15 EQUITY FINANCING

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Outline the advantages and disadvantages of the different kinds of stock and other equity securities.
 - List the characteristics of the different classes of stock.
 - Describe the role of the investment banker.
 - Explain the importance of making wise capital structure decisions .
 - Distinguish difference between a private and public placement of securities.
-

All stock issued by a company is either preferred stock or common stock, regardless of what name the issue of stock may be given. And, although some companies may describe several different types or classes, there is (except in very rare cases) only one class of common stock. All other classes of stock, regardless of name, are preferred in some way over the one class of common stock. *Note:* An advantage of issuing new securities to the public is that the liquidity of the firm's stock increases.

This chapter discusses the advantages and disadvantages of the different kinds of stock and other equity securities a company can issue. We will discuss the role of the investment banker and the difference between a public and private placement of securities.

ISSUING EQUITY SECURITIES

The sources of equity financing are preferred stock and common stock. There are advantages and disadvantages associated with issuing preferred and common, and each is the issue of choice in certain circumstances.

Preferred Stock

Preferred stock is a hybrid of bonds and common stock. Preferred stock comes after debt but before common stock in the event of liquidation and in the distribution of earnings. The optimal time to issue preferred stock is when the company has excessive debt and an issue of common stock might encourage a corporate raider to try to take control of the company. Issuing preferred stock is a more expensive way to raise capital than issuing bonds because dividend payments are not tax deductible

Preferred stock may be cumulative or noncumulative. If any prior year's dividend payments to holders of cumulative preferred stock have been missed, they must be made up before dividends can be paid to common stockholders. If preferred dividends are in arrears for a long time, the company may find it difficult to resume its dividend payments to common stockholders. The company need not pay missed preferred dividends to holders of noncumulative preferred stock.

Most preferred stock is cumulative; dividends are limited to a specified rate, which is based on the total par value of the outstanding shares.

EXAMPLE 15-1

As of December 31, 20X6, Ace Company has 6,000 shares of \$15 par value, 14 percent, cumulative preferred stock outstanding. Dividends have not been paid in 20X4 and 20X5. Assuming the company has been profitable in 19X6, the amount of the dividend to be distributed is:

Par value of stock = 6,000 shares x \$15 = \$90,000	
Dividends in arrears (\$90,000 x 14% x 2 years)	\$25,200
Current year dividend (\$90,000 x 14%)	<u>12,600</u>
Total dividend	<u>\$37,800</u>

If dividends exceed the amount typically given to preferred stockholders and common stockholders, the preferred and common stockholders will participate in the excess dividends; in such cases, the preferred stock is referred to as participating preferred stock. Unless stated otherwise, the distribution of the excess dividends will be based on the relative total par values. Nonparticipating preferred stock does *not* participate with common stock in excess dividends. Most preferred stock is nonparticipating.

Preferred stock may be callable. This provision is advantageous to the company when interest rates decline, since the company has the option of discontinuing payment of dividends at a rate that has become excessive by buying back outstanding preferred stock. Unlike bonds, preferred stock rarely has a maturity date; however, preferred stock that has a sinking fund associated with it in effect has a maturity date for repayment.

There are several forms of preferred stock issues. *Limited life preferred stock* has a specified maturity date or can be redeemed at the holder's option. *Perpetual preferred stock* automatically converts to common stock at a given date. There is also preferred stock with "*floating rate dividends*", which keep the preferred stock at par by altering the dividend rate.

In the event of a corporate bankruptcy, preferred stockholders are paid after creditors and before common stockholders. In such a case, preferred stockholders receive the par value of their shares, dividends in arrears, and the current year's dividend. Any asset balance then goes to the common stockholders.

The cost of preferred stock usually follows changes in interest rates and is likely to be low when interest rates are low. When the cost of common stock is high, preferred stock may be issued at a lower cost.

A preferred stock issue has the following advantages:

- Preferred dividends do not have to be paid (important during periods of financial distress). Interest on debt must be paid.
- Preferred stockholders cannot force the company into bankruptcy .
- Preferred shareholders do not share in unusually high profits because the common stockholders are the real owners of the business.
- A growth company can generate better earnings for its original owners by issuing preferred stock having a fixed dividend rate than by issuing common stock.
- Preferred stock issuance does not dilute the ownership interest of common stockholders in terms of earnings participation and voting rights.
- No sinking fund is required.

- The company does not have to collateralize its assets as it may have to do if bonds are issued.
- The debt to equity ratio is improved.

A preferred stock issue does have some disadvantages:

- Preferred stock must offer a higher yield than corporate bonds because it carries greater risk (since preferred stock comes after bonds in corporate liquidation).
- Preferred dividends are not tax deductible.
- Preferred stock has higher flotation costs than bonds.

To an investor, a preferred stock offers the following:

- Preferred stock usually provides a constant return in the form of a fixed dividend payment.
- Preferred stockholders come before common stockholders in the event of corporate bankruptcy.
- Preferred dividends are subject to an 80 percent dividend exclusion for corporate investors. For example, if a company holds preferred stock in another company and receives dividends of \$10,000, only 20 percent (or \$2,000) is taxable. On the other hand, interest income received on bonds is fully taxable.

The disadvantages of preferred stock to an investor are:

- Return is limited because of the fixed dividend rate.
- Prices of preferred stock fluctuate more than those of bonds because there is no maturity date on the stock.
- Preferred stockholders cannot require the company to pay dividends if the firm has inadequate earnings.

Common Stock Issues

Common stock is the residual equity ownership in the business; it does not involve fixed charges, maturity dates, or sinking fund requirements. Holders of common stock have voting power but come after preferred stockholders in receiving dividends and in liquidation.

Common stockholders enjoy the following rights:

- The right to receive dividends.
- The right to receive assets if the business dissolves.
- The right to vote.
- A rights offer. It is the preemptive right to buy new shares of common stock prior to their sale to the general public, thus allowing them to maintain proportionate percentage ownership in the company.

Preemptive rights protect common shareholders' proportional ownership interests from dilution in value. A secondary purpose is to maintain the shareholders' control of the company. Accordingly, the preemptive right, whether granted by statute or by the corporate charter, grants common shareholders the power to acquire on a pro rata basis any additional common shares sold by the firm. Preemptive rights also apply to debt convertible into common shares.

- The right to a stock certificate which evidences ownership in the firm. The stock certificate may then be sold by the holder to another investor in the secondary security market, exchanges and over-the-counter markets in which securities are bought and sold after their original issuance. Proceeds of secondary market sales go to the dealers or investors, not to the company which originally issued the securities.
- The right to inspect the company's books.

Companies may occasionally issue different classes of common stock. Class A is stock issued to the public that has no dividends but does usually have voting rights (although these are insufficient to obtain control of the company). Class B stock, which is typically kept by the company's organizers, does not pay dividends until the company has generated adequate earnings; it provides majority voting rights in order for current management to maintain control. Having two classes of stock enables the founders or management of the company to keep control by holding majority voting rights.

Authorized shares represent the maximum amount of stock the company can issue according to the corporate charter. *Issued shares* represent the number of authorized shares that have been sold by the firm. *Outstanding shares* are the issued shares actually being held by the investing public; *treasury stock* is stock that has been reacquired by the company. Outstanding shares are therefore equal to the issued shares less the treasury shares; dividends are based on the outstanding shares.

The *par value* of a stock is a stated amount of value per share as specified in the corporate charter. The company usually cannot sell stock at a price below par value since stockholders would then be liable to creditors for the difference between par value and the amount received if the company were to fail.

The price of common stock moves in opposition to market interest rates. For example, if market interest rates increase, stock prices fall as investors transfer funds out of stock into higher-yielding money market instruments and bank accounts. Further, higher interest rates raise the cost of borrowing, lowering profits and thus stock prices.

Common stock is generally issued in one of the following ways:

- *Broad syndication*. In a broad syndication, many investment bankers distribute corporate securities. This method is most common, because it gives the issuer the greatest control over distribution and thus probably achieves the highest net price. It also provides the widest public exposure. Its drawbacks are that it may take longer and has high transaction costs.

- *Limited distribution*. In a limited distribution, a limited number of underwriters are involved in the issuance of the company's securities. As a result, the stock receives less public exposure. However, the issuing company may choose to work with only those investment bankers it believes are best qualified or who have the widest contacts.

- *Sole distribution*. In a sole distribution, only one underwriter is used, possibly resulting in unsold shares. The company has less control in this set-up than in a broad syndication, but incurs lower transaction costs. Sole distribution is also fast.

- *Dribble-out*. In this method, the company periodically issues stock at different prices depending on market conditions. This approach is not recommended because of the high associated costs, and because it depresses stock price because of the constant issuance of shares.

In timing a public issuance of common stock, you should consider the following:

- Do not offer shares near the expiration date for options on the company's shares, since the option-related transaction may affect share price. (An option is the right to buy stock at a specified price within a given time period. If the right is not exercised within the specified time period, the option expires.)

- Offer higher yielding common stock just before the ex-dividend date to attract investors. Ex-dividend is a term used to indicate that a stock is selling without a recently declared dividend. The ex-dividend date is four business days before the date of record.

- Issue common stock when there is little competition from other recent issues in the industry.

-- Issue shares in bull markets (a rising stock market) and refrain from issuing them in bear markets (declining markets).

You may need to determine the number of shares that must be issued to raise funds required to satisfy your capital budget.

EXAMPLE 15-2

Your company currently has 650,000 shares of common stock outstanding. The capital budget for the upcoming year is \$1.8 million.

Assuming new stock may be issued for \$16 a share, the number of shares that must be issued to provide the necessary funds to meet the capital budget are:

$$\frac{\text{Funds Needed}}{\text{Market Price Per Share}} = \frac{\$1,800,000}{\$16} = 112,500 \text{ shares}$$

EXAMPLE 15-3

Your company wants to raise \$3 million in its first public issue of common stock. After its issuance, the total market value of stock is expected to be \$7 million. Currently, there are 140,000 outstanding shares that are closely held (that is, held by a few shareholders). The shares held by the controlling group are not considered likely to be available for purchase.

We want to compute the number of new shares that must be issued to raise the \$3 million.

The new shares will constitute 3/7 (\$3 million/\$7 million) of the outstanding shares after the stock issuance, and current stockholders will be holding 4/7 of the shares.

140,000 shares = 4/7 of the total shares

$$\text{Total shares} = \frac{140,000}{4/7}$$

Total shares = 245,000

New shares = 3/7 x 245,000 = 105,000 shares

After the stock issuance, the expected price per share is:

$$\text{Price per Share} = \frac{\text{Market Value}}{\text{Shares Outstanding}} = \frac{\$7,000,000}{245,000} = \$28.57$$

A company that is about to make its first public offering of stock is referred to as "going public." The estimated price per share to sell the securities is equal to:

$$\frac{\text{Anticipated market value of the company}}{\text{Total outstanding shares}}$$

The anticipated market value of the company is based on a valuation model.

For an established company, the market price per share can be determined as follows:

$$\frac{\text{Expected dividend}}{\text{Cost of capital} - \text{growth rate in dividends}}$$

EXAMPLE 15-4

Your company expected the dividend for the year to be \$10 a share. The cost of capital is 13%. The growth rate in dividends is expected to be constant at 8%. The price per share is:

$$\text{Price per share} = \frac{\text{Expected dividend}}{\text{Cost of capital} - \text{growth rate in dividends}}$$

$$= \frac{\$10}{0.13 - 0.08} = \frac{\$10}{0.05} = \$200$$

Another approach to pricing the share of stock for an existing company is through the use of the price/earnings (P/E) ratio, which is equal to:

$$\frac{\text{Market price per share}}{\text{Earnings per share}}$$

EXAMPLE 15-5

Your company's earnings per share is \$7. It is expected that the company's stock should sell at eight times earnings. (This expectation is usually based on what the stock of similar companies sells for in the market).

The market price per share is therefore:

$$P/E = \frac{\text{Market price per share}}{\text{Earnings per share}}$$

$$\begin{aligned} \text{Market price per share} &= P/E \text{ multiple} \times \text{earnings per share} \\ &= 8 \times \$7 = \$56 \end{aligned}$$

You may want to determine the market value of your company's stock. There are a number of different ways to accomplish this.

EXAMPLE 15-6

Assuming an indefinite stream of future dividends of \$300,000 and a required return rate of 14 percent, the market value of the stock equals:

$$\text{Market value} = \frac{\text{expected dividends}}{\text{rate of return}} = \frac{\$300,000}{0.14} = \$2,142,857$$

If there are 200,000 shares, the market price per share is:

$$\text{Market value} = \frac{\$2,142,857}{200,000} = \$10.71$$

EXAMPLE 15-7

Your company is considering a public issue of its securities. The 266 average price/earnings multiple in the industry is 15. The company's earnings are \$400,000. There will be 100,000 outstanding after the issue. the expected per share is:

$$\begin{aligned} \text{Total market value} &= \text{net income} \times \text{price earnings multiple} \\ &= \$400,000 \times 15 = \$6,000,000 \end{aligned}$$

$$\text{Price per share} = \frac{\text{market value}}{\text{shares}} = \frac{\$6,000,000}{100,000} = \$60$$

If your company has significant debt, it will be better off financing with an equity issue to lower overall financial risk.

Financing with common stock has the following advantages:

- The company is not required to pay fixed charges such as interest or dividends.
- There is no repayment date or sinking fund requirement.
- A common stock issue improves the company's credit rating compared to a bond issue. For example, it improves the debt-equity ratio.

Financing with common stock has disadvantages:

- Dividends are not tax deductible.
- Ownership interest is diluted. The additional voting rights might vote to remove the current ownership group from power.
- Earnings and dividends must spread over more shares outstanding.
- The flotation costs of a common stock issue are higher than those for preferred stock and debt financing.

It is always cheaper to finance operations from internally generated funds because such financing involves no flotation costs. Retained earnings may be used as equity funding if the company believes its stock price is lower than the true value of its assets or if transaction costs for external financing are high.

The company may make use of dividend reinvestment plans, in which stockholders reinvest their dividends into the company by buying more shares, and employee stock option plans, which allow employees to buy company stock at an option price typically below what the market price of the stock will be when the option is exercised. Such plans allow the company to raise financing and avoid issuance costs and the market impact of a public offering.

A summary comparison of bonds and common stocks is presented in Exhibit 15-1.

TABLE 15-1

SUMMARY COMPARISON OF BONDS AND COMMON STOCK

Bonds	Common Stock
Bondholders are creditors	Stockholders are owners
No voting rights exist.	Voting rights exist.
There is a maturity date	There is no maturity date.
Bondholders have prior claims on profits and assets in bankruptcy.	Stockholders have residual claims
Interest payments represent fixed charges.	Dividend payments do not continue.
Interest payments are deductible on the tax return.	There is no tax deductibility for dividend payments
The rate of return required by bondholders is typically lower than that by stockholders.	The required rate of return by stockholders is typically greater than that by bondholders

Stock Rights

Stock rights--options to buy securities at a specified price at a later date--are a good source of common stock financing. *Preemptive rights* provide existing stockholders with the first option to buy additional shares. Exercising this right permits investors to maintain voting control and protects against dilution in ownership and earnings.

Financial management decides on the life of the right (typically about two months), its price (typically below the current market price), and the number of rights needed to buy a share.

In a rights offering, a date of record indicates the last day that the receiver of the right must be the legal owner as reflected in the company's stock ledger. To compensate for bookkeeping lags, stocks are often sold *ex rights* (without rights) four business days before the record date; prior to this point, the stock is sold *rights on*, which means the purchasers receive the rights and can exercise them, sell them, and let them expire.

Since stock rights are transferable, many are traded on the stock exchange and over-the-counter markets. They may be exercised for a given period of time at a *subscription price*, which is set somewhat below the prevailing market price. After the subscription price has been determined, financial management must ascertain the number of rights necessary to purchase a share of stock. The total number of shares must be sold equals:

$$\text{Shares to be sold} = \frac{\text{Amount of funds to be obtained}}{\text{Subscription price}}$$

The number of rights needed to acquire one share equals:

$$\text{Rights per share} = \frac{\text{Total shares outstanding}}{\text{Shares to be sold}}$$

EXAMPLE 15-8

Your company wants to obtain \$800,000 by a rights offering. There are presently 100,000 shares outstanding. The subscription price is \$40 per share. The shares to be sold equal:

$$\begin{aligned} \text{Shares to be sold} &= \frac{\text{Amount of funds to be obtained}}{\text{Subscription price}} \\ &= \frac{\$800,000}{\$40} \\ &= 20,000 \text{ shares} \end{aligned}$$

The number of rights to acquire one share equals:

$$\text{Rights per share} = \frac{\text{Total shares outstanding}}{\text{Shares to be sold}} = \frac{100,000}{20,000} = 5$$

Thus, five rights will buy one new share at \$40. Each right enables the holder to buy 1/5 of a share of stock.

Value of a Right. The value of a right should, theoretically, be the same whether the stock is selling with rights on or with ex rights.

When stock is selling with rights on, the value of a right equals:

$$\frac{\text{Market value of stock with rights on} - \text{subscription price}}{\text{Number of rights needed to buy one share} + 1}$$

EXAMPLE 15-9

Your company's common stock sells for \$55 a share with rights on. Each stockholder is given the right to buy one new share at \$35 for every four shares held. The value of each right is:

$$\frac{\$55 - \$35}{4 + 1} = \frac{\$20}{5} = \$4$$

When stock is traded ex rights, the market price is expected to decline by the value of the right. The market value of stock trading ex rights should theoretically equal:

$$\text{Market value of stocks with rights on} - \text{value of a right when stock is selling rights on}$$

$$\frac{\text{The value of a right when stock is selling ex rights equals:} \\ \text{Market value of stock trading ex rights} - \text{subscription price}}{\text{Number of rights needed to buy one new share}}$$

EXAMPLE 15-10

Assuming the same information as in Example 15-9, the value of the company's stock trading ex rights should equal:

Market value of stocks with rights on - value of a right when stock is selling rights on
or

$$\$55 - \$4 = \$51$$

The value of a right when stock is selling ex rights is:

$$\frac{\text{Market value of stock trading ex rights} - \text{subscription price}}{\text{Number of rights needed to buy one new share}}$$

$$\frac{\$51 - \$35}{4} = \frac{\$16}{4} = \$4$$

The theoretical value of the right is identical when the stock is selling rights on or ex rights.

GOVERNMENTAL REGULATION

When securities are issued publicly, they must conform to federal and state regulations. The major federal laws are the Securities Act of 1933 and the Securities Exchange Act of 1934. State rules are referred to as *blue sky laws*.

The financial manager must be familiar with these laws for several reasons. First, a violation of the laws makes the manager subject to personal legal liability. Second, governmental regulation impacts the availability and costs of financing. Third, regulations apply to the money and capital markets in which the company's shares are traded. Fourth, the laws serve as safeguards to investors.

The Securities Act of 1933 deals with the regulation of new security issues. Its purpose is to ensure full disclosure of financial information about the company's affairs and to furnish a record of representations. The Act applies to interstate offerings to the public in amounts exceeding \$1.5 million. Securities must be registered with the Securities and Exchange Commission (SEC) at least twenty days before they are publicly offered. Prior to the issuance of a new security issue, the company must prepare a prospectus for investors which contains a condensed version of the registration statement filed with the SEC, including accounting, financial, and legal information about the company. The SEC may delay or cease a public offering if information contained in the registration statement is erroneous, misleading, or incomplete. If the SEC-approved registration statement or prospectus is later found to contain misrepresentations, an investor who suffers losses can sue the issuing company and its officers for damages.

The Securities Exchange Act of 1934 applies to existing securities transactions. It requires full and accurate disclosure of financial information. Companies whose securities are listed on securities exchanges must file registration statements and periodic financial reports with

both the SEC and the listing stock exchange. "Insider transactions" are monitored; officers and major stockholders of the company must prepare monthly reports of their holdings in the company's stock and changes therein. (An insider is defined as an officer, director, or stockholder of the company who controls 10 percent or more of equity shares.) The SEC also monitors trading practices in the stock exchanges and is empowered to monitor and punish manipulative activities affecting the company's stock. The voting process for corporate elections, particularly proxy voting (power of attorney by which the holder of stock transfers the voting right to another party), is also subject to SEC scrutiny; margin requirements regulating the purchase of securities on credit are regulated by the Federal Reserve System.

State blue sky laws are designed to protect investors from being defrauded. Companies issuing securities must register their offerings with the state in which they are incorporated, and furnish relevant financial information.

SELECTING A FINANCING METHOD

Some companies obtain most of their funds by issuing stock and from earnings retained in the business. Other companies borrow as much as possible and raise additional money from stockholders only when they can no longer borrow. Most companies are somewhere in the middle.

Financial managers are concerned with selecting the best possible source of financing based on the company's situation.

They must consider the following:

- The cost and risk of alternative financing strategies.
- Future trends in market conditions and their impact on future fund availability and interest rates. For example, if interest rates are expected to go up, the company will be better off financing with long-term debt at the currently lower interest rates. If stock prices are high, equity issuance may be preferred over debt.
- The current debt-to-equity ratio. A very high ratio, for example, indicates financial risk, so additional funds should come from equity sources.
- The maturity dates of present debt instruments. For example, the company should avoid having all debt come due at the same time; in an economic downturn, it may not have adequate funds to meet required debt payments.
- The restrictions in loan agreements. For instance, a restriction may place a cap on the allowable debt-equity ratio.
- The type and amount of collateral required by long-term creditors.
- The company's ability to change financing strategy to adjust to changing economic conditions. For example, a company subject to large cyclical variations should have less debt because it may not be able to meet principal and interest at the low point of the cycle. If earnings are unstable and/or there is a highly competitive environment, more emphasis should be given to equity financing.
- The amount, nature, and stability of internally generated funds. If earnings are stable, the company will be better able to meet debt obligations.
- The adequacy of present lines of credit to meet current and future needs.
- The inflation rate, since debt is repaid in cheaper dollars.

- The earning power and liquidity position of the company. For example, a liquid company is able to meet debt payments.
- The nature and risk of assets. High-quality assets in terms of cash realizability allow for greater debt.
- The nature of the product line. A company, for example, that faces obsolescence risk in its product line (e.g., computers) should refrain from overusing debt.
- The uncertainty of large expenditures. If huge cash outlays may be required (e.g., for a lawsuit or the acquisition of another company), additional debt capacity should be available.
- The tax rate. For example, a higher tax rate makes debt more attractive because interest expense is tax deductible.

You have to select the best possible source of financing based on the facts.

EXAMPLE 15-11

Your company is considering issuing either debt or preferred stock to finance the purchase of a plant costing \$1.3 million. The debt position is currently very high. The interest rate on the debt is 15 percent. The dividend rate on the preferred stock is 10 percent. The tax rate is 34 percent.

The annual interest payment on the debt is:

$$15\% \times \$1,300,000 = \$195,000$$

The annual dividend on the preferred stock is:

$$10\% \times \$1,300,000 = \$130,000$$

The required earnings before interest and taxes to meet the dividend payment is:

$$\frac{\$130,000}{(1 - 0.34)} = \$196,970$$

If your company anticipates earning \$196,970 or more, it should issue the preferred stock because of its currently excessive debt position.

EXAMPLE 15-12

Your company has sales of \$30 million a year. It needs \$6 million in financing for capital expansion. The debt/equity ratio is 68%, which is considered quite high in the industry. Your company is in a risky industry, and net income is not stable. The common stock is selling at a high P/E ratio compared to competition. The company is considering either a common stock or a debt issue.

Because your company is in a high-risk industry and has a high debt/equity ratio and unstable earnings, issuing debt may be costly, restrictive, and potentially dangerous to the company's future financial health. A common stock issue is recommended.

EXAMPLE 15-13

Your company is a mature one in its industry. It has limited ownership. The company has vacillating sales and earnings. The debt/equity ratio is 70%, compared to the industry standard of 55%. The after-tax rate of return is 16%. Since your company is in a seasonal business, there are certain times during the year when its liquidity position is inadequate. Your company is unsure of the best way to finance.

Preferred stock is one possible means of financing. Debt financing is not recommended because of the already high debt/equity ratio, the fluctuation in profit, the seasonal nature of the

business, and the deficient liquidity posture. Because of the limited ownership, common stock financing may not be appropriate because it would dilute the ownership.

EXAMPLE 15-14

A new company is established and plans to raise \$15 million in funds. The company expects to obtain contracts that will provide \$1,200,000 a year in before-tax profits. The company is considered whether to issue bonds only or an equal amount of bonds and preferred stock. The interest rate on AA corporate bonds is 12 percent. The tax rate is 50%.

The company will probably have difficulty issuing \$15 million of AA bonds because the interest cost of \$1,800,000 ($12\% \times \$15,000,000$) on these bonds is greater than estimated earnings before interest and taxes. The issuance of debt by a new company is a risky alternative.

Financing with \$7.5 million in debt and \$7.5 million in preferred stock is also not recommended. While some debt may be issued, it is not practical to finance the balance with preferred stock. If \$7.5 million of AA bonds were issued at the 12 percent rate, the company would be required to pay \$900,000 in interest. A forecasted income statement would look as follows:

Earnings before interest and taxes	\$1,200,000
Interest	<u>900,000</u>
Taxable income	\$ 300,000
Taxes	<u>150,000</u>
Net income	<u>\$ 150,000</u>

The amount available for the payment of preferred dividends is only \$150,000. Hence, the maximum rate of return that could be paid on \$7.5 million of preferred stock is .02 ($\$150,000 / \$7,500,000$), too low to attract investors.

The company should consider financing with common stock.

EXAMPLE 15-15

Your company wants to construct a plant that will take about 11/2 years to construct. The plant will be used to produce a new product line, for which your company expects a high demand. The new plant will materially increase corporate size. The following costs are expected:

1. The cost to build the plant, \$800,000
2. Funds needed for contingencies, \$100,000
3. Annual operating costs, \$175,000

The asset, debt, and equity positions of your company are similar to industry standards. The market price of the company's stock is less than it should be, taking into account the future earning power of the new product line. What would be an appropriate means to finance the construction?

Since the market price of stock is less than it should be and considering the potential of the product line, convertible bonds and installment bank loans might be appropriate means of financing, since interest expense is tax deductible. Additionally, issuing convertible bonds might not require repayment, since the bonds are likely to be converted to common stock because of the company's profitability. Installment bank loans can be paid off gradually as the new product generates cash inflow. Funds needed for contingencies can be obtained through open bank lines of credit.

If the market price of the stock were not depressed, financing through equity would be an alternative financing strategy.

EXAMPLE 15-16

Your company wants to acquire another business but has not determined an optimal means to finance the acquisition. The current debt/equity position is within the industry guideline. In prior years, financing has been achieved through the issuance of short-term debt.

Profit has shown vacillation; as a result, the market price of the stock has fluctuated. Currently, however, the market price of stock is strong.

Your company's tax bracket is low.

The purchase should be financed through the issuance of equity securities for the following reasons:

- The market price of stock is currently at a high level.
- Issuing long-term debt will cause greater instability in earnings, because of high fixed interest charges. Consequently, the stock price will become even more volatile.
- Issuing debt will result in a higher debt/equity ratio relative to the industry norm, negatively impacting the company's cost of capital and availability of financing.
- Short-term debt would have to be paid before the company receives a return from the acquired business and is therefore not advisable .

INVESTMENT BANKING

Investment banking is the underwriting of a securities issue by a firm that serves as an intermediary between the issuing company and the investing public.

An issuer of new securities ordinarily selects an investment banker in a negotiated deal because of the costs incurred in learning about the issuer and setting an issue price. The probability of closing a deal is high in a negotiated deal, so the banker is willing to incur such costs. On the other hand, the likelihood of closing the deal is smaller in a competitive bid system, so the banker is less willing to take the risk.

The direct underwriting responsibilities of the investment banking firm may include preparing the SEC registration statement, assisting in pricing the issue, forming and managing a group of underwriters, and stabilizing the price of the issue during the offering and distribution period. When a client relationship exists, the underwriter provides counseling and may have a seat on the board of directors of the company.

Investment bankers conduct the following activities:

- *Underwriting.* The investment banker buys a new security issue, pays the issuer, and markets the securities. The underwriter's compensation is the difference between the price at which the securities are sold at to the public and the price paid to the issuing company.
- *Distributing.* The investment banker markets the company's security issue.
- *Advice.* The investment banker advises the company on the best way to obtain funds. The investment banker is knowledgeable about alternative sources of long-term funds, debt and equity markets, and SEC regulations.

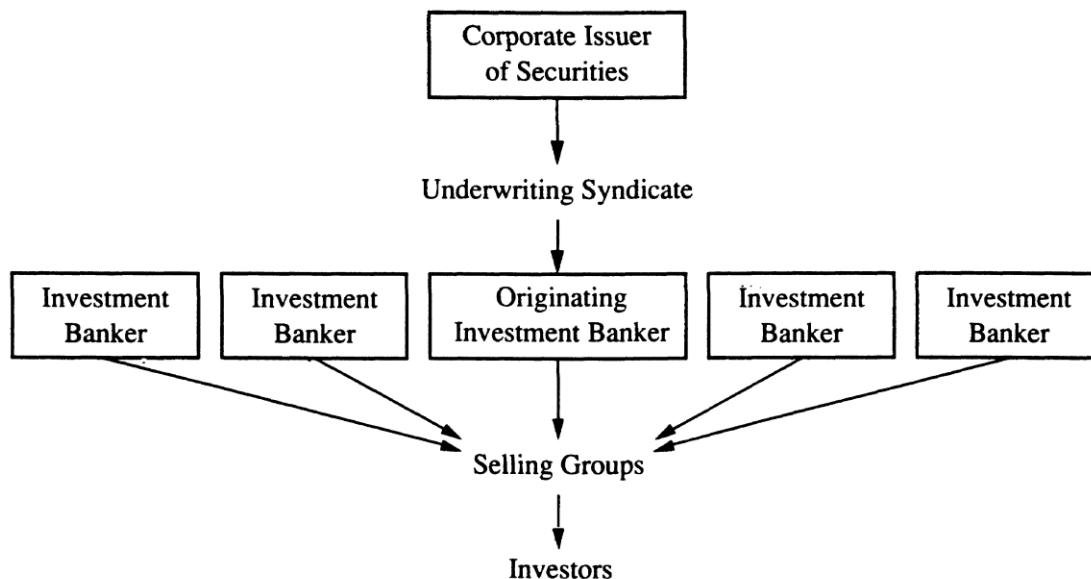
-- *Providing Funds*. The investment banker provides funds to the company during the distribution period.

A *syndicate* is a group of several investment bankers who have come together to market a particularly large or risky issue. One investment banker (originating house) in the group will be selected to manage the syndicate and underwrite the major amount of the issue. The syndicate makes one bid for the issue, but the terms and features of the issue are set by the company.

The distribution channels for a new security issue are illustrated in Figure 15-1.

In another approach to investment banking, the investment banker may agree to sell the company's securities on a best efforts basis, or to an agent. Here, the investment banker does not act as underwriter but instead sells the stock and receives a sales commission. Depending on the agreement, the agent may exercise an option to buy enough shares to cover its sales to the public, or the agent may cancel the incompletely sold issue altogether. Investment bankers may insist on this type of arrangement if they have reservations about the likelihood of success of the offering, such as with speculative securities issued by new and financially weak companies. A best-efforts arrangement involves risks and delays to the issuing company.

FIGURE 15-1
DISTRIBUTION CHANNELS FOR A NEW SECURITY ISSUE



In selecting an investment banker for a new issue of securities, you should look for the following:

-- Low spread. Spread is the difference between the price paid to the issuing company by the investment banker and the resale price to the investor.

-- Good references, meaning other issuing companies were satisfied with the investment banker's performance.

- Ability to float many shares at a good price.
- Institutional (corporate) and retail (individual) clientele.
- Good after-market performance, meaning securities do well after issuance.
- Wide geographic distribution.
- Attractive secondary markets for resale.
- Knowledge of market, regulations, industry, and company.

Public vs. Private Placement

Equity and debt securities may be issued either publicly or privately. In a public issuance, the shares are bought by the general public; in a private placement, the company issues securities directly to either one or a few large investors, usually financial institutions such as insurance companies, pension plans, and commercial banks.

When a company goes public, it is subject to reporting requirements that do not apply to privately held companies. Because reports filed with the SEC are in the public domain, competitors will have greater access to information about the company. Moreover, pressure from outside shareholders for earnings growth increases due to the increase in the number of shareholders who want returns on their investment. Additional funds enable operations to expand, but increased management control is needed to monitor the expansion. As the number of shareholders increases, the costs to meet their informational needs increase rather than decrease.

Prior to issuing securities to the public, management must first obtain approval from the board of directors. This step is performed during the preunderwriting conferences, in which the prospective issuer and the investment banker discuss the amount to be raised, the type of securities to issue, and the nature of the agreement.

Private placement has the following advantages compared to public issuance:

- The flotation cost is less. The flotation cost for common stock exceeds that for preferred stock and expressed as a percentage of gross proceeds, is higher for smaller issues than for larger ones.
- It avoids SEC filing requirements.
- It avoids the need for disclosure of information to the public.
- It reduces the time lag for obtaining funds.
- It offers greater flexibility.
- It may be the only avenue available to small companies planning small issues that would not be sufficiently profitable to attract the interest of investment bankers.

The drawbacks of private placement compared to public issuance are these:

- Private placement often requires a higher interest rate because of a reduced resale market.
- Private placements usually have a shorter maturity period than public issues.
- It is more difficult to obtain significant amounts of money in private placements than in public ones.
- Large private investors typically use stringent credit standards and require the company to be in strong financial condition. In addition, they impose more restrictive terms.
- Large institutional investors may watch the company's activities more closely than smaller investors in a public issue.

- Large institutional investors are more capable of obtaining voting control of the company, assuming they hold a large amount of stock.
- If the company's credit rating is low, private investors with limited funds may not be interested in purchasing the securities.

Most private placements involve debt securities; in fact, only about 2 percent of common stock is placed privately. The private market is more receptive to smaller issues (e.g., those up to several million dollars). Small and medium-sized companies typically find it cheaper to place debt privately than publicly, especially when the issue is \$5 million or less.

CONCLUSION

Your company may finance long-term with debt or equity (preferred stock and common stock) funds. Each has its own advantages and disadvantages. The facts of a situation have to be examined to determine which type is best under the circumstances. For example, a rapidly growing company needs flexibility in its capital structure. While a high debt position may be needed to sustain growth, it is important that periodic additions to equity are made.

CHAPTER 16

INTERNATIONAL FINANCE

LEARNING OBJECTIVES

After reading this chapter, you should be able to:

- Outline the key features of the financial management of a multinational corporation (MNC).
 - Describe some popular financial goals of MNCs.
 - Distinguish between spot and forward foreign exchange rate.
 - Explain ways to control currency risk.
 - Outline three different types of foreign exchange exposure.
 - Explain long versus short position.
 - List some key questions to ask that help to identify foreign exchange risk.
 - Identify the ways to forecast foreign exchange rates.
 - Analyze foreign investments.
 - Measure political risk and deal with political risk.
 - Identify various international sources of financing.
-

Many companies are multinational corporations (MNCs) that have significant foreign operations deriving a high percentage of their sales overseas. The managers of MNCs require an understanding of the complexities of international finance to make sound financial and investment decisions. International business and finance involves consideration of managing working capital, financing the business, control of foreign exchange and political risks, and foreign direct investments. Most importantly, the financial manager has to consider the value of the U.S. dollar relative to the value of the currency of the foreign country in which business activities are being conducted. Currency exchange rates may materially affect receivables and payables, and imports and exports of the U.S. company in its multinational operations. The effect is more pronounced with increasing activities abroad.

FOREIGN OPERATIONS

What is unique about the financial management of a multinational corporation (MNC)?

- *Multiple-currency problem.* Sales revenues may be collected in one currency, assets denominated in another, and profits measured in a third.
- *Various legal, institutional, and economic constraints.* There are variations in such things as tax laws, labor practices, balance of payment policies, and government controls with respect to the types and sizes of investments, types and amount of capital raised, and repatriation of profits. Many firms have business operations abroad. *Note:* Repatriation is conversion of

funds held in a foreign country into another currency and remittance of these funds to another nation. A firm must often obtain permission from the currency exchange authorities to repatriate earnings and investments. Regulations in many nations encourage a reinvestment of earnings in the country.

- *Internal control problem.* When the parent office of a MNC and its affiliates are widely located, internal organizational difficulties arise.

What are popular financial goals of MNCs?

The financial goals of MNCs are identified in the following order of importance:

1. Maximize growth in corporate earnings, whether total earnings, earnings before interest and taxes (EBIT), or earnings per share (EPS).
2. Maximize return on equity.
3. Guarantee that funds are always available when needed.

What types of foreign operations are right for you?

When strong competition exists in the U.S., a company may look to enter or expand its foreign base. However, if a company is unsuccessful in the domestic market, it is likely to have problems overseas as well. Further, the manager must be cognizant of local customs and risks in the international markets.

A large, well-established company with much international experience may eventually have wholly-owned subsidiaries. However, a small company with limited foreign experience operating in "risky areas" may be restricted to export and import activity.

If the company's sales force has minimal experience in export sales, it is advisable to use foreign brokers when specialized knowledge of foreign markets is needed. When sufficient volume exists; the company may establish a foreign branch sales office including sales people and technical service staff. As the operation matures, production facilities may be located in the foreign market. However, some foreign countries require licensing before foreign sales and production can take place. In this case, a foreign licensee sells and produces the product. A problem with this is that confidential information and knowledge are passed on to the licensees who can then become a competitor at the expiration of the agreement.

A joint venture with a foreign company is another way to proceed internationally and share the risk. Some foreign governments require this to be the path to follow to operate in their countries. The foreign company may have local goodwill to assure success. A drawback is less control over activities and a conflict of interest.

In evaluating the impact that foreign operations have on the entity's financial health, the controller should consider the extent of intercountry transactions, foreign restrictions and laws, tax structure of the foreign country, and the economic and political stability of the country. If a subsidiary is operating in a high-tax country with a double-tax agreement, dividend payments are not subject to further U.S. taxes. One way to transfer income from high tax areas to low tax areas is to levy royalties or management fees on the subsidiaries.

What are some popular international strategies?

Depending on its situation, its mission, and its objectives, a multinational corporation can select from several strategic options the most appropriate methods to use in entering a foreign market or establishing manufacturing facilities in another country. Such strategies can be combined with the corporate, business, and functional strategies. The following are some of the more popular international strategies.

- **Exporting:** Simply shipping goods produced in the company's home country to other countries or marketing is a good way to minimize risk and to experiment with a specific product. The company could choose to handle all critical functions itself, or it could contract these functions to an export management company. Exporting is becoming increasingly popular for small businesses because of fax machines, 800 numbers, emails, and overnight air express services, which reduce the once formidable costs of going international.
- **Licensing:** Under a licensing agreement, the licensing firm grants rights to another firm in the host country to produce and/or sell a product. The licensee pays compensation to the licensing firm in return for technical expertise. This is an especially useful strategy if the trademark or brand name is well known but the MNC doesn't have sufficient funds to finance its entering the country directly. Anheuser-Busch is using this strategy to produce and market Budweiser beer in the United Kingdom, Japan, Israel, Australia, South Korea, and the Philippines. This strategy also becomes important if the country makes entry by investment either difficult or impossible. However, a licensee might develop its competence to the point that it becomes a competitor to the licensing firm. Therefore a company should never license its distinctive competence, even for some short-run advantage.
- **Joint ventures:** The rate of joint venture formation between U.S. companies and international partners has been growing 27% annually. Companies often form joint ventures to combine the resources and expertise needed for the development of new products or technologies. A joint venture also enables an MNC to enter a country that restricts foreign ownership. The corporation can enter another country with fewer assets at stake and thus lower risk. A joint venture may be an association between an MNC and a firm in the host country or a government agency in that country. A quick method of obtaining local management, it also reduces the risks of expropriation and harassment by host country officials. This is the approach Dean Foods used to increase its presence in Mexico. Disadvantages of joint ventures include loss of control, lower profits, probability of conflicts with partners, and the likely transfer of technological advantage to the local partner. Joint ventures often are meant to be temporary, especially by the Japanese, who view them as a way to overcome a competitive weakness until they can achieve long-term dominance in the partnership.
- **Acquisitions:** A relatively quick way to move into another country is to purchase a company already operating there. Synergistic benefits can result if the MNC acquires a firm with strong complementary product lines and a good distribution network. Maytag Corporation's

acquisition of Hoover gave it entry into Europe through Hoover's strength in home appliances in the United Kingdom and in its vacuum cleaner distribution centers on the European continent. To expand into Central Europe, K mart purchased department stores in the Czech and Slovak Republics. In some countries, however, acquisitions can be difficult to arrange because of a lack of available information about potential candidates. Government restrictions on ownership, such as the U.S. requirement that limits foreign ownership of U.S. airlines to 49% of nonvoting and 25% of voting stock, also can discourage acquisitions.

- **Green-field development:** If a corporation doesn't want to obtain another firm's existing facilities through acquisition, it may choose a *green-field development*, or the building of a manufacturing facility from scratch. This approach usually is far more complicated and expensive than acquisition, but it allows the MNC more freedom in designing the plant, choosing suppliers, and hiring a work force. For example, Nissan, Honda, and Toyota built auto factories in rural areas of the United Kingdom and then hired and trained a young work force with no experience in the industry.
- **Production sharing:** The term *production sharing* means the combining of higher labor skills and technology available in developed countries with the lower cost labor available in developing countries. By locating a labor-intensive assembly plant called a *maquiladora* in Ciudad Juarez, Mexico, and a packaging plant across the border in El Paso, Texas, companies such as Hoover have been able to take advantage of Mexico's low labor costs. Companies also are moving data processing and computer programming activities "offshore" to places such as Philippines, India, and Singapore where wages are lower, English is spoken, and telecommunications are in place.
- **Turnkey operations:** Turnkey operations typically involve contracts for the planning, design, and construction of operating facilities for a fee. The facilities are transferred to the host country or firm when they are complete. The customer usually is a government agency of, for example, a Middle Eastern country that has decreed that a particular product be produced locally and under its control. For example, Fiat built an auto plant in Russia to produce an older model of Fiat under a Russian brand name (Lada). Corporations that perform turnkey operations frequently are industrial equipment manufacturers that supply some of their own equipment for the project and also sell replacement parts and maintenance services to the host country. They thereby create customers as well as future competitors.
- **Management contracts:** A large multinational corporation is likely to have a great amount of management talent at its disposal. Management contracts offer a means through which an MNC may use part of its personnel to assist a firm in a host country for a specified fee and period of time. Such arrangements are useful when a multinational corporation builds a turnkey operation in a less developed country where people do not have the knowledge and skills needed to operate a manufacturing facility. Management contracts also are common when a host government expropriates part or all of an MNC's holdings in its country. The contracts allow the MNC to continue to earn some income from its investment and keep the operations going until it can train local management.

THE FOREIGN EXCHANGE MARKET

What is the foreign exchange market?

Except in a few European centers, there is no central marketplace for the foreign exchange market. Rather, business is carried out over telephone or telex. The major dealers are large banks. A company that wants to buy or sell currency typically uses a commercial bank. International transactions and investments involve more than one currency. For example, when a U.S. company sells merchandise to a Japanese firm, the former wants to be paid in dollars but the Japanese company typically expects to receive yen. Due to the foreign exchange market, the buyer may pay in one currency while the seller can receive payment in another currency.

Although currencies can be supported by various means for short periods, the primary determinant of exchange rates is the supply of and demand for the various currencies. Under current international agreements, exchange rates are allowed to "float." During periods of extreme fluctuations, however, governments and control banks may intervene to maintain stability in the market. The U.S. dollar is the most widely used currency in international markets today. It is considered much more stable than any of the third-world currencies. Thus, many third-world countries rely on the U.S. dollar for foreign trade.

What are spot and forward foreign exchange rates?

An exchange rate is the ratio of one unit of currency to another. An exchange rate is established between the different currencies. The conversion rate between currencies depends on the demand/supply relationship. Because of the change in exchange rates, companies are susceptible to exchange rate fluctuation risks because of a net asset or net liability position in a foreign currency. *Note:* If the exchange rate changes from \$1 being worth 5 Swiss francs to \$1 being worth 5.5 Swiss francs, the U.S. dollar has appreciated by 10% $[(5.5-5) / 5]$.

Exchange rates may be in terms of dollars per foreign currency unit (called a *direct quote*) or units of foreign currency per dollar (called an *indirect quote*). Therefore, an indirect quote is the reciprocal of a direct quote and vice versa.

$$\begin{aligned}\text{An indirect quote} &= 1/\text{direct quote} \\ \text{Pound/\$} &= 1/(\$/\text{pound})\end{aligned}$$

EXAMPLE 16-1

Figure 16-1 presents a sample of indirect and direct quotes for selected currencies. A rate of 1.617/British pound means each pound costs the U.S. company \$1.617. In other words, the U.S. company gets $1/1.617 = .6184$ pounds for each dollar.

The spot rate is the exchange rate for immediate delivery of currencies exchanged, while the forward rate is the exchange rate for later delivery of currencies exchanged. For example, there may be a 90-day exchange rate. The forward exchange rate of a currency will be slightly different from the spot rate at the current date because of future expectations and uncertainties.

FIGURE 16-1
FOREIGN EXCHANGE RATES
(A SAMPLE)
AUGUST 5, 20X6

Country	Contract	U.S. Dollar Equivalent	Currency per U.S. \$
Britain (Pound)	Spot	1.6124	.6202
	30-day future	1.6091	.6215
	90-day future	1.6030	.6238
	180-day future	1.5934	.6276
Japan (Yen)	Spot	.008341	119.89
	30-day future	.008349	119.77
	90-day future	.008366	119.53
	180-day future	.008394	119.13

Forward rates may be greater than the current spot rate (premium) or less than the current spot rate (discount).

What are cross rates?

A cross rate is the indirect calculation of the exchange rate of one currency from the exchange rates of two other currencies. It is the exchange rate between two currencies derived by dividing each currency's exchange rate with a third currency.

EXAMPLE 16-2

Hypothetical dollar per pound and the yen per dollar rates are given in Figure 16-1. For example, if dollars per pound is \$1.6124/£ and yens per dollar is ¥119.89/\$, the cross rate between Japanese yen and British pounds is

$$\begin{aligned}
 \text{Cross rate between yen and pound} &= \frac{\text{Dollars}}{\text{Pound}} \times \frac{\text{Yen}}{\text{Dollar}} = \frac{\text{Yen}}{\text{Pound}} \\
 &= \$/\text{£} \times \text{¥}/\$ = \text{¥}/\text{£} \\
 &= 1.6124 \text{ dollars per pound} \times 119.89 \text{ yens per dollar} \\
 &= 193.31 \text{ yens per pound}
 \end{aligned}$$

Because most currencies are quoted against the dollar, it may be necessary to work out the cross rates for currencies other than the dollar. The cross rate is needed to consummate financial transactions between two countries.

FIGURE 16-2
EXAMPLE OF KEY CURRENCY CROSS RATES

	British	Euro	Japan	U.S.
British	---	.7054	.05770	.62020
Euro	1.4176	---	.00733	.87920
Japan	193.31	136.36	---	119.89
U.S.	1.6124	1.1374	.00834	---

Note: The Wall Street Journal routinely publishes key currency cross rates, as shown in the hypothetical rates. They are also available on www.bloomberg.com. The cross currency table calculator can be accessed by www.xe.net/currency/table.htm.

EXAMPLE 16-3

On August 5, 20x3, forward rates on the British pound were at a discount in relation to the spot rate, while the forward rates for the Japanese yen were at a premium from the spot rate. This means that participants in the foreign exchange market anticipated that the British pound would depreciate relative to the U.S. dollar in the future but the Japanese yen would appreciate against the dollar.

The percentage premium (P) or discount (D) is computed as follows.

$$P \text{ (or D)} = \frac{F - S}{S} \times \frac{12 \text{ months}}{n} \times 100$$

where F, S = the forward and spot rates and n = length of the forward contract in months.

If $F > S$, the result is the annualized premium in percent; otherwise, it is the annualized discount in percent.

EXAMPLE 16-4

On August 5, 20X3, a 30-day forward contract in Japanese yens (see Figure 16-1) was selling at a 1.15 percent premium:

$$\frac{.008349 - .008341}{.008341} \times \frac{12 \text{ months}}{1 \text{ month}} \times 100 = 1.15\%$$

How do you control foreign exchange risk?

Foreign exchange rate risk exists when the contract is written in terms of the foreign currency or denominated in foreign currency. The exchange rate fluctuations increase the riskiness of the investment and incur cash losses. The controllers must not only seek the highest return on temporary investments but must also be concerned about changing values of the currencies invested. You do not necessarily eliminate foreign exchange risk. You may only try to contain it.

FINANCIAL STRATEGIES

In countries where currency values are likely to drop, controllers of the subsidiaries should:

- Avoid paying advances on purchase orders unless the seller pays interest on the advances sufficient to cover the loss of purchasing power.
- Not have excess idle cash. Excess cash can be used to buy inventory or other real assets.
- Buy materials and supplies on credit in the country in which the foreign subsidiary is operating, extending the final payment date as long as possible.
- Avoid giving excessive trade credit. If accounts receivable balances are outstanding for an extended time period, interest should be charged to absorb the loss in purchasing power.
- Borrow local currency funds when the interest rate charged does not exceed U.S. rates after taking into account expected devaluation in the foreign country.

What are three different types of foreign exchange exposure?

MNCs' controllers are faced with the dilemma of three different types of foreign exchange risk.

They are:

.Translation exposure, often called *accounting exposure*, measures the impact of an exchange rate change on the firm's financial statements. An example would be the impact of British pound devaluation on a U.S. firm's reported income statement and balance sheet.

.Transaction exposure measures potential gains or losses on the future settlement of outstanding obligations that are denominated in a foreign currency. An example would be a U.S. dollar loss after the Euro devalues, on payment received for an export invoiced in Euros before that devaluation.

.Operating exposure, often called *economic exposure*, is the potential for the change in the present value of future cash flows due to an unexpected change in the exchange rate.

TRANSLATION EXPOSURE

A major purpose of translation is to provide data of expected impacts of rate changes on cash flow and equity. In the translation of the foreign subsidiaries' financial statements into the U.S. parent's financial statements, the following steps are involved:

1. The foreign financial statements are put into U.S. generally accepted accounting principles.
2. The foreign currency is translated into U.S. dollars.

Current FASB 52 rules, *Foreign Currency Translation*, require translation by the *current rate* method. Under the current rate method

- All balance sheet assets and liabilities are translated at the current rate of exchange in effect on the balance sheet date. If a current exchange rate is not available at the balance sheet date, use the first exchange rate available after that date.

- Income statement items are usually translated at an average exchange rate for the reporting period.
- All equity accounts are translated at the historical exchange rates that were in effect at the time the accounts first entered the balance sheet.
- Foreign currency translation gains or losses are presented under “other comprehensive income.”

TRANSACTION EXPOSURE

Foreign currency transactions may result in receivables or payables fixed in terms of the amount of foreign currency to be received or paid. Transaction gains and losses are reported in the income statement.

Foreign currency transactions are those transactions whose terms are denominated in a currency other than the entity's functional currency. Foreign currency transactions take place when a business:

- Buys or sells on credit goods or services the prices of which are denominated in foreign currencies.
- Borrows or lends funds, and the amounts payable or receivable are denominated in a foreign currency.
- Is a party to an unperformed forward exchange contract.
- Acquires or disposes of assets, or incurs or settles liabilities denominated in foreign currencies.

NOTE: Transaction losses differ from translation losses, which do not influence taxable income.

What is long versus short position?

When there is a devaluation of the dollar, foreign assets and income in strong currency countries are worth more dollars as long as foreign liabilities do not offset this beneficial effect.

Foreign exchange risk may be analyzed by examining expected receipts or obligations in foreign currency units. A company expecting receipts in foreign currency units ("long" position in the foreign currency units) has the risk that the value of the foreign currency units will drop. This results in devaluing the foreign currency relative to the dollar. If a company is expecting to have obligations in foreign currency units ("short" position in the foreign currency units), there is risk that the value of the foreign currency will rise and it will need to buy the currency at a higher price.

If net claims are greater than liabilities in a foreign currency, the company has a "long" position since it will benefit if the value of the foreign currency rises. If net liabilities exceed claims with respect to foreign currencies, the company is in a "short" position because it will gain if the foreign currency drops in value.

What is your monetary position?

Monetary balance is avoiding either a net receivable or a net payable position. Monetary assets and liabilities do not change in value with devaluation or revaluation in foreign currencies.

A company with a long position in a foreign currency will be receiving more funds in the foreign currency. It will have a net monetary asset position (monetary assets exceed monetary liabilities) in that currency.

A company with net receipts is a net monetary creditor. Its foreign exchange rate risk exposure has a net receipts position in a foreign currency that is susceptible to a drop in value.

A company with a future net obligation in foreign currency has a net monetary debtor position. It faces a foreign exchange risk of the possibility of an increase in the value of the foreign currency.

What are some ways to neutralize foreign exchange risk?

Foreign exchange risk can be neutralized or hedged by a change in the asset and liability position in the foreign currency. Here are some ways to control exchange risk.

.Entering a money-market hedge. The exposed position in a foreign currency is offset by borrowing or lending in the money market.

EXAMPLE 16-5

XYZ, an American importer enters into a contract with a British supplier to buy merchandise of 4,000 pounds. The amount is payable on the delivery of the goods, 30 days from today. The company knows the exact amount of its pound liability in 30 days. However, it does not know the payable in dollars. Assume that the 30-day money-market rates for both lending and borrowing in the U.S. and U.K. are .5% and 1%, respectively. Assume further that today's foreign exchange rate is \$1.7350 per pound.

In a money-market hedge, XYZ can take the following steps:

Step 1. Buy a one-month U.K. money market security, worth of $4,000/(1+.005)=3,980$ pounds. This investment will compound to exactly 4,000 pounds in one month.

Step 2. Exchange dollars on today's spot (cash) market to obtain the 3,980 pounds. The dollar amount needed today is $3,980 \text{ pounds} \times \$1.7350 \text{ per pound} = \$6,905.30$.

Step 3. If XYZ does not have this amount, it can borrow it from the U.S. money market at the going rate of 1%. In 30 days XYZ will need to repay $\$6,905.30 \times (1+.01) = \$7,595.83$.

Note: XYZ need not wait for the future exchange rate to be available. On today's date, the future dollar amount of the contract is known with certainty. The British supplier will receive 4,000 pounds, and the cost of XYZ to make the payment is \$7,595.83.

.Hedging by purchasing forward (or futures) exchanges contracts. Forward exchange contracts is a commitment to buy or sell, at a specified future date, one currency for a specified

amount of another currency (at a specified exchange rate). This can be a hedge against changes in exchange rates during a period of contract or exposure to risk from such changes. More specifically, you do the following: (1) Buy foreign exchange forward contracts to cover payables denominated in a foreign currency and (2) sell foreign exchange forward contracts to cover receivables denominated in a foreign currency. This way, any gain or loss on the foreign receivables or payables due to changes in exchange rates is offset by the gain or loss on the forward exchange contract.

EXAMPLE 16-6

In the previous example, assume that the 30-day forward exchange rate is \$1.7272. XYZ may take the following steps to cover its payable.

Step 1. Buy a forward contract today to purchase 4,000 pounds in 30 days.

Step 2. On the 30th day pay the foreign exchange dealer 4,000 pounds x \$1.7272 per pound = \$6,908.80 and collect 4,000 pounds. Pay this amount to the British supplier.

Note: Using the forward contract XYZ knows the exact worth of the future payment in dollars (\$6,908.80).

Note: The basic difference between futures contracts and forward contracts is that futures contracts are for specified amounts and maturities, whereas forward contracts are for any size and maturity desired.

.Hedging by foreign currency options. Foreign currency options can be purchased or sold in three different types of markets: (a) Options on the physical currency, purchased on the over-the-counter (interbank) market, (b) options on the physical currency, on organized exchanges such as the Philadelphia Stock Exchange and the Chicago Mercantile Exchange, and (c) options on futures contracts, purchased on the International Monetary Market (IMM) of the Chicago Mercantile Exchange. *Note:* The difference between using a futures contract and using an option on a futures contract is that with a futures contract, the company must deliver one currency against another, or reverse the contract on the exchange, while with an option the company may abandon the option and use the spot (cash) market if that is more advantageous.

.Repositioning cash by leading and lagging the time at which an MNC makes operational or financial payments. Often, money- and forward-market hedges are not available to eliminate exchange risk. Under such circumstances, leading (accelerating) and lagging (decelerating) may be used to *reduce* risk. *Note:* a net asset position (i.e., assets minus liabilities) is not desirable in a weak or potentially depreciating currency. In this case, you should expedite the disposal of the asset. By the same token, you should lag or delay the collection against a net asset position in a strong currency.

.Maintaining balance between receivables and payables denominated in a foreign currency. MNCs typically set up "multilateral netting centers" as a special department to settle the outstanding balances of affiliates of a MNC with each other on a net basis. It is the development of a "clearing house" for payments by the firm's affiliates. If there are amounts due among affiliates they are offset insofar as possible. The net amount would be paid in the currency of the transaction. The total

amounts owed need not be paid in the currency of the transaction; thus, a much lower quantity of the currency must be acquired. *Note:* The major advantage of the system is a reduction of the costs associated with a large number of separate foreign exchange transactions.

.Positioning of funds through transfer pricing. A transfer price is the price at which an MNC sells goods and services to its foreign affiliates or, alternatively, the price at which an affiliate sells to the parent. For example, a parent that wishes to transfer funds from an affiliate in a depreciating-currency country may charge a higher price on the goods and services sold to this affiliate by the parent or by affiliates from strong-currency countries. Transfer pricing affects not only transfer of funds from one entity to another but also the income taxes paid by both entities.

OPERATING EXPOSURE

Operating (economic) exposure is the possibility that an unexpected change in exchange rates will cause a change in the future cash flows of a firm and its market value. It differs from translation and transaction exposures in that it is subjective and thus not easily quantified. *Note:* The best strategy to control operation exposure is to diversify operations and financing internationally.

What are some key questions to ask that help to identify foreign exchange risk?

A systematic approach to identifying an MNC's exposure to foreign exchange risk is to ask a series of questions regarding the net effects on profits of changes in foreign currency revenues and costs.

The questions are:

- Where is the MNC selling? (Domestic vs. foreign sales share)
- Who are the firm's major competitors? (Domestic vs. foreign)
- Where is the firm producing? (Domestic vs. foreign)
- Where are the firm's inputs coming from? (Domestic vs. foreign)
- How sensitive is quantity demanded to price? (Elastic vs. inelastic)
- How are the firm's inputs or outputs priced? (Priced in a domestic market or a global market; the currency of denomination)

IMPACTS OF CHANGES IN FOREIGN EXCHANGE RATES

Figure 16-3 summarizes the impacts of changes in foreign exchange rates on the company's products and financial transactions.

FIGURE 16-3
THE IMPACTS OF CHANGES IN FOREIGN EXCHANGE RATES

	<i>Weak Currency (Depreciation /devaluation)</i>	<i>Strong Currency (Appreciation /revaluation)</i>
Imports	More expensive	Cheaper

Exports	Cheaper	More expensive
Payables	More expensive	Cheaper
Receivables	Cheaper	More expensive
Inflation	Fuel inflation by making imports more costly	Low inflation
Foreign investment	Discourage foreign investment. Lower return on investments by international investors.	High interest rates could attract foreign investors.
The effect	Raising interest rates could slow down the economy.	Reduced exports could trigger a trade deficit.

Can you forecast foreign exchange rates?

The forecasting of foreign exchange rates is a formidable task. Most MNCs rely primarily on bank services for assistance and information in preparing exchange rate projections. The following economic indicators are considered to be the most important for the forecasting process:

- Recent rate movements
- Relative inflation rates
- Balance of payments and trade
- Money supply growth
- Interest rate differentials

INTEREST RATES

Interest rates have an important influence on exchange rates. In fact, there is an important economic relationship between any two nations' spot rates, forward rates, and interest rates. This relationship is called the *interest rate parity theorem* (IRPT). The IRPT states that the ratio of the forward and spot rates is directly related to the two interest rates.

Specifically, the premium or discount should be:

$$P \text{ (or D)} = - \frac{r_d - r_f}{1 + r_f}$$

where r_f and r_d = foreign and domestic interest rates.

(When interest rates are relatively low, this equation can be approximated by: $P \text{ (or D)} = - (r_f - r_d)$).

The IRPT implies that the $P \text{ (or D)}$ calculated by the equation should be the same as the $P \text{ (or D)}$ calculated by:

$$P \text{ (or D)} = \frac{F - S}{S} \times \frac{12 \text{ months}}{n} \times 100$$

EXAMPLE 16-7

On August 5, 20X3, a 30-day forward contract in Japanese yens (see Figure 16-1) was selling at a 1.15 percent premium:

$$\frac{.008349 - .008341}{.008341} \times \frac{12 \text{ months}}{1 \text{ month}} \times 100 = 1.15\%$$

The 30-day U.S. T-bill rate is 8% annualized. What is the 30-day Japanese rate?

Using the equation:

$$P \text{ (or D)} = - \frac{r_d - r_f}{1 + r_f}$$

$$.0115 = \frac{.08 - r_f}{1 + r_f}$$

$$.0115 (1 + r_f) = .08 - r_f$$

$$.0115 + .0115 r_f = .08 - r_f$$

$$-.0685 = -.9885 r_f$$

$$r_f = .0693$$

The 30-day Japanese rate should be 6.93%.

INFLATION

Inflation, which is a change in price levels, also affects future exchange rates. The mathematical relationship that links changes in exchange rates and changes in price level is called the *purchasing power parity theorem* (PPPT). The PPPT states that the ratio of the forward and spot rates is directly related to the two inflation rates:

$$\frac{F}{S} = \frac{1 + P_d}{1 + P_f}$$

where F = forward exchange rate (e.g., \$/foreign currency)

S = spot exchange rate (e.g., \$/foreign currency)

P_d = domestic inflation rate

P_f = foreign inflation rate

EXAMPLE 16-8

Assume the following data for U.S. and U.K.:

Expected U.S. inflation rate = 5%

Expected U.K. = 10%

$$S = \$1.6124/\text{UK}$$

Then,

$$\frac{F}{1.6124} = \frac{1.05}{1.10}$$

So $F = \$1.5391/\text{UK}$

Note: If U.K. has the higher inflation rate, then the purchasing power of the pound is declining faster than that of the dollar. This will lead to a forward discount on the pound relative to the dollar.

How do you analyze foreign investments?

Foreign investment decisions are basically capital budgeting decisions at the international level. The decision requires two major components:

.The estimation of the relevant future cash flows. Cash flows are the dividends and possible future sales price of the investment. The estimation depends on the sales forecast, the effects on exchange rate changes, the risk in cash flows, and the actions of foreign governments.

.The choice of the proper discount rate (cost of capital). The cost of capital in foreign investment projects is higher due to the increased risks of:

- Currency risk (or foreign exchange risk) -- changes in exchange rates. This risk may adversely affect sales by making competing imported goods cheaper.
- Political risk (or sovereignty risk) -- possibility of nationalization or other restrictions with net losses to the parent company.

Note: The ways to adjust for risk when analyzing the prospects of a foreign investment include:

- Adjusting the discount rate
- Adjusting the cash flows
- Conducting sensitivity and scenario analysis

EXAMPLES OF POLITICAL RISKS

Below is some examples associated with political risks.

- Expropriation of plants and equipment without compensation or with minimal compensation that is below actual market value.
- Nonconvertibility of the affiliate's foreign earnings into the parent's currency --the problem of "blocked funds."
- Substantial changes in the laws governing taxation.
- Government controls in the host country regarding wages, compensation to the personnel, hiring of personnel, the sales price of the product, making of transfer payments to the parent, and local borrowing.

How do you measure political risk?

Many MNCs and banks have attempted to measure political risks in their businesses. They even hire or maintain a group of political risk analysts. Several independent services provide political risk and country risk ratings.

.*Euromoney* magazine's annual *Country Risk Rating*, which is based on a measure of different countries' access to international credit, trade finance, political risk and a country's payment record. The rankings are generally confirmed by political risk insurers and top syndicate managers in the Euromarkets.

.Rating by *Economist Intelligence Unit*, a New York-based subsidiary of the *Economist Group*, London, which is based on such factors as external debt and trends in the current account, the consistency of the government policy, foreign-exchange reserves, and the quality of economic management.

.*International Country Risk Guide*, published by the PRS Group (www.prsgroup.com/icrg/icrg.html), which offers a composite risk rating, as well as individual ratings for political, financial and economic risk for 140 countries. The political variable - which makes up half of the composite index - includes factors such as government corruption and how economic expectations diverge from reality. The financial rating looks at such things as the likelihood of losses from exchange controls and loan defaults. Finally, economic ratings consider such factors as inflation and debt-service costs.

What are the methods for dealing with political risk?

To the extent that forecasting political risks is a formidable task, what can a MNC do to cope with them? There are several methods suggested. They are:

.*Avoidance* Try to avoid political risk by minimizing activities in or with countries that are considered to be of high risk. Use higher discount rates for projects in riskier countries.

.*Adaptation* Try to reduce risk by adapting the activities (for example, by using hedging techniques discussed previously).

.*Diversification* Diversify across national borders, so that problems in one country do not severely damage the company.

.*Risk transfer* Buy insurance policies for political risks.

EXAMPLE 16-9

Most developed nations offer insurance for political risk to their exporters. Examples are:

- In the U.S., the Exurban offers policies to exporters that cover such political risks as war, currency inconvertibility, and civil unrest. Furthermore, the *Overseas Private Investment Corporation (OPIC)* offers policies to U.S. foreign investors to cover such risks as currency inconvertibility, civil or foreign war damages, or expropriation.
- In the U.K., similar policies are offered by the *Export Credit Guarantee Department (ECGD)*; in Canada, by the *Export Development Council (EDC)*; and in Germany, by an agency called *Hermes*.

INTERNATIONAL FINANCING

What are international sources of financing?

A company may finance its activities abroad, especially in countries it is operating in. A successful company in domestic markets is more likely to be able to attract financing for international expansion. *Note:* Eurodollars are dollar denominated deposits in banks located outside the United States. Most Eurodollars are deposited in London. Dollar deposits in International Banking Facilities in the United States are also Eurodollars.

The most important international sources of funds are the Eurocurrency market and the Eurobond market. Also, MNCs have access to national capital markets in which their subsidiaries are located. Figure 16-4 presents an overview of international financial markets.

The Eurocurrency market is a largely short-term (usually less than one year of maturity) market for bank deposits and loans denominated in any currency except the currency of the country where the market is located. For example, in London, the Eurocurrency market is a market for bank deposits and loans denominated in dollars, yen, franc, marks, and any other currency except British pounds. The main instruments used in this market are CDs and time deposits, and bank loans. *Note:* The term "market" in this context is not a physical market place, but a set of bank deposits and loans.

The Eurobond market is a long-term market for bonds denominated in any currency except the currency of the country where the market is located. Eurobonds may be of different types such as straight, convertible, and with warrants. While most Eurobonds are fixed rate, variable rate bonds also exist. Maturities vary but 10-12 years is typical.

Although Eurobonds are issued in many currencies, you wish to select a stable, fully convertible, and actively traded currency. In some cases, if a Eurobond is denominated in a weak currency the holder has the option of requesting payment in another currency.

Sometimes, large MNCs establish wholly owned offshore finance subsidiaries. These subsidiaries issue Eurobond debt and the proceeds are given to the parent or to overseas operating subsidiaries. Debt service goes back to bondholders through the finance subsidiaries.

If the Eurobond was issued by the parent directly, the U.S. would require a withholding tax on interest. There may also be an estate tax when the bondholder dies. These tax problems do

not arise when a bond is issued by a finance subsidiary incorporated in a tax haven. Hence, the subsidiary may borrow at less cost than the parent.

In summary, the Euromarkets offers borrowers and investors in one country the opportunity to deal with borrowers and investors from many other countries, buying and selling bank deposits, bonds, and loans denominated in many currencies.

Figure16-5 provides a list of funding sources available to a foreign affiliate of an MNC (debt and equity).

FIGURE 16-4
INTERNATIONAL FINANCIAL MARKETS

<i>Market</i>	<i>Instruments</i>	<i>Participants</i>	<i>Regulator</i>
International monetary system	Special drawing rights; gold; foreign exchange	Central banks; International Monetary Fund	International Monetary Fund
Foreign exchange markets	Bank deposits; currency; futures and forward contracts	Commercial and central banks; firms; individuals	Central banks in each country
National money markets (short term)	Bank deposits and loans; short-term government securities; commercial paper	Banks; firms; individuals; government agencies	Central bank; other government agencies
National capital markets	Bonds; long-term bank deposits and loans; stocks; long-term government securities	Banks; firms; individuals; government agencies	Central bank; other government agencies
Eurocurrency markets (short-term)	Bank deposits; bank loans; short-term and rolled-over credit lines; revolving commitment	Commercial banks; firms; government agencies	Substantially unregulated
Euro-commercial paper markets (short-term)	Commercial paper issues and programs; note-issuing facility; revolving underwritten facilities	Commercial banks; firms; government agencies	Substantially unregulated

Eurobond market (medium and long-term)	Fixed coupon bonds; floating-rate notes; higher-bound bonds; lower-bound bonds	Banks; firms; individuals; government agencies	Substantially unregulated
Euroloan market (medium and long-term)	Fixed-rate loans; revolving loans; revolving loans with cap; revolving loans with floor	Banks; firms; individuals; government agencies	Substantially unregulated

FIGURE 16-5
INTERNATIONAL SOURCES OF CREDIT

<i>Borrowing</i>	<i>Domestic Inside the Firm</i>	<i>Domestic Market</i>	<i>Foreign Inside the Firm</i>	<i>Foreign Market</i>	<i>Euromarket</i>
Direct, short-term	Intrafirm loans, transfer pricing, royalties, fees, service charges	Commercial paper	International intrafirm loans, international transfer pricing, dividends, royalties, fees		Euro-commercial paper
Intermediated short-term		Short-term bank loans, discounted receivables	Internal back-to-back loans	Short-term bank loans, discounted receivables	Euro short-term loans
Direct, long-term	Intrafirm loans, invested in affiliates	Stock issue Bond issue	International intrafirm long-term loans, foreign direct investment	Stock issue Bond issue	Eurobonds
Intermediated long-term		Long-term bank loans	Internal back-to-back loans	Long-term bank loans	Euro long-term loans

GLOSSARY

Accelerated depreciation method Depreciation method that allow the owner of the asset to take greater amounts of depreciation during the early years of its life, thereby deferring some of the taxes until later years. *See also* STRAIGHT-LINE DEPRECIATION METHOD.

Accountability The liability of a board of directors to shareholders and stakeholders for corporate performance and actions of the corporation.

Accounting exposure Variability in the firm's reported values for net income and net worth that results from changes in exchange rates.

Accounting principles Rules governing the systematic collection, organization, and presentation of financial information; also called *accounting standards*.

Accounting rate of return A capital-budgeting criterion that relates the returns generated by the project, as measured by average accounting profits after tax, to the average dollar size of the investment required; also called *simple rate of return* or *unadjusted rate of return*.

Accounting standards *see* ACCOUNTING PRINCIPLES.

Accounts payable Cash owed by a firm to its suppliers for purchases made on credit and not yet paid; reported in the firm's balance sheet as a current liability.

Accounts receivable Cash owed to a firm by its customers for sales made on credit and not yet paid; reported in the firm's *balance sheet as a current asset*.

Accrual basis of accounting A method of accounting whereby income is recorded when earned, whether or not the income has been received at that time, and expenses are recorded when incurred, whether or not any money has actually been paid out.

Accrued expenses Liabilities other than accounts payable that arise from the lag between the date at which these expenses have been incurred and the date at which they are paid.

Accumulated depreciation The sum of the periodic depreciation expenses deducted from the gross value of a fixed asset in order to obtain its net book value.

Acid test ratio $(\text{Current assets} - \text{inventories}) / \text{current liabilities}$. This ratio is a more stringent measure of liquidity than the current ratio in that it subtracts inventories (the least liquid current asset) from current assets; also called *quick ratio*.

Acquisition. A combination of two or more businesses into a single operational entity.

Adjusted present value (APV) A valuation method according to which the value of a firm's assets is equal to the sum of (i) their value assuming that they are financed only with equity capital (unlevered value), and (ii) the present value of the tax savings provided by the portion of the assets financed with debt.

Advance (1) Money given to an employee before it is earned, such as an advance against salary. (2) Payment received from customers in advance for work, goods, or services. (3) Money given by a banker to a borrower in advance usually short-term, and in the form of an overdraft.

Affiliated group A group of firms related by affiliation, expressed in terms of one firm's owning, either directly or indirectly, 80 percent of the firm paying the dividend.

After-tax cash flow Net cash flow (cash revenue less cash expenses) after taxes have been subtracted. It is the cash flow generated from operations.

Agency costs. The costs, such as a reduced stock price, associated with potential conflict between managers and investors when these two groups are not the same.

Agency problem Problem arising from the separation of ownership and control of a firm.

American terms A method of exchange rate quotation that gives the value of a foreign currency in U.S. dollars.

Amortization The process of converting the cost of an intangible asset, such as goodwill, into periodic expenses reported in the firm's income statement. When the asset is tangible, the same process is called depreciation.

Annual report An audited document issued annually by all publicly listed corporations to their shareholders in accordance with SEC regulation. Contains information on financial results and overall performance of the previous fiscal year and comments on future outlook

Annuity A cash-flow stream that is composed of a sequence of equal and uninterrupted periodic cash flows.

Antidilution provision Agreement that protects an investor from a reduction in fractional ownership in a company in the event of a stock split, issuance of additional stock or other such measure.

Antitakeover defense A device designed to prevent a hostile takeover by increasing the takeover cost usually through the issuance of new preferred shares that carry severe redemption provisions.

Appraisal value The value of a company as stated by an independent appraisal firm.

Appreciation An increase in the value of one currency in terms of another currency. When the dollar appreciates, it can be exchanged for greater amounts of foreign currencies.

Arbitrage-Pricing Model (APM) A theory that relates stock returns and risk. The theory maintains that security returns vary from their expected amounts when there are unanticipated changes in basic economic forces. Such forces would include unexpected changes in industrial production, inflation rates, term structure of interest rates, and the difference between interest rates of high-and-low risk bonds.

Ask price The price at which a trader in the market is willing to sell; also called *offer price*.
See BID PRICE.

Asset turnover Sales divided by assets. A measure of the efficiency of asset management

Audit Report Statement of the accounting firm's assessment of the validity and accuracy of a company's financial information and conformity with accepted accounting practices.

Average age of accounts receivable see AVERAGE COLLECTION PERIOD.

Average collection period Accounts receivable at the end of the period divided by the average daily sales during that period. A ratio that expresses how rapidly the firm is collecting its credit accounts.

Average tax rate. The rate calculated by dividing the total tax liability by the entity's taxable income.

Balance of payments The relationship between monies received from exports and monies paid out for imports.

Balance of trade A unit of the balance of payments that reflects the value of all goods imported and exported by any nation.

Balance sheet A basic accounting statement that represents the financial position of a firm on a given date. Financial statement reporting, at a given date, the total amount of assets held by a firm and the liabilities and owners' equity that finance these assets.

Bank wire. A private wire service used and supported by approximately 250 banks in the United States for transferring funds, exchanging credit information, or effecting securities transactions.

Banker's acceptance Time draft drawn by a business firm whose payment is guaranteed by the bank's "acceptance" of it. It is especially important in foreign trade, because it allows the seller of goods to be certain that the buyer's draft will actually have funds behind it.

Bankruptcy (1) A legal procedure through which the ownership of a firm's assets is transferred to debtholders. (2) the inability to pay debts when due. A business is insolvent in a legal sense when its financial condition is such that total liabilities exceed the fair market value of the assets.

Base-period earn-out An agreement by which the stockholders of an acquired company receive additional stock in future years provided the firm improves its earnings above those of the base period. Base-period earnings are those in the last year prior to the acquisition.

Basis point One hundredth of one percent. For example, 0.14 percent is equal to 14 basis points.

Bearer bonds/securities Bonds/securities that do not indicate the holder's name. *See* REGISTERED SECURITIES.

Benchmark rate Rate to which the coupon rate of a floating rate bond is linked.

Best efforts basis A method of distributing securities whereby an investment bank undertakes to do its best to sell on behalf of the firm the securities the firm has issued.

Beta (coefficient) A measure of risk based on the sensitivity of an individual stock's returns to changes in the returns of a broad stock market index; also called *systematic*, *market*, *undiversifiable*, and **relative risk**. A beta less than 1 means that the company's stock is less risky than the market.

Bid price Price at which a trader in a market is willing to buy. *See* ASK PRICE.

Bid-ask spread The difference between the bid price and the ask price.

Bidder In a takeover, the firm that wants to acquire all or a portion of another firm's shares.

Billing cycle the time period between periodic billings for merchandise or services rendered, typically one month.

Bond A long-term (ten-year or more) promissory note issued by the borrower, promising to pay the owner of the security a predetermined and fixed amount of interest each year.

Bond market Market where bonds are issued and traded.

Bond par value. The face value appearing on the bond, which is to be returned to the bondholder at maturity.

Bond rating Rating assigned by an agency (such as Standard and Poor's or Moody's Investors Service) that provides an assessment of the bond's credit risk.

Book value. The depreciated value of a company's assets (original cost less accumulated depreciation) less the outstanding liabilities.

Book-value weights The percentage of financing provided by different capital sources as measured by their book values from the company's balance sheet.

Bottom line *see* EARNINGS AFTER TAX.

Bounced check a check that has been returned for not sufficient funds (NSF).

Break-even Analysis An analytical technique used to determine the quantity of output or sales that results in a zero level of earnings before interest and taxes (EBIT). Relationships among the firm's cost structure, volume of output, and EBIT are studied.

Bridge loan Short-term loan that is made in expectation of intermediate- or long-term loans. The interest rate on a bridge loan is generally higher than that on longer-term loans. An example is a temporary loan made to permit a closing on a building purchase prior to a closing on long-term mortgage financing.

Brokers Individuals or institutions that trade securities on behalf of a third party and do not own the securities.

Business risk The relative dispersion or variability in the firm's expected earnings before interest and taxes (EBIT). The nature of the firm's operations causes its business risk. This type of risk is affected by the firm's cost structure, product demand characteristics, and intra-industry competitive position. In capital-structure theory, business risk is distinguished from financial risk. *See* FINANCIAL RISK.

Buy-back program *see* SHARE BUY-BACK PROGRAM.

Call option A call option gives its owner the right to purchase a given number of shares of stock or some other asset at a specified price during the life of the option (American option) or on its expiration date (European option). *See also* PUT OPTION.

Call premium. The difference between the call price and the security's par value.

Call provision. A provision that entitles the corporation to repurchase its bonds or preferred stock from their holders at stated prices over specified periods. This provision can be immediate or deferred.

Call value The price at which the issuer can buy a callable bond from its holder.

Callable bond A bond that gives the issuer the option to redeem (repay) the bond before it reaches its maturity date.

Capital Asset Pricing Model (CAPM) A formula according to which a security's expected return is equal to the risk-free rate plus a risk premium. The model shows the relationship between an investment's expected (or required) return and its beta. It can be used to estimate the cost of equity of a firm or a project.

Capital asset All property used in conducting a business other than assets held primarily for sale in the ordinary course of business or depreciable and real property used in conducting a business.

Capital budgeting The decision-making process with respect to investment in fixed assets. Specifically it involves measuring the incremental cash flows associated with investment proposals and evaluating those proposed investments.

Capital gain or loss As defined by the revenue code, a gain or loss resulting from the sale or exchange of a capital asset. The appreciation (depreciation) in market value.

Capital rationing The placing of a limit by the firm on the dollar size of the capital budget.

Capital structure decision Deciding on the amount of debt relative to equity capital a firm should take on; also

Capital structure The mix of long-term sources of funds used by the firm; also called *capitalization*. The relative total (percentage) of each source of fund is emphasized.

Cash and cash-equivalent Cash in hand, cash on deposit with banks, and short-term liquid investments with less than a year's maturity (marketable securities).

Cash budget A detailed plan of future cash flows. This budget is composed of four elements: cash receipts, cash disbursements, net change in cash for the period, and new financing needed. The cash budget helps the owner keep cash balances in reasonable relationship to needs. It assists in avoiding idle cash and possible cash shortages.

Cash dividend The portion of a firm's net profit distributed to shareholders in cash. *See also* DIVIDEND.

Certainty equivalents. The amount of cash a person would require with certainty to make him indifferent between this certain sum and a particular risky or uncertain sum.

Certificates of deposit (CDs) Short-term securities sold by banks in the money markets in order to raise cash.

Certification role Role played by underwriters with respect to guaranteeing the quality of the underwritten securities.

Chattel mortgage agreement A loan agreement in which the lender can increase his security interest by having specific items of inventory identified in the loan agreement. The borrower retains title to the inventory but cannot sell the items without the lender's consent.

Coefficient of variation A measure of the relative dispersion of a probability distribution -that is, the risk per unit of return. Mathematically it is defined as the standard deviation divided by the expected value.

Commercial paper Short-term unsecured note issued by financially strong businesses. Unlike most other money market instruments, commercial paper has no developed secondary market.

Common stock Certificate issued by a firm to raise equity capital that represents a specified share of total equity funds.

Compensating balance A deposit that a bank can use to offset an unpaid loan. No interest is earned on the compensating balance, which is stated as a percentage of the loan. It increases the effective interest rate on the loan.

Compounded value The situation in which interest paid on the investment during the first period is added to the principal and, during the second period, interest is earned on the original principal plus the interest earned during the first period.

Compounding. The process of determining the future value of a payment or series of payments when applying the concept of compound interest.

Concentration banking Acceleration of cash collections from customers by having funds sent to several regional banks and transferred to a *main* concentration account in another bank. The transfer of funds can be accomplished electronically.

Conglomerate merger Combination of unrelated businesses for which there are no obvious synergies.

Conglomerate A multifaceted corporation involved in a variety of products and services.

Conversion price Price at which the holder of a convertible bond has the right to buy one share of the firm's common stock.

Conversion ratio The number of shares of common stock for which a convertible security can be exchanged.

Conversion value The current price of the stock multiplied by the number of shares to which the convertible bond can be converted.

Convertible bond A bond that the holder can convert into the firm's common stock.

Convertibles Preferred stock or debentures that can be exchanged for a specified number of shares of common stock at the will of the owner.

Corporate bonds Debt securities issued by firms that usually have a maturity exceeding ten years.

Corporate bylaws Regulations that govern the internal affairs of the corporation, designating such items as the time and place of the shareholders' meetings, voting rights, the election process

for selecting members of the board of directors, the procedures for issuing and transferring stock certificates, and the policies relating to the corporate records.

Correlation The degree of relationship between variables, such as cost and volume. Correlation analysis evaluates cause-effect relationships. It looks consistently at how the value of one variable changes when the value of the other is changed. An example is the effect of advertising on sales.

Cost of capital The rate that must be earned in order to satisfy the required rate of return of the firm's investors; also called *minimum required rate of return*. It may also be defined as the rate of return on investments at which the price of the firm's common stock will remain unchanged. The cost of capital is based on the opportunity cost of funds as determined in the capital markets.

Coupon interest rate The interest to be paid annually on a bond as a percent of par value, which is specified in the contractual agreement.

Covenants (restrictive) Conditions imposed by lenders and stipulated in a bond indenture that require managers to achieve certain financial targets or refrain from certain actions that may be detrimental to lenders' interests.

Coverage ratios A group of ratios that measure a firm's ability to meet its recurring fixed charge obligations, such as interest on long-term debt, lease payments, and/or preferred stock dividends.

Credit line specified amount of money available to a borrower from a bank, usually for one year. A credit line is a moral, not a contractual, commitment, and no commitment fee is charged.

Credit rating A rating to help the business determine if a credit applicant should be granted credit. It is based on factors such as the applicant's job history, income, assets owned, and credit history.

Credit risk The risk that a borrower will be unable to service its debt.

Current Income Income received on a periodic basis, including interest, dividends, and rent.

Current ratio Current assets divided by current liabilities. A measure of liquidity.

Current yield A bond's coupon payment divided by its price.

Date of record Date at which the stock transfer books are to be closed for determining the investor to receive the next dividend payment. *See also* EX-DIVIDEND DATE.

Days of sales outstanding (DSO) *see* AVERAGE COLLECTION PERIOD.

Debenture Any unsecured long-term debt.

Debt capacity The maximum proportion of debt that the firm can include in its capital structure and still maintain its lowest composite cost of capital.

Debt ratio Total liabilities/total assets. A ratio that measures the extent to which a firm has been financed with debt. It is a measure of financial leverage.

Debt service The timely and full payment of interest on borrowed funds as well as the repayment of the borrowed funds.

Debt-to-equity ratio Total interest-bearing debt divided by owners' equity. It is a measure of financial leverage.

Declaration Date The date upon which a dividend is formally declared by the board of directors.

Default Failure to meet the conditions of a loan contract. It generally refers to the failure to meet interest and/or principal payments.

Default risk *see* CREDIT RISK.

Degree of combined leverage The percentage change in earnings per share caused by a percentage change in sales. It is the product of the degree of operating leverage and the degree of financial leverage; also called *degree of total leverage*.

Demand deposit Deposit from which funds may be drawn on demand and from which funds may be transferred to another party by means of a check.

Depository transfer checks A means for moving funds from local bank accounts to concentration accounts. The depository transfer check itself is an unsigned, nonnegotiable instrument. It is payable only to the bank of deposit for credit to the firm's specific account.

Depreciation. The means by which an asset's value is expensed over its useful life for federal income tax purposes.

Dilution Reduction in the fraction of a firm's equity held by its existing shareholders after the firm sells common stock to new investors.

Direct quote The value of a foreign currency in units of the domestic currency. A direct quote on the pound in America would be a dollar value, whereas a direct quote for the value of the pound in Britain would be a pound value.

Disbursing float Funds available in the company's bank account until its payment check has cleared through the banking system.

Discharge of bankruptcy An order in which the bankrupt debtor is relieved of responsibility to pay his or her obligations.

Discount loan A loan in which the whole interest charge is deducted in advance from the face value of a loan reducing the proceeds received. This increases the effective interest cost of the loan.

Discounting The inverse of compounding. This process is used to convert future cash flows into their equivalent value today.

Discretionary cash flow Cash flow available to the firm for strategic investment and financing decisions after all of the firm's financial obligations are met; also called *free cash flow*.

Diversifiable risk Risk that can be eliminated through portfolio diversification; also called *unsystematic risk* or *company-specific risk*.

Divestitures The removal of a division or subsidiary from the company. Typically, the part of the firm being separated is viewed as not contributing to the company's basic purposes.

Dividend payout ratio The amount of dividends relative to the company's net income or earnings per share.

Dividend policy The decision regarding the portion of a year's profit that should be paid out in the form of cash dividends to the firm's shareholders.

Dividend yield Dividend per share divided by share price.

Earnings after tax (EAT) Revenues minus all expenses, including interest and tax expenses. Same as net income, net profit, and bottom line.

Earnings before depreciation, interest, and tax (EBDIT) Revenues minus all operating expenses, excluding depreciation expenses and amortization. Same as earnings before interest, tax, depreciation, and amortization (EBITDA).

Earnings before interest, and tax (EBIT) Difference between the firm's operating profit and any extraordinary items reported in its income statement

Earnings before interest, tax, depreciation, and amortization (EBITDA) Revenues minus all operating expenses, excluding depreciation and amortization. Same as earnings before depreciation, interest, and tax (EBDIT).

Earnings before tax (EBT) Earnings before interest and tax minus net interest

Earnings multiple Share price divided by the firm's earnings per share, also called *price-to-earnings ratio*. It is used to value a firm.

Earnings per share (EPS) Earnings after tax divided by the total number of shares outstanding.

Earn-out A deferred payment plan, under which an acquiring firm agrees to make a specified initial payment of cash or stock and additional compensation if the acquired company can maintain or increase earnings.

EBIT-EPS indifference point The level of earnings before interest and taxes (EBIT) that will equate earnings per share (EPS) between two different financing plans.

Economic exposure Variations in the economic or market value of the firm that result from changes in exchange rates. This is due primarily to changes in the firm's competitiveness with importers and exporters.

Economic value added (EVA) Net operating profit after tax (NOPAT) for a particular period (such as a year) minus the annual cost of *all* the capital a firm uses. EVA is a measure of economic profit, but not the accounting profit we are accustomed to seeing in a corporate profit and loss statement.

Efficient market A market in which the values of all assets and securities at any instant in time fully reflect all available information.

Electronic Funds Transfer (EFT) A number of systems that are electronically linked via a communications network. Funds may be automatically transferred by telephone, telex, terminal, or microcomputer.

EPS Typical financial notation for earnings per (common) share.

Equal Credit Opportunity Act A federal law making it illegal to discriminate when giving credit.

Equipment financing loan A medium- to long-term loan backed by a piece of machinery.

Equity capital Funds contributed by shareholders that are equal to the difference, at a particular date, between what a firm's shareholders collectively own, called assets, and what they owe, called liabilities; also called *equity funds*, *owners' equity*, *shareholders' equity* or *funds*, or *net asset value*.

Equity funds *see* EQUITY CAPITAL.

Equity multiplier Invested capital divided by owners' equity. It is a measure of financial leverage.

Eurobonds Bonds issued in the Euromarket.

Eurodollars Dollar denominated deposits in banks located outside the United States. Most Eurodollars are deposited in London. Dollar deposits in International Banking Facilities in the

United States are also Eurodollars.

European terms A method of exchange rate quotation whereby the value of the dollar is given in units of foreign currency, such as francs per dollar or lire per dollar.

Ex-dividend date The date upon which stock brokerage companies have uniformly decided to terminate the right of ownership to the dividend, which is two days prior to the record date.

Exercise price (currency option) The fixed exchange rate at which a currency can be bought or sold in an option contract; also called *strike price*.

Exercise price (warrant) The fixed price at which the holder of a warrant has the right to buy shares.

Expected return The arithmetic mean or average of all possible outcomes where those outcomes are weighted by the probability that each will occur.

Ex-rights date The date on or after which the stock sells without rights.

External common equity A new issue of common stock.

External funds need Internally generated funds less funding needs.

Extraordinary items Nonrecurrent losses or gains.

Face value The fixed amount that has to be paid back to bondholders at the maturity date of a bond; also called *principal*, *par value*, or *redemption value*.

Factoring The outright sale of a firm's accounts to another party (the factor) without recourse. The factor, in turn, bears the risk of collection.

Fair market value An estimate of the amount that could be received on the sale of an asset under normal market conditions (as opposed to an emergency or liquidating sale).

Federal Agency Securities. Debt obligations of corporations and agencies created to carry out the lending programs of the U.S. government.

Federal Reserve System (FRS) The U.S. central banking system.

Financial intermediaries Institutions that act as "middlemen" between the ultimate recipients of capital (firms) and the ultimate suppliers of capital (household sector). They include commercial banks, savings and loan associations, credit unions, life insurance companies, and mutual funds, which assist the transfer of savings from economic units with excess savings to those with a shortage of savings.

Financial lease A noncancellable contractual commitment on the part of the firm leasing the asset (the lessee) to make a series of payments to the firm that actually owns the asset (the lessor) for the use of the asset.

Financial leverage The use of debt financing to complement equity financing. It is a measure of financial risk that arises from fixed financial costs. The use of financial leverage exposes the firm to financial risk.

Financial markets Institutions and procedures that facilitate transactions in all types of financial claims (securities).

Financial model A system of mathematical equations, logic, and data that describes the relationship among financial and operating variables.

Financial risk The added variability in earnings available to the firm's common shareholders, and the added chance of insolvency caused by the use of securities bearing a limited rate of return in the firm's financial structure. The use of financial leverage gives rise to financial risk.

Fisher effect An economic relation between interest rates and inflation rates. Interest rates reflect expected inflation rates.

Fixed asset turnover Sales divided by fixed assets. It is A measure of the efficiency of fixed assets management.

Fixed costs Charges that do not vary in total amount as sales volume or the quantity of output changes over some relevant range of output.

Float (1) Amount of funds represented by checks that have been issued but not yet collected. (2) Time between the deposit of checks in a bank and payment. Due to the time difference, many firms are able to "play the float." ; that is, to write checks against money not presently in the firm's bank account.

Floating rate bond or floater A bond whose rate is linked to another rate which is revised periodically.

Flotation costs The underwriter's spread and issuing costs associated with the issuance and marketing of new securities; also called *issuance or issue costs*.

Foreign bond A bond issued by a foreign company in the domestic bond market. Unlike Eurobonds, foreign bonds sold in the United States are denominated in dollars.

Foreign exchange rate The price of one nation's currency in terms of another nation's currency.

Forward premium The percentage by which the forward rate exceeds the spot rate.
Forward rate the exchange rate or price of a currency specified in a forward contract.

Free cash flow The value of a firm based on the cash flows available for distributing to any investors, both debt and equity. The free cash flows equal operating cash flows less any incremental investments made to support a firm's future growth. The value of these flows is equal to their present value.

Future value The value at a future date of an amount deposited today that grows at a given compound, or growth, rate.

Futures contract A forward contract that has a standardized contract size and delivery date. It is a contract to buy or sell a stated commodity (such as soybeans or corn) or financial claim (such as U.S. Treasury bonds) at a specified price at some future, specified time.

Futures markets Organized exchanges where futures contracts are traded.

Government bills Short-term marketable securities issued by governments.

Gross profit margin Gross profit/net sales. A ratio denoting the gross profit of the firm as a percentage of net sales.

High-yield bonds *see* JUNK BONDS.

Holding period return (HPR) The total return earned from holding an investment for a stated time period.

Holding period The time period over which an investment is held.

Horizontal merger Two firms in the same sector pooling their resources.

Hurdle rate An investment's cost of capital (*see* weighted average cost of capital) when used in comparison with the investment's internal rate of return; also called *cost of capital* or *minimum required rate of return*.

Illiquid (1) Lacking enough liquid assets, such as cash and marketable securities, to cover short-term obligations. (2) Having current liabilities exceed current assets.

Income bond A bond that requires interest payments only if earned. Failure to meet these interest payments will not result in bankruptcy.

Incremental cash flows The difference between the firm's expected cash flows if the investment is made and its expected cash flows if the investment is not undertaken; also called *differential cash flows*.

Indenture The legal agreement between the firm issuing the bonds and the bond trustee who represents the bondholders, providing the specific terms of the loan agreement.

Indirect quote A method of quoting an exchange rate that gives the number of foreign currency units per unit of domestic currency. An indirect quote for the yen in America would be the number of yen per dollar.

Initial public offering (IPO) When a firm sells equity to the public for the first time.

Insolvency A company's inability to pay debt. An analysis of insolvency concentrates on the operating and capital structure of the business. The proportion of long-term debt in the capital structure must also be considered.

Interest coverage ratio *see* TIMES-INTEREST-EARNED RATIO.

Interest-rate risk Risk arising from unexpected changes in the level of interest rates that affect the firm's future cost of debt financing. *See* FUNDING RISK.

Internal common equity Profits retained within the business for investment purposes.

Internal equity financing Refers to retained earnings, the part of a firm's profit that the firm's owners decide to invest back into their company.

Internal rate of return (IRR) A capital-budgeting technique that reflects the rate of return a project earns. Mathematically it is the discount rate that equates the present value of the inflows with the present value of the outflows.

Internally generated funds The sum of retained earnings and depreciation expenses.

Intrinsic value The present value of the investment's expected future cash flows, discounted at the investor's required rate of return.

Inventory turnover Cost of goods sold divided by ending inventories. It is a measure of the efficiency of inventory management.

Investment banker A financial specialist who underwrites and distributes new securities and advises corporate clients about raising new funds.

Investment banks Financial intermediaries that act as "middlemen" between firms wanting to issue securities to raise funds and the suppliers of capital.

Investment grade bonds Highly rated bonds (BBB and above) that can be purchased by pension funds and other institutional investors.

Investor's required rate of return The minimum rate of return necessary to attract an investor to purchase or hold a security.

Issuance or issue costs Costs incurred when issuing securities; also called *flotation costs*.

Junk bonds Any bond rated BB or below.

Just-in-time (JIT) An inventory management system in which the company buys and manufactures in small quantities Just-In-Time for use, resulting in a minimization of inventory costs.

Law of one price An equilibrium between the price of a tradable good in one country and its price in another country. Arbitrage ensures that the prices are equivalent when translated at the current exchange rate.

Letter of credit A contractual commitment by a bank to make payment for goods shipped to an importer. This eliminates the exposure of exporters to credit risk.

Leveraged buyout (LBO) A corporate restructuring where the existing shareholders sell their shares to a small group of investors. The purchasers of the stock use the firm's unused debt capacity to borrow the funds to pay for the stock.

Leveraged lease A financial lease in which the leasing company finances the purchase of the asset with a substantial level of debt, using the lease contract as collateral.

Limited partnership A partnership in which one or more of the partners has limited liability, restricted to the amount of capital he invests in the partnership.

Line of credit The maximum preapproved amount that a business may borrow.

Liquid asset Cash asset (e.g., cash or an unrestricted bank account) or readily marketable security. A liquid asset can be converted into cash in a short time without a material concession in price. Excluded from this definition are accounts receivable and inventory.

Liquid The state of having sufficient cash and near-cash assets to meet current debt.

Liquidation Process of closing a business entity, including selling or disposing of the assets, paying the liabilities, and having whatever is left over returned to the owners.

Liquidation Value. The dollar sum that could be realized if an asset were sold independently of the going concern.

Liquidity The ability of a firm to meet short-term recurrent cash obligations. *See SOLVENCY.*

Lockbox A box in a U.S. Postal Service facility, used to facilitate collection of customer remittances. The use of a lockbox reduces processing float. The recipient's local bank collects from these boxes periodically during the day and deposits the funds in the appropriate corporate account.

Long-term financing Equity plus long-term debt.

Mail float Funds tied up during the time that elapses from the moment a customer mails his remittance check until the firm begins to process it.

Market capitalization Market value of a firm's equity. Equal to its quoted price per share multiplied by the total number of shares the company has issued. Also referred to as market cap.

Market equilibrium The situation in which expected returns equal required returns.

Market risk (of a bond) Sensitivity of a bond price to changes in interest rates.

Market risk (of common stock) Sensitivity of a stock price to changes in the general market movements. *See also* BETA COEFFICIENT

Market risk premium The difference between the expected return on a portfolio of all existing common stocks and the risk-free rate. *See* CAPITAL ASSET PRICING MODEL.

Market value added (MVA) The difference between the market value of a firm's capital (equity and debt) and the amount of capital that shareholders and debtholders have invested in the firm.

Marketable securities Security investments that the firm can quickly convert into cash balances.

Market-value weights The percentage of financing provided by different capital sources, measured by the current market prices of the firm's bonds and preferred and common stock.

Merger A combination of two or more businesses into a single operational entity.

Money market Market in which firms raise short-term funds and money market instruments are issued and traded.

Money market instruments Debt securities with maturity not exceeding one year.

Money market Market for short-term (less than one year) debt securities. Examples of money-market securities include U.S. Treasury bills and commercial paper.

Money market hedge Elimination or reduction of a firm's transaction exposure by simultaneously borrowing in one currency and lending in another currency.

Mortgage bonds Bonds secured by a lien on real property.

Mutually exclusive projects A set of projects that perform essentially the same task, so that acceptance of one will necessarily mean rejection of the others.

Negative cash flow A situation in which cash inflows are less than cash outflows. This is an

unfavorable situation that may result in liquidity problems.

Negotiable certificates of deposit Marketable receipts for funds deposited in a bank for a fixed period. The deposited funds earn a fixed rate of interest. More commonly, these are called CDs.

Net assets Cash plus working capital requirement plus net fixed assets. Also, total assets less operating liabilities; also called invested capital. Not to be confused with net asset value.

Net income A figure representing the firm's profit or loss for the period. It also represents the earnings available to the firm's common and preferred stockholders.

Net operating cash flow (NOCF) The net cash flow originating from the firm's operating activities during the period under consideration (cash inflows from operations minus cash outflows from operations).

Net operating profit after tax (NOPAT) Earnings before interest and tax $\times$ (1 - Tax rate). *See* ECONOMIC VALUE ADDED.

Net present value (NPV) A capital-budgeting concept defined as the present value of the project's annual net cash flows after tax less the project's initial outlay.

Net profit margin. Net income/sales. A ratio that measures the net income of the firm as a percent of sales.

Net working capital Current assets less current liabilities.

Nominal interest rate The interest rate that a borrower will actually pay, including a premium for the rate of inflation.

Nominal value *see* FACE VALUE.

Noncurrent assets Long-lived assets that are not expected to be turned into cash within a year; also called *long-term assets*, *fixed assets*, or *capital assets*. It can be tangible or intangible assets as well as financial assets.

Nondiscretionary cash flows Cash outflows that the firm is legally obliged to meet.

Nondiversifiable risk *see* SYSTEMATIC RISK.

Note A debt security acknowledging a creditor relationship with the issuing firm and stipulating the conditions and terms under which the money was borrowed; also called *promissory notes*.

Notes payable Bank overdrafts, drawings on lines of credit, short-term promissory notes, and the portion of long-term debt due within a year.

Offer price *see* ASK PRICE.

Operating cycle Average time period between buying inventory and receiving cash proceeds from its eventual sale. It is determined by adding the number of days inventory is held and the collection period for accounts receivable.

Operating exposure Effect of changes in exchange rates on the firm's cash flows generated by future and *uncertain* transactions.

Operating lease A contractual commitment on the part of the firm leasing the asset (the lessee) to make a series of payments to the firm that actually owns the asset (the lessor) for use of the asset. An operating lease differs from a financial lease in that it can be canceled at any time after proper notice has been given to the lessor.

Operating leverage The responsiveness to sales changes of the firm's earnings before interest and taxes. This responsiveness arises from the firm's use of fixed operating costs.

Opportunity cost Loss of revenues that results from giving up an activity in order to carry out an alternative one.

Optimal capital structure The capital structure that minimizes the firm's composite cost of capital (maximizes the common stock price) for raising a given amount of funds.

Option (contracts) A contract that gives the holder the right (with no obligation) to buy (call option) or sell (put option) a fixed number of securities or a stated amount of currency, at a specified price before (American option) or on the expiration date (European option) of the option.

Option premium The market price of an option.

Overdraft (1) Negative balance in a checking account caused by payment of checks drawn against insufficient funds. (2) Situation where a borrower draws money against a previously established line of credit. The basic cost to the borrower is the interest rate levied on the daily overdraft balance.

Over-the-counter markets All security markets except the organized exchanges. The money market is an over-the-counter market. Most corporate bonds also are traded in this market.

Par value For a share of stock, an arbitrary fixed value set when shares are issued. For a bond, the fixed amount (face value) that has to be paid back to bondholders at the maturity date of the bond.

Payback period A capital-budgeting criterion defined as the number of years required to recover the initial cash investment.

Payment date The date on which the company mails a dividend check to each investor.

Percentage of sales method A financial forecasting tool involving estimating expenses for a future period as a percentage of the sales forecast.

Perpetuity An annuity with an infinite life.

Pledging accounts receivable A loan the firm obtains from a commercial bank or a finance company using its accounts receivable as collateral.

Portfolio A group of securities held in order to reduce risk by diversification.

Pre-authorized check (PAC) A check written by the payee on the payor's account and deposited on the agreed date.

Pre-authorized debit (PAD) Authorization given by the customer to the seller to routinely and automatically charge his or her account.

Preemptive right The right entitling the common shareholder to maintain his proportionate share of ownership in the firm.

Preferred stocks A security that has a priority over common stock in the payment of dividends and a prior claim on the firm's assets in the event of liquidation, but has no voting rights.

Premium (bond) The difference between the price of a bond and its face value, if the former is higher.

Present value The value in today's dollars of a future payment discounted back to present at the required rate of return.

Price/earnings ratio (P/E) The price the market places on \$1 of a firm's earnings. For example, if a firm has an earnings per share of \$2, and a stock price of \$30, its price/earnings ratio is 15 ($\$30 \div \2).

Price-to-book ratio (P/B) Share price divided by book value of equity per share.

Private placement The issuance and sale of a firm's securities directly to financial institutions and qualified investors, thus bypassing the financial markets. *See* PUBLIC OFFERING.

Pro forma statements Financial statements based on estimated, or projected, data.

Processing float Funds tied up during the time required for the firm to process remittance checks before they can be deposited in the bank.

Profit retention rate Retained earnings divided by net profit.

Profitability index (PI) The present value of an investment's expected cash-flow stream divided by the investment's initial cash outlay.

Promissory note A debt security acknowledging a creditor relationship with the issuing firm and stipulating the conditions and terms under which the money was borrowed.

Prospectus A condensed version of the full registration statement filed with the Securities and Exchange Commission that describes a new security issue.

Proxy A means of voting in which a designated party is provided with the temporary power of attorney to vote for the signee at the corporation's annual meeting.

Public offering The issuance and sale of a firm's securities to the public at large, not only to its existing shareholders.

Public Company Accounting Oversight Board (PCAOB) (www.pcaobus.com) Established in 2002 as a result of the Sarbanes-Oxley Act, a private sector, non-profit corporation set up to oversee the audits of public companies and ensure that accountancy firms should no longer derive non-audit revenue streams, such as consultancy, from their audit clients.

Quick asset Current asset that can be converted into cash in a short time. Examples are cash, marketable securities, and accounts receivable. Certain current assets, such as inventory and prepaid expenses, are excluded.

Quick ratio Quick assets divided by current liabilities, also called *acid test*. It is a measure of liquidity.

Real interest rate The interest rate adjusted for changes in the cost of living. See NOMINAL INTEREST RATE.

Refunding The process of replacing an old debt issue with the sale of new debt.

Registration statement A lengthy document filed with the Securities and Exchange Commission containing pertinent facts about a firm planning to sell new securities.

Remote disbursing A cash management service specifically designed to extend disbursing float.

Reorganization A procedure, administered by the courts, that attempts to revitalize a firm by changing its operating procedures and capital structure.

Repurchase agreements Legal contracts that involve the sale of short-term securities by a borrower to a lender of funds. The borrower commits to repurchase the securities at a later date at the contract price plus a stated interest charge.

Reserves The accumulation of retained earnings since the creation of the firm.

Residual Income Net income less the minimum return on total assets.

Restrictive covenants Provisions in the loan agreement that place restrictions on the borrower and make the loan immediately payable and due when violated. These restrictive covenants are designed to maintain the borrower's financial condition on a par with that which existed at the time the loan was made.

Restructuring plan Changes in a firm's assets or financing structures to improve its performance.

Restructuring The rearrangement of a company's organization to reduce costs and improve efficiency, resulting in a reduction of shares outstanding.

Retail lockbox a lockbox that collects numerous small-dollar remittances from consumers.

Retained earnings The part of a firm's profit that owners decide to invest back into their company.

Retention rate Retained earnings divided by earnings after tax (EAT).

Return on assets (ROA) Earnings after tax (EAT) divided by total assets. It is a measure of profitability.

Return on equity (ROE) Earnings after tax (EAT) divided by owners' equity. A measure of the firm's profitability to shareholders.

Return on invested capital (ROIC) Net operating profit after tax (NOPAT or $EBIT \times (1 - \text{Tax rate})$) divided by invested capital (cash plus working capital requirement plus net fixed assets). Same as return on net assets (RONA). Equal to return on capital employed (ROCE). Can also be measured before tax by replacing $EBIT \times (1 - \text{Tax rate})$ with EBIT. It is a measure of operating profitability.

Return on investment (ROI) A general measure of profitability that refers to the ratio of a measure of profit to a measure of the investment required to generate that profit.

Revolving credit agreement An understanding between the borrower and the bank as to the amount of credit the bank will be legally obligated to provide the borrower. *See* LINE OF CREDIT.

Right A certificate issued to common stockholders giving them an option to purchase a stated number of new shares at a specified price during a two- to ten-week period.

Rights offering Offering of a firm's common stocks exclusively to its existing stockholders.

Rights-on shares Shares for which rights were issued and which are traded with their rights attached.

Risk (1) A term used to describe a situation in which a firm makes an investment that requires a known cash outlay without knowing the exact future cash flow the decision will generate. (2) The chance of losing money. (3) The possible variation associated with the expected return measured by the standard deviation or coefficient of variation.

Risk averse (investors) Investors who would buy shares of firms with riskier projects only if they expect to earn a higher return to compensate them for the higher risk they have to bear.

Risk premium The difference between the expected return on a security and the risk-free rate. *See also* CAPITAL ASSET PRICING MODEL.

Risk-adjusted discount rate A method for incorporating the project's level of risk into the capital budgeting process, in which the discount rate is adjusted upward to compensate for higher-than-normal risk or downward to compensate for lower-than-normal risk.

Risk-free rate The rate of return of a risk-free asset, usually government securities; also called *riskless rate of return*.

Sale and leaseback Arrangement. An arrangement arising when a firm sells land, buildings, or equipment that it already owns and simultaneously enters into an agreement to lease the property back for a specified period, under specific terms.

Salvage value The resale, or scrap, value of an asset at the end of its useful life; also called *residual value* or *disposal value*.

Sarbanes-Oxley (SOX) Act Wide-ranging U.S. corporate reform legislation, coauthored by the Democrat in charge of the Senate Banking Committee, Paul Sarbanes, and Republican Congressman Michael Oxley. It is legislation to ensure internal controls or rules to govern the creation and documentation of corporate information in financial statements. It establishes new standards for corporate accountability and penalties for corporate wrongdoing.

Seasoned issue When a firm returns to the market after an initial public offering for another issue of equity.

Secondary market Transactions in currently outstanding securities. This is distinguished from the new issues or primary market.

Secured bond A bond for which the issuer has provided collateral to the lender.

Secured credit Sources of credit that require security in the form of pledged assets. In the event the borrower defaults in payment of principal or interest the lender can seize the pledged assets and sell them to settle the debt.

Securities and Exchange Commission (SEC) (www.sec.gov) A federal agency created by the Securities Exchange Act of 1934 to protect investors from dangerous or illegal financial practices or fraud by requiring full and accurate financial disclosure by companies offering stocks, bonds, mutual funds, and other securities to the public. It is the chief regulator of the U.S. securities market and overseer of the nation's stock exchanges, broker-dealers, investment advisors, and mutual funds.

Security market line (SML) A straight line that relates the expected returns on risky investments to their corresponding risk measured by the beta coefficient *See also* THE CAPITAL ASSET PRICING MODEL.

Segment margin Contribution margin less direct (traceable) fixed costs.

Segmental reporting The presentation of financial information, such as profitability, by a major business segment, including the product, major customer, division, department, and responsibility centers within the department.

Self-liquidating loans Short-term bank loans to firms that need to finance the seasonal buildup in their working capital investment and that bankers expect the firm to repay with the cash that will be released by the subsequent reduction in working capital.

Self-sustainable growth rate (SGR) The fastest growth rate a firm can achieve by retaining a constant percentage of its profit, keeping both its operating and financing policies unchanged, and not issuing new equity. It is Equal to the profit retention rate multiplied by return on equity; also called *sustainable growth rate*.

Sell-off The sale of a subsidiary, division, or product line by one company to another.

Senior bond/debt/loan A bond/debt/loan that has a claim on the firm's assets (in the event of liquidation) that precedes the claim of junior or subordinated debt

Settlement date (currency trading) The date at which the delivery of the currencies takes place.

Settlement price (for currency futures contracts) The quote of the last trade of the day for a currency futures that is marked-to-market.

Share buy-back program The buying by a firm of its own shares for the purpose of reducing the number of shares outstanding; also called *share repurchase program*. The opposite of a new issue of shares.

Share repurchase program *see* SHARE BUY-BACK PROGRAM.

Sinking fund provision Requires that a bond issuing firm set aside cash in a special account according to a regular schedule in order to allow the firm to redeem the bond at maturity.

Sinking fund A required annual payment that allows for the periodic retirement of debt.

Solvency A firm's ability to meet its long-term cash obligations.

Sovereign risk Variability in the value of a foreign firm or investment that results from uncertainty about future government action. It is also called political or country risk.

Spin-off The separation of a subsidiary from its parent, with no change in the equity ownership. The management of the parent company gives up operating control over the subsidiary, but the shareholders maintain their same percentage ownership in both firms. New shares representing ownership in the averted company are issued to the original shareholders on a pro-rata basis.

Spontaneous financing. The trade credit and other accounts payable that arise "spontaneously" in the firm's day-to-day operations.

Spot rate The price at which a currency can be purchased or sold and then delivered within two business days.

Spread (in underwriting) The difference between the price at which an issue is sold to the public and the price paid by the underwriter to the issuing firm.

Stock dividend A distribution of shares of up to 25 percent of the number of shares currently outstanding, issued on a pro-rata basis to the current stockholders.

Stock split A stock dividend exceeding 25 percent of the number of shares currently outstanding.

Stock repurchases The repurchase of common stock by the issuing firm for any of a variety of reasons resulting in a reduction of shares outstanding.

Subscription price The price for which the security may be purchased in a rights offering.

Standby fee Fee received by investment banks for underwriting the unsold portion of a rights issue.

Stated value An arbitrary fixed value attached to each share of common stock when it is issued.

Statement of cash flows Financial statement, such as FASB Standard 95, that provides information about the cash transactions between the firm and the outside world by separating these transactions into cash flows related to operating, investing, and financing activities. *See* CASH FLOW STATEMENT.

Stock dividend A distribution of shares of up to 25 percent of the number of shares currently outstanding, issued on a pro-rata basis to the current stockholders.

Strike price *see* EXERCISE PRICE.

Sustainable growth rate *see* SELF-SUSTAINABLE GROWTH RATE.

Systematic risk Risk that remains despite the risk-reduction property of diversification. Measured with the beta coefficient ; also called *market risk*, *nondiversifiable*, or *undiversifiable risk*. *See also* CAPITAL ASSET PRICING MODEL.

Takeover Transaction involving one firm that wants to acquire all or a portion of another

Target balance Average collected balance to be maintained at the bank to compensate it for services provided to the small business.

Target capital structure The debt-to-equity ratio that maximizes the market value of the firm's assets .

Target debt ratio. A desired proportion of long-term debt in the firm's capital structure. Alternatively, it may be the desired proportion of total debt in the firm's financial structure.

Target firm The firm whose shares the bidder is trying to acquire in a takeover.

Technical insolvency. Situation in which the firm can no longer honor its financial obligations. Although its assets may exceed its total liabilities, thereby indicating a positive net worth, the company simply does not have sufficient liquidity to pay its debts.

Technically bankrupt A firm that is no longer able to pay its creditors.

Temporary financing Financing (other than spontaneous sources) that will be repaid within a period of one year or less. Included among these sources of short-term debt are secured and unsecured bank loans, commercial paper, loans secured by accounts receivable, and loans secured by inventories.

Tender offer A bid by an interested party, usually a corporation, for controlling interest in another corporation.

Term loan Immediate- to long-term secured loan granted to a business by a commercial bank, insurance company, or commercial finance company, usually to finance capital equipment or provide working capital. The loan is amortized over a fixed period.

Term structure of interest rates The relationship between interest rates and the term to maturity, where the risk of default is held constant.

Terminal cash flow Cash flow that occurs in the last year of a project.

Tight money A situation in which fewer funds are made available to borrowers by lending institutions and creditors. If available, the loans carry higher interest rates.

Time deposit Savings account at a financial institution that earns interest but is not legally subject to withdrawal on demand or transfer by check. The depositor can withdraw only by giving notice.

Time value of money value of money at different time periods. As a rule, one dollar today is worth more than one dollar tomorrow. The time value of money is a critical consideration in financial decisions.

Times interest earned ratio Earnings before interest and taxes (EBIT)/interest expense. A ratio that measures the firm's ability to meet its interest payments from its annual operating earnings.

Total leverage A measure of total risk, referring to how earnings per share is affected by a change in sales. It equals the percentage change in earnings per share divided by the percentage change in sales. Total leverage at a given level of sales is the operating leverage multiplied by the financial leverage.

Trade credit Credit made available by a firm's suppliers in conjunction with the acquisition of materials. Trade credit appears on the balance sheet as accounts payable.

Transit float Funds tied up during the time necessary for a deposited check to clear through the commercial banking system and become usable funds to the company.

Transparency Providing complete information about a firm's operations and future prospects to its (outside) shareholders.

Treasury bill Short-term obligation of the federal government, commonly called T-bill. Treasury bills carry no coupon but are sold on a discount basis. Denominations range from \$10,000 to \$1 million. The yields on T-bills are lower than those on any other marketable securities due to their virtually risk-free nature.

Treasury stock The amount that a firm has spent to repurchase its own shares up to the date of the balance sheet.

Trust/Trustee A third party (usually a financial institution) that makes sure the issuer of a bond meets all the conditions and provisions reported in the bond's indenture.

Truth-in-Lending Act A federal law protecting credit purchases. The most important provision is the requirement that both the dollar amount of finance charges and the annual percentage rate

charged be disclosed.

Underwriter Investment bank that buys the securities a firm wants to issue and then resells them to the public at a higher price.

Underwriting When an investment bank buys the securities a firm wants to issue.

Underwriting syndicate A group of investment banks jointly underwriting an issue.

Underwriting The purchase and subsequent resale of a new security issue. The risk of selling the new issue at a satisfactory (profitable) price is assumed by the investment banker.

Undiversifiable risk The portion of the variation in investment returns that cannot be eliminated through investor diversification.

Unsecured loan a loan on which no collateral is required.

Unsystematic risk The portion of the variation in investment returns that can be eliminated through investor diversification. These variations result from factors that are unique to the particular firm.

Venture capital A financing source for new businesses or turnaround ventures that usually combine much risk with potential for high return.

Venture capital firm An investment firm specializing in the financing of small and new ventures.

Venture capitalists Investors interested in supplying capital to particularly high-risk situations, such as start-ups or firms denied conventional financing.

Vertical merger For example, the integration of a car manufacturer with its major supplier or its major distributor.

Volatility Unpredictable fluctuations in the market price of an asset.

Warrant An option to purchase a fixed number of shares of common stock at a predetermined price during a specified time period.

Weighted cost of capital A composite of the individual costs of financing incurred by each capital source. A firm's weighted cost of capital is a function of (1) the individual costs of capital, (2) the capital structure mix, and (3) the level of financing necessary to make the investment.

Working capital A concept traditionally defined as a firm's investment in current assets. Net working capital refers to the difference between current assets and current liabilities

Yankee bond A bond that is denominated in dollars and sold in the United States by foreign firms.

Yield spread The difference between the market yield on a nongovernment bond and the yield on a government bond with the same maturity and currency denomination.

Yield to maturity The rate that makes the bond price equal to the present value of the bond's future cash-flow stream.

Zero-coupon bond A bond with no coupon payments that is sold at an original discount from face value.